

Interest, Learning, and Motivation

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Recent research related to the concept of interest is reviewed. It is argued that current constructs of motivation fail to include crucial aspects of the meaning of interest emphasized by classical American and German educational theorists. In contrast with many contemporary concepts (e.g., intrinsic learning orientation), interest is defined as a content-specific motivational characteristic composed of intrinsic feeling-related and value-related valences. Results from a number of studies are presented that indicate the importance of interest for the depth of text comprehension, the use of learning strategies, and the quality of the emotional experience while learning. The implications of these results and possible directions for future research are discussed.

A SHORT HISTORY OF THE CONCEPT OF INTEREST

To many psychologists, *interest* is a vague, everyday term that denotes a personal characteristic or an affective state and that has already been thoroughly investigated by modern motivational psychology. Specifically, it seems as if interest is nothing more than the lay term for intrinsic motivation. There is some reason to believe, however, that intrinsic motivation research does not capture all of the essential aspects of interest. Contemporary motivational research has clearly neglected some aspects of interest that are highly significant from theoretical and educational points of view.

It is also interesting to note that leading intrinsic motivation theorists (e.g., Deci, in press; Deci & Ryan, 1985) often employ the term. For example, Deci and Ryan (1985) ascribed to interest "an important directive role in intrinsically motivated behavior in that people naturally approach

activities that interest them" (p. 34). In view of the significance attributed to interest, it is surprising that many authors do not bother to clarify their understanding of the term.

The concept of interest has a long tradition in psychology that can be traced back to Herbart (1806/1965, 1841/1965), one of the early pioneers of modern psychology. He regarded the development of unspecialized, multifaceted interest as one of the primary goals of education. In Herbart's view, interest is closely related to learning. It allows for correct and complete recognition of an object, leads to meaningful learning, promotes long-term storage of knowledge, and provides motivation for further learning. Herbart's work was later continued by, among others, Kerschensteiner (1922) and Lunk (1926, 1927).

In the United States, Dewey (1913, 1933, 1938) stands out as a forerunner of modern interest research. In his brilliant book *Interest and Effort in Education* (1913), he distinguished between interest-oriented learning and learning that neglects a student's interests and is based on coercion. According to Dewey, external attempts to make something interesting lead to only temporary effort and do not result in identification with the material. Consequently, he dismissed instructional efforts that take place without regard to the material to be learned. In his opinion, the results of interest-based learning differ qualitatively from the results of learning based only on effort. Effort-based learning is mechanical and results in trained knowledge and habits lacking any mental purpose or worth. Dewey postulated three basic characteristics of interest: (a) It is an active, "propulsive" state; (b) it is based on real objects; and (c) it has high personal meaning.

The concept of interest was also crucial to the pioneering work of James (1890/1950). As Rathunde (in press) pointed out, James and Dewey share remarkable similarities, in terms of both the importance of the experience of interest and the psychological dynamics that generate it. James considered interest to be a central directive force in the human mind:

Millions of items of the outward order are present to my senses which never properly enter into my experience. Why? Because they have no *interest* for me. *My experience is what I agree to attend to.* Only those items which I notice shape my mind — without selective interest, experience is an utter chaos. (1890/1950, p. 402)

In addition to selective interest, James hypothesized another form of interest — momentary interest. This form of interest is impulsive, or habitual, in the sense that one naturally attends to something, whereas selective interest is willed, or effortful. The latter can avert the spontaneous drift of attention and hold an object in mind until it becomes clear and distinct (Rathunde, in press).

Although James put great emphasis on interest, he did not develop a theory of interest. Consequently, Dewey's work must be recognized as being most relevant for modern conceptualizations of interest. Its significance is also reflected by the fact that Kerschensteiner (1922) integrated Dewey's theory into his own work, which was influenced mainly by Herbart.

With the onset of behaviorism, the concept of interest lost its influence in psychology and education. Among the survivors of interest research were some scattered studies (e.g., Bernstein, 1955; Travers, 1978), isolated theoretical papers (e.g., Eagle, 1981; Kirkland, 1976), and approaches toward the measurement of occupational interests, a research tradition within personality psychology that regards interests as enduring personal traits (e.g., Walsh & Osipow, 1986). In addition, interest-related research issues were partially integrated into theories of intrinsic motivation (e.g., Berlyne, 1949, 1960).

In Germany, the revival of interest as an educationally relevant motivational concept in its own right was initiated by H. Schiefele (1974) in his book *Lernmotivation und Motivlernen (Motivation to Learn and Acquisition of Motives)*. The first explicit programmatic statement was published in 1979 by H. Schiefele, Hausser, and Schneider. These authors argued that the prevailing concepts of achievement motivation (e.g., Heckhausen, 1989; Weiner, 1980) were insufficient from an educational point of view because they implied that the best form of motivation a student can have is to strive for high performance, no matter in what area. In general, researchers of achievement motivation have overlooked the content to be learned. Specific emphasis on student performance neglects the possibility that students come to like their subjects and learn because they value the process of being engaged in certain fields of knowledge (see similar arguments by Brophy, 1983; Deci & Ryan, 1985; Dweck, 1986; Ryan, Connell, & Deci, 1985).

