DOCUMENT RESUME

ED 286 937 TM 870 590

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TITLE	The Hows and Whys of Studying: The Relationship of Goals to Strategies.
PUB DATE	Apr 87
NOTE	24p.; Paper presented at the Annual Meeting of the American Educational Research Association (Washington, DC, April 20-24, 1987). Document contains small print.
PUB TYPE	Speeches/Conference Papers (150) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Age Differences; *Cognitive Processes; *Goal Orientation; Higher Education; Learning Motivation; *Learning Strategies; Science Instruction; Secondary Education; *Student Motivation; *Study Habits
IDENTIFIERS	*Task Orientation

ABSTRACT

A correlational study of 62 8th grade, 60 11th grade, and 58 college students investigated developmental differences in learning goals, study strategy beliefs and their inter-relationship for science classes. Questionnaires measured levels of task orientation, ego orientation, and work avoidance, as well as belief in the utility of two types of strategies: those requiring deep processing of information, and those requiring only surface-level processing. Of the three goal orientations, only task orientation was significantly positively correlated with belief in the value of deep-processing strategies; this was the case at all three age levels. Valuing of the two strategy types was positively correlated for younger, but not college students, who appeared to more clearly differentiate the two strategy types on the basis of utility for learning than did the younger groups. The results supported the hypotheses that students' personal goals for learning influence which strategies they use in studying. The nature of this influence appeared to depend in part on students' belief in or knowledge of the effectiveness of different strategy types. It is suggested that fostering interest in learning as an end in itself will prove to be more effective in teaching students effective tools of learning than emphasis on competition or grades. (Author/KA)

ED286937

The Hows and Whys of Studying: The Relationship of Goals to Strategies

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Paper presented at the annual meeting of the American Educational Research Association, April 20-24, 1987, Washington D.C. This research was supported in part by a David Ross Grant from Purdue University. Thanks to John Nicholls and Tom Haladyna for their comments on earlier drafts of the manuscript.

Abstract

A correlational study of 62 eighth-grade, 60 eleventh-grade and 58 college students investigated developmental differences in learning goals, study strategy beliefs and their inter-relationship for science classes. Questionnaires measured levels of task orientation, ego orientation and work avoidance, as well as belief in the utility of two types of strategies: those requiring deep processing of information, and those requiring only surface-level processing. Of the three goal orientations, only task orientation was significantly positively correlated with belief in the value of deep-processing strategies; this was the case at all three age levels. Valuing of the two strategy types was positively correlated for younger, but not college students, who appeared to more clearly differentiate the two strategy types on the basis of utility for learning than did the younger groups. The possible influence of fostering task involvement on students' acquisition and application of learning strategies is discussed.

Research on students' development of effective strategies for learning in school has become increasingly focused on the spontaneous use of these strategies during complex school tasks (Levin, 1986; Pelincsar, 1986; Thomas & Rohwer, 1986). As is the case for all complex human behavior (see Weiner, 1985), the extent to which students effectively apply learning strategies is conceptualized as multiply determined (Brown, Bransford, Ferrara & Campione, 1983; Levin, 1986; Thomas & Rohwer, 1986). Paris and Cross (1983) identify four determinants of spontaneous strategy use: 1) declarative knowledge of the strategy, 2) procedural knowledge (how to employ the strategy), 3) conditional knowledge (when the strategy should be used), and 4) motivation to engage in the task. Although early research focused on the first two or three factors, motivation has increasingly become a concern to investigators.

Most researchers who have examined the relationship between strategy use and motivation have concentrated either on motivational benefits of strategy training (e.g., de Charms, 1984; Pelincsar & Brown, 1984; Paris & Oka, 1986) or on the relationship between self-perceptions of competence and strategy knowledge or use (Oka & Cross, 1986; Oka & Hwang, 1986). To date, relatively little work has been done on a potentially important motivational factor: the influence on strategy use of students' goals. If strategies are, in essence, goal-directed activities, it stands to reason that different learning goals may elicit substantially different learning strategies (Condry &

Chambers, 1978; Dweck, 1984; Flavell, 1981; Nicholls, 1984; Thomas & Rohwer, 1986).

Nicholls and his colleagues (Nicholls, Patashnick & Nolen, 1985) identified three major goals or motivational orientations adolescents have for learning in school, and found that they were associated with different beliefs about general strategies leading to school success. Task orientation, which involves a commitment to learning for its own sake, was associated with the belief that effort, cooperation, interest and trying to understand were likely to lead to success in school. Ego orientation, which involves a desire to perform better than others, or to establish that one's ability is superior, was positively correlated with the belief that acting as if you like the teacher, knowing how to impress the right people, being intelligent and trying to beat others were successful strategies. The third motivational orientation, work avoidance, involves a desire to put forth as little effort as possible. This orientation was related to a belief in the necessity of acting as if you like the teacher, impressing people and being lucky in order to achieve success in school.

