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ABSTRACT
                The development of an English version of a Dutch
instrument--the Questionnaire on Teacher Interaction (QTI)--that
measures interpersonal teacher behavior (TB) is described. Using this
instrument, comparisons were made between Dutch and American
interpersonal TB. Students' perceptions of TB were used to measure
TB. The QTI was first translated into English in 1985. A 100-item
version was administered to 537 American secondary school students in
1987, and after revision, to 363 more students. The current 65-item
version was given by 31 American physics teachers to 1,606 students.
American results were compared with those from two previous studies
in the Netherlands. Results indicate that Dutch and American versions
of the QTI had the same internal structure, and that Dutch and
American teachers displayed the same interpersonal behavior toward
their students in many aspects. American teachers wanted to be
stricter than did their Dutch colleagues; Dutch teachers wanted to
give students more responsibility and freedom. This implies that
Dutch teachers emphasize affective outcomes to a greater degree and
that American teachers emphasize cognitive outcomes to a greater
degree. Seven tables and five figures give data and show
relationships. (SLD)

A COMPARISON OF DUTCH & AMERICAN INTERPERSONAL TEACHER BEHAVIOR

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SUMMARY
This study describes the development of an English version of a Dutch instrument which measures interpersonal teacher behavior. Using this instrument, comparisons are made between interpersonal teacher behavior in the US and The Netherlands. The results show that the Dutch and the American versions have the same internal structure. In addition, the participating American and Dutch teachers displayed the same interpersonal behavior towards their students in many aspects. One difference was found: American teachers want to be stricter than their Dutch colleagues, whereas the Dutch teachers want to give their students more responsibility and freedom.

THEORETICAL BACKGROUND

Interpersonal Teacher Behavior

This study examines interpersonal teacher behavior from a systems perspective, following the work of Watzlawick, Beavin & Jackson (1967) on communication processes. On the basis of a theory developed by Leary (1957) Wubbels, Creton and Hooymayers (1985) developed a model for interpersonal teacher behavior. This model maps teacher behavior through use of a Proximity Dimension (Cooperation-Opposition) and an Influence Dimension (Dominance-Submission). These dimensions can be represented in a coordinate system divided into eight equal sections (see Figure 1). Every instance of interpersonal teacher behavior can be placed within the system of axes. The closer the instances of behavior are in the chart, the more closely they resemble each other. The sectors are labelled DC, CD, etc. according to their position in the coordinate system. For example, the two sectors DC and CD are both characterized by Dominance and Cooperation. In the DC sector, however, the Dominance aspect prevails over the Cooperation aspect, whereas the adjacent sector CD includes behaviors of a more cooperative and less dominant character. The sections of the model describe eight different behavior aspects: Leadership, Helpful/Friendly, Understanding, Student

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Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Stric::. To clarify the concepts covered by each sector, Figure 1 shows typical behaviors for each sector.
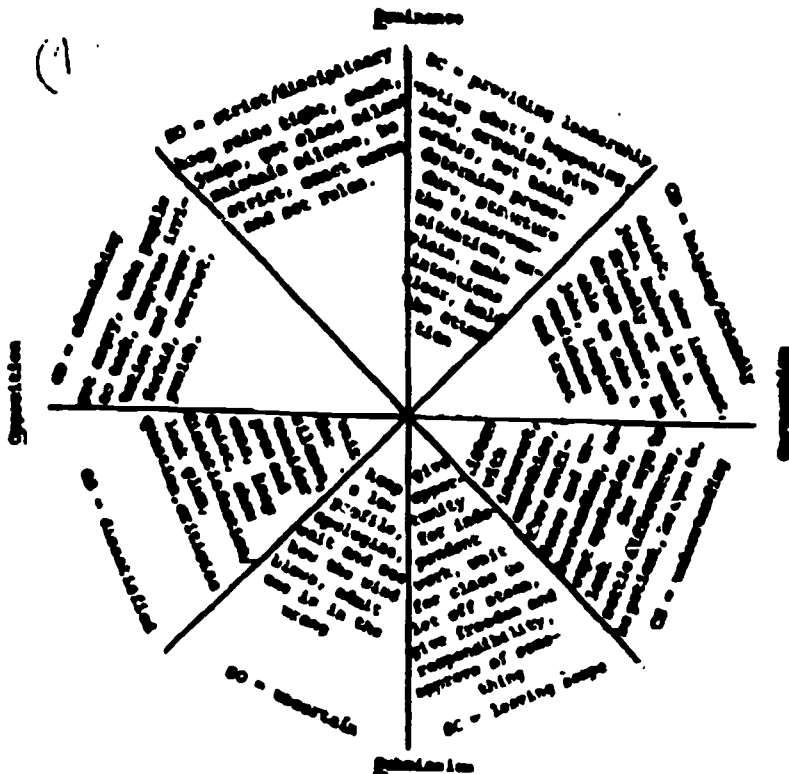