The concept of interest presented here has the following features that are not shared by most contemporary motivational theories:

1. Interest is a content-specific concept. It is always related to specific topics, tasks, or activities.
2. Interest is a directive force. It is able to explain students' choice of an area in which they strive for high levels of performance or exhibit intrinsic motivation.
3. Interest plays an important role as an explanatory factor in the subjective theories of teachers and educators (Krapp, 1989).
4. Interest consists of valences attached to a topic or activity (this is discussed later). It may be either enduring or short lived, and either general (involving many similar areas) or specific. Interest is not a personality trait like other motives of behavior (e.g., achievement motive).
5. When understood as a content-specific concept, interest fits well with

modern cognitive theories of knowledge acquisition, in that new information is always acquired in particular domains. The use of specific cognitive factors, such as prior knowledge or domain-specific learning strategies, should be supplemented by the inclusion of equally specific motivational factors.

6. Subject-matter-specific interest is probably more amenable to instructional influence than are general motives or motivational orientations.

The first period of interest research, as initiated by Schiefele, involved primarily work on theoretical issues (for reviews, see Prenzel, 1988; H. Schiefele, Krapp, Prenzel, Heiland, & Kasten, 1983). Later, an increasing number of empirical investigations followed (see overview by Krapp, 1989). These studies investigated the development of preschool interests (e.g., Fink, in press; Krapp & Fink, in press), literary interests in high school (H. Schiefele & Stocker, 1990), and the persistence of interest (Prenzel, in press). My own work focuses on the relations among interest, text comprehension, learning strategies, and the quality of experience.

A DEFINITION OF INTEREST

Researchers studying interest have focused on two different conceptions (see Hidi, 1990; Hidi & Baird, 1988; Renninger, Hidi, & Krapp, in press): individual and situational interest. Individual interest is conceived of as a relatively enduring preference for certain topics, subject areas, or activities (e.g., Hidi, 1990; Prenzel, 1988; Renninger, 1990; Renninger & Wozniak, 1985; U. Schiefele, 1990, in press-b), whereas situational interest is an emotional state brought about by situational stimuli (e.g., Anderson, Shirey, Wilson, & Fielding, 1987; Hidi, 1990; Hidi & Baird, 1986, 1988; Kintsch, 1980; Schank, 1979). The latter approach is concerned mainly with the identification of stimulus characteristics that arouse interest and the effects of interestingness of text material on comprehension.

The focus of this article is on individual interest. It is useful to distinguish between two forms of individual interest: interest as a latent characteristic and as an actualized characteristic.

Individual Interest as a Latent Characteristic

Individual interest is interpreted here as the relatively long-term orientation of an individual toward a type of object, an activity, or an area of knowledge (H. Schiefele et al., 1983). I (U. Schiefele, in press-b) identified two components of interest: feeling-related and value-related valences (see Table 1). *Feeling-related valences* refer to the feelings that are associated

TABLE 1
Definition of Individual Interest

<i>Feeling-Related Component</i>	<i>Value-Related Component</i>
Association of an object or object-related activity with positive feelings, especially enjoyment and involvement (feeling-related intrinsic valences of an object)	Attribution of personal significance to an object (value-related intrinsic valences of an object)

with a topic or an object. Presumably, feelings of enjoyment and involvement are most typical of interest. *Value-related valences* refer to the attribution of personal significance to an object. Personal significance may be ascribed to an object (or subject area) for a wide variety of reasons, such as its contribution to one's personality development, competence, or understanding of important problems. Although these two components correlate highly with one another, it seems justified to distinguish between them. On the one hand, it is likely that people differ with regard to the emphasis they put on the experiencing of feelings, or on attributions of personal significance, when they are interested in a certain subject area. On the other hand, presumably some objects of interest are preferred because involvement with them creates strong feelings of excitement, whereas other objects are preferred mainly because of the high personal meaning they have for many people.

A third essential feature of interest is its intrinsic character. In text learning, for example, this means that the reader should be involved in a topic for its own sake and not for any external reason (e.g., passing an exam or positive self-evaluation). The feeling- and value-related valences can therefore be described more precisely as intrinsic feeling- and value-related valences. To measure interest, then, the topic valences involved must relate directly to the topic (or to reading a text on a certain topic) and not to events that are external to the topic.¹

Actualized Individual Interest

Actualized interest is best described as a content-specific intrinsic motivational orientation (see also Nenniger, in press). Basically, this means that a person in a state of being interested in a certain topic wants to learn about

¹Note that Pintrich's (1989, Pintrich & De Groot, 1990) definition of "task value" is similar to the conception of interest presented here. Task value includes three components: interest (operationalized as liking and interest felt for subject matter), importance, and utility.

(or become involved with) that topic for its own sake. Using the concepts of Nicholls, Patashnick, and Nolen (1985) and Dweck (1986), one could say that the interested person adopts a task or learning orientation (as opposed to an ego or performance orientation) toward a specific topic. It should be noted that the concepts of task and learning orientation are usually defined as general orientations toward learning material in school. Accordingly, they imply that some students simply enjoy learning and improving their skills, whether the subject matter is English or chemistry. In contrast, the interest concept is based on the idea that people develop specific relationships with different subject areas. It enables us to acknowledge the fact that, for example, some students are motivated to learn mathematics although they intensely dislike learning a foreign language or chemistry. This view is supported by Gottfried's (1985, 1990) finding that academic intrinsic motivation is differentiated into school subject areas. Similarly, other researchers have adapted general measures of motivational orientation to assess subject- or task-specific orientations (e.g., Boekaerts, 1986; Nolen, 1988; Pintrich & De Groot, 1990).

