

TIME ON TASK AND PUPIL ACHIEVEMENT.

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ABSTRACT

The relation between achievement and time spent learning has been well established in early studies in learning theory. In the past thirty five years perhaps this relationship has suffered the fate of the obvious, to be forgotten. In the last decade it has been recalled by Carrol and Berliner in the USA and by Cane and Bennett in the U.K.. The paper reports the results of a study of the relation of the observed time on learning task, to achievement in a specific mathematics curricular and to some other variables.

SUMMARY

In conjunction with a maths curriculum specialist a segment of number learning was devised with teachers of the appropriate age of children. A sample of 15 teachers and their 450 grade children were used. The teachers were asked to assess the children for ability. The children were given a test of N.V. Ability. Subsequently the children were given a pre-test on the unit of work, were taught the material, for three days and at the end of the third day were retested. During their teaching experience 6 children in each class were observed using two different schedules. The percentage time on learning task was related by simple and multiple analyses to teacher assessment, general ability, pre and post test scores and gain scores. Results would broadly support the time on task hypothesis but not very closely suggesting the complexity of the learning task situation and the perennial statement of further work need in this area.

SECONDARY SCHOOL STUDENTS' ATTITUDES TOWARD READING

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While debates rage about many aspects of reading education, the individuals involved would generally agree that affective factors are important in learning to read. Somewhere in virtually every reading 'methods' book will be a statement like this one: "A love and appreciation for what reading can do for people must be fostered" (Stauffer, 1975, p.171). As a consequence of the role which affective factors play in the learning and teaching of reading, it becomes crucial that we have adequately validated instruments for measuring students' attitudes toward reading.

Although there has been historically, but a relatively small number of studies dealing with the development of such instruments (Summers, 1977), during recent years interest in this activity has been high. Dulin and Chester (1973). Estes, Johnstone and Richards (1975), Heathington (1975), Kennedy and Halinski (1975) and Rowell (1972) have all published scales. In addition, reviews by Summers (1977) and Zirkel and Greene (1976) and an IRA monograph on the subject of attitude and reading (Alexander and Filler, 1976) have appeared.

Thus, it seemed worth investigating what researchers should be measuring with respect to the construct attitude toward reading. By applying the Krech, Crutchfield and Ballachey (1962) definition of attitude



to the "object" reading, the following results: *Attitude toward reading is a system of positive or negative evaluations, emotional feelings, and pro or con action tendencies with respect to reading.* The important point to bear in mind is that an attitude toward something like reading may be viewed as a system of dispositions.

Imagine a person like Katrina D, for example. Katrina completed a Ph.D. in psychology last year. The literature review for her thesis took four months, during which time she read for about six hours each day. Since finishing her degree, Katrina has put aside one full day each week for keeping up with the literature in her field. Thus, Katrina demonstrates behaviourally her belief in the value of reading. Likewise, were you to ask her, she would state unreservedly that the ability to read was of great value to her. Yet Katrina does not enjoy reading. She seldom reads non-fiction irrelevant to her work and rarely, if at all, reads fiction. Given a choice of leisure-time activities, reading ranks very low for her. Katrina's reason for seeing reading in a positive light is that reading is necessary for securing her chosen occupation and promoting job satisfaction. The development of personal rather than occupational factors is not part of Katrina's reason for viewing reading positively. Contrast Katrina with Joan S. Joan has a job which requires virtually no reading (and she is very happy with that job). For this reason Joan does not value reading as a means for succeeding in her work. However, she does enjoy reading and feels that reading is important for her personal development. Thus, Katrina and Joan exemplify different systems of dispositions toward reading.

Measuring Attitudes Toward Reading.

The nature of people's systems of dispositions toward reading should certainly be reflected in the instruments designed to measure those dispositions. In an attempt to characterize the dimensions of people's

attitudes toward reading, a pool of 56 statements was collected from a number of well-known reading attitude scales, from teachers, from reading experts and from primary and secondary school students. Inspection of these statements revealed that three theoretically distinct constructs within the more general construct of attitude toward reading were represented.

The first construct identified was exemplified by statements like "The more I read, the more I learn about myself", and "Reading helps me understand people better". This attitude was concerned with one's valuing reading as a means of gaining insight into self, others, and/or life in general. This first construct was called "Individual Development".

