

CHANGE AND THE CORRELATES OF CHANGE*

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Of particular interest in a longitudinal study are the changes that occur between two points in time. There are two ways in which change can be studied: first, by correlating subjects' scores at one point in time with their scores at another point in time, second, by comparing group means. The one procedure focuses on individual change, the other on group change.

This paper describes the changes that occurred in a group of 103 boys who were first studied in grade 9 and then again in grade 12. The data collected at these two points in time yielded 186 measures. Of these 80 were conceived of as possible indicators of vocational maturity (see Table 2); the remainder were variables like intelligence and parental occupational level which might be related to these presumed indices of maturity.

Relationship between 9th and 12th grade scores. Table 1 reports the correlations between 9th and 12th grade scores on the 80 measures which may be helpful in assessing a subject's vocational maturity. It will be noted that only 13 of the correlations achieve significance at the .01 level and that they range from .26 to .55.

The significant correlations are:

Specificity of information about the preferred occupation:	
Training and educational requirements.....	..278
Range of information, all occupations under consideration:	
Hours of work.....	..305

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2. Even the significant correlations, most of which are in the 30's and 40's, leave so much of the variance unaccounted for, that while they may be statistically significant, they are not very useful for purposes of prediction.

Difference between 9th and 12th grade means. Table 2 shows that certain traits, attitudes and behaviors are considerably more in evidence in grade 12 than in grade 9. There were 34 on which the 12th grade mean was significantly higher (at the .01 level) than the 9th grade mean. There were 6 instances in which they were significantly lower.

If the measures are grouped in the same manner as in Table 1, it can be seen that the categories in which a majority of the measures showed significant increases are: Independence of Work Experience (5 out of 5)

Consistency of Preferences (3 out of 3).

Specificity of preference and commitment or attachment to it also showed an increase. Eighteen out of 42 measures dealing with information showed an increase. On exactly half of the measures there were no significant differences between 9th and 12th grade means. Of these, 24 were information measures.

The six instances in which the 12th grade mean was lower than the 9th grade mean deserve special comment because in at least 4 out of the 6, the results run counter to expectation. The six in question are:

Number of occupational possibilities under consideration

Number of fields under consideration

Plans for qualifying for a beginning job or post-high school training

Implementation: Selection of relevant high school courses and curriculum

Implementation: Selection of relevant extra-curricular activities

Use of resources.

Of the preceding the decrease in Number of occupation possibilities and

fields under consideration is the easiest to account for. One would expect this type of narrowing with experience and maturity.

With regard to Plans for qualifying for a beginning job or post-high school training, the twelfth-grader is almost at the end of his school career; there is not much he can do at this stage to improve his chances of getting into a beginning job, a training program, or college. The die, so to speak, has already been cast. The ninth-grader, on the other hand, is at the beginning of his school career, and can envisage more ways of utilizing courses, school activities and the like to improve his future chances.

There were two implementation measures dealing with school courses and activities selected by the boy because he thought they were relevant to his occupational goal. The reason for the lower 12th grade scores may be contained in Tables 3 and 4 which show that most boys not only change their preferences rather drastically during the four years of high school, but also that they are not very attached even to their 12th grade preference. Consequently, when a twelfth-grader is asked to detail what he has done to implement his preference, he may not have as much to point to as a ninth-grader who, upon enrolling in high school, is required to make a variety of decisions about courses, curriculum, school activities and the like.

Twelfth-graders also appear to be making use of fewer resources than 9th graders in getting oriented. Here again, their lower scores may be related to fairly recent changes of preference and/or lack of commitment to these preferences. The ninth-grader may be equally uncommitted but there are decisions about courses and curriculum which he cannot postpone; there are also more readily available sources of information in the form of older brothers, parents, teachers, peers, guidance counselors, school handbooks, and the like.

Summary. Most scores increase between the 9th and 12th grades except those dealing with rather specific items of occupational information. Even so, 12th graders as a group have more information about their preference than 9th graders. The occupational possibilities which they are considering are fewer in number and they are also more consistent. Their preferences are more specific, and they are also more committed or attached to them. The degree of commitment to them, however, is not high. Twelfth-graders had more paid work experience and evidenced more initiative and independence in finding employment.

Their preferences are not significantly more realistic than those of 9th graders. This does not mean, however, that their preferences are unrealistic. In an earlier monograph it was reported that 9th graders are not as unrealistic as some studies have suggested. Even in the 9th grade, about half of our subjects had preferences which were in accord with their measured interests and abilities.

