

## Original Communication

# The Swiss Teaching Style Questionnaire (STSQ) and Adolescent Problem Behaviors

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Based on evidence on parenting, the aim of the study was to develop a teaching questionnaire and to examine links to adolescent problem behaviors. Exploratory and confirmatory factor analysis, cluster analysis, and hierarchical linear modeling was used based on self-reports of 340 teachers (mean age 44.7 years,  $SD = 10.7$ ) and their 5904 students (mean age 15.9 years,  $SD = 0.9$ ). The three-dimensional factor structure could be confirmed. The dimension *warmth and support* was negatively associated with bullying in the class taught, and interaction between *warmth and support* and *rules and control* was negatively associated with cigarette smoking, cannabis use, and delinquency. On the other hand, *psychological pressure* was associated with low academic achievement. Although indications of the importance of teaching styles in the prevention of multiple adolescent problem behaviors were found, differences between teaching and parenting make further research necessary.

**Keywords:** parenting styles, teaching, prevention, adolescent problem behaviors, multi-level analysis

According to the model to classify parental behavior of Baumrind (1978), two aspects are critical: parental responsiveness and parental demandingness (Maccoby & Martin, 1983). Parental responsiveness refers to the degree to which parents respond to their children's needs in an accepting, supportive manner. Parental demandingness means the extent to which parents expect and demand mature, responsible behavior from their children.

Crossing these two dimensions results in four different parenting styles: authoritative (high responsiveness and high demandingness), authoritarian (low responsiveness and high demandingness), indulgent (high responsiveness and low demandingness), and indifferent (low responsiveness and low demandingness). Authoritative parents are issue-oriented, but are warm yet firm. They encourage discussions and give explanations. Authoritarian parents place great importance on obedience and conformity. Indulgent parents are warm and accepting but passive concerning discipline. Indifferent parents try to minimize the time and energy spent interacting with their children.

Recently, a questionnaire based on a sample of adolescents in Switzerland was developed that also takes into account the reassessment of authoritative parenting as a multidimensional construct, which additionally includes the

psychological pressure exerted by the parents (Gray & Steinberg, 1999). Accordingly, the *Zürcher Kurzfragebogen zum Erziehungsverhalten* (Zurich Brief Questionnaire for the Assessment of Parental Behaviors; Reitzle, Winkler Metzke, & Steinhausen, 2001), called ZKE in the following, reliably measures three parenting dimensions. The first two dimensions refer to the Baumrind (1978) concept and were labeled warmth and support for responsiveness and rules and control for demandingness. In addition, the dimension psychological pressure measures aspects of impeding the development of adolescent autonomy, such as harsh sanctions for low academic achievement and evocation of feelings of guilt (Gray & Steinberg, 1999). Research showed that the dimension warmth and support was related to adolescents' positive developmental outcomes such as high self-esteem, active coping strategies, and low frequencies of externalizing and internalizing symptoms. The dimension psychological pressure, in contrast, was associated with a low level of self-esteem and higher levels of repressive coping and psychopathological symptoms (Reitzle et al., 2001).

Also in an international context, many studies found a negative association between authoritative parenting and adolescent problem behaviors in many ethnicities, cultures,

regions, social classes, and family structures (e.g., Carson, Chowdhury, Perry, & Pati, 1999; Forehand, Miller, Dutra, & Chance, 1997; Ge, Best, Conger, & Simons, 1996; Pilgrim, Lou, Urberg, & Fang, 1999; Weiss & Schwarz, 1996). Reviewing the evidence which supports the benefits of authoritative parenting, Steinberg (2001) concluded that the question "Which type of parenting benefits teenagers the most?" no longer merits study.

With regard to the question "Which determinants bring out the best in students?" Steinberg (2002) suggested that the same factors that influence positive adolescent development at home are also important at school. Wentzel (1997), for example, found that teachers who had the highest level of responsibility, prosocial activities, and academic achievement in their classes were described by their students as demonstrating democratic interaction styles, developing expectations for individual behavioral standards, having a "caring" attitude, and providing constructive feedback. In another study, she found that high expectations of teachers concerning student performance was the most consistent predictor for students' responsible behavior, interest in class, and academic performance (Wentzel, 2002). Consequently, she concluded from her study that effective teaching corresponds closely to effective parenting (Wentzel, 1997, 2002).