General motivational orientations and specific interests are not mutually exclusive, however. It seems plausible to assume that a person has both a general orientation toward academic tasks and content-specific interests (Brophy, 1983; Gottfried, 1985). It is assumed that both general orientations and individual interests determine the strength and nature of the motivational orientation a student adopts in a specific situation involving learning a specific content. However, interest is expected to be more predictive of specific motivational orientations, and therefore, of outcomes of specific learning processes.

CONSEQUENCES OF INTEREST

Empirical findings are available that highlight the significance of interest for a number of different aspects of learning: the quality of learning results, the use of learning strategies, and the quality of the learning experience. A hypothetical model of causal relations that attempts to integrate the reported findings is presented.

The Quality of Learning Results

One of the most interesting and relevant educational research problems is to determine the relation between motivation and learning (Lepper, 1988; Paris, Olson, & Stevenson, 1983; Pintrich, 1989). From the viewpoint of a theory of interest, the foremost task would seem to be the investigation of the effects of interest on the quality of learning results. As already

indicated, the relation between interest and learning was at the heart of all earlier interest theories.

The area of text learning was chosen as an appropriate experimental context because it is one of the dominant fields within cognitive psychology and a tradition of research on the effects of topic interest on text comprehension has already been established (e.g., Asher, 1980; Renninger et al., in press). It has been maintained that interest is less important for the retention of single facts or details than for understanding the meaning of a text, for relating different parts of a text to one another, or for the quality of inferential and elaborative processes (e.g., Bernstein, 1955; Dewey, 1913; Johnson & Jacobson, 1968; Stevens, 1979). However, such studies have failed to yield conclusive evidence for this hypothesis. Instead, they have usually relied on one-dimensional quantitative indicators of comprehension.

In order to compensate for this deficit, four studies were designed to compare high-interest and low-interest students with regard to different indicators of comprehension intended to reflect varying degrees of depth of processing (U. Schiefele, 1990, 1991, in press-b; U. Schiefele & Krapp, 1991). In each study, subjects were asked to read a text and then complete a test of comprehension. In addition, in all studies measures of intelligence and prior knowledge were used as control variables. Thus it was possible to examine the independent contribution of interest. The four studies differed mainly with respect to the type of comprehension test used (open-ended questions, free recall, or recognition test).

In Study 1 (U. Schiefele, 1990, in press-b), 53 male university students were assigned to either a high-topic-interest or a low-topic-interest group on the basis of a questionnaire. This questionnaire assessed intrinsic feeling-related and value-related valences. The feeling-related valences were operationalized as the expectation of experiencing certain feelings while reading the experimental text. Subjects were asked to use the following adjectives in estimating their expected feelings in response to the question "While reading the text on — — — I expect to feel": "bored," "stimulated," "interested," "indifferent," "involved," and "engaged." When estimating value-related valences, subjects were asked to use the terms: "meaningful," "unimportant," "useful," and "worthless" to describe the value of the text's topic to them personally. Individual scores of topic interest were computed by adding the average scores for the two components. The subjects were then asked to read a text entitled "Emotion." The text was five pages long and ecologically valid in that it was based on chapters from actual psychology textbooks. Subjects were told that they would later be asked to evaluate the text. After reading the text, subjects were given a comprehension test consisting of 12 open-ended questions, designed to distinguish among three different levels of understanding. Accordingly, the test

included three types of questions: six simple questions (requiring recall of concrete details stated explicitly in the text), three complex questions (requiring recall of groupings of facts or relations between facts), and three deeper comprehension questions (requiring the subject to recombine or to compare various aspects of the text and to apply the information contained in the text to a novel situation).

The results showed a significant main effect for interest in a 2×3 (High vs. Low Interest \times Simple vs. Complex vs. Deep Comprehension questions) analysis of variance (ANOVA; $p < .005$). Planned comparisons revealed, however, that interest influenced significantly only answers to the complex ($p < .05$) and deep comprehension questions ($p < .001$). Although high-interest subjects showed a (nonsignificant) tendency to recall more details, as required by the simple questions, the overall pattern of results confirms the hypothesis that interest exerts greater influence at deeper levels of comprehension. Taking into account prior knowledge and intelligence did not weaken the effect of interest.

In Study 2 (U. Schiefele & Krapp, 1991), we used a different text (entitled "Communication") of about the same length as that used in Study 1. This time, however, the subjects (81 male university students) were asked to freely recall the whole text as completely as possible. Several dependent variables were used to examine the effect of interest on comprehension: the number of completely, incompletely, and falsely recalled propositions; the number of new propositions (i.e., inferred propositions that are correct but not explicitly stated in the text); the number of completely and incompletely recalled main ideas; and the degree of coherence of the recall protocol (i.e., the extent to which the subjects recalled propositions, or main ideas, in the same sequence as they appeared in the original text).

The results showed significant ($p < .01$) correlations between interest and the total number of recalled propositions ($r = .30$) and main ideas ($r = .31$). A detailed analysis, however, revealed that interest was related significantly only to recall of complete propositions ($r = .24$, $p < .05$), new propositions ($r = .37$, $p < .001$), and complete main ideas ($r = .34$, $p < .01$), and not to recall of incomplete ($r = .17$, ns) or wrong propositions ($r = -.02$, ns), or incomplete main ideas ($r = .16$, ns). In addition, interest affected significantly the coherence of recall of propositions ($r = .22$, $p < .05$) and main ideas ($r = .41$, $p < .001$). Thus interest did not simply enhance the quantity of recalled textual information. Instead, significant relations between interest and recall were obtained only for those measures of recall that indicated a deeper level of processing (e.g., production of inferences, number of main ideas, and coherence).