Based on this research, Nolen (1987) investigated the relationship between motivational orientations (goals) and belief in the value of various study strategies for promoting learning (strategy utility ratings) and reported use of various study strategies. For the purposes of this study, two types of strategy were distinguished. First were those requiring deep processing of information, such as trying to figure out how new information fits with what one already knows, taking notes, and monitoring comprehension. Second were those requiring only surface-level processing, such as simply reading the whole passage over and over, memorizing all the new words, and rehearsing information. These categories are similar to those used by Entwhistle and Ramsden (1983). Deep processing of information is held to be more likely to lead to understanding and retention of meaningful material than is surface-level processing (Anderson, 1980).

It was predicted that task orientation would be associated with the belief that strategies requiring deep processing of information would be useful when studying expository text. Conversely, ego orientation was expected to be related to a valuing of more surface-level strategies. Although not the best for promoting understanding, these strategies may appear to students to be of some value in preparing for school tests, which tend to emphasize recall of facts rather than higher cognitive (Frederiksen, 1984). Work avoidance was expected to be negatively related to the use of either kind of strategy.

For the eighth-graders in Nolen's sample, task orientation was, as predicted, was associated with the use of deep-processing strategies, as well as valuing of these strategies for studying (both in general and in reference to a just-completed studying task). When students were asked about studying in general, this correlation was stronger than that between task

orientation and valuing of surface-level strategies. Both correlations, however, were statistically significant. In addition, when asked about a specific, just-completed studying task, task orientation was equally correlated with valuing and reported use of deep-processing and surface-level strategies.

A possible explanation for these somewhat unexpected findings is that junior high school students believe that both kinds of strategies are useful in promoting understanding and retention of new material. They may not fully realize that, when these are the goals of studying, strategies requiring deep processing of information are superior to those requiring only surface-level processing. Some support for this idea comes from an earlier study (Nolen, Meece & Blumenfeld, 1986) which found age-related increases in the ability of students to discriminate between effective (deep-processing) and less-effective (surface-level) learning strategies across a variety of classroom tasks.

Another somewhat surprising finding of the Nolen (1987) study was that ego orientation was not significantly related to use of either strategy type. A positive relationship between a desire to perform better than others, as opposed to understanding the material, was expected to correlate positively with a belief in the utility of surface-level strategies such as rote memorization. The absence of such a relationship may indicate that some ego-involved students desire to "look smart" by performing well without appearing to try hard (Nicholls, 1984), and therefore downplay the value of any learning strategy. It is possible that older students would be more likely to recognize that some strategic studying is necessary in order to assure high performance, but still be unwilling to expend the extra effort required by more effective strategies.

To investigate the possibility of developmental differences in the relationship between goals and strategies, two older groups of students were given the General Motivational Orientation and Strategy Utility scales used in the original study. This data was then compared with the data from the eighth-grade sample already collected. Specific questions addressed were:

1. Are older students better able to differentiate between the value of using deep-processing strategies and that of using surface-level strategies while studying?
2. Are there age-related changes in the pattern of relationship among various goals or motivational orientations and valuing of the two different strategy types?

Method

Subjects

Subjects included volunteers from three grade levels: 62 eighth-graders, from three junior high schools in two Midwestern towns; 60 high school juniors from the same school corporation attended by 49 of the eighth-graders, and 58 undergraduates, attending a public university in the same town. College students were participating for credit in an introductory course in

educational psychology. Eighth-graders and juniors were recruited from regularly-scheduled reading and study periods.

Measures

Motivational Orientation Scales. To measure goal orientations, students completed a questionnaire based on the Motivational Orientation Questionnaire (Nicholls, Patashnick & Nolen, 1985). The questionnaire was reworded to refer to science class. Of the 36 items, 18 were selected that reflected three different goal orientations: Task Orientation, Ego Orientation, and Work Avoidance. (Reliabilities are given in Table 1.)

General Strategy Utility Scales. Students were asked to imagine studying a chapter in a science text that concerned a really interesting topic, so that they really wanted to learn and remember the information. For each of the study strategies, students responded to the statement "This is a good thing to do if you really want to learn and remember" on a five-point Likert scale (strongly agree to strongly disagree). On the basis of previous studies (Entwhistle & Ramsden, 1983; Nolen, Meece & Blumenfeld, 1986) scales were constructed to measure ratings of deep-processing strategies (e.g., try to see how this fits with what I've learned in class) and surface-level strategies (e.g., read the whole thing over and over). (See Table 1 for reliabilities.)