There are several indications in the literature that students are more engaged, are better achievers, have greater psycho-social well-being and are less aggressive if their teachers apply an appropriate combination of responsiveness and demandingness (Hughes, Cavell, & Jackson, 1999; Ladd, Birch, & Buhs, 1999; Phillips, 1997; Pianta, 1999; Roeser & Eccles, 1998; Rowan, Chiang, & Miller, 1997). Teachers are supposed to contribute to high achievement motivation and greater school engagement among their students if they are supportive, respond to their students' needs as well as fix and reinforce clearly defined standards for behavior and achievement (Paulson, Marchant, & Rothlisberg, 1998; Roeser, Midgley, & Urdan, 1996; Rutter, 1983). On the other hand, if the teacher is too demanding, students are likely to feel uncomfortable and anxious and to be less concentrated in classes due to excessively high levels of task orientation and control (Moos, 1978). Similarly, teachers' negative feedback was the most consistent predictor of students' academic failure and anti-social behavior (Wentzel, 2002).

Together with evidence on parenting, these findings emphasize the important role of teachers in the prevention of adolescent problem behaviors inside and outside the school context (see Hughes, 2002, for a review). Although there are several school-based prevention programs targeting adolescent substance use and aggressive behaviors (e.g., Botvin, 2000; Olweus, 1993), Kellam, Ling, Merisca, Brown and Jalongo (1998) conclude that effective didactic and classroom management practices are essential for children's development, yet, as a general rule, teachers are not given such training. In addition, only a few studies provide evidence on the extent to which teachers apply different

classroom management or teaching styles (see Barnas, 2000; Hughes, 2002, for reviews). Since most of these studies originate in North America, it is questionable whether their results can be transferred to European cultures as easily as research on parenting styles.

The present study aims at developing a questionnaire to measure different teaching styles. The items for this questionnaire were adapted from the ZKE. Research showed that the dimension warmth and support was related to adolescents' positive developmental outcomes whereas psychological pressure was negatively related (Reitzle et al., 2001). By means of this questionnaire it is not only possible to determine homogenous groups of teachers who apply a particular combination of warmth and support, and of rules and control, and psychological pressure in Swiss schools but also to assess if different teaching styles have an impact on students. More precisely, the present study will examine if teaching styles are related to different measures of adolescent problem behaviors. Based on evidence from parenting (e.g., Carson et al., 1999; Forehand et al., 1997; Ge et al., 1996; Pilgrim et al., 1999; Weiss et al., 1996), the results of the present study should enhance current knowledge on the link between teaching styles and adolescent academic, social, and psychological adjustment (e.g., Paulson et al., 1998; Roeser et al., 1996, 1998; Wentzel, 1997, 2002).

## Method

### Study Design and Participants

The data used for the present study were collected as part of the *European School Survey Project on Alcohol and Drugs* (ESPAD; Hibell et al., 2004) in which Switzerland participated for the first time. This study has been conducted every four years since 1995 in about 30 European countries, under the supervision of the *Swedish Council for Information on Alcohol and Other Drugs* and the *Co-operation Group to Combat Drug Abuse and Illicit Trafficking in Drugs* (Pompidou Group). The ESPAD study aims to collect comparable data on alcohol, tobacco and drug use among 15–16-year-old students in as many European countries as possible, so that trends in alcohol and drug habits among students can be studied and compared between countries. In addition to the student survey, the teachers received a questionnaire covering aspects of the school itself, characteristics of its environment (e.g., school and class sizes and urbanization), prevention activities undertaken, characteristics of the class (e.g., climate, stress and rule breaking), and questions pertaining to the teachers themselves, such as sex, age, teaching styles, overwork, and professional dissatisfaction. In 2003, the *Swiss Institute for Prevention of Alcohol and Drug Problems* (SIPA) and the *Addiction Research Institute* (ARI) jointly conducted the survey for Switzerland.