On the basis of the results of Studies 1 and 2 it seems justified to assume that high-interest subjects, as compared with low-interest subjects, engage

in a more intensive and meaning-oriented processing of a text. They produce more inferences, recall a greater number of main ideas important for an adequate understanding of the text, and (consequently) are better at answering complex questions and applying their acquired text knowledge to new situations. It is noteworthy that similar results were obtained by Benware and Deci (1984) and Grolnick and Ryan (1987), who compared intrinsically versus extrinsically oriented students, and by Golan and Graham (1990), who compared task- versus ego-oriented students.

An important limitation of Studies 1 and 2 is the type of comprehension test used. In relying on recall data, it was not possible to determine with certainty that highly interested learners actually engaged in a different mode of text processing. The alternative explanation that a retrieval effect was measured, whereby the observed differences arose not during processing of the text but rather during the recall phase, cannot be ruled out. It could be argued that less interested subjects were also capable of answering the deeper comprehension questions, but were simply not motivated to work hard on the recall tasks.

The text-processing theory of van Dijk and Kintsch (1983; Kintsch, 1986) seemed the most adequate for the purpose of constructing a theoretically well-founded test of differences in text processing. The theory differentiates between various text representations that are formed during text reading. Van Dijk and Kintsch distinguished between the representation of a text and the representation of the situation that the text describes (situation model). Knowledge contained in the situation model is not dependent on the text, and can also be derived from other sources (e.g., learning by doing). The situation model is distinguished from two forms of text-bound representation—the verbatim and the propositional representations—that together form the "text basis." The propositional text basis consists of both a microstructure, which contains the meaning of the text, and a macrostructure, which represents the gist of the text. The verbatim text representation is even more closely bound to the text than the propositional, and contains the representation of the text's surface structure. The strength of the different types of text representation is usually determined by means of sentence recognition tests (e.g., Kintsch, Welsh, Schmalhofer, & Zimny, 1990; Schmalhofer & Glavanov, 1986).

It was hypothesized that highly interested readers would build propositional and situational text representations to a greater extent than less interested readers. On the other hand, students with low interest would acquire mainly a verbatim comprehension of a text.

Two studies were conducted using a recognition paradigm in order to test comprehension. One study, Study 3 (U. Schiefele, in press-a; in press-b), was conducted with a similar sample as in the first two studies (German

male university students), whereas the other study, Study 4 (U. Schiefele, 1991), was carried out in the United States and included female and male senior high school students as subjects. Study 4 is of interest here.

Study 4 included two different texts, one entitled "Prehistoric People" and the other entitled "Television."² Both texts were read by the same group of students. Both texts were about seven pages long, of the same level of difficulty (10th grade), and adapted from chapters of the *World Book Encyclopedia* (1989). The recognition tests were composed of original (O), paraphrased (P), meaning-changed (M), and correctness-changed (C) sentences. M sentences contained correct and reasonable inferences from the text, which could be recognized as correct only on the basis of the situation model. C sentences contradicted the corresponding original sentences and were wrong in terms of the situation model.

The strength of the individual text representations was calculated by using d' values, which are a measure of the discriminability of two response distributions. The strength of the verbatim representation was determined by the difference between the number of "yes" answers for the O sentences ("hit rate") and the number of "yes" answers for the P sentences ("false alarm rate"). The strength of the propositional representation was determined by the difference between the hit rate for the P sentences and the false alarm rate for the M sentences. Finally, the extent of the situational representation was determined by the difference between the hit rate for the M sentences and the false alarm rate for the C sentences.

For both texts, strong evidence was found that low-interest subjects had a more pronounced verbatim representation and less pronounced propositional and situational text representations than did high-interest subjects. Figure 1 shows the results from Study 4. These results pertain to the text on prehistoric people.

Whereas there were significant differences between high- and low-interest subjects with regard to the verbatim (planned comparison, $p < .01$) and the propositional ($p < .05$) representations, only a marginally significant ($p < .10$) difference was obtained for the situational representation. Similar results were found for the text on television and in Study 3. Therefore, it can be concluded that the differences between high- and low-interest subjects were quite consistent. It should be noted that, for the text on prehistoric people, a significant effect of interest on the strength of the situational representation was obtained after controlling for scholastic ability (as measured by the Preliminary Scholastic Aptitude Test [PSAT]). This result could not, however, be replicated for the text on television. In both Study 4 and Study 3, controlling for prior knowledge and ability

²I thank Mihaly Csikszentmihalyi for his help in selecting appropriate topics and developing the recognition tests.

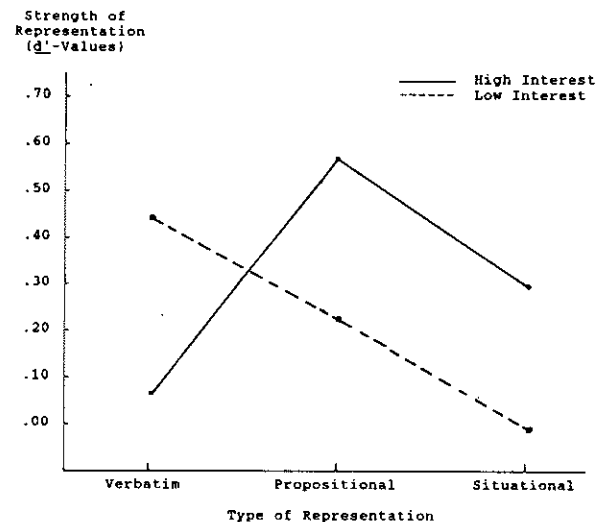


FIGURE 1 The strength of the verbatim, propositional, and situational text representations as a function of topic interest (Study 4).

