Refining the Value Orientation Inventory

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Abstract:

Educational value orientations reflect teachers' philosophical beliefs about schooling and serve as the basis on which teachers make their decisions. Five value orientations have been identified empirically among physical educators: disciplinary mastery (DM), learning process (LP), self actualization (SA), ecological integration (EI), and social responsibility (SR) (Ennis & Chen, 1993). The Ennis Value Orientation Inventory (EnnisVOI) was designed and used in value orientation research to elicit physical educators' educational values by having teachers prioritize a set of curricular decisions. The original inventory (VOI-1) (Ennis & Hooper, 1988) consisted of 75 decision statements organized into 15 five-statement sets. Each statement in a set represented one value orientation. In testing, teachers first read and consider statements in a set. Then, they rank the five statements using a different number on a 5-point scale (in which 1 = least important and 5 = most important) to indicate their value priority. Teachers' value orientations emerge when they consistently rank the statements representing one particular value orientation higher than others throughout the 15 sets.

Keywords: physical education | validity | value orientations

Article:

Educational value orientations reflect teachers' philosophical beliefs about schooling and serve as the basis on which teachers make their decisions. Five value orientations have been identified empirically among physical educators: disciplinary mastery (DM), learning process (LP), self actualization (SA), ecological integration (EI), and social responsibility (SR) (Ennis & Chen, 1993). The Ennis Value Orientation Inventory (EnnisVOI) was designed and used in value orientation research to elicit physical educators' educational values by having teachers prioritize a set of curricular decisions. The original inventory (VOI-1) (Ennis & Hooper, 1988) consisted of 75 decision statements organized into 15 five-statement sets. Each statement in a set represented one value orientation. In testing, teachers first read and consider statements in a set. Then, they rank the five statements using a different number on a 5-point scale (in which 1 =

least important and 5 = most important) to indicate their value priority. Teachers' value orientations emerge when they consistently rank the statements representing one particular value orientation higher than others throughout the 15 sets.

Evidence derived from analyses of the teachers' value orientation profiles using the VOI-1 pointed to a need for a substantial revision of the statements and reconceptualization of the social reconstruction orientation. A subsequent examination of the representativeness of the statements led to a revision in the VOI and resulted in the construction of the Ennis-VOI-2 (VOI2). The VOI-2 includes 90 statements organized into 18 five-statement sets (Ennis & Chen, 1993). Another significant revision involved substituting the social reconstruction value orientation with a social responsibility orientation. The time needed to complete the VOI-2 varied but was usually between 30-60 min.

In developing the VOI-1 and VOI-2, the representativeness of the statements for a value orientation was determined primarily by having a panel of judges compare each item with the theoretical domain statement of the value orientation (Ennis & Chen, 1993; Ennis & Hooper, 1988). The items on which the judges reached a highly favorable consensus were considered to be representative and subsequently were used in the VOI. An underlying assumption, not examined previously, presupposed that the statements representing a value orientation would be rated higher than the midpoint of 3.0 on the 5-point scale by the teachers who highly valued the orientation. Examining this assumption became possible recently after the establishment of a data bank containing value profiles of teachers from several states across the United States and several foreign countries.

The purpose of this investigation was twofold: (1) to examine the representativeness of the statements for each value orientation in the VOI-2, using school-based teacher value profiles, and (2) to shorten the VOI-2 by eliminating the statements rated low (below the midpoint 3.0 on the 5-point scale) by teachers who highly valued the respective value orientations. Because the VOI-2 is a criterion-referenced instrument, we particularly focused on analyzing (a) the concordance (strength of association) and (b) the degree of classification consistency (agreement) of the VOI-Short Form (VOI-SF) with the VOI-2. Examining the concordance involved analyzing the concurrent validity of the new VOI-SF using the VOI-2 as a criterion test. The primary question to answer was to what extent we could reduce the error in predicting a pair of teachers' rankings on statements in the VOI-2, when we actually used their rankings from the new VOI-SF. A greater reduction in error would mean a greater degree of association between classifications from the two instruments. In analyzing the classification consistency (agreement), we hypothesized that the VOI-SF would be independent from the VOI-2. Thus, the interinstrument consistency could be determined.