Figure 1. The model for interpersonal teacher behavior.

Measurement Through Student Perceptions

The present study uses students' perceptions of teacher behavior to measure teacher behavior. Helmke, Schneider and Weinert (1986) provide a sound rationale for measuring aspects of the learning environment through student perceptions. First, many teacher behaviors are nominal stimuli that only become functional when they are perceived as cues by the students (Winne & Marx, 1977). Second, in a general way student perceptions provide insight into "usual" teacher behavior (Borich & Klinzing, 1984). Finally, it may be possible to measure more idiosyncratic features of teacher behavior through student perceptions, since some signals that are familiar to students may not be measured by observational instruments.

The Questionnaire on Teacher Interaction

Students' and teachers' perceptions of interpersonal teacher behavior can be measured with a Dutch instrument: The Questionnaire on Teacher Interaction (QTI). In several studies this instrument demonstrated its reliability (e.g. Wubbels, Creton & Hooymayers, 1985; Brekelmans, Wubbels & Creton, 1989). The QTI consists of 77 items which are answered

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on a five point scale. Designed according to the aforementioned model on interpersonal teacher behavior, it has eight scales corresponding to the eight behavior aspects. For every completed questionnaire a set of eight scores, together called a profile, can be produced. These scale scores are computed by summing up the item scores and than transforming this score to a score ranging from 0.0 to 1.0. The results of administering the QTI can also be represented in a figure in which part of a sector is shaded in such a way that the degree of shading is a measure of the height of the scale-scores (see Figure 2 for the profile of the average students' perception of 119 randomly sampled Dutch teachers, Wubbels et al. 1985).
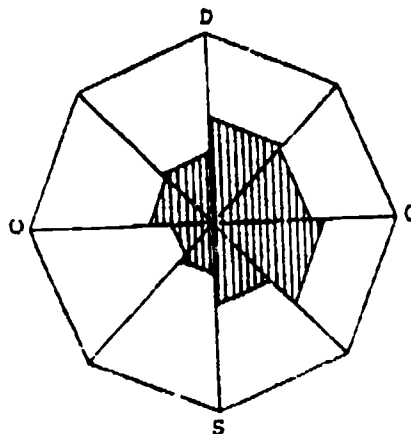

Figure 2 Average students' perceptions of 119 Dutch teachers.

Related Research

In previous research in the Netherlands it was demonstrated that students' perceptions of interpersonal teacher behavior are an important aspect of the learning environment. Wubbels, Brekelmans and Hermans (1988) showed that students' perceptions of aspects of interpersonal teacher behavior are related to cognitive and affective student outcomes. Leadership, friendly and understanding behavior are positively related to student outcomes while uncertain, dissatisfied and admonishing behavior are negatively related. It was also shown that in interpersonal teacher behavior rather stable patterns are found that describe a teacher's teaching style (Wubbels, Brekelmans, Creton & Hooymayers, 1989). Such a style is a particular combination of behaviors of the eight sections of the model of interpersonal teacher behavior.

The authors are not aware of research in which American and Dutch teacher behavior or other learning environment aspects of classrooms in these countries have been compared. Differences in interpersonal behavior can be expected for several reasons. First, it is often supposed that the Dutch society is more egalitarian than the American (see e.g. Graf, Freer & Plaizier, 1979). This could account for less dominance and more submission in the Dutch than in the American teacher behavior. Second it has repeatedly been shown that there are differences in educational productivity in different countries (e.g. National Commission on Excellence in Education 1983; Walberg, Tsai & Harnish, 1985). The

Netherlands and the US have experienced differences in achievement scores in the Second International Science Study (IEA,1988). Interpersonal teacher behavior can be one of the origins of these differences, since it has been shown that the classroom environment is an important factor in educational productivity (Walberg, 1986; Fraser, Walberg, Welch & Hattie, 1987), and the teacher-student relationship (among others revealed in interpersonal teacher behavior) is an aspect of this learning environment (Moos, 1974).