The second attitude was similar to the first in that it was also concerned with the value of reading as a means to an end. However, the end in this case was not related to personal, but to school or vocational development. This construct, which was termed "Utilitarian", was reflected in attitude statements like "Being able to read well can help a person get a better job", and "People who read a lot do best at school".

The third attitude was "Enjoyment" of reading. This construct was represented by statements such as "I enjoy reading", or "Reading is a good way to spend spare time".

To validate the conceptual existence of these constructs, 61 reading education experts were asked to indicate, if possible, which of the three constructs each of the 56 items was measuring. Thus, the experts had four possible choices for each item:

- (1) Utilitarian factor
- (2) Enjoyment factor

- (3) Individual development factor (insight into self, others, life).
- (4) Not clearly any one category (fits more than one category)

The experts designated, with 80% or greater agreement, 40 items which clearly represented primarily one of the constructs. 14 items were identified as representing Individual Development, and 13 items were identified for each of the sub-constructs Utilitarian and Enjoyment. These results indicated that the three constructs were clearly capable of being conceptually differentiated by the experts.

Thus, three constructs were identified as representing distinct facets of people's attitudes toward reading. However, in surveying the literature on the development of instruments to measure attitude toward reading, attitude is treated as an undifferentiated construct.

No mention is made of 'sub-constructs' like those described above, within the general construct of attitude toward reading. There are at least three possible reasons for this fact:

- (a) Researchers have failed to recognize the conceptual distinctions among the sub-constructs.
- (b) Researchers have been aware of the sub-constructs, but have not believed they could be measured reliably.
- (c) While researchers were aware of the constructs and believed them measurable, the researchers also found that the constructs covaried to such an extent that it was unnecessary to measure them separately.

Because no mention in the literature is made of the constructs, (a) would seem the most likely explanation. It might have been, however, that in constructing the scales, researchers actually did sample from the three constructs (unconsciously) and as a result (c) is closer to the truth.

To test this latter possibility the Estes Attitude Scale for reading (Estes, Johnstone and Richards, 1975) was used. Summers (1977) says that the Estes Scale is "well-developed within the state of the art" (p.146). Zirkel and Greene (1976) maintain that it is a "generally promising instrument" (p.108); Dulin and Chester (1974) go even further, calling it "a very powerful instrument for measuring the levels of positive attitude toward books and reading" (p.6). Overall, the Estes Scale is supported by more validity information than any other available scale (Dulin and Chester, 1974; Johnstone, 1974; Johnstone, Estes and Richards, 1975). Thus, the Estes Scale seemed the best representative for testing hypothesis (c).

Forty-six reading education experts were given the 15 items of the Estes Scale and were asked to rate them in the same manner in which the 56 items gathered for the present study had been rated (see page 3). The same four choices - (1) Utilitarian, (2) Enjoyment, (3) Individual Development, and (4) Not clearly any one category were available. Of the 15 items, only 6 were classified by at least 80% of the experts as clearly reflecting one of the constructs (5 as Enjoyment, 1 as Utilitarian). The remainder were identified as combining more than one construct.

From this analysis it was clear that the Estes Attitude Scale did not take account of each of the three constructs detailed above. Thus, it could not have been the case that the constructs covaried to such a degree that they could be combined for the purpose of measuring attitudes towards reading. Rather, the constructs were not adequately measured by the scale in the first place.

Analysis of other self-report measures of attitude toward reading (Askov and Fishback, 1973; Datillo, 1974; Greenberg, Gerver, Chall and

Davidson, 1965; Kennedy and Halinski, 1975; Pennsylvania State Department of Education, 1975 and San Diego City Board of Education, 1969)

revealed that they also confounded the three constructs or measured only one of the constructs. So, too, did direct observational techniques (Healy, 1965; Rowell, 1972) ignore the existence of more than one attitude to reading.

Construction of Scales to Measure Attitudes Toward Reading.

Thus, while the Individual Development, Utilitarian and Enjoyment constructs had conceptual validity, it remained to determine the extent to which the three constructs covaried. The 40 items identified by 80% or more of the experts as representing only one construct were administered to 97 Grade 12 and 118 Grade 8 students in 3 greater Melbourne schools. The format employed was a four point Likert Scale. Since the express aim of the study was to demonstrate that students' scores on the three constructs were not totally dependent, an elaborate sampling procedure was not utilized.