Method

Data

Two sets of value orientation profiles were used in this study. The first set (Data 1) consisted of 491 profiles collected during previous value orientation studies (e.g., Ennis & Chen, 1995; Ennis, Chen, & Ross, 1992). Participants in Data 1 were physical education teachers from a major

metropolitan area in the United States. The second set (Data 2) included 277 profiles collected by researchers in seven U.S. states and two English-speaking foreign countries. In the analysis, we used only those profiles that demonstrated at least one value orientation higher than its classification criterion of mean plus a standard deviation of .60. This criterion was selected for classifying high value orientations, because it provided adequate power to discriminate between high and low value orientations while maintaining a relatively large sample size for statistical analyses (Ennis & Zhu, 1991). Based on this criterion, 10 value profiles were excluded from Data 1. The remaining 481 profiles included 152 in DM,143 in LP,163 in SA, 158 in EI, and 146 profiles in SR. Screening in Data 2 yielded a sample of 220 profiles, with 60 high value profiles in DM and 69, 70, 77, and 73 profiles in LP, SA, EI, and SR, respectively.

Preliminary Analysis

A preliminary descriptive analysis was conducted on Data 1 to provide an initial description of the consistency between statements and their associated value orientations. In the preliminary analysis, profiles high on one value orientation were categorized together. The mean and standard deviation of the 18 statements representing the value orientation were computed. The descriptive statistics showed that some statements in each of the five value orientations received low response scores (below the midpoint 3.0 on the 5-point scale) from the teachers who highly valued the corresponding orientations, indicating that those statements were inconsistent with their corresponding value orientations. Thus, the representativeness of those statements were judged questionable from the school teachers' perspective. This preliminary analysis presented a need for further validation of the statements in the Ennis-VOI-2.

Procedure

The validation procedure included three stages. In the first and second stages, the value profiles in Data l were used to (a) determine the weak representative statements to be eliminated and (b) generate a new VOI-SF format. In the third stage, the validating process was replicated using the value orientation profiles in Data 2.

Stage 1. In this stage, two tasks were accomplished. First, the teacher value profiles in Data 1 were categorized first into five high value orientation groups using the classification criterion of mean plus standard deviation of .60 (Ennis & Zhu, 1991). Then, within each high value orientation group, the 18 statements of the value orientation were ranked in terms of their means and standard deviations. The statement with the highest mean and lowest standard deviation was placed at the top, and the one with the lowest mean and highest standard deviation at the bottom. A statement with a mean below 3.0 on the 5-point scale was considered a weak representative for the value orientation and marked for elimination, regardless of its ranking position.

Stage 2. In this stage, a cyclic stepwise-elimination was conducted, which started with the weakest representative statement being eliminated from each value orientation and ended with three statements remaining in it. One elimination cycle involved four steps. First, the statement ranked as the lowest in each value orientation was eliminated. Second, a new classification criterion, based on a new mean and standard deviation from the scores of the remaining statements, was computed using the mean plus .60 standard deviation formula (Ennis & Zhu,

1991). In the third step, each value profile in the data set was recalculated, and its high value orientations were reclassified in terms of the new criteria. In the fourth step, the concordance and consistency of the reclassified profiles' high value priorities, with their original high value orientations determined using the original VOI-2, were examined using a contingency table approach.

Goodman and Kruskal's (1954) concordance coefficient (Gamma) was used to determine the concordance between a new VOI format produced at each cycle and the original VOI-2. Cohen's (1960) consistency coefficient (Kappa) was computed to assess the classification consistency between the two VOI formats. Criteria of .90 for Gamma (γ) and .60 for Kappa (κ) were predetermined as acceptable. In addition, both marginal distribution index (M) and Maximum Kappa (κ_{max}) coefficients were computed to provide additional marginal distribution information required for adequate interpretations of both γ and κ coefficients. Interested readers should refer to Cohen (1960), Goodman and Kruskal (1954), Ott, Larson, and Mendenhall (1992), and Looney (1987) for more detailed information about the indexes used.

Stage 3. In this stage, the validation process was replicated using Data 2. The profiles' high value orientations were first classified using the response scores on the original VOI-2, then reclassified based on the response scores on the statements included in the VOI-SF. The same contingency table approach was used to compute the γ and κ coefficients.