The present data were collected by means of a paper-and-pencil questionnaire which was translated into the three

main national languages (German, French, and Italian) and sent to schools to be administered to each pupil in the relevant classes between the end of April and the end of June 2003. To avoid systematic student participation dropouts, the exact date of the distribution of the questionnaires was not communicated to the school boards ahead of time. The time frame for filling out the questionnaires was one school lesson (about 45 minutes). Students and teachers could freely choose to participate; anonymity and confidentiality, in accordance with the *Helsinki Declaration*, was ensured at all stages of the study (World Medical Association, 2002).

Cluster sampling was used, based on a list of all classes of Swiss schools from eight to tenth grade compiled by the *Swiss Federal Office of Statistics*, where the classes served as the primary sampling unit. There was an overall response rate of 83.1% (including non-participation of individual teachers, individual students and entire classes). This sample can be considered as representative for all eight, ninth and tenth graders and their corresponding teachers in state schools in Switzerland. Detailed information on Swiss participation of the ESPAD study can be found in Gmel, Rehm, Kuntsche, Wicki, and Grichting (2004), in the relevant chapter of the 2004 international report (Hibell et al., 2004), and online at [www.espad.org](http://www.espad.org).

Unfortunately, in the framework of the ESPAD study, it was not possible to obtain information from the other teachers of participating classes. However, to guarantee regular interaction between teachers and their classes, only teachers who taught the class for at least three hours a week were selected.

The 11 teachers (3.1%) who did not answer all questions on teaching styles were omitted from the analyses. At the student level, missing values varied between 0.1 and 5.6% and were excluded in the respective analyses. The analyzed data were based on 340 teachers and 5904 students. About 71% of the participants came from the German speaking part; 23% were from the French and 6% from the Italian speaking part. The total mean age was 44.7 years ( $SD = 10.7$ ) for teachers and 15.9 years ( $SD = 0.9$ ) for students. There were 71.1% male teachers, and 49.8% of the students were male.

## Measures

### Measures at the Teacher Level (Second Level in the Hierarchical Linear Models)

Items for the *Swiss Teaching Style Questionnaire* (STSQ) were adapted from the ZKE. This 27-item questionnaire was chosen because it is reasonably short, has been tested in the same cultural context as the present study, and was shown to measure different parenting dimensions reliably. The questions were reformulated to take into account classroom-specific circumstances. For example, the question “My mother/my father set down clear rules and instructions

on how to behave” in the rules and control dimension became “I set down clearly defined rules which they must obey” to take into account the teacher’s perspective. The three items that were family-specific (e.g., “My mother/my father wants to know exactly how I spend my pocket money”) were omitted, resulting in a 24-item questionnaire with 11 items on the warmth and support dimension, 5 items on demands and control, and 7 items to measure psychological pressure. For all items, answer categories varied between “totally disagree” (coded as 0) and “totally agree” (coded as 4).

### Measures at the Student Level (First Level in the Hierarchical Linear Models)

At the student level, different variables from the ESPAD study were selected to account for the variety of problem behaviors in adolescence. To measure *academic achievement*, the question was “Which of the following best describes your average grade in the end of the last term?” with answer categories from “very good” (coded as 0) to “very weak” (coded as 5). *Risky single occasion drinking* (RSOD) was measured by means of the question “Think back once more over the last 30 days. How many times (if any) have you had five or more drinks in a row? (a “drink” is a glass of wine (ca. 15 cl), a bottle or can of beer (ca. 50 cl), a shot glass of spirits (ca. 5 cl) or a mixed drink.)” with answer categories from “none” (coded as 0) to “10 or more times” (coded as 5). *Smoking* was assessed by the question “How frequently have you smoked cigarettes during the last 30 days?” with answer categories from “none” (coded as 0) to “more than 20 cigarettes per day” (coded as 6). To measure *cannabis use* the following question was used: “On how many occasions (if any) have you used marijuana (grass, pot) or hashish (hash, hash oil) during the last 30 days?” with answer categories from “none” (coded as 0) to “40 or more occasions” (coded as 6). To measure *bullying* the question was “During the last 12 months, how often have you participated in a group teasing an individual?” To measure *physical violence* the two questions “During the last 12 months, how often have you participated in a group bruising an individual?” and “During the last 12 months, how often have you participated in a group starting a fight with another group?” were used and added up in a summary score. To measure *delinquency* the two questions “During the last 12 months, how often have you stolen something valuable (about CHF 40/USD 30)?” and “During the last 12 months, how often have you damaged public or private property on purpose?” were used to create a summary score. For all violence-related questions, the answer categories varied from “none” (coded as 0) to “40 or more occasions” (coded as 6). Details on the ESPAD questions can be found in Hibell et al. (2004).