FACTORS ASSOCIATED WITH CHANGE

As we have seen, a subject's standing in grade 12 cannot be predicted with any degree of accuracy from his standing in grade 9. This does not necessarily mean that changes in standing are completely random and unpredictable. While later standing may not be related to earlier standing, it may be related to such factors as intelligence, parental occupational level and school achievement.

To investigate this possibility, the subjects were divided into four groups according to whether their position in the group had improved, deteriorated, or remained unchanged over the four year period. Thus, on each of the 18 factors which had similar structures at the two grade levels

(see paper by Heyde) those subjects who were below the median in the 9th grade but above the median in the 12th, were assigned to the low-high group, and those who were above the median in the 9th grade, but below the median in the 12th, to the high-low group. Subjects whose positions remained unchanged were assigned to the high-high or low-low groups according to whether they were below or above the median on both occasions. Each group was then compared with every other group on 26 variables including grades, type of curriculum, intelligence, parental occupational level, peer acceptance, clarity of self concept, scope of self concept, etc.

The table in which preliminary findings were presented is being reworked. A new and more appropriate analysis of the data is currently underway, the results of which should be available by the end of this year.

OTHER FINDINGS

Tables 3 and 4 indicate that our subjects' preferences underwent considerable change over the four-year period, and that most 9th and 12th grade boys have only a minimal attachment to their preferences. More than two-thirds of 12th graders say that they may change their preferences. Ninth-graders show even less attachment to their preferences.

A majority of boys (56%) change their preferences substantially between the 9th and 12th grades. The scores which the 12th graders obtained on our measures are therefore based on what they know, or have done about, these lightly held and/or recently acquired preferences. One would expect that this would make prediction difficult.

SUMMARY

Certain traits, attitudes and behaviors are much more in evidence in the 12th grade than in the 9th. In most instances, however, a boy's standing

in the 9th grade offers no reliable clue to his standing in the 12th grade. This may be due to the fact that preferences at both the 9th and 12th grades appear to be quite tentative and unstable.

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RELATIONSHIP BETWEEN 9th AND 12th GRADE SCORES ON CERTAIN VOCATIONALLY RELEVANT ATTRIBUTES, BEHAVIORS AND ATTITUDES

Table 1

<u>Category</u>	<u>Number of Variables in Category</u>	<u>No. Signif. at .01 Level</u>	<u>Titles of Variables on which Standing at 9th Grade was Significantly Correlated with Standing at the 12th Grade</u>	<u>r*</u>
Information	42	4	Specificity of Information about the Preferred Occupation: Training & Educational Requirements	.278
			Range of Information, All Occupations Under Consideration: Hours of Work	.305
			Awareness of Factors in Occupational Choice: Hours of Work	.360
			Awareness of Factors in Occupational Choice: Psychological Conditions	.410
Consideration of Possibilities	3	2	Consideration of Alternatives	.377
			Number of Fields Under Consideration	.279
Implementation of Preference	5	1	Selection of Vocationally Relevant Extra-Curricular Activities	.260
Planning	5	0		
Crystallization & Patterning of Interests	3	1	Interest Maturity (Strong's Blank)	.554
Independence of Work Experience	5	0		

*p < .01 = .254

(continued)

Table 1
(continued)

<u>Category</u>	<u>Number of Variables in Category</u>	<u>No. Signif. at .01 Level</u>	<u>Titles of Variables on which Standing at 9th Grade Was Significantly Correlated With Standing at the 12th Grade</u>	<u>r*</u>
Acceptance of Responsibility for Choice & Planning	3	0		
Consistency of Preferences	3	0		
Realism of Preference	7	5	Agreement between Ability and First Choice	.458
			Agreement between Ability and All Preferences Under Consideration	.370
			Agreement between Level of Measured Interests and Level of Preference	.318
			Socioeconomic Accessibility of Preference	.408
			Socioeconomic Accessibility of All Preferences Under Consideration	.404
Use of Resources	1	0		
Commitment to Preference	1	0		
Awareness of Contingency Factors	1	0		
Specificity of Preference	1	0		
N = 80				
		13		

