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ABSTRACT

Work values, or the qualities and rewards that one desires from work, are considered to be important determinants of career decision making and exploration during adolescence. A study was conducted to investigate age-based continuities and discontinuities in the structure of work values in a cross-sectional sample of 679 students in grades 7-12. It was hypothesized that the structure of work values would not be continuous across the grade levels, and that the discontinuities would reflect a normative pattern of increased differentiation. Work values were measured with the Work Aspect Preference Scale (WAPS). Confirmatory factor analysis was the primary data analytic strategy. The purpose of the analysis was to test for factor invariance of the WAPS scales across gender and grade levels. The model depicting configural factor invariance across grade levels was rejected, and in general, the structure was found to be more differentiated in the higher grade levels than in the lower grade levels. Females also tended to evidence greater differentiation than males. The findings suggest that the development of work values during adolescence is characterized by the progression toward greater differentiation. (Author/KC)

DIFFERENTIATION OF WORK VALUES DURING ADOLESCENCE

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ABSTRACT

Work values, or the qualities and rewards that one desires from work (e.g., money, personal growth), are considered to be important personological determinants of career decision making and exploration during adolescence. The present study was undertaken to investigate age-based continuities and discontinuities in the structure of work values in a cross-sectional sample of 679 students in grades 7-12.

It was hypothesized that the structure of work values would not be continuous across the grade levels, and that the discontinuities would reflect a normative pattern of increased differentiation. Confirmatory factor analysis (via LISREL) was the primary data analytic strategy. Structural continuity was operationalized as factor invariance, and greater differentiation was operationalized as more factors, fewer global factors, and less correlation among the factors.

The model depicting configural factor invariance across grade levels was rejected, and in general, the structure was found to be more differentiated in the higher grade levels than in the lower grade levels. Also, females tended to evidence greater differentiation than males. The findings suggest that the development of work values during adolescence is characterized by the progression towards greater differentiation.

INTRODUCTION

Whereas, in the past, the career development of adolescents was largely a concern of vocational and educational psychologists, it is becoming more clear to developmental psychologists that career development is an essential component of adolescent development (e.g., Archer, 1985; Grotevant & Thorbecke, 1982; Vondracek, Lerner, & Schulenberg, 1983, 1986; Waterman, 1982). Career development can be viewed as being interrelated with other key developmental processes characteristic of adolescence, including identity formation (e.g., Erikson, 1968; Waterman, 1982), self-concept development (e.g., Super, 1957; Tiedeman & O'Hara, 1963), and cognitive development (e.g., Inhelder & Piaget, 1958; Neimeyer, Nevill, Probert, & Fukuyama, 1985; Tiedeman & O'Hara, 1963). As part of the continuing effort to bridge vocational and developmental psychology (cf. Jepsen, 1984; Vondracek et al., 1983, 1986), the present study was undertaken to investigate the development of work values during adolescence.

Work values, or the qualities and rewards that one desires from work (e.g., money, personal growth), are considered to be important personological determinants of career decision making and exploration during adolescence (e.g., Ginzberg, Ginsburg, Axelrad, & Herma, 1951; Herr & Cramer, 1984; Katz, 1963; Pryor, 1979; Super, Starishevsky, Matlin, & Jordaan, 1963). For example, in discussing the importance of work values, Katz (1963) stated that "if there is a single synthesizing element...that accounts for a particular decision or for a mode of choosing... that element is the individual's value system" (p. 16). A critical issue for vocational theory, research, and guidance and testing is the stability and development of work values during adolescence. Although there is some (generally equivocal) empirical evidence concerning the changes in work values during adolescence at the quantitative (e.g., mean, rank-order) level (for reviews of this literature, see, e.g., Kapes & Strickler, 1975; Zytowski, 1970; Pryor, 1980), little is known about the qualitative, or structural, continuities or discontinuities in work values during adolescence.