Procedure

Measures were administered in group sessions. An experimenter read the directions aloud and answered any questions before students filled out each measure. Directions were also printed at the top of each questionnaire. Students were reminded that there were no right or wrong answers, and that the experimenter was interested only in their opinions. After completing all questionnaires, students were thanked and dismissed.

Results

Reliability and intra-scale correlations.

Scale means, standard deviations, and reliability coefficients (Cronbach's alpha) for each scale are reported in Table 1. Product-moment correlations were computed among the scales for each grade level; these are reported in Table 2.

Motivational orientations. A Grade Level (3) x Sex (2) x Orientation (3) repeated measures analysis of variance revealed a significant main effect for Orientation ($F_{2,342}$ = 306.24, p <.0001) and a significant Grade Level x Orientation interaction ($F_{4,342}$ = 8.04, p <.0001), with the greatest difference between Orientations occurring at the undergraduate level (see Figure 1).

Strategy beliefs. Correlations between utility ratings for deep-processing and surface-level strategies were moderately strong for the eighth-graders (r = .59, p <.001) and for the high school juniors (r = .64, p <.001). The correlation between these subscales, however, were not significant for under-graduates (r = .16, p >.10). It appears that undergraduates discriminated between these two strategy types to a greater extent than did younger students.

A Grade Level (3) x Sex (2) x Strategy Type (2) repeated measures analysis of variance was run with ratings of strategies as the dependent measure. Main effects for Grade Level ($F_{2,172}$ = 6.60, p <.01) and Strategy Type ($F_{1,172}$ = 67.04, p <.0001) were significant, as well as a Grade x Strategy Type interaction ($F_{2,172}$ = 6.61, p < .01). Students at all three grade levels rated deep-processing strategies as more useful than they did surface-level strategies (p <.05 for each grade level). For undergraduates, for whom ratings of the two strategy types were uncorrelated, this difference is much greater (1.36 standard deviations) than for eighth-graders (.56 SD) and high school juniors (.63 SD).

Orientations and strategies. The correlations between Orientation Scales and the Strategy Utility Scales are shown in Table 2. Differences in the strength of correlations were explored using Williams' T_2 (Steiger, 1980). For both eighth-grade and high school students, correlations between deep-processing strategies and each of the three orientations were significantly different from each other (p <.05). Ratings for deep-processing strategies were more positively related to task orientation than to either ego orientation or work avoidance. For college students, the correlation between task orientation and valuing of deep-processing strategies was significant (p <.001), while the corresponding relationship involving ego orientation was not. The difference between these correlations, however, was not statistically reliable.

For eighth- and eleventh-graders, all differences between the two strategy types in their correlation with each of the orientations were significant (all $p < .05$) (e.g., correlation between task orientation and deep-processing strategy ratings was stronger than the correlation between task orientation and surface-level strategy ratings). For the undergraduates, although there were differences between these correlations in level of significance, the differences between them were not statistically significant by Steiger's T^2 (for task orientation, the difference between correlations with valuing of deep and surface strategies was .26, $p < .06$).

Separate multiple regression equations, regressing students' valuing of deep-processing strategies on the three orientation variables, were computed for each grade level. In addition, valuing of surface-level strategies was entered, to see to what extent the variance for deep-processing strategies (as distinguished from surface-level strategies) was explicable by task orientation. Task Orientation was entered last in each equation. The results of these analyses appear in Table 2. Task Orientation was the only variable that consistently predicted valuing of these strategies at all three grade levels. Additionally, in all three samples it explained a significant portion of the variance in these beliefs, beyond that explained by ego orientation, work avoidance, or valuing of other (surface-level) strategies.

Discussion

This study yielded both age-related differences and similarities in relationships. Task orientation, or a goal of learning and understanding, consistently predicted a valuing of effective deep-processing strategies. Across all three age levels, it was more positively related to valuing of deep-processing strategies than to a valuing of surface-level strategies. The opposite trend was seen for ego orientation, a goal of performing better than others, which tended to be more strongly related to a valuing of surface-level strategies.

Although task orientation was related to high utility ratings for both deep-processing and surface-level strategies in the two younger samples, this was not true of the older sample. For college students, task orientation was related only to a valuing of deep-processing strategies; this may be related to an increased understanding of the differences in value of these two strategy types.