On the bases of avoiding response set and including items with the greatest empirical association to the particular construct (generally those with greatest differentiation), 30 items, 10 identified as representing each of the three constructs, were selected. The aim was to arrive at three 10-item scales, one to measure each of the three constructs, Individual Development, Utilitarian Factor and Enjoyment.

To obtain statistical evidence to assist the validation of the three scales, factor analyses were undertaken on both samples. Since the constructs were not assumed to be independent, a three-factor oblique rotation with Kaiser normalization was employed (Nie et al. 1975). The data for the Grade 8 students are presented in Table 1. (Items are grouped by scale membership) Only loadings greater than, or equal to, 0.30 are recorded. With few

TABLE 1

Grade 8 Factor Analysis: Oblique Rotation with Kaiser Normalization

	Items	Factor Loadings x 100		
		I	II	III
Enjoyment Items	2	58		
	9	48		
	11	80		
	13	62		
	14	77		
	16	40		
	19	78		
	21	84		
	23	48		
	32	75		
Utilitarian Items	3		37	
	5		49	
	7		48	
	10	31	42	
	18		31	
	22		43	
	33		48	
	35		46	
	38		31	
	40		50	
Individual Development Items	4			--
	8			59
	15			--
	17			68
	27	.47		--
	31			37
	36			37
	37			55
	39			64
	25			30
Percentage of Variance		21.36	6.48	4.89

Root No.	Latent Root	Cumulative Percent of Trace
I	6.44	23.2
II	2.65	32.0
III	2.10	39.0
Trace = 30		

exceptions, the loadings of items on factors fit the hypothesized pattern. Only Item 27, "Reading is a good way to find out about life" loads on an inappropriate factor and seems to relate most closely to the items on the Enjoyment rather than the Individual Development Scale. Item 10, "Reading won't get you anywhere in life", loads significantly on two factors, and seems empirically to fit both the Utilitarian and Enjoyment Scales. The only other items not behaving as hypothesized are Item 15, "People who read are better judges of other people" and Item 4, "Reading helps me understand how people feel about things". Neither item loaded at 0.30 or above on any of the three factors.

In general, students have responded in a way which is consistent with the expert raters' grouping of items into scales. Therefore, the constructs that these raters used as criteria for placement of items appear to be a good way of explaining the response patterns of the students in the sample. It is possible to infer, therefore, that Grade 8 students do hold (at least) three conceptually distinct and measurable attitudes toward reading.

It is of interest to note that the relationship between these factors is not great. Factor scores on Factor I correlate only .19 and .32 with those on Factors II and III respectively. Factor scores on II correlate only .25 with those on III. These correlations provide support for the argument for distinguishable constructs within the more general construct of attitude toward reading.

The pattern of loadings for the equivalent analysis of Grade 12 data was somewhat different. The three-factor solution, recorded in Table 2, indicated that these students were empirically able to distinguish

TABLE 2

Grade 12 Factor Analysis: Oblique Rotation with Kaiser Normalization

Items	3 Factor Solution			2 Factor Solution	
	Factor Loadings x 100				
	I	II	III	I	II
Enjoyment Items	2	54			56
	9	55			56
	11	75			71
	13	78			71
	14	82			87
	16	48		48	60
	19	71			77
	21	83			83
	23	48	-39	53	62
	32	63			55
Utilitarian Items	3		45		54
	5			41	40
	7			38	34
	10			53	--
	18		37		49
	22		41		47
	33			33	--
	35		45	35	63
	38			41	--
	40		59		63
Individual Development Items	4		43		45
	8	33		30	31
	15		44		44
	17		38		42
	27		61		61
	31			45	42
	36		42		50
	37		63		63
	39	30	58		58
	25		77		68
Percentage of Variance		25.8	9.61	4.77	25.7
					9.46

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Root No.	Latent Root	Cumulative Percent of Trace
I	8.28	27.6
II	3.42	29.0
III	2.03	45.8
Trace = 30		



distinctions between Individual Development and the Utilitarian factor.