s gap in the literature is problematic. While
ations of both quantitative and structural change are
t, the examination of the invariance in the meaning of
truct over time (i.e., structural continuity) can be
ed superordinate to the examination of changes in the
e of the construct (i.e., quantitative change) (e.g.,
Nesslroade, 1970; 1973; Labouvie, 1980; Nesselroade,
That is, if the meaning of a given construct changes
qualitative discontinuities are identified), then the
of making quantitative comparisons is rendered
ble. The present study sought to address this gap in
ature by considering age-based continuities and
uities in the factor structure of work values in a cross
sample of adolescents in grades seventh through

ral of the current conceptual formulations in the
l literature suggest that career development during
ce is marked by the progression from global and poorly
onceptions of the self in relation to the world of work
hat are more clearly defined and differentiated (e.g.,
57; Super et al., 1963; Jepsen, 1984; Knefelkamp &
1976; Tiedeman & O'Hara, 1963; Neimeyer et al., 1985).
ith these formulations, as well as with Werner's (1957)
ic principle, it was hypothesized that the structure of
s would be more differentiated at the higher grade
n at the lower grade levels. That is, it was predicted
tructure would not be continuous across the grade
d that the discontinuities would refect a normative
increased differentiation. In addition, in
g that increased differentiation represents increased
urity (see Super et al., 1963), and based on the
finding that females tend to evidence greater career
han males during adolescence (e.g., Smith & Herr, 1972;
78; Herr & Enderlein, 1976; Omvig & Thomas, 1977), it
ted that the structure would be more differentiated for
an for males.

To test the hypotheses described above, the general research questions of the present study were: (1) Is the factor structure of work values invariant across grade-based subsamples of adolescents? (2) If the structure is not invariant, do the discontinuites reflect a pattern of increasing differentiation across the grade levels? and (3) Is the structure of work values invariant with respect to gender, both overall and at the grade levels?

METHODS

The present study is part of a larger ongoing investigation of the career development of junior high and senior high school students. The larger project utilizes a cross-sequential longitudinal design. Two waves of data have been collected, and a third is scheduled for the fall of 1987. In addition to work values, constructs that have been or will be investigated include career interests, career indecision, educational and occupational aspirations and expectations, family background characteristics, curriculum track, identity formation, future time orientation, and personality characteristics. The present study is based on the first wave of data collection.

Subjects

The potential sample consisted of all of the approximately 1020 students enrolled in a rural community junior-senior high school (grades 7-12) in western Pennsylvania. Of the 961 students who had parental/guardian consent to participate, agreed to participate, and were present on the day of data collection, 195 students (one homeroom per grade level) were designated as the control group (i.e., did not receive the vocational measures). Of the remaining 766 students, the data of 87 students were elimated due to incomplete or obviously bogus responses. Thus, the present sample consisted of 679 students (332 females, 347 males). For the present analyses, students were grouped into six grade level by gender groups: 7th-8th grade females (n=116) and males (n=128); 9th-10th grade females (n=102) and males (n=112); and 11th-12th grade females (n=114) and males (n=109).

Measure

Work values were measured with the Work Aspect Preference Scale (WAPS; Pryor, 1981), a standardized self-administered questionnaire that has been found previously to be a valid and reliable measure of preferences for 13 distinct work values (e.g., see Pryor, 1983). The WAPS consists of 52 variable-response items (responses are on a five-point scale and range from "totally unimportant" to "extremely important"), with four items per scale. The 13 scales, and a sample item of each scale, are presented in Table 1 (the acronym and alpha reliability coefficient for each scale are also provided).

Procedures

As part of a large battery of vocational questionnaires, the WAPS was administered to students during an extended homeroom period (students are assigned to homeroom alphabetically). Homeroom teachers were instructed by project staff as to the administration procedures.

ANALYSES AND RESULTS

The primary purpose of the analyses was to test for factor invariance of the WAPS scales across gender and grade levels, and if factor invariance was not obtained, to consider the pattern of discontinuites in reference to the extent of differentiation. Both "configural" factor invariance (i.e., same pattern of zero and non-zero factor loadings) and "strong" factor invariance (i.e., same values for all loadings) across the groups were considered. Differentiation was operationalized as the number of factors, the "global" characteristics of the factors, and the extent of intercorrelations among the factors (cf. Baltes, Cornelius, Spiro, Nesselroade, & Willis, 1980; Coan, 1966; Reinert, 1970). That is, a more differentiated structure would be characterized by more factors, fewer global factors, and/or lower factor correlations.