(measured by the PSAT or an intelligence test) did not reduce the interest effect. Prior knowledge generally had weak or nonsignificant effects; ability exerted a strong impact on comprehension. Highly able students achieved higher scores on all three types of representation than did less able students.

To summarize, significant differences between high- and low-interest subjects were consistently found only for verbatim and propositional representations. There was no clear evidence that interest affected the situational representation of the text. A possible reason for the ambiguity of these results might be a lack of validity for the recognition test, especially with regard to the M sentences. Their construction was somewhat problematic because no straightforward guidelines for constructing them were available. On the other hand, level of ability significantly influenced the strength of the situational representation, suggesting that the formation of a situation model is more dependent on general capabilities than on interest. More studies are needed to allow a choice between alternative explanations.

Studies 1, 2, and 4 provide evidence for the importance of topic-specific interest for the comprehension of learning material. It was shown that interest did not simply enhance the quantity of recalled text information, but had different effects on different indicators of comprehension. Specifically, the results suggest that interest motivates the reader to go beyond the text's surface and to try to understand its meaning and main ideas. The efforts of the interested reader are obviously not aimed only at memorizing

the text but at drawing inferences and relating different parts of the text to one another.

The Use of Learning Strategies

In looking at the relation between interest and learning outcomes, we have neglected important aspects of the learning process itself: the strategies and thought processes of the learner. Of course, the fact that high-interest readers tend to process the meaning of a text more fully than low-interest readers gives insight into the process of learning. As we have seen, high-interest readers process the text in a way that reflects their search for meaning. However, meaning-oriented processing is not the only means that can be used to improve one's learning. An increasing body of research (e.g., Schmeck, 1988; Zimmerman & Schunk, 1989) investigates a wide variety of strategies that are (or should be) used by efficient and successful learners. One important and often replicated finding is that, although many students know much about learning strategies, they rarely use them. Among the motivational factors that have been shown to influence the use of learning strategies are self-efficacy and task-orientation (Brown, 1988; Nolen, 1988; Pintrich, 1988, 1989; Pokay & Blumenfeld, 1990; Zimmerman & Martinez-Pons, 1990). In this section, studies are reported in which the hypothesis that interest influences the use of learning strategies was tested.

Two different sets of empirical data shed some light on the relation between interest and use of learning strategies. The first set of data is based on Studies 1 through 3, in which indicators of learning strategies (i.e., underlining and note taking) and elaborative inferences were assessed. The second set of empirical data stems from a large-scale questionnaire study (U. Schiefele, Winteler, & Krapp, 1991), Study 5, in which the relations between study interest (i.e., interest in one's major), other motivational variables, and use of learning strategies were investigated.

In Study 5, interest was measured by three subscales. The first subscale assessed feeling-related valences (e.g., "Working with a particular subject matter puts me in a good mood"). The second subscale involved value-related valences (e.g., "It was of great personal importance to me to be able to study this particular major"). The third subscale assessed the intrinsic nature of study-related activities (e.g., "Without outside pressure I probably wouldn't spend so much time working on problems or subject matter in my major"). A number of other scales asked about learning strategies. In accordance with Pintrich (1988, 1989), Zimmerman and Martinez-Pons (1986), and Weinstein (1988), we distinguished among the following strategies: rehearsal (e.g., "Before exams, I memorize text passages or my lecture notes"), elaboration (e.g., "I learn new material by imagining concrete examples"), organization (e.g., "When I prepare myself for an

exam, I make an outline of the material"), information seeking (e.g., "When I can't understand something, I look for additional information to gain more clarity"), time management (e.g., "I have determined the time spent daily for learning by a time schedule"), and critical thinking (e.g., "I do not prefer tasks requiring critical examination"—reversed coding). The items of these subscales were related to different learning contexts, such as studying texts, listening to a lecture, or learning for an exam. In addition, another scale measured the amount of time and effort a student was willing to invest in learning (e.g., "I spend less time studying than most other students"—reversed coding). In order to examine the relation between study interest and learning strategies, zero-order correlations were calculated (see Table 2).

Interest correlated most strongly with use of elaboration and information-seeking strategies. It also exhibited a moderate relation to critical thinking. However, interest did not affect organization and time management. Interestingly, a negative correlation was obtained between interest and rehearsal. These results are consistent with the hypothesis that interest facilitates "deep level," but not "surface level," processing (Entwistle, 1988). In accordance with this assumption, interest was highly correlated with investment of time and effort. Clearly, learning strategies that involved relating new material to prior knowledge, posing questions, searching for main ideas, looking for additional sources of information, and critical evaluation were time consuming and required effort.

In addition, the results suggest that the negative relation between interest and use of rehearsal strategies was due to the fact that high-interest students relied to a larger extent on deep-level strategies than did low-interest students. Apparently, the use of deep-level strategies made it less necessary for a student to fall back on simply memorizing material.