RESEARCH QUESTIONS

The research questions for this study are:

1. Is the English version of the (Dutch) Questionnaire on Teacher Interaction a reliable and valid instrument?

2. To what degree are the Dutch and English versions of the Questionnaire On Teacher Interaction equivalent?

3. Are there differences in students' or teachers' perceptions of interpersonal teacher behavior in the US and The Netherlands?

METHODS

The QTI was first translated from Dutch to English in 1985. The translation of the items was checked with a back-translation by an independent second translator (Brislin, 1976). A 100-item version (some items had more than one possible translation) was completed in Fall, 1987 and administered to 32 American secondary school classes (537 students). Scale reliabilities (coefficient alpha) and correlations of every item with every scale were calculated. Correlations were also calculated for each item with its own scale after removing that item.

According to Leary's model an item should correlate highest with the scale to which it belongs and lowest with the opposite sector. The closer a sector is to the item's own sector the higher the correlation of the item with the sector should be. Thirty three items were dropped on the basis of this psychometric analyses because the correlations didn't meet this criteria, or students appeared to have difficulties in answering the item. As a result, in the second version some items were worded differently, becoming paraphrases rather than the original literal translations. This version was then administered to 14 more classes (363 students). On the basis of the same psychometric analyses two more items were dropped, leaving the current 65-item version. Of these items 59 are translations of 59 of the 77 Dutch items. Table 1 presents the scales on the American version, the number of items, and a typical item for each scale (on the basis of the corrected item-total correlation).

Scale	Number of Items	Typical Item
DC Leadership	7	S/he is a good leader
CD Helpful/friendly	8	S/he is someone we can depend on
CS Understanding	8	If we have something to say s/he
SC Student responsibility/ freedom	8	S/he gives us a lot of free time in class
SO Uncertain	8	S/he seems uncertain
OS Dissatisfied	9	S/he is suspicious
OD Admonishing	8	S/he gets angry quickly
DO Strict	9	S/he is strict

Table 1: Scales, number of items and a typical item of the American version of the Questionnaire on Teacher Interaction.

The present American version of the QTI has been used to gather data on teachers' and students' perceptions of interpersonal teacher behavior. The data source are teachers and students of secondary classes in a variety of grade levels and subjects. The sample is, however, not random and the character of the study is thus explorative.

Every American teacher in this study (n=31) was asked to administer the questionnaire on a voluntary basis to two or more classes of noticeably different student behavior (in the teacher's opinion). This gave student data for 1606 students in 66 classes. Teachers themselves completed the QTI for their own behavior in these two or more classes and for the behavior of what they consider to be the "ideal teacher". In addition, data were collected on student perceptions of the teacher who that student considered to be his/her "Best" teacher (n = 117) and of the teacher who that student considered to be his/her "Worst" teacher (n = 114). This model of data collection conforms exactly to that used previously in The Netherlands (Wubbels et al., 1985). This paper compares American results with results from that Dutch study and with results of another Dutch study that was carried out as an option of the Second International Science Study (see Brekelmans et al., 1989; Wubbels et al. 1988).

RESULTS

Reliability and Validity of the American QTI

Internal consistencies (coefficient alpha) were calculated as a measure of reliability. Table 2 presents the QTI internal consistency for the students' perceptions (n = 1606) at the student level and for the teacher perceptions. The QTI can be used to offer teachers feedback on the basis of class means of the sector scores. Therefore the internal consistency for the students' perceptions at the class level are also shown. The internal consistencies for the students' perceptions of Best and Worst teachers are of the same size. Comparisons are presented with the internal consistency in a study with the Dutch QTI (Brekelmans et al., 1989). The internal consistencies are far higher than 0.60, the value above which there is no need for further improvement for research purposes (Nunnally, 1967). Seven of the eight reliabilities on class