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A two-factor solution, using only the items on the Individual Development and Utilitarian scales, also failed to separate the items into two conceptually interpretable scales. . . . Since it appeared that only two attitudes could be teased out in Grade 12, a two-factor solution using the 30 items was attempted. The results, recorded in Table 2, suggest that at Grade 12 the factors underlying attitude toward reading may be characterized as (1) Enjoyment and (2) Valuing reading (for either Utilitarian or Individual Development purposes).

The difference between the Grade 12 and Grade 8 analyses appears to be caused by greater overlap in the Grade 12 sample between valuing reading for its utilitarian benefits and valuing reading as a means for individual development.

Having established that, at least for the grade 8 sample, three potentially distinguishable attitudes toward reading existed, the next step involved closer inspection of the individual scales. To determine how well the items on each scale were measuring each attitude, Cronbach Alpha coefficients of internal consistency were calculated. These data are reported in Table 3, together with the scale means and standard deviations.

TABLE 3.

Means, Standard Deviations and Internal Consistency Measures for Three Attitudes Toward Reading.

Attitude	Possible Range	\bar{X}	σ	Cronbach α
<u>Utilitarian:</u>				
Grade 8	-20 to +20	+7.66	5.41	0.69
Grade 12	-20 to +20	+7.32	5.06	0.72
<u>Individual Development:</u>				
Grade 8	-20 to +20	+2.11	5.94	0.73
Grade 12	-20 to +20	+4.53	6.67	0.84
<u>Enjoyment:</u>				
Grade 8	-20 to +20	+6.32	7.94	0.89
Grade 12	-20 to +20	+6.45	7.51	0.90

The figures indicated that the scales were discriminating well and had moderate to high internal consistency. To test further the reliability of the scales, a sample of 65 Grade 8 and 43 Grade 12 students was retested between one and four weeks after the original testing to determine scale stability. The correlations between test-retest scores ranged from .72 to .90 for the scales. These stability coefficients indicated that the three constructs measured by the scales were relatively stable over a short time.

Validity of the Scales.

In an attempt to validate the scales, each student identified two individuals in his/her class who the student felt read the most school-related work and two who read the least school-related work. It was assumed that the students

named differed on the dimension of Utilitarian attitude toward reading.

Similarly each student identified two people who read both the most and the least non-school related material. These responses were considered to be related to Individual Development scores. Finally, each student named the two class peers who most enjoyed reading and the two who least enjoyed reading.

To assess the concurrent validity of the scales, the scale scores of Grade 8 and Grade 12 students categorized by at least three peers as being high (most) on each attitude scale were compared with those categorized as low (least). Table 4 reports the means of each group and the likelihood that the groups' mean attitude scores are systematically different by chance.

TABLE 4.
Validity Data.

	Attitude Toward Reading	Peer Group Rating	\bar{X}	σ	t-value	df	Probability less than
GRADE 8	Utilitarian Value	High	10.36	7.83	10.57	307	.0005
		Low	4.96	7.01			
	Individual Development Value	High	4.37	5.55	6.86	304	.0005
		Low	-0.45	6.64			
	Enjoyment	High	13.53	4.30	19.81	306	.0005
		Low	-2.12	9.05			
GRADE 12	Utilitarian Value	High	9.04	4.83	2.77	170	.005
		Low	7.04	4.58			
	Individual Development Value	High	6.79	4.12	5.32	110	.0005
		Low	1.91	5.28			
	Enjoyment	High	13.51	2.71	11.19	142	.0005
		Low	3.33	6.79			

The data indicate that for each scale, students identified as high on the construct scored more highly on the attitude scale designed to measure the construct. The differences in mean attitude scores were consistently more substantial for the Grade 8 students. One plausible explanation of this result is that students in Grade 8 participate in more stable groupings and therefore are able to rate their peers more validly than students in the less stable Grade 12 groups.

Covariance of the Three Attitudes Toward Reading.

At this stage it appeared that the scales were reasonably valid and reliable measures of the three attitudes toward reading. The last step of the study was to investigate further the assumption that the three constructs represented by the scale scores were so closely related that it was unnecessary to distinguish among them. A correlation matrix was calculated and is shown in Table 5.