TABLE 2
Zero-Order Correlations Among Subscales of Study Interest, Learning Strategies, and Investment of Time and Effort (Study 5)

<i>Learning Strategy</i>	<i>Study Interest</i>
Rehearsal	-.26*
Elaboration	.47**
Organization	.19
Seeking Information	.44**
Time Management	.12
Critical Thinking	.29*
Investment of time and effort	.58**

Note. $n = 77$.

* $p < .05$. ** $p < .001$.

The preceding analysis was strictly correlational, based on questionnaire data, and not related to a specific learning task. Consequently, it seemed necessary to examine the impact of interest on learning strategies during a specific learning task in a controlled setting. Fortunately, studies 1 through 3 included measures of three different learning strategies: underlining, note taking, and elaboration. In order to assess elaboration, a 4-item self-report measure was administered, which asked for the extent to which students related the text content to personal events or experience, whether the students created mental images and produced their own thoughts and ideas, and whether they tried to paraphrase the text in their own words. Fifteen minutes were allotted for reading the complete text. Subjects were told they could make notes in the page margins and underline portions of the text. The results of all three studies show that interest also affected actual learning activities in a specific situation. In Study 3, for example, we obtained moderate correlations between topic interest and the number of underlined ($r = .28, n = 41, p < .05$) and noted ($r = .28, n = 41, p < .05$) words and a high correlation between interest and self-report of elaborations ($r = .60, n = 41, p < .001$). In support of these results, Pokay and Blumenfeld (1990) found that task value significantly predicted strategy use (see also Nolen, 1988; Nolen & Haladyna, 1990; Pintrich & De Groot, 1990) and that its influence was stronger than that of self-concept of ability and expectancy for success.

To summarize, we observed moderate to strong relations between interest and learning strategies, measured at both a general and a specific level. In addition, for the text studies it was possible to show that these relations were independent of prior knowledge and intelligence. Obviously, interest is an important motivator for the use of learning strategies that facilitate deep processing.

The Quality of the Learning Experience

The significance of motivational concepts in education rests predominantly on their power to predict academic achievement. In the past, theories of achievement motivation dominated our understanding of student motivation (e.g., Heckhausen, Schmalt, & Schneider, 1985). Although research exhibits an increasing focus on intrinsic motivation, the one-sided emphasis on measures of cognitive outcome remains. Despite its admittedly major importance, academic performance is not the only criterion in evaluating the usefulness of a motivational concept. The evaluation of motivational concepts should also include measurements of subjective experience during task completion (e.g., Brophy, 1983; Csikszentmihalyi & Csikszentmihalyi, 1988; Matsumoto & Sanders, 1988). Positive emotional experience has to be considered as an academic outcome measure in its own right. There is some

evidence that various forms of creativity and deep comprehension of complex facts require the presence of positive emotional states (e.g., Amabile, 1983; Csikszentmihalyi, 1988; Isen, Daubman, & Gorgoglione, 1987; Larson, 1990).

The relation between interest and the quality of experience was investigated in experimental text-learning situations (Studies 1 through 4) and in high school classrooms (Study 6; U. Schiefele & Csikszentmihalyi, 1990a, 1990b). It was found that topic interest was significantly correlated with involvement, enjoyment, concentration, and activation. In addition, there is evidence that these dimensions of experience were also related to the level of comprehension. In the following, however, we will focus on Study 6, in which the relation between interest in different subject matters and experience in the corresponding classrooms was examined.

The data used in Study 6 came from a large-scale longitudinal project being conducted at the University of Chicago by Csikszentmihalyi, Rathunde, and Whalen (in press). The study began in 1985 and was designed to trace the development of talented students over a period of about 4 years. At the beginning, the sample consisted of 208 male and female freshmen and sophomores. Interest was measured using rating scales, on which students were asked to indicate to what degree they would describe each subject area as being their "favorite." In addition, measures of achievement motivation (based on the Achievement and Endurance subscales from the Personality Research Form) and scholastic aptitude (PSAT) were available. The quality of experience in the classroom was measured by means of the Experience Sampling Method (ESM; Csikszentmihalyi & Larson, 1987). The ESM respondents are provided with an electronic pager and a block of self-report forms with open-ended and scaled items. The students carried the pager for a week and were paged about 55 times at random intervals. Whenever they were signaled, they had to fill out an experience sampling form. The experience sampling took place 1 week after the interest ratings. The following dimensions of subjective experience were included in our analysis: potency, affect, intrinsic motivation, self-esteem, concentration, importance of current activity, and perceived skills. Each dimension was measured by one to four rating scales. The influence of interest on the quality of experience was examined in mathematics, biology, English, and history classrooms. In addition, the effects of interest were compared with those of achievement motivation and scholastic ability.

As an example of the results, Table 3 shows zero-order correlations among interest in mathematics, achievement motivation, mathematical ability (measured by the mathematics subtest of the PSAT), and experience. It should be noted that individual students contributed, on average, 2.2 experience sampling forms.

TABLE 3
Zero-Order Correlations Among Interest in Mathematics, Achievement Motivation, Ability, and Subjective Experience (Study 6)

Experience in Class	Interest in Mathematics	Achievement Motivation	Mathematical Ability
Potency	.33*	.18	-.07
Affect	.21	.19	-.02
Intrinsic Motivation	.39*	.26	.24
Self-Esteem	.37*	.12	.04
Concentration	.06	.18	-.08
Importance	.25	.21	.06
Skill	.32*	.15	.16

Note. $n = 108$. Because of the large number of correlations computed in Study 6, an adjusted alpha level was applied.