The data base consisted of nine correlation matrices constructed from the WAPS scales: one for the total group, one for females, one for males, and one each for the six grade level by gender groups. The analytic strategy included both

exploratory factor analysis (via the Exploratory Factor Analysis Program (EFAP; Joreskog & Sorbom, 1980) and the SPSSX factor procedure) and confirmatory factor analysis (via LISREL VI (Joreskog & Sorbom, 1984)). In an effort to maximize the chances for detecting factor invariance across the groups (see, e.g., Meredith, 1964; Joreskog, 1971; Schaie & Hertzog, 1985), the scale covariance matrices were used when conducting multiple group confirmatory factor analysis, and factors were permitted to covary (promax rotation was used in the exploratory factor analyses, and the factor covariance matrix was unrestricted in the confirmatory factor analyses). Maximum likelihood estimation procedures were used in all analyses.

In accord with the research questions described above, the analyses consisted of four sequential steps: (1) construct a "target" confirmatory factor model for the total sample; (2) test the fit of the target model for the female total and male total subsamples (to test for factor invariance across gender), and if unsuccessful, develop gender-specific models; (3) test the fit of the target model for the grade level groups within gender (to test for factor invariance across grade levels), and if unsuccessful, develop grade-specific models; and (4) consider gender differences within each grade level group. These steps, and the results at each step, are described in detail below.

Target Confirmatory Factor Model

The first step was to construct a "target" confimatory factor model for the total sample that could be used to test for factor invariance across the sub-samples. Based on the scree test (Cattell, 1966), the Tucker-Lewis reliability coefficient (Tucker & Lewis, 1973), previous exploratory factor analytic work with the WAPS (Pryor, 1986), and on an examination of the loading patterns and residuals of various exploratory models (cf. Gorsuch, 1983), it was determined that four factors were indicated. The initial specification of the confirmatory factor loading pattern was based on exploratory factor analyses (hypothesized non-salient loadings were fixed equal to 0 and salient loadings were unrestricted). Based on the LISREL results, the fit of this initial model was less than adequate,

and model modification ensued until no further meaningful modifications were indicated. The accepted model is presented in Table 2. This model provided a good fit to the data [Goodness of Fit Index (GFI)=.94; although a significant chi-square was obtained (309.24, df= 53, p < .001), indicating that the relationships among the observed variables were not fully accounted for, this was probably due to the large sample size.] As is shown in Table 2, the four factors were:

I. Non-Work Orientation (the concern that work not interfere with the rest of one's life);

II. Human-Personal Concern (concern with personal relationships and self development);

III. Power/Control (concern with exercizing control over one's work and the work of others);

IV. Material (concern with money and job security).

These factors were all significantly correlated (the correlations between factors I and IV, and between II and III were quite substantial).

Gender Comparison

The next step was to use the target model to test for factor invariance across gender (disregarding grade level). To test for configural factor invariance (same pattern of zero and non-zero factor loadings), a two group confirmatory factor analysis was conducted. It was found that the target model provided an acceptable fit for both females and males (GFI for females = .92; GFI for males = .92; chi-square = 377.11, df=105, p < .001 -- again, the large sample size probably contributed to the significant chi-square), indicating that configural factor invariance was obtained across gender. The model depicting strong factor invariance (same factor loading values) across gender was then tested, and it was found that this model provided a significantly worse fit than did the previous model (increase in chi-square was significant; however the GFI values for females and males did not decrease), and thus was rejected. Attempts were made to isolate the constraints that were causing the stress in this model; however, it was found that the stress could not be isolated to only a few constrained factor loadings. Thus, at

least with respect to configural factor invariance, the factor structure for females and males overall was found to be identical.