This assertion is supported by two additional findings. First, the two strategy types, highly correlated in the younger samples, were not correlated at the undergraduate level. Secondly, similar to the results reported by Nolen, Meece, & Blumenfeld (1986), the difference between mean utility ratings of the two strategy types was much larger for college students than for the two younger groups (more than twice the difference, expressed in terms of effe   se).

Age-related changes in correlation between a valuing of surface-level strategies and the other two orientations also indicate that students change their views about the usefulness of certain strategies. In the eighth-grade sample, ego orientation and work avoidance show almost identical patterns of relationship to the two strategy types. Although the use of any strategy requires effort on the part of the learner, the deep-processing strategies rated in this study generally require more; hence the negative opinion of the work-avoidant. Ego-involved students may also under-rate these strategies, trying to show high ability by the appearing not to try too hard.

In the high school sample, ego orientation and work avoidance show clearly different associations with learning strategies. Work avoidance at this level is fairly strongly related to a devaluing of learning strategies in general. Ego orientation, on the other hand, is associated with a valuing of surface-level but not deep-processing strategies.

In the college sample, both ego orientation and, to a lesser extent, work avoidance are associated with high utility ratings for surface-level strategies. Most older students seem to be aware that some strategic studying is useful, although belief in the usefulness of deep-processing strategies is clearly not associated with either ego orientation or work avoidance in any of the age groups.

Two major findings are of interest to teachers and researchers interested in students' strategy use. First, task

orientation is consistently associated with a valuing of deep-processing strategies; those strategies most likely to induce efficient storage and retrieval of information in memory. Secondly, the older students in this sample seemed both increasingly aware of the usefulness of strategic studying, and better able to differentiate between deep and surface-level strategies on the basis of usefulness for learning from text.

The results of this study must be interpreted with caution. Comparisons of high-school and college students can be somewhat risky because of selection factors, although restrictions in range and scale reliabilities were similar across age groups. Secondly, the study is only descriptive. In addition, only self-report strategy measures were employed. Although these measures have been found to correlate significantly with reported and observed use of study strategies in junior high students (Nolen, 1987), it would be of interest to know if more objective measures of strategy value or use would produce similar findings.

The results of the present study are, however, consistent with the hypothesis that students' personal goals for learning influence which strategies they bring to bear on a studying task. In addition, the nature of this influence appears to depend in part on students' beliefs in or knowledge of the effectiveness of different strategy types.

Further research is needed to replicate and extend these findings. It would be particularly interesting to see if, after training in the use and utility of effective strategies, the pattern of relationship between motivational orientation and strategy beliefs for younger students becomes more like that for the college students in this sample. It is also possible that students are aware that the two strategy types differ in value, but that, compared to college students, the learning environment of younger students emphasizes rote memorization of facts more than the kinds of learning for which deep-processing strategies would be more useful. It would be quite informative, from a teacher's standpoint, to see if fostering task involvement and/or encouraging learning at at a higher cognitive level during (and after) strategy training increases the extent to which students learn and spontaneously apply effective rather than ineffective strategies.

The results of the present study, like those of previous investigations (Nolen, 1987; Paris & Oka, 1986) suggest that both motivation and knowledge of effective strategies may influence a student's approach to studying, regardless of age. In addition, students' reasons for learning may play a part in forming their beliefs about the advisability of using different kinds of strategies. It seems likely that fostering interest in learning as an end in itself will prove to be more effective in teaching students effective tools of learning than will an ego-involving emphasis on competition, social comparison or grades.

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Table 1

Means, standard deviations and coefficient alpha reliabilities of motivational orientation and strategy utility scales.

Eighth-graders	Mean	S.D.	alpha
Task Orientation	4.14	.54	.70
Ego Orientation	4.04	.69	.81
Work Avoidance	2.79	.64	.79
Deep-Processing Utility	3.95	.47	.78
Surface-Level Utility	3.62	.59	.52
High school juniors			
Task Orientation	4.08	.50	.68
Ego Orientation	3.96	.65	.79
Work Avoidance	2.84	.54	.72
Deep-Processing Utility	3.77	.55	.81
Surface-Level Utility	3.37	.63	.58
College undergraduates			
Task Orientation	4.51	.44	.70
Ego Orientation	3.84	.70	.84
Work Avoidance	2.47	.54	.72
Deep-Processing Utility	4.12	.43	.73
Surface-Level Utility	3.18	.69	.69

Table 2

Pearson correlations among orientation and strategy scales.