## Analytical Strategy

First, an exploratory factor analysis was carried out, and the scree plot was examined to determine the number of dimensions of the questionnaire to be developed, called *Swiss Teaching Style Questionnaire* (STSQ) in the following. Under the present assumptions of a small number of factors expected and a considerably large sample size, the use of a scree plot is a particularly obvious and reliable choice (Tabachnick & Fidell, 2001). Second, by checking internal consistency measures (Cronbach's alpha) and communalities of the principal component analysis (PCA), items were excluded that did not fit in one of the dimensions. Finally, principal components analysis with varimax-rotation, Cronbach's alpha and confirmatory factor analysis were used to evaluate the final allocation of items to dimensions.

To determine the association between teaching dimensions and adolescent problem behaviors, multi-level models were used to account for the nested structure of the data (e.g., Hox, 2002; Raudenbush, Bryk, Cheong, & Congdon, 2001). Therefore, the item values of the STSQ were multiplied with their respective PCA loadings and added up to scales. Subsequently, the scales were standardized ( $M = 0$ ,  $SD = 1$ ). We performed multi-level models separately for the seven adolescent problem behaviours (low academic performance, risky single occasion drinking, cigarette smoking, cannabis use, bullying, violence, and delinquency) as dependent variables at the first level. At the second level, we included the three hypothesized teaching dimensions and additionally the interaction between the dimensions warmth and support and rules and control since their combination is supposed to be particularly beneficial to adolescents' development (e.g., Hughes et al., 1999; Paulson et al., 1998; Pianta, 1999; Rowan et al., 1997). The equation of the models is given as:

$$\text{Adolescent problem behaviors} = \beta_{0j} + r_{ij}; \text{ with } \beta_{0j} = \gamma_{00} + \gamma_{01} (\text{warmth and support}) + \gamma_{02} (\text{rules and control}) + \gamma_{03} (\text{psychological pressure}) + \gamma_{04} (\text{interaction warmth and support} \times \text{rules and control}) + u_{0j}; \text{ where } i \text{ is the index of students (first level) and } j \text{ is the index for teachers (second level)}$$

To identify teachers who apply a certain teaching style, a k-means cluster analysis was used based on the standardized PCA-weighted summary scores of the three hypothesized dimensions of the STSQ (cf. Reitzle et al., 2001). The k-means algorithm starts with a pre-determined number of clusters and objects per cluster. It then displaces objects between clusters iteratively so that distances to the center within clusters are minimized and those between centers are maximized. In order to attribute equal weighting to each item included in the cluster analysis, Euclidean distances were calculated (Everitt, Landau, & Leese, 2001; SPSS Inc., 2001). To obtain a comparable solution with previous research on parenting styles, a four-cluster solution was specified a priori (cf. Maccoby et al., 1983; Reitzle et al., 2001).

Group means of the three contributing variables are descriptively presented in profile plots to support the face validity of the cluster solution. For maximum efficiency of the analytical procedure, a randomly selected sub-sample was used to determine cluster centers. Subsequently, the entire sample was classified according to the centers estimated from the sub-sample. This procedure accounts for the problem of local minima in the hill-climbing algorithm and therefore enhances the reliability of the group classification (Everitt et al., 2001; SPSS Inc., 2001).