Grade Level Group Comparisons (within gender)

The third step was to test the fit of the target model for the data of the three grade level groups separately by gender (although overall gender differences were not detected above, it was considered possible that gender differences could exist at the different grade levels). To test for configural factor invariance for females and for males across the three grade level groups, three group confirmatory factor analyses were conducted. Both the model for females and the model for males were rejected, indicating a lack of configural factor invariance across the grade levels for both females and males. For females, although the model provided a fair fit to the data especially for the 7th-8th and 9th-10th graders (GFIs for the three grade level groups were .89, .89, and .83, respectively), estimation problems were encountered (negative unique variances -- i.e., Heywood cases), and even after this was remedied (unique variances in question were fixed equal to .01), some of the factors were clearly item-specific. In addition, in considering the indicated number of factors (see below), it was determined that a four factor model was not appropriate for all three groups. For males, negative unique variances were also obtained, and even when this was remedied, iterations could not converge after several attempts. Rather than attempting model modification within the confirmatory factor mode, exploratory factor analyses were conducted on the six grade level by gender groups.

Females. As was the case for the total group, the determination of the number of factors for each grade level group was based on the careful consideration of several criteria (scree test, Tucker-Lewis reliability coefficient, consideration of the loading patterns and residuals of different exploratory factor analytic models). It was determined that three, four, and five factors would be extracted for the 7th-8th, 9th-10th, and 11th-12th grade level groups, respectively. The SPSSX factor procedure was used, with promax rotation. The three exploratory

factor models are presented in Table 3 (factor intercorrelations are presented in Table 4). The characteristics of these factors are similar to those obtained for the total sample (as discussed above). Although there are some similarities across the grade level groups, there is evidence indicating a pattern of increased differentiation. First, the number of factors increased across the grade level groups. Secondly, although the Non-Work Orientation and Material factors remained fairly similar across the groups, the Human-Personal Concern factor became less global and split into additional factors (i.e., Power/Control in the latter two groups, and Security in the last group). Third, the Non-Work Orientation and Human-Personal Concern factors became less correlated across the grade level groups.

Males. According to the several criteria (as discussed above), three factors were indicated for both the 7th-8th and 9th-10th grade males, and four factors were indicated for the 11th-12th grade males. These three exploratory factor analysis models are presented in Table 5 (factor intercorrelations are presented in Table 6). Again, the characteristics of the factors are similar to those obtained for the total sample, although the factor representing Non-Work Orientation was quite global in the first two groups. The evidence for a pattern of increased differentiation is not as clear as it was for females. Indeed, it appears that the extent of differentiation is similar for the 7th-8th and 9th-10th grade level groups. There is evidence that the structure was more differentiated for the 11th-12th grade level group. Specifically, the number of factors increased from three to four, and the factors appeared somewhat less global. The differentiation, however, could not be attributed to the splitting of a specific factor (as was the case for females); and the factor intercorrelations did not appear to decrease in magnitude.

Gender Comparisons Within Grade Level Groups

The final step was to compare the structure for females and males at each grade level group. These comparisons were made by considering the exploratory factor models presented in Tables 3-6. In the 7th-8th grade level groups, although all of the

factors were not the same for males and females, structure of was equally differentiated for males and females. In both the 9th-10th and 11th-12th grade level groups, however, females evidenced greater differentiation than males. Specifically, there were more factors for females and the factors were less global (there was no evidence for greater differentiation in the factor intercorrelations). Thus, although there were no differences overall in the structure of work values for females and males overall (as noted previously), the evidence does indicate that the structure for females was more differentiated than it was for males, particularly at the higher grade levels.

To summarize the findings: (1) configural factor invariance was obtained across gender (disregarding grade level), indicating that the structure of work values was quite similar for females and males overall; (2) configural factor invariance was not obtained across grade level groups within gender, and the patterns of discontinuity reflected increased differentiation across the grade level groups (this pattern of increasing differentiation was more clear for females than for males, particularly in regard to the Human-Personal Concern factor); and (3) females evidenced greater differentiation than males at the 9th-10th and 11th-12th grade levels (but not at the 7th-8th grade level).