* $p < .01$ (corresponds to an adjusted level of .0004).

The results reveal that interest was significantly correlated with potency, intrinsic motivation, self-esteem, and perception of skill. There were nonsignificant correlations between interest and concentration and importance.

Surprisingly, achievement motivation and ability were not significantly related to any of the dimensions of experience. In addition, by means of multiple regression analyses it was shown that interest predicted quality of experience independently of achievement motivation and ability.

In sum, the reported findings suggest that subject matter interest has a stronger and more consistent impact on the quality of experience in class than do achievement motivation or ability. It is rather surprising that interest, but neither achievement motivation nor ability, was significantly correlated with self-esteem and perception of skills.

A Hypothetical Model of Causal Relations

A model of causal relations is now presented that summarizes the reported empirical findings and serves as a heuristic guideline for future research. As shown in Figure 2, the model represents causal relations among interest, general motivational orientations, cognitive capabilities, cognitive and emotional mediating processes, learning outcome (or depth of comprehension), and the evaluation of the learning process. In addition, the model is to be understood to describe the course of an action. Three phases are distinguished: preactional, actional, and postactional. The preactional phase consists of activating the latent motivational characteristics, and forming a task-specific motivational orientation. The actional phase (e.g., reading a text) is characterized by emotional and cognitive processes. The

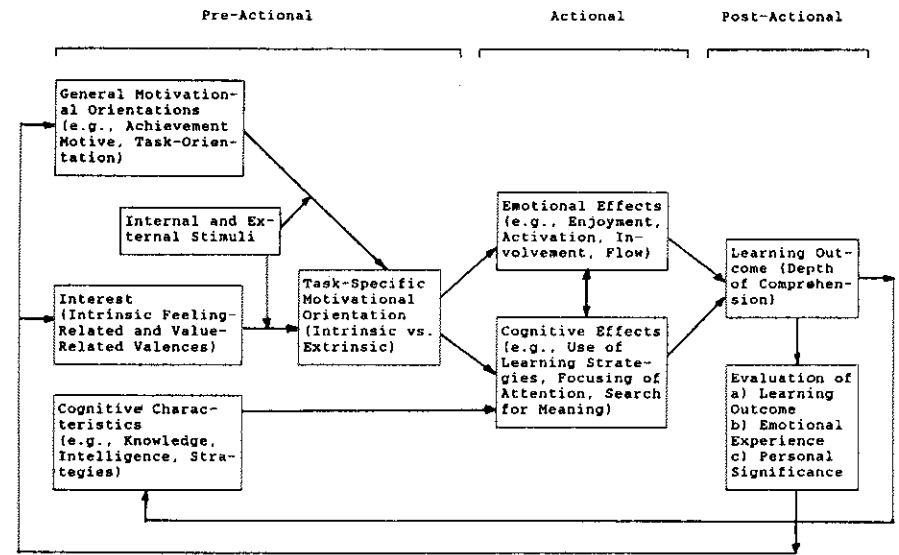


FIGURE 2 A hypothetical model of causal relations.

outcome of learning and the evaluation of the learning process are part of the post-actional phase.

In this model, three characteristics of the learner are included: general motivational orientations, interest (or task value, in terms of Pintrich's, 1989, model), and cognitive variables (which may be either general or content specific). It is assumed that cognitive factors usually have a stronger impact on the learning outcome than do motivational factors. However, the influence of motivational and cognitive factors might vary, depending on a number of conditions such as ability level, the opportunity of choice, and the difficulty of an academic task. Interest and general motivational orientations may be activated by internal (e.g., thinking about a challenging problem) or external cues (e.g., a reading assignment in school). The activation of any motivational characteristic results in a task- or content-specific motivational orientation that may be described on a continuum ranging from intrinsic (i.e., wanting to learn about a topic for its own sake) to extrinsic (i.e., wanting to learn about a topic for reasons external to that topic).³ The direction (intrinsic vs. extrinsic) and the strength of the motivation to learn influence the emotional and cognitive aspects of the

³As has been argued by Lepper (1988), the distinction between intrinsic and extrinsic motivation is broader than the distinctions between task and ego orientation and between learning and performance orientation. Consequently, the terms *intrinsic* and *extrinsic* are used here in a generic sense.

learning process. Emotional and cognitive aspects are believed to interact with one another. On the one hand, emotional states presumably influence the willingness to use learning strategies, to invest effort, and to draw inferences. On the other hand, the level of cognitive involvement with the task at hand may contribute to the quality of emotional experience.

The outcome of the learning process is the result of cognitive and affective processes. It is assumed that cognitive processes are more important than affective ones, at least as far as the immediate learning result is concerned. However, it is possible that this hypothesis has to be modified according to the nature of the desired learning result (e.g., fact retention vs. conceptual understanding). In addition, because emotional factors may influence learning only indirectly, by stimulating cognitive processes, their importance is easily underestimated (Pekrun, 1990). There is ample evidence that emotions have a pronounced effect on various aspects of cognitive outcomes (e.g., Amabile, 1983; Isen et al., 1987; Pekrun, 1990).

Further important aspects of the model are two feedback loops. The first feedback relation runs from learning outcome to cognitive characteristics. This means that new information, when adequately processed, adds to a person's knowledge structure and, conversely, every learning experience has the potential to enrich one's cognitive strategies and, in the long run, increase one's intelligence.