TABLE 5.
Correlation Among the Three Attitudes Toward Reading

	Grade 8	Utilitarian	Individual Development	Enjoyment
Grade 8				
Utilitarian		1.00	0.29	0.28
Individual Development			1.00	0.48
Enjoyment				1.00
Grade 12				
Utilitarian		1.00	0.58	0.22
Individual Development			1.00	0.50
Enjoyment				1.00

were dimensions of the more global construct of attitude toward reading.

Thus, as would be expected, the correlations among Utilitarian, Individual Development and Enjoyment are statistically significant, implying that the measures are related. However, it is important to note that the correlations are certainly low enough to warrant measuring each attitude toward reading separately. The attitude scales do not covary to such a degree that they are merely different labels for the same construct. To employ a scale which does not measure these different attitudes would be to confound the assessment of students' attitudes toward reading.

The relationships between pairs of attitudes were investigated using a t-test for correlated samples. For Grade 12 the Utilitarian attitude was correlated significantly more highly ($P < .001$) with Individual Development than with Enjoyment. Of the two valuing constructs, Individual Development was significantly more closely related to Enjoyment in both grades ($P < .001$). Thus, it appears that in Grade 12, students who see reading as useful for getting ahead in the world also tend to see it as a means of developing self-awareness, whereas this phenomenon does not occur in Grade 8. However, in both grades valuing reading as a means of securing academic or vocational success is only weakly associated with enjoyment of reading.

The main issue in this paper was the degree of overlap between the theoretical constructs and not merely the particular measures we produced. Therefore, the intercorrelations between scale scores for the unreliabilities of measurement were corrected using the correction for attenuation procedure (Guilford, 1956). The "corrected" correlations, representing the relationship between the three "pure" constructs (with the unreliabilities due to errors of instability removed) are recorded in Table 6.

TABLE 6.

"Corrected" Correlations Among Attitudes.

Grade 8	Utilitarian	Individual Development	Enjoyment
Utilitarian	1.00	0.41	0.36
Individual Development		1.00	0.60
Enjoyment			1.00
Grade 12			
Utilitarian	1.00	0.75	0.27
Individual Development		1.00	0.58
Enjoyment			1.00

The correlations indicate that in Grade 12 a substantially greater relationship exists between the two attitudes concerned with the valuing of reading (Utilitarian and Individual Development) than between either of them and Enjoyment. In addition, the correlation between Enjoyment and the valuing of reading as a Utilitarian device to promote success is quite low. In Grade 8, however, the picture is a little different. The relationship between the two valuing attitudes is weaker.

It appears that a clear distinction between the three attitudes is more likely at Grade 8 level than at Grade 12 level. This finding is consistent with the factor analytical data in Tables 1 and 2. At this later level the constructs measured by the Development and Utilitarian scales tend to overlap to a greater extent. Two explanations are possible. Students in Grade 12 may see reading for Individual Development as Utilitarian a construct

utilitarian aspects of reading as part of a broader form of self-development. Our initial feelings favour the former explanation as it is in the higher secondary levels that reading which can be interpreted as aimed at developing self-awareness, becomes examinable. That is, students in Grade 12 are frequently examined on the degree to which they can come to an understanding of characters in novels and the relevance these characters' behaviour has to their own lives.

In order to interpret further these correlations, the distance of each student's score from the mean of each attitude scale was computed as a fraction of the scale's standard deviation. In this way it was possible to compare students' respective levels of commitment to pairs of attitudes. A student was considered to have a difference between pairs of attitudes scores if (1) the student's score on one scale was at least one standard deviation above the mean and his/her score for another attitude was below the mean or, (2) the student's score on one attitude was at least one standard deviation below the mean and his/her score for another attitude was above the mean. The percentages of students whose scores fit either of these categories were calculated. The results are shown in Table 7.

It can be seen from Table 7 that between 11% and 28% of the sample have quite substantial differences between particular pairs of attitudes. These results indicate that individual students do vary on their attitudes toward the three constructs Individual Development, Utilitarian and Enjoyment, thus providing validation for the decision to measure the constructs separately. In general it can be said that the students in these samples valued reading as a Utilitarian device more than they found it Enjoyable or used it as a means of Individual Development.

TABLE 7.