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Scale	Students				Teachers	
	Student Level		Class Level			
	US	D	US	D	US	D
DC Leadership	0.80	0.83	0.94	0.94	0.75	0.81
CD Helpful/friendly	0.88	0.90	0.95	0.95	0.74	0.78
CS Understanding	0.88	0.90	0.94	0.96	0.76	0.83
SC Student responsibility/ freedom	0.76	0.74	0.86	0.85	0.82	0.72
SO Uncertain	0.82	0.79	0.97	0.92	0.85	0.83
OS Dissatisfied	0.83	0.86	0.90	0.92	0.75	0.83
OD Admonishing	0.84	0.81	0.92	0.90	0.81	0.71
DO Strict	0.80	0.78	0.95	0.89	0.84	0.61
n=	1606	1105	66	66	66	66

Table 2: Internal consistencies of Dutch and American versions of the eight scales of the QTI.

level are higher than .90 (the 8th is .86), the value that Nunnally (1967) mentions as the minimum for tests that influence decisions about individuals. The QTI can thus be safely used to give teachers feedback about their behavior on the basis of class means. Because of the higher reliability of the student scores at the class level we will use only class means as data in this study.

In order to be a valid instrument the QTI should at least be able to distinguish between classes. Therefore an analysis of variance was performed with class as a factor. Table 3 shows the results for both the Dutch and the American sample. It appears that a fair amount of variance in the students perceptions is accounted for by class membership.

		DC	CD	CS	SC	SO	OS	OD	DO
	F*	19.5	7.7	7.7	11.3	17.3	6.4	9.2	21.6
United St.	eta2	41	22	28	29	38	19	25	43
	F*	16.6	10.9	9.0	6.7	17.2	7.6	7.5	9.6
Netherl.	eta2	59	48	43	36	59	39	39	45

* Every F-value in this table is significant at the 0.01-level

Table 3: The results of analyses of variance on student QTI scores with class as factor.

According to Leary, two dimensions underlie the eight scales. Therefore factor analyses were performed for the student and teacher perceptions separately. The results of these two analyses are about the same. In addition, the results of the analysis for the student data are presented. Both on the basis of the criterium "eigenvalue higher than 1.0" and on the criterium of a sudden marked flattening in the curve of

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the eigenvalues, two factors can be extracted. This result corresponds
to the results with the Dutch version. In Table 4 shows the factor
loadings of two orthogonal factors after a varimax rotation. The first
factor can be interpreted as a Cooperation-Opposition dimension and the
second one as a Dominance-Submission dimension. Figure 3 presents the
results of the factor analysis at the class level by plotting the scales
in a two dimensional frame of axes on the basis of the factor loadings.
The scales appear to be ordered as is assumed in the Leary model.

	US		Dutch	
	Factor 1	Factor 2	Factor 1	Factor 2
DC Leadership	0.51	0.81	0.46	0.87
CD Helpful/friendly	0.94	0.08	0.95	0.23
CS Understanding	0.98	-0.01	0.95	-0.05
SC Student responsibility/ freedom	0.43	-0.84	0.49	-0.61
SO Uncertain	-0.24	-0.94	-0.09	-0.94
OS Dissatisfied	-0.87	-0.06	-0.88	-0.03
OD Admonishing	-0.87	0.28	-0.78	0.12
DO Strict	-0.29	0.89	-0.53	0.64

Percentage of variance
accounted for   88.3   80.2

Table 4: Factor loadings in a two factor (orthogonal) varimax rotated
         solution for the American and Dutch version of the QTI (Dutch
         data of the SIS Study).