DISCUSSION

The present study was undertaken to investigate the continuities and discontinuities in the structure of work values in a cross sectional sample of adolescents. Based on several of the current conceptual formulations in the vocational literature that describe career development during adolescence as the progression from global and poorly defined conceptions of the self in relation to the world of work to views that are more clearly defined and differentiated, as well as on Werner's orthogenetic priciple, it was hypothesized that the structure of work values would not be continuous across the grade levels and that the discontinuities would reflect a pattern of increased differentiation. In addition, based on the consistent finding

ales evidence greater career maturity than males during
nce, it was hypothesized that the structure would be more
tiated for females than for males.
findings provide some support for both hypotheses.
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some of the factors were similar across the grade level
here was some evidence indicating that the structure was
ferentiated at the higher grade levels than the lower
vels. The pattern of increased differentiation was less
males than for females. The evidence is limited,
in that not all of the discontinuities noted across the
el groups fit a pattern of increased differentiation.
d suggest that the development of work values during
ce is more complex than would be suggested by a pattern
sing differentiation. In regard to gender differences,
configural factor invariance was obtained across females
overall, there was evidence indicating that the
was more differentiated for females than for males in
0th and 11th-12th grade level groups. However, again,
f the discontinuities across gender reflected a pattern
ed differentiation.
findings must be considered within the limitations of
t study. First, the study was limited by the necessity
mating normative developmental patterns with
l based (age-related) differences. That is, historical
netic effects were confounded. Longitudinal
s, as well as cross-sequential comparisons, are needed
in intra-individual change and to disentangle
c and historical effects (such analyses are underway
larger project). The second limitation involves the
ty the WAPS to measure the work value constructs. That
be the case that the WAPS is an imperfect measure of
structs.
hird limitation of the present study involves the use
tory factor analysis to obtain the models for each of
level by gender groups. Since exploratory factor

analysis does not provide a unique solution (i.e., several competing models are equally acceptable on a statistical basis), it is possible (but not likely) that the patterns pertaining to increased differentiation were an artifact of this method. Confirmatory factor analysis, albeit more tedious, should be used to obtain the models for each group, and also to more specifically consider the similarities in the factors across the groups (e.g., some of the factors may be identical across the groups). While these analyses will be conducted on the present sample, it is essential that the obtained models be tested on a new sample before conclusions about the generality of the models can be made.

Finally, the study was limited in its focus on normative ontogenetic patterns. That is, the present study provides information about the possible developmental progression for adolescents in general, but fails to consider individual differences in the progression. It may be the case that the progression differs according to such factors as career decisiveness or curriculum track (cf. Kapes & Strickler, 1975). Future research needs to attend to possible interindividual differences in the developmental progression.

Although there are certain limitations of the present study, there are several implications for career theory, research, and practice (only the most important are mentioned here). In terms of research, the finding that the factor structure of work values is not continuous during adolescence suggests that the meaning of work values may change, indicating that age-based comparisons at the quantitative level may not be appropriate (if the same construct is not being measured, than comparisons may not be meaningful). Furthermore, since basing predictions and guidance on work values identified at one point in time is appropriate only to the extent that work values remain unchanged (cf. Super, 1983), the findings indicate that testing and guidance should not be based on a one-time assessment of work values. Finally, the study indicates that career development may progress in a manner similar to the progression of other key developmental phenomena, such as cognitive and identity development, during adolescence.

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TABLE1

Scale	Acronym	Sample Items (Work in which you...)	Alpha
Life Style	LS	do not have to change the way you live.	.72
Detachment	DET	are not expected to take work home.	.72
Independence	IND	can do your own work in your own way.	.70
Physical Activity	PA	are physically active.	.59
Surroundings	SUR	do your work in physically attractive work environment.	.63
Coworkers	CW	have pleasant people to work with.	.79
Self Development	SD	improve the skills you have.	.79
Altruism	ALT	give aid to those in need.	.76
Prestige	PRE	get a good reputation for your good work.	.74
Management	MAN	plan and arrange the work of others.	.71
Money	MON	become quite wealthy.	.73
Security	SEC	are certain of keeping your job.	.79
Creativity	CRE	design new things.	.77

Note. Each scale consists of 4 items; scale alphas based on those who completed all items (n=631).

Table 2. Accepted Confirmatory Factor Analysis Model for Total Sample.