EIGHTH-GRADERS	Ego Orientation	Work Avoidance	Deep-Processing Strategies	Surface-Level Strategies
Task Orientation	.14	-.25*	.47***	.24^{*a}
Ego Orientation		.11	-.25*	.04
Work Avoidance			-.24*	.01
HIGH SCHOOL JUNIORS				
Task Orientation	.31**	-.34**	.54***	.38***
Ego Orientation		.22	.09	.30**
Work Avoidance			-.51***	-.34**
COLLEGE UNDERGRADUATES				
Task Orientation	.13	-.23*	.41***	.15^{b}
Ego Orientation		.24*	.21	.39***
Work Avoidance			-.10	.26*

$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

[a] correlations connected by solid lines significantly different by Williams' T_2 ($p < .05$)

[b] correlations connected by broken lines significantly different by Williams' T_2 ($p < .06$)

Table 3

Multiple regressions: Valuing of deep-processing strategies on valuing of surface-level strategies and motivational orientations.

	Mult.R	R^2	R^2 Change	b	Beta	F Change	*p* Change
Eighth Grade							
Value Surface-level	.589	.346	.346	.413	.517	31.17	.000
Ego Orientation	.651	.424	.078	-.213	-.314	7.85	.007
Work Avoidance	.687	.472	.049	-.093	-.125	5.25	.026
Task Orientation	.763	.581	.111	.312	.360	14.83	.000
Eleventh Grade							
Value Surface-level	.649	.421	.421	.445	.456	42.31	.000
Ego Orientation	.653	.427	.005	-.025	-.027	.49	.486
Work Avoidance	.731	.535	.108	-.252	-.284	13.01	.001
Task Orientation	.761	.580	.045	.297	.250	5.86	.019
Undergraduates							
Value Surface-level	.146	.021	.021	.058	.089	1.22	.275
Ego Orientation	.153	.023	.002	.014	.023	.12	.734
Work Avoidance	.185	.034	.011	-.008	-.008	.60	.442
Task Orientation	.362	.131	.097	.339	.331	5.91	.018

NOTE: Variables were forced to enter the equation in the order listed.

Figure 1

Mean level of motivational orientations at three age levels.

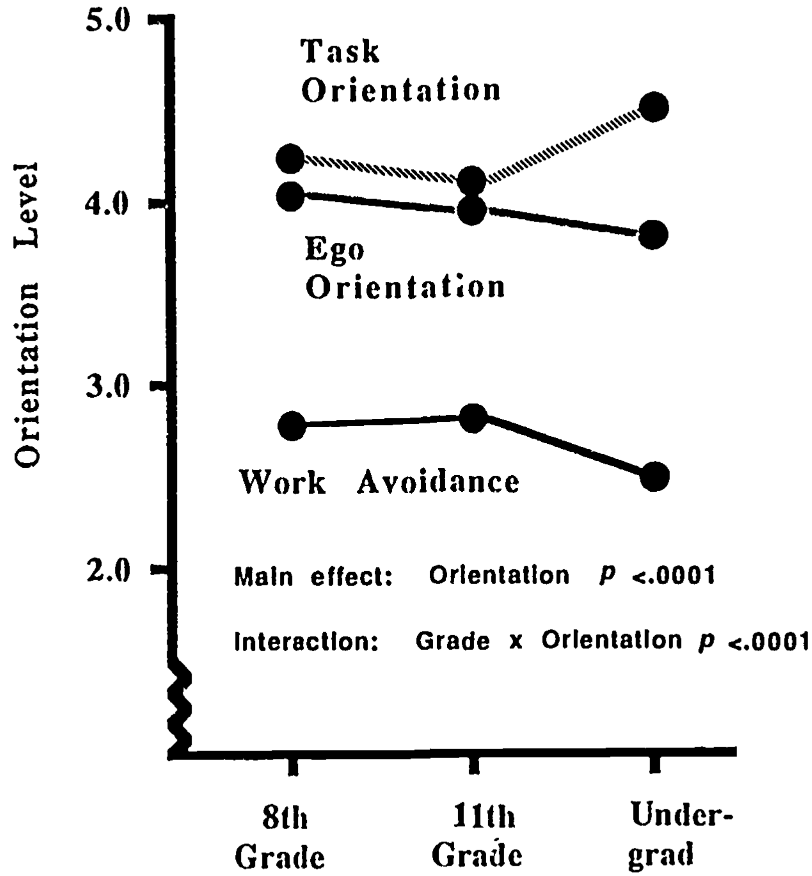

Figure 2

Perceived value of deep and surface-level at three age levels.