Horizontal Factor 1 Vertical Factor 2

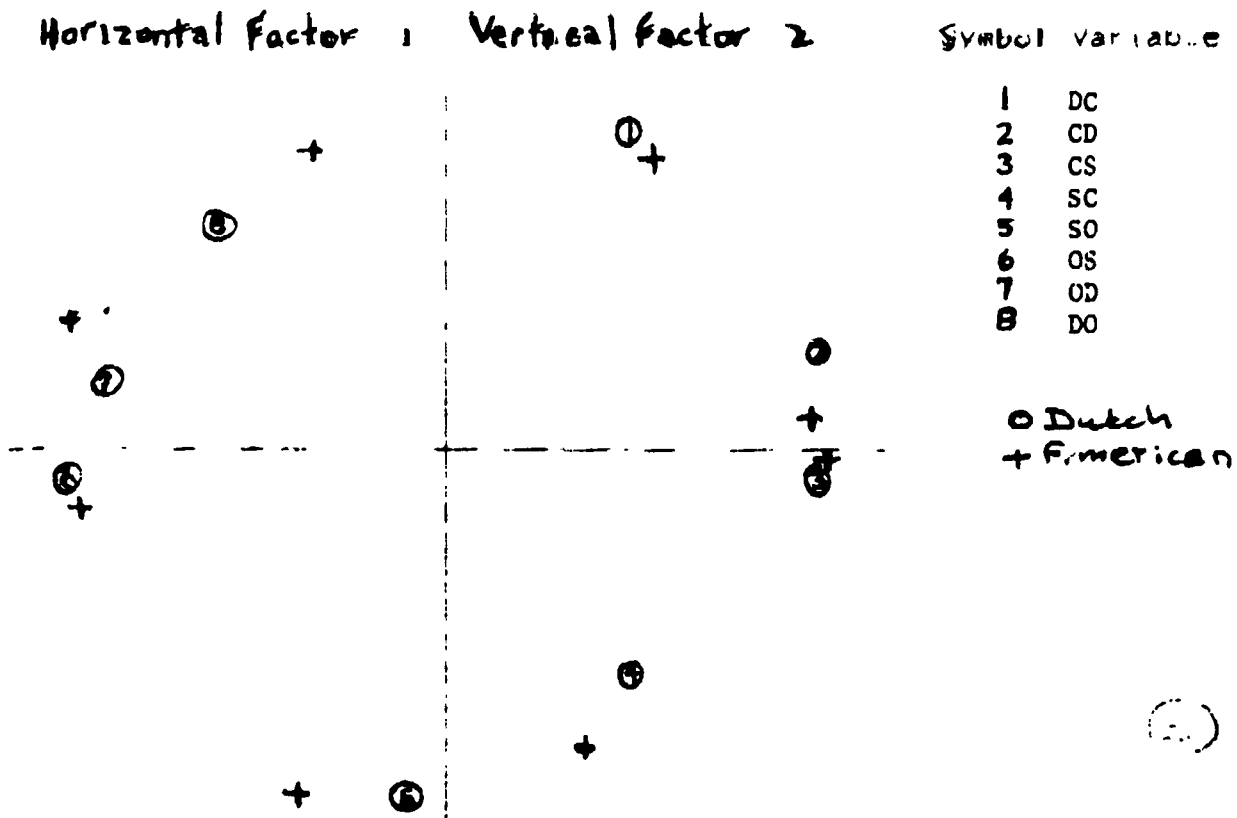| Symbol	Variable
1	DC
2	CD
3	CS
4	SC
5	SO
6	OS
7	OD
8	DO

O Dutch
+ American

Figure 3 Scales of the Dutch (O) and the American (+) QTI plotted in a
two dimensional plane on the basis of factor loadings

There are some differences, however - the scales are not as uniformly
distributed in the systems of axes as is prescribed by the model.
Still, it can be concluded that the reliability of the American QTI is
good and that there is some confirming evidence about the validity of
the instrument.

Equivalence of the Dutch and American QTI

This paper only describes a preliminary test of the equivalence of
the Dutch and the American QTI at the scale level of student percep-
tions. The equivalence of the internal structure of the two versions is
investigated.

In order to make an initial comparison of the instruments the two
v.riance-co-variance matrices of the eight scales were inspected. To
determine if the two matrices are equal a LISREL VI (Joreskog and Sorbom
1986) analysis was conducted. Table 5 provides the results of this
analysis. The fit is high, indicating that the American and Dutch ver-
sions of the QTI have the same variance-covariance matrices.

		Goodness of fit index
Covariance matrix		0.972
	-US	0.994
Two factor model		
	-Netherlands	0.962

Table 5: Results of LISREL-analyses

The results of the factor analyses on the American and Dutch data that were presented in the previous section suggest that the factor structures underlying the eight scales are about the same. The question of whether the same two-factor structure can be considered to underlie the American and Dutch version of the QTI was investigated. Using LISREL VI once again, two confirmatory factor analyses were performed. A common two orthogonal pattern was assumed in the model. The American and the Dutch sample were taken as two different samples. The results (Table 5) show that in both samples the data fit very good to the common factor structure. This supports the conclusion that the internal structure of the American and Dutch QTI in this study can be represented by the same two factors.