The second feedback relation involves evaluation, interest, and motivational orientations. Specifically, it is assumed that individual interest and an intrinsic motivational orientation are strengthened when individuals feel they succeeded in a learning task, when the learning process itself was enjoyable and stimulating, and when they attributed personal significance to the learning content. Of course, it is not assumed that every negative learning experience is detrimental to one's interests. But the repeated experience of learning about a particular topic that is neither enjoyable, meaningful, nor instructive may well have a considerable impact on one's interest.

HOW RESEARCH COULD PROCEED

This article suggests that interest is an important mental resource for learning (Hidi, 1990). Interest leads students to adopt a task- or learning-oriented motivational orientation, which in turn codetermines level of comprehension, use of (deep-level) learning strategies, and the quality of emotional experience. These promising findings should encourage educational researchers to include the concept of interest in empirical studies and theoretical models.

A number of tasks should be on the agenda for future research on interest and motivation (see also U. Schiefele, in press-b).

What is the relation between interest and the quality of learning outcome? Although we have gained some evidence that high-interest students achieve deeper understanding than low-interest students, it is still unclear whether, and in what way, they differ from students who exhibit other forms of motivation (e.g., extrinsic motivation). In addition, intensive efforts are needed to distinguish between different levels of the quality of learning outcomes on a well-founded theoretical basis (see Cole, 1990). Van Dijk and Kintsch's (1983) model of text processing may be a good example, but it cannot account for all qualitative aspects of learning outcomes. A more differentiated and comprehensive model of levels of learning, which includes a wide range of qualitatively different features of the learning outcome (e.g., relating new material to one's prior knowledge, drawing conclusions, and understanding main ideas), needs to be developed. It would enable us to evaluate different motivational orientations more precisely.

What role does interest play in the use of learning strategies? In most studies on the relation between motivation and use of learning strategies, self-report measures have been used; it seems an important task for future research to include behavioral indicators of strategy use. Another significant issue concerns the problem of whether strategy use can, at least partially, mediate the effect of interest on learning (e.g., Pokay & Blumenfeld, 1990), as is implied by the present model.

How does interest affect the quality of experience? This study confirms that interest improves the quality of experience on various dimensions. At least three problems have to be addressed in future research. First, the question remains as to how the effects of interest on experience differ from those of other motivational orientations on experience. Second, does emotional experience mediate the effect of interest on learning, or is it just an epiphenomenon of interest? Even if there is no mediating effect of emotion, it may well be that emotion influences the learning outcome indirectly, by facilitating cognitive processes. In order to answer this question, a third problem needs to be resolved: How do cognitive and emotional factors interact with one another in the learning process?

In sum, these research problems reveal two fundamental tasks for future research: (a) the comparison of the learning experiences of students motivated by interest with those of students motivated by other orientations and (b) the explanation of the effect of interest on the quality of learning. A recent study by Shirey and Reynolds (1988) addressed the latter problem, but yielded no conclusive evidence (see also Hidi, 1990).

Interest should be thought of not only as an independent factor in the process of learning, but also as a desired outcome. This view of interest brings us to the issue of how instruction can facilitate the development of interest in academic subjects. Lepper (1988; Lepper & Chabay, 1985) proposed four general ways to increase intrinsic motivation in the classroom: promoting students' sense of control, providing challenging activities, provoking curiosity, and highlighting the functionality of an activity or topic. These are appropriate and well-supported guidelines. However, in order to stimulate subject-matter-specific interest, it may be necessary to supplement these general strategies with specific instructional methods that promote interest in a subject. Every subject matter has its own limitations and possibilities. For example, many students enjoy art and music, whereas science and mathematics often arouse anxiety (Csikszentmihalyi & U. Schiefele, in press). Therefore, increasing students' interest in art requires different methods than facilitating their interest in mathematics. The latter subject has been the object of much instructional research. In her study on mathematics teachers in the United States, Weiss (1990) found that arousing student interest in mathematics and making students aware of the importance of mathematics in daily life were among the least emphasized objectives of senior high school teachers. Moreover, the least preferred instructional activities were using hands-on or manipulative material, using computers, working in small groups, and completing supplemental worksheets. Weiss argued convincingly that the problem of student indifference to mathematics cannot be solved by increasing teachers' qualifications as mathematicians, but by increasing their knowledge pertaining to instruction and motivation. According to Weiss, if a higher level of interest is desired, then instruction should involve more active and student-centered activities, such as mathematics laboratory activities, or mathematics projects. In addition, one should not forget that students are most impressed and influenced by teachers showing interest and enjoyment in what they teach (Csikszentmihalyi & McCormack, 1986).

Weiss's (1990) research is just one of many examples suggesting that a one-sided concern with students' cognitive abilities and skills at the expense of students' motivation and experience is inadequate from both the scientific and practical points of view (e.g., Csikszentmihalyi, 1988; Nicholls, 1990). The increasingly perceived problem of illiteracy in the United States (see "Literacy in America," 1990), as well as in other countries, makes it obvious that the chief problem is not a lack of ability, but of motivation. Consequently, educators should focus on the intrinsic rewards of the various subject areas and bear in mind that, if "intrigued by the opportunities of the domain, most students will make sure to develop the skills they need to operate within it" (Csikszentmihalyi, 1990, p. 126).

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