To determine if a certain teaching style is negatively associated with adolescent problem behaviors a second series of multi-level models was calculated. Therefore, dummy variables were created to indicate membership in the homogenous group, resulting from the cluster analysis, that apply a certain teaching style. At the first level, the seven adolescent problem behaviours (academic achievement, RSOD, cigarette smoking, cannabis use, bullying, violence, and delinquency) served again as dependent variables and, at the second level, dummy variables indicating the membership of teachers to the group that applies a certain teaching style were included. The equation of the models is given as:

$$\text{Adolescent problem behaviors} = \beta_{0j} + r_{ij}; \text{ with } \beta_{0j} = \gamma_{00} + \gamma_{01} (\text{group 1}) + \gamma_{02} (\text{group 2}) + \gamma_{03} (\text{group 3}) + u_{0j}; \text{ where } i \text{ is the index of students (first level) and } j \text{ is the index for teachers (second level)}$$

For the hierarchical regression analyses, the computer program HLM 5.04 (Raudenbush et al., 2001) was used. Data treatment and descriptive and factor analyses were carried out in SPSS 11.5 (SPSS Inc., 2001).

## Results

The examination of the scree plot indicated that a three-factorial solution could account for a considerable amount of variance in the 27 original items that were adopted from the parental questionnaire. However, low final communalities and low internal consistencies led to the exclusion of 10 items. The final solution consisted of 17 items of which the exact wording is given in Table 1. In the principal components analysis with varimax-rotation, nine items loaded on the factor labeled as warmth and support. The items dealing with comfort and encouragement of students revealed the highest loadings on this factor. Six items loaded on the factor labeled as rules and control. The items dealing with rules and order in the classroom had the highest loadings on this factor. Finally, four items loaded on the factor labeled as psychological pressure. The items dealing with engagement and disappointment of teachers had the highest loadings on this factor. The items dealing with control keeping and obedience loaded on rules and control as well as on psychological pressure. Each of the three factors accounted for 10 to 20% of the total item variance. Internal consistencies were  $\alpha = .58$ ,  $\alpha = .67$  and  $\alpha = .75$ . The three-fac-

Table 1

Item Formulation, Factor Loadings of the Varimax-Rotated Principal Components Analysis and Item Means (Standard Deviations in Parentheses)

“As a general rule, what is your attitude towards your students?”	Warmth and support	Rules and control	Psychological pressure	Means (SD)
I comfort them when they are having difficulties	.74	–	–	3.12 (.84)
I encourage them when they score badly	.72	–	–	3.01 (.80)
I have a good relationship with them	.59	–	–	2.92 (.84)
I am there for them if they need help	.57	–	–	3.63 (.56)
I congratulate them when they have done something well	.56	–	–	3.37 (.64)
I can abandon the idea of doing something to please the class	.53	–	–	2.79 (.82)
I respect them and expect the same in return	.46	–	–	3.56 (.60)
I value their opinion even if it differs from mine	.38	–	–	3.46 (.62)
I explain why I have asked them to do something	.36	–	–	3.33 (.65)
I set down clearly defined rules which they must obey	–	.76	–	3.54 (.57)
I expect them to keep their things tidy	–	.70	–	3.51 (.59)
I regularly check their homework	–	.56	–	3.04 (.83)
I demand good results from them	–	.42	–	3.35 (.76)
A class must be kept under control	–	.43	.59	2.93 (.76)
A class must be obedient	–	.42	.58	3.16 (.77)
I am easily enraged if a student does not do what I say	–	–	.67	1.74 (.90)
I am disappointed/angry when they behave badly	–	–	.64	3.08 (.87)
Amount of total variance in %	17.1	13.9	10.6	
(Lambda in brackets)	(2.9)	(2.4)	(1.8)	
Internal consistency (Cronbach’s alpha)	.75	.67	.58	

Note. Factor loadings below .35 are not shown

torial solution was confirmed by a confirmatory maximum likelihood factor analysis which revealed an acceptable model fit (GFI = .940, CFI = .917, RMR = .028, RMSEA = .047).