Table 1. Gamma (γ) and kappa (κ) coefficients at each elimination cycle on Data 1 ($N = 463$)

Cycle	Remaining items in each VO	DM ($\gamma - \kappa$)	LP ($\gamma - \kappa$)	SA ($\gamma - \kappa$)	EI ($\gamma - \kappa$)	SR ($\gamma - \kappa$)
1	17	.99 - .93	.99 - .91	.99 - .88	.99 - .89	.99 - .92
2	16	.99 - .91	.99 - .86	.99 - .85	.99 - .83	.99 - .87
3	15	.99 - .86	.99 - .87	.99 - .81	.97 - .76	.99 - .84
4	14	.99 - .84	.99 - .83	.96 - .74	.96 - .74	.99 - .83
5	13	.98 - .80	.98 - .80	.94 - .69	.96 - .73	.97 - .79
6	12	.95 - .71	.97 - .79	.95 - .69	.93 - .67	.97 - .78
7	11	.94 - .68	.96 - .74	.93 - .65	.90 - .62	.97 - .76
8[a]	10	.96 - .63	.96 - .71	.92 - .68	.91 - .63	.98 - .76
9	9	.94 - .69	.92 - .67	.89 - .53	.90 - .61	.97 - .76

Note. DM = disciplinary mastery; LP = learning process; SA = self actualization; EI = ecological integration; SR = social responsibility; VO = value orientation.
[a]The Ennis-VOI-SF format (10 items per VO) was based on the results from this cycle; VOI-SF = Value Orientation Inventory-Short Form.

Results

In the 90-statement VOI-2, 14 weak representative statements with mean scores below 3.0 were identified. Among those statements, five were found in each of SA and EI value orientations, two in DM, and one each in LP and SR. These statements were marked and eliminated. A total of 26 additional statements with low mean standard deviation ranking positions relative to the remaining statements were eliminated in the cyclic stepwise procedure, to produce a VOI-SF consistent with the five statements per set format. With the elimination of the statements, the γ and κ coefficients gradually decreased. Table 1 reports the γ and κ changes in each cycle (from

Cycle 1 to Cycle 9). It was evident that both γ and κ coefficients remained above the predetermined .90 and .60 acceptable criteria until the ninth cycle. The results suggested that a 10-set VOI-SF produced at the eighth cycle was likely to be an appropriate format. Table 2 presents the contingency tables based on which both the γ and κ coefficients for the five value orientations in the 8th cycle were obtained.

Table 2. Contingency table for classification consistency analysis at the 8th cycle (Data 1)

DM			VOI-SF		
			Nonhigh DM	High DM	Total
	VOI-2	Nonhigh DM	251 (52.2%)	78 (16.2%)	329 (68.4%)
		High DM	9 (1.9%)	143 (29.7%)	152 (31.6%)
		Total	260 (54.1%)	221 (45.9%)	481 (100.0%)
LP			VOI-SF		
			Nonhigh LP	High LP	Total
	VOI-2	Nonhigh LP	301 (62.7%)	36 (7.5%)	337 (70.2%)
		High LP	23 (4.8%)	120 (25.0%)	143 (29.8%)
		Total	324 (67.5%)	156 (32.5%)	480 (100.0%)
SA			VOI-SF		
			Nonhigh SA	High SA	Total
	VOI-2	Nonhigh SA	274 (57.1%)	43 (8.9%)	317 (66.0%)
		High SA	49 (10.2%)	114 (23.8%)	163 (34.0%)
		Total	323 (67.3%)	157 9 (32.7%)	480 (100.0%)
EI			VOI-SF		
			Nonhigh EI	High EI	Total
	VOI-2	Nonhigh EI	277 (57.8%)	44 (9.2%)	321 (67.0%)
		High EI	36 (7.5%)	122 (25.5%)	158 (33.0%)
		Total	313 (65.3%)	166 (34.7%)	479 (100.0%)
SR			VOI-SF		
			Nonhigh SR	High SR	Total
	VOI-2	Nonhigh SR	293 (61.0%)	41 (8.6%)	334 (69.6%)
		High SR	11 (92.3%)	135 (28.1%)	146 (30.4%)
		Total	304 (63.3%)	176 (36.7%)	480 (100.0%

Note. DM = disciplinary mastery; LP = learning process; SA = self actualization; EI = ecological integration; SR = social responsibility; VO = value orientation; VOI-1 = original value orientation inventory; VOI-2 = revised value orientation inventory; VOI-SF = Value Orientation Inventory-Short Form.