Finally, for every student perception profile the average of the eight scales scores was computed. This average has been shown to be rather stable in the Netherlands (mean score of the averaged eight scale scores is 0.48, s.d. .03). In the US the mean of the average profile score for student perceptions is 0.47 (s.d. .03). There is a significant difference (0.05-level) between the two means of the average profile scores (t-test, t = 3.76, df =88.12), but this difference is of little practical importance. So it seems that in the American and Dutch profiles the same total amount of scores is divided over the sectors. This is a first indication that the construct is measured on the same metric. However more analyses will be needed to prove scalar equivalence (Hui & Triandis, 1985).

Dutch and American Interpersonal Teacher Behavior

Table 6 shows mean student perception scores for the American sample and a Dutch sample which also included only teacher volunteers (Creton & Wubbels, 1984). In addition, the teacher perception scores for their own behavior and their ideal are presented.

	Ideals		Teacher's Perceptions		Student Perceptions	
	US	D	US	D	US	D
DC Leadership	0.95	0.81	0.75	0.58	0.69	0.61
CD Helpful/friendly	0.95	0.81	0.81	0.62	0.75	0.65
CS Understanding	0.91	0.84	0.76	0.72	0.71	0.69
SC Student responsibility/ freedom	0.42	0.53	0.38	0.45	0.44	0.45
SO Uncertain	0.06	0.18	0.16	0.23	0.21	0.24
OS Dissatisfied	0.14	0.09	0.24	0.18	0.23	0.18
OD Admonishing	0.08	0.22	0.24	0.25	0.28	0.28
DO Strict	0.54	0.33	0.48	0.33	0.43	0.32

Table 6 Mean QTI scores in Dutch and American samples of volunteers

Because scalar equivalence has not yet been shown, scores of the American and Dutch QTI cannot be directly compared. What can be compared are differences in one country between student and teacher perceptions or between ideals and perceptions with these differences in the other country.

American teachers and Dutch teachers agree that they want to be less admonishing, dissatisfied and uncertain than their students and they themselves think they are. They also agree that they want to show more leadership than they do and want to be more friendly and understanding. In addition American teachers want to be more strict than students perceive them, whereas Dutch teachers on average are satisfied with the amount of strictness in their behavior. On the other hand, Dutch teachers want to give more freedom and responsibility to students than they do (according to their students) whereas American teachers want to give about the amount of freedom and responsibility that they do give. This result is an indication that American teachers stress more strict behavior whereas Dutch teachers put more emphasis on student responsibility and freedom in their teaching.

When the discrepancies between teacher and student perceptions in the US and the Netherlands are compared they appear to be rather small and about the same size. This confirms results of previous studies which showed that volunteer teachers are accurate in describing their own behavior (Creton and Wubbels, 1984).

The previous section showed that it can be assumed that students divide the same total amount of scores over the eight sectors. Of this amount there are a greater number in the Strict (DO) sector in the United States than in the Netherlands. This indicates that in the US strictness is a more prominent aspect of teacher behavior (compared to other behavior aspects) than in the Netherlands.

In Table 7 the mean scale scores for the students' perceptions of Best and Worst teachers are shown for the American and Dutch sample. The American results are also presented as profiles in figure 4. When the scale scores for Best and average (volunteer) teachers in the U.S. and the Netherlands are compared the differences are the same for every aspect of behavior. In both countries Best teachers show more leadership, helpful/friendly and understanding behavior than average volunteer teachers. The differences are very small for the other five sectors: Best teachers are about as uncertain, dissatisfied, admonishing and strict as volunteer teachers and they provide about the same amount of responsibility to students. The comparisons for Worst teachers are similar: Worst teachers show more behavior in the sectors on the opposition side of the model and less on the cooperative side. It can thus be concluded that American and Dutch average volunteer teachers differ in the same way from teachers who are seen by students as their Best and Worst.