	Factors				
Scale	I. Non-Work Orientation	II. Human-Personal Concern	III. Power/Control	IV. Material	Unique Variance
LS	70				51
DET	64				59
IND	38		34		63
PA	38	25			71
SUR	42	43			48
CW		62		20	51
SD		74			45
ALT		74			45
PRE		59		36	40
MAN			70		50
MON				87	24
SEC		35		40	64
CRE			77		41
Factor Intercorrelations					
I	1.00				
II	.41	1.00			
III	.44	.75	1.00		
IV	.60	.30	.41	1.00	

Note. Decimal points are omitted. Blanks indicate that parameter was fixed equal to 0; Factor loadings ≥ .35 are emphasized. (N = 679).

Table 3. Exploratory Factor Analysis Models for Females by Grade Level Group.

Scale	Factors I. Non-Work Orientation	II. Human-Personal Concern	III. Material	IV. Power/Control	V. Security	Unique Variances
7th-8th Grade Females (n = 116)						
LS	77					51
DET	71					64
IND	32	23				67
PA	46	23				61
SUR	43	32				56
CW	29	47				57
SD		84				39
ALT		82				41
PRE		67	30			41
MAN		61				54
MON			99			09
SEC			46			60
CRE		74	-21			52
9th-10th Grade Females (n = 102)						
LS	74					40
DET	63		28			43
IND	28		32	43		51
PA	56					68
SUR	48	36				53
CW		70				39
SD		63		37		31
ALT		49		38		49
PRE		52	40	25		32
MAN			29	73		35
MON			59			46
SEC		79				44
CRE				74		43
11th-12th Grade Females (n = 114)						
LS	82					33
DET	49		25			57
IND	61			35		44
PA	20	61				57
SUR	31	51				36
CW		67				43
SD		39		35	35	33
ALT		61				54
PRE		31	45		23	39
MAN		34	47	24		41
MON			78			29
SEC			25		77	28
CRE				87		14

Note. Decimal points are omitted. To facilitate interpretation, only factor loadings ≥ .2 are presented, and loadings ≥ .35 are emphasized.

Table 5. Exploratory Factor Analysis Models for Males by Grade Level Group.

Scale	Factors I. Global (Non-Work)	II. Power/ Control	III. Material	IV. Human-Personal Concern	V. Detachment	Unique Variance
7th-8th Grade Males (n = 128)						
LS	76					54
DET	58					64
IND	29					77
PA	62					69
SUR	51					48
CW	62	22				48
SD	44	32				61
ALT	37	56				39
PRE	33	32	25			50
MAN		60				65
MON			98			04
SEC	56		23			59
CRE		81				38
9th-10th Grade Males (n = 112)						
LS	81					45
DET	69					49
IND	40	47				58
PA	36					70
SUR	35			33		46
CW				85		24
SD				62		43
ALT		28		62		48
PRE	21			62		37
MAN		32		37		54
MON	55					62
SEC	48			40		54
CRE		95				07
11th-12th Grade Males (n = 109)						
LS		21	22	30		58
DET					98	04
IND		48	26			56
PA		34		33	24	58
SUR		39			36	41
CW				47		63
SD		32		64		36
ALT		62		35		35
PRE		54	24	29		32
MAN		71	25			41
MON			83			24
SEC			36	76		29
CRE		80				37

Note. Decimal points are omitted. To facilitate interpretation, only factor loadings ≥ .2 are presented, and loadings ≥ .35 are emphasized.

Table 4. Factor Intercorrelations for Females by Grade Level Groups

	Factors				
	I	II	III	IV	V
7th-8th Grade Females					
I	1.00				
II	.55	1.00			
III	.45	.37	1.00		
9th-10th Grade Females					
I	1.00				
II	.22	1.00			
III	.39	.23	1.00		
IV	.14	.45	.22	1.00	
11th-12th Grade Females					
I	1.00				
II	.26	1.00			
III	.49	.45	1.00		
IV	.23	.39	.20	1.00	
V	.14	.51	.21	.48	1.00

Table 6. Factor Intercorrelations for Males by Grade Level Groups

	Factors				
	I	II	III	IV	V
7th-8th Grade Males					
I	1.00				
II	.51	1.00			
III	.45	.28	1.00		
9th-10th Grade Males					
I	1.00				
II	.52	1.00			
IV	.62	.56		1.00	
11th-12th Grade Males					
II		1.00			
III		.31	1.00		
IV		.52	.35	1.00	
V		.26	.35	.29	1.00