Table 3. Gamma (γ) and Kappa (κ) coefficients from data 2 (*N* = 220)

VOI format	DM	LP	SA	EI	SR
	(γ − κ)	(γ − κ)	(γ − κ)	(γ − κ)	(γ − κ)
10 set	.97 - .70	.92 - .64	.92 - .63	.95 - .72	.98 - .82
9 set	.96 - .70	.91 - .62	.88 - .57	.95 - .69	.96 - .74

Note. DM = disciplinary mastery; LP = learning process; SA = self actualization; EI = ecological integration; SR = social responsibility; VO = value orientation.

The replication of eliminating the same statements using the same procedure in Data 2 supported adopting the 10-set VOI-SF. Table 3 reports the g and k coefficients for both the 10-statement and 9-statement VOI formats based on the analyses on Data 2, using the same contingency table

approach. The y and K coefficients for the 10-set format met the .90 and .60 criteria, respectively, while the 9-statement format did not.

Because the marginal distribution property (symmetric or asymmetric distribution) in a contingency table is an important factor that affects interpreting both γ and κ coefficients (Looney, 1987), the marginal distribution index (M) was calculated to determine the extent of the marginal distribution symmetry for each contingency table. In addition, the κ_{max} was computed to address the influence of possible asymmetric marginal distributions on the κ coefficients. The M and κ_{max} coefficients for the 10-set VOI-SF based on both data sets are reported in Table 4. The results suggesd that most of the proportional distributions were symmetric, indicating a relatively low influence of asymmetry on the κ coefficients.

Table 4. Marginal index (M) and maximum Kappa (κ_{max}) coefficients for Data 1 and 2

	DM Data 1 - 2	LP Data 1 - 2	SA Data 1 - 2	EI Data 1 - 2	SR Data 1 - 2
M index	.96 - .98	.99 - 1.00	.99 - .99	.99 - .99	.99 - .99
κ_{max}	.71 - .78	.94 - 1.00	.97 - .89	.96 - .94	.86 - .98

Note. DM = disciplinary mastery; LP = learning process; SA = self actualization; EI = ecological integration; SR = social responsibility.

Discussion

This investigation examined statement representativeness of the VOI-2 and refined the instrument by eliminating the weak representative statements determined by school-based teacher value-orientation profiles. The analysis revealed those statements whose average ranking scores were below 3.0 criterion for high value priority in each of the five value orientations. They were characterized by a low mean, high standard deviation, and low rank in their respective value orientations, suggesting that they were either inconsistent with the theoretical framework or incompatible with the daily teaching operation in schools.

The cyclic stepwise-elimination procedure permitted us to monitor the changes in γ and κ at each elimination cycle. Prior to the ninth cycle, the γ coefficients for all the five value orientations remained above .90, indicating a strong association between the value rank orders based on the various VOI-SF formats and the original rank orders determined using the VOI-2. According to the error definition for the y coefficient (Ott et al., 1992), it can be interpreted that there is at least 90% reduction in error of predicting pairs of teachers' ranks for statements in VOI-2, when using their ranks on similar statements in VOI-SF. In other words, the scores collected using the VOI-SF were strongly associated with their corresponding scores elicited using the VOI-2. Thus, the use of the VOI-SF for measuring teachers' value orientations can be considered adequate for practical use. Similarly, the κ coefficients across the five value orientations did not fall below the predetermined criterion (.60) until the ninth elimination cycle. The results suggest that the classification of the teachers' value orientations using the VOI-SF was consistent with the classification determined using the VOI-2. The κ coefficients also indicate that it was less likely that the degree of classification consistency found between the two VOI formats was due to chance. More likely, it is due to the validity of the remaining statements in the VOI-SF which generated the high concordance between the two VOI formats.

The M coefficients computed for each value orientation in Data 1 and Data 2 indicated that asymmetric marginal proportions, although very small, did exist in the contingency tables for all five value orientations in Data 1 and four in Data 2. Thus, the upper limits of K coefficients must be accounted for when interpreting these coefficients. With the M and κ_{max} coefficients taken into account (see Table 4), we concluded that the κ coefficients obtained in the analysis were high enough to indicate a relatively strong classification consistency between the two instruments. After accounting for chance agreement, more than 60% of the marginally permitted agreements occurred (Cohen, 1960; Ott et al., 1992).

Our analysis yielded a condensed VOI format, Ennis-VOI-SF, which is 44% shorter than the original VOI-2. The results from the analysis strongly suggest that teachers' value orientations identified using the VOI-SF are very likely to be consistent with those determined using the VOI-2, suggesting that the Ennis-VOI-SF is appropriate for practical use.

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