	BEST TEACHER		WORST TEACHER	
	US	D	US	D
DC Leadership	0.82	0.70	0.28	0.36
CD Helpful/friendly	0.84	0.75	0.19	0.22
CS Understanding	0.81	0.76	0.23	0.28
SC Student responsibility/ freedom	0.48	0.50	0.22	0.33
SO Uncertain	0.16	0.20	0.45	0.37
OS Dissatisfied	0.19	0.15	0.64	0.52
OD Admonishing	0.25	0.27	0.70	0.61
DO Strict	0.46	0.33	0.62	0 55

Table 7: Students' perceptions of Best and Worst teachers in the U.S. and the Netherlands
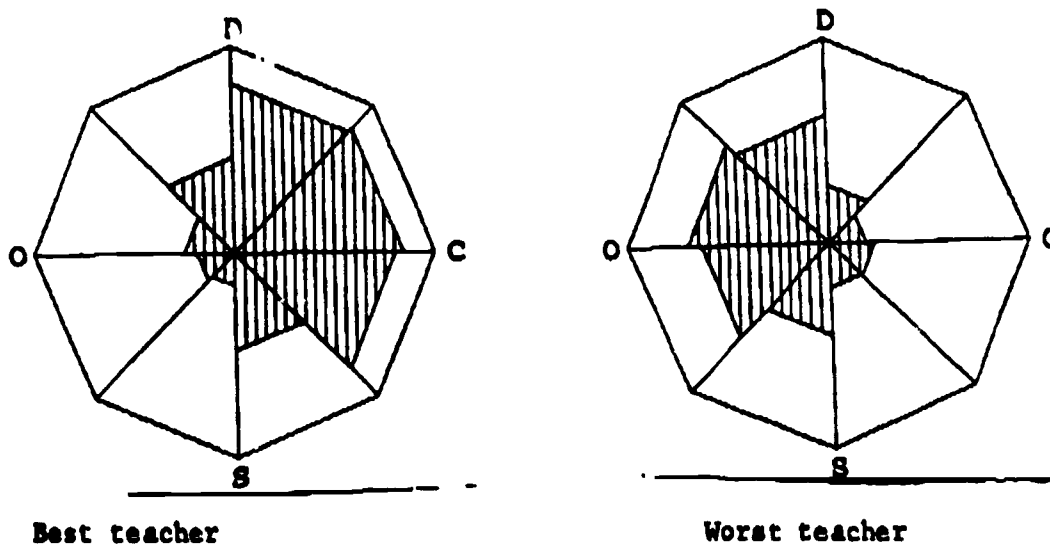

Best teacher   Worst teacher

Figure 4: Average students' perceptions of Best and Worst American teachers

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On the basis of the Dutch data a typology of interpsonal teacher behavior has been developed (Wubbels et al. 1989). It is presented in Figure 5.