Table 1 also provides means and standard deviations of the STSQ items. In most cases the teachers indicated a high level of agreement. The highest level was found for the items “I am there for them if they need help” and “I respect them and expect the same in return”; the lowest level revealed “I am easily enraged if a student does not do what I say” and “I can abandon the idea of doing something to please the class”.

Subsequently, the items were multiplied with their respective factor loadings (cf. Table 1) and summed up to scales. Further analyses revealed high correlations between the two dimensions warmth and support and rules and control (as latent variables:  $r = .61$ , as summary scores:  $r = .51$ ) and between rules and control and psychological pressure (as latent variables:  $r = .39$ , as summary scores:  $r = .40$ ). In comparison, the correlation between warmth and support and psychological pressure was somewhat lower (as latent variables in confirmatory factor analysis:  $r = .24$ , as summary scores:  $r = .15$ ). Female teachers scored higher than their male counterparts on warmth and support ( $t = 3.36, p < .001$ ) and on rules and control ( $t = 3.41, p < .001$ ) but no differences were found on psychological pressure ( $t = 0.64, n.s.$ ). For all three dimensions, no significant age effects were found (warmth and support:  $r = .02, n.s.$ ; rules and control:  $r = .03, n.s.$ ; psychological pressure:  $r = .03, n.s.$ ).

To determine the association between teaching dimensions and adolescent problem behaviors, hierarchical linear

regression models were performed. Table 2 shows that warmth and support was tendentially negatively ( $p < .10$ ) associated with bullying, while psychological pressure was positively associated with low academic achievement, and tendentially with physical violence and delinquency. The interaction between warmth and support, and rules and control was negatively associated with cigarette smoking, cannabis use, and delinquency. All seven hierarchical linear regression models were repeated including the mean age of classes as a potential confounder at the second level. However, the results remained basically the same.

To identify teachers who apply a certain teaching style, that is, a particular combination of warmth and support, rules and control, and psychological pressure, a k-means cluster analysis was calculated based on the standardized and PCA-weighted summary scores. Results are shown in Figure 1. In line with the literature on parenting styles, the first group was labeled as *indifferent teachers*. Since these teachers scored lowest on warmth and support and rules and control they are supposed to minimize the time and energy in interacting with their students. The second group was labeled as *indulgent teachers*. As these teachers showed a certain degree of warmth and support but a low level of rules and control and psychological pressure they are supposed to be supportive and accepting without a strong reinforcement of discipline. The third group was labeled as *supportive teachers* as this group showed the highest level of warmth and support. The last group was labeled as *ambivalent teachers*. These teachers showed the highest level of rules and control, and psychological pressure but at the same time were warm and supportive. The largest group

were supportive teachers (34.4% of the total sample), and the smallest group were indulgent teachers (12.4%).

To determine if a certain teaching style is negatively associated with adolescent problem behaviors, a second series of linear regression models was calculated. Indulgent teachers are likely to have slightly lower levels of bullying and lower levels of physical violence and delinquency in their classes (cf. Table 3). Both supportive and ambivalent

teachers are likely to have higher levels of low academic achievement in their classes.

## Discussion

The first aim of the present study was to develop a questionnaire that measures different teaching styles based on

Table 2

Relation between Teaching Dimensions (2<sup>nd</sup> Level) and Adolescent Problem Behaviors (1<sup>st</sup> Level); Regression Coefficients of the Hierarchical Linear Modeling Analyses with *t* Values in Parentheses

	Low academic achievement	RSOD <sup>1</sup>	Cigarette smoking	Cannabis use	Bullying	Physical violence	Delinquency
Intercept	1.396	0.775	0.926	0.525	0.969	0.263	0.262
Warmth and support	.013 (1.11)	.001 (0.055)	.000 (-0.01)	-.010 (-0.39)	-.063 <sup>†</sup> (-1.82)	-.019 (-1.08)	-.019 (-1.11)
Rules and control	.002 (0.11)	.003 (0.086)	-.001 (-0.02)	.030 (0.98)	-.004 (-0.10)	.003 (0.20)	.005 (0.34)
Psychological pressure	.029* (1.97)	-.001 (-0.05)	.018 (0.49)	-.010 (-0.37)	.023 (0.79)	.023 <sup>†</sup> (1.70)	.023 <sup>†</sup> (1.78)
Warmth*rules	-.012 (-0.97)	.040 (1.47)	-.057* (-1.99)	-.055* (-2.36)	.020 (0.56)	-.016 (-1.05)	-.027* (-2.05)