*p < .01 = .254

Table 2

COMPARISON OF 9th AND 12th GRADE MEANS ON 80 VOCATIONALLY
RELEVANT ATTRIBUTES, BEHAVIORS, AND ATTITUDES

<u>Variable</u>	<u>Signif.*</u> <u>Higher</u> <u>12th Gr.</u>	<u>Signif.</u> <u>Lower</u> <u>12th Gr.</u>	<u>No</u> <u>Difference</u>
Specificity of Info. about the Preferred Occ.			
Required h.s. background			x
Required training and/or education	x		
Economic requirements			x
Psychological requirements	x		
Duties	x		
Monetary rewards	x		
Entry opportunities	x		
Supply and demand			x
Opportunities for advancement & transfer	x		
Family obligations			x
Range of Info., All Occ. Under Consideration			
Required h.s. background			x
Required training and/or education	x		
Economic requirements			x
Psychological requirements			x
Duties			x
Rationale for duties			x
Conditions of work: monetary rewards	x		
Conditions of work: hours			x
Conditions of work: security			x
Conditions of work: physical conditions			x
Conditions of work: psychosocial conditions	x		
Entry opportunities	x		
Supply and demand	x		
Opportunities for advancement & transfer	x		
Family obligations			x
Awareness of Factors in Vocational Choice			
Required h.s. background			x
Required training and/or education	x		
Economic requirements			x
Psychological requirements			x
Physical requirements			x
Duties	x		
Rationale for duties			x
Duties: how well work must be done			x
Conditions of work: monetary rewards			x
Conditions of work: hours	x		
Conditions of work: security			x
Conditions of work: physical conditions			x
Conditions of work: psychosocial conditions	x		
Opportunities for entry	x		
Supply and demand			x
Opportunities for advancement & transfer	x		
Family obligations			x

*Significant at .01 level.

(continued)

Table 2
(continued)

<u>Variable</u>	<u>Signif.*</u> <u>Higher</u> <u>12th Gr.</u>	<u>Signif.</u> <u>Lower</u> <u>12th Gr.</u>	<u>No</u> <u>Difference</u>
Specificity of Preference	x		
Consideration of Alternatives	x		
Commitment to Preference	x		
Extent of Planning			x
Specificity of Planning			
Plans for qualifying in h.s. for post-h.s. training or a beginning job		x	
Plans for obtaining post-h.s. training or beginning job	x		
Plans for getting into the occ. once training has been completed			x
Plans for qualifying for the preferred occupation	x		
Number of Occupational Possibilities Under Consideration		x	
Number of Fields Under Consideration		x	
Awareness of Contingency Factors			x
Use of Resources in Orientation		x	
Implementation			
Selection of relevant h.s. courses and curriculum		x	
Selection of relevant school activities		x	
Obtaining of, or the taking of steps to obtain, relevant work experience			x
Steps taken to obtain or be admitted to intended job or training	x		
Range of implementation			x
Acceptance of Responsibility for Choice and Planning			
Choice of occupation			x
Choice of training and/or education			x
Employment, training, and/or experience	x		
Consistency of Fields	x		
Consistency of Levels	x		
Consistency within Families	x		
Interest Maturity			x
Degree of Patterning of Measured Interests (medians)			x
Degree of Patterning of Measured Interests (A & B+)	x		

*Significant at .01 level.

(continued)

Table 2
(continued)

<u>Variable</u>	<u>Signif.*</u> <u>Higher</u> <u>12th Gr.</u>	<u>Signif.</u> <u>Lower</u> <u>12th Gr.</u>	<u>No</u> <u>Difference</u>
Independence of Work Experience			
Assumption of responsibility for obtaining employment	x		
Self-employment	x		
Extent of extra-curricular work experience	x		
Auspices of work Establishment	x		
Establishment	x		
Agreement between Ability and First Preference			x
Agreement between Measured Interests and First Preference			x
Agreement between Occupational Level of Measured Interests and Level of Preference			x
Socioeconomic Accessibility of First Preference			x
Socioeconomic Accessibility of All Preferences			x
Agreement between Measured Interests and All Preferences			x
Agreement between Ability and All Preferences			x

Table 3
 STABILITY OF PREFERENCES OVER FOUR-YEAR PERIOD
 (9th GRADE - 12th GRADE)
 (N = 119)

<u>Degree of Similarity between 9th & 12th Grade Preferences</u>	<u>N</u>	<u>%</u>
Preferences identical or very similar, e.g., airplane mechanic, diesel mechanic	19	16
Different but in same field and on same level, e.g., TV repairman, auto-mechanic	7	6
Preferences are in same field but on different levels, e.g., electrical engineer, TV repairman	26	22
Preferences are in different fields, e.g., forest ranger, bookkeeper	67	56

Table 4
 COMMITMENT TO PREFERENCE EXPRESSED IN 12th GRADE
 (N = 120)

<u>Degree of Commitment</u>	<u>N</u>	<u>%</u>
Strong	16	13.3
Intermediate	22	18.3
Minimal	82	68.3