type 1
directive

type 2
authoritative/friendly

type 3
cooperative/tolerant

type 4
repressive

type 5
business-like

type 6
uncertain/drudging

type 7
agre. ve/uncertain

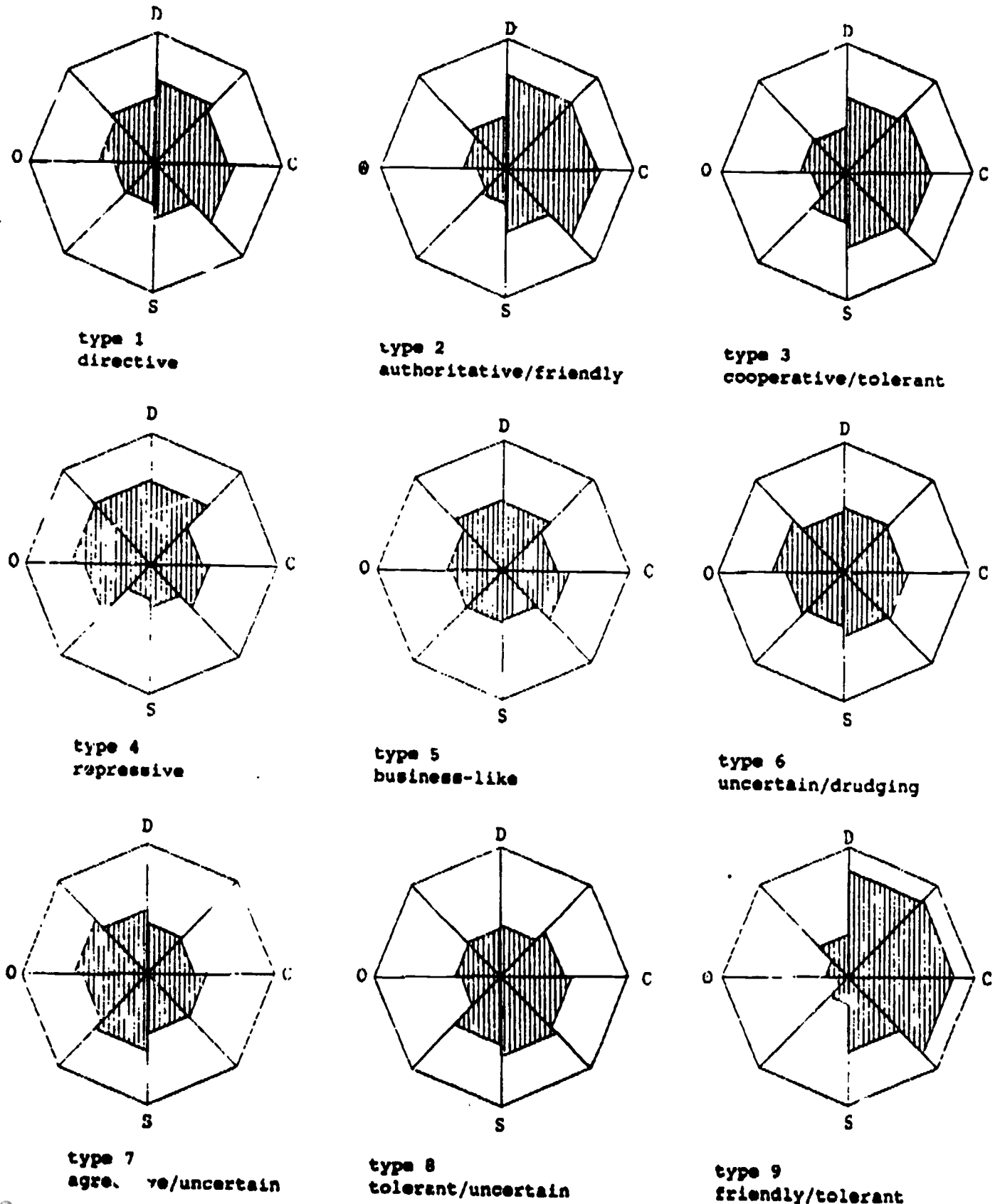type 8
tolerant/uncertain

type 9
friendly/tolerant

14

Figure 5: Nine types of interpersonal teacher behavior patterns

The question of whether the American profiles fit into the Dutch typology was investigated. Dutch profiles belong to one of the types on the basis of the similarity of the profile with every type. The profile belongs to the type with which it has the highest similarity, provided that the profile has a higher similarity with this type than the mean of all the similarities between profiles in the sample. It appears that under these conditions every American profile fits into one of the types. The authors conclude that in the American sample of this study no teacher interpersonal behavior types are present that are different from the types found in the Netherlands.

DISCUSSION

The results presented in this paper are only a first step toward a comparison of American and Dutch interpersonal teacher behavior. In order to be able to draw firm conclusions more data must be gathered, especially from random samples. This study can only identify hypotheses that can be tested in future research.

The data presently available suggest that in many respects Dutch and American teacher behavior is the same. Differences may be present in the amount of strictness. In line with what can be expected on the basis of a supposed more egalitarian Dutch society the Dutch teachers behave less strict and also want to be less strict than their American col-leagues. Because of the aforementioned relations between interpersonal teacher behavior and student outcomes (Brekelmans et al., 1989) this would imply that Dutch teachers emphasize more affective student outcomes and American teachers more cognitive student outcomes. It must be stated, however, that these relations between student outcomes and interpersonal teacher behavior have presently only been studied for physics teachers.

The results do not account for the differences in educational achievement between The Netherlands and the United States that were found in The Second International Science Study (IEA, 1988). In that study Dutch students outperformed American students. On the basis of the data on interpersonal teacher behavior American students would have been expected to perform better.

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