Percentages of Students with Differences Between Attitudes Scores

Commitment		Grade 8	Grade 12
High	Low		
Utilitarian	Development	27	5
Development	Utilitarian	1	6
Development-Utilitarian Total		28	11
Utilitarian	Enjoyment	24	8
Enjoyment	Utilitarian	1	9
Utilitarian-Enjoyment Total		25	17
Enjoyment	Development	10	8
Development	Enjoyment	5	6
Enjoyment-Development Total		15	14

Yet another way of examining how students varied on the three attitudes toward reading was to determine the percentage of students who held a positive attitude toward one construct while having a negative attitude to a second. The distance of each student's score from each scale's neutral, or zero, point was computed as a fraction of the scale's standard deviation. A student was considered to hold a positive attitude toward one construct and a negative attitude toward another construct if (1) the student's score was at least one standard deviation above zero for one attitude, and below zero for another, or (2) the student's scores were at least one standard deviation below zero for one attitude and above zero for another. The percentages of students whose scores fit either of these categories are shown in Table 8.

Percentages of Students with Positive and Negative Attitudes.

Attitude			
Positive	Negative	Grade 8	Grade 12
Utilitarian	Development	27	10
Development	Utilitarian	0	0
Development-Utilitarian		Total	27
			10
Utilitarian	Enjoyment	10	14
Enjoyment	Utilitarian	0	4
Utilitarian-Enjoyment		Total	10
			18
Enjoyment	Development	8	7
Development	Enjoyment	2	3
Enjoyment-Development		Total	10
			10

The data in Table 8 indicate that between 10% and 27% of students sampled held positive attitudes on one construct and negative attitudes on another. It appears that similar trends exist in the relative commitment of both samples of students to different attitudes toward reading.

A substantial number of both Grade 8 and Grade 12 students believe that reading is useful for getting ahead in the world, but not valuable as a means of developing a greater awareness of oneself or others. Similarly, approximately 7% of students in both samples indicate that reading is enjoyable, but has no value for developing the individual. Finally, and perhaps most importantly, there are 10% of Grade 8 and 14% of Grade 12

students who do not appear to find reading enjoyable, but who do see it as a valuable way of achieving vocational goals, including success at school.

Conclusion and Implications.

Results presented here indicate that there is good reason to believe that individuals possess attitudes, rather than an attitude, toward reading. Reading education experts demonstrated that it is possible to differentiate conceptually among, (1) valuing reading as a means of Individual Development, (2) valuing reading as a means of achieving Utilitarian ends, and (3) Enjoyment of reading. Furthermore, their ratings showed that it is possible to construct items measuring each of these three constructs. Analyses of secondary school students' responses to the three scales provide further evidence that the different attitudes toward reading are measurable and that the attitudes are distinguishable one from the other.

Numerous implications may be drawn in light of the findings of this study. First, scales such as those employed here should be used to provide a more valid indication of how people feel about reading. Scales in general use which purport to measure attitude toward reading are not sampling adequately the three dimensions outlined above, and therefore may well be providing an incomplete or misleading view of people's attitudes toward reading.

Alexander and Filler (1976) note conflicting results in research investigating the relations between attitudes toward reading and achievement in reading. It may be that the conflicting results are due to the confounding of attitudes toward reading. Perhaps each of three attitudes discussed here is related in a particular way to achievement in reading. Further research in this area would help characterize the relations between attitudes and

Questions arise in the areas of curriculum and diagnosis as well.

Should curriculum aim at promoting growth in each attitude, or should the school focus on developing positive attitudes in only one or two of these areas? What effects does a particular curriculum have on students' relative commitments to the three attitudes?

In so far as diagnosis is concerned, an indication of students' attitudes in each of the three areas could provide a detailed profile of how particular children feel about reading. Such information could be useful in planning reading programmes or in giving the teachers insight into what motivates or fails to motivate certain children to read.

Also, the question of developmental patterns in children's attitudes toward reading arises. Are there shifts in attitudes toward reading that occur as children proceed through formal schooling? If so, are these shifts linked to curriculum? To sociological factors?

In the light of the results of this study and the implications of these results, further refinement of the attitude scales seems both warranted and needed. Such development is particularly necessary for the scales to be used to measure validly attitudes of individual students. Research designed to achieve that end is currently in progress.

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