Note. <sup>1</sup> Risky single occasion drinking measured by having five drinks or more in a row; <sup>†</sup>  $p < .10$ ; \*  $p < .05$

Table 3

Relation between Homogenous Groups of Teachers (2<sup>nd</sup> Level) and Adolescent Problem Behaviors (1<sup>st</sup> Level); Regression Coefficients of the Hierarchical Linear Modeling Analyses with *t* Values in Parentheses

	Low academic achievement	RSOD <sup>1</sup>	Cigarette smoking	Cannabis use	Bullying	Physical violence	Delinquency
Intercept	1.330	0.840	0.947	0.392	1.066	0.275	0.249
Indifferent teachers	Reference <sup>2</sup>	-.034 (-0.51)	-.061 (-0.71)	Reference	Reference	Reference	-.023 (-0.71)
Indulgent teachers	.044 (0.99)	-.040 (-0.93)	-.040 (-0.37)	-.025 (-0.50)	-.154 <sup>†</sup> (-1.69)	-.096* (-2.47)	-.094* (-2.15)
Supportive teachers	.076* (2.34)	-.088 (-1.47)	-.072 (-0.93)	-.030 (-0.71)	-.141* (-2.03)	-.013 (-0.36)	Reference
Ambivalent teachers	.104** (2.98)	Reference	Reference	-.001 (-0.03)	-.073 (-0.91)	-.012 (-0.31)	-.014 (-0.44)

Note. <sup>1</sup> Risky single occasion drinking measured by having five drinks or more in a row; <sup>†</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$   
<sup>2</sup> Reference group

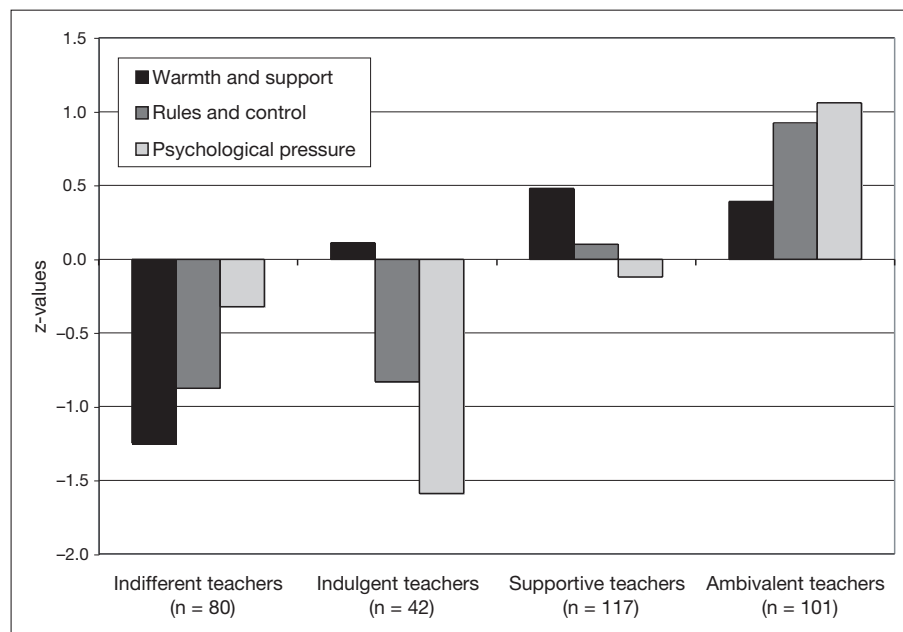


Figure 1. Graphical representation of the Cluster Analysis' results on the classification of teaching styles.

the ZKE. Although there are indications that the transfer from parenting to teaching styles was successful, a number of critical aspects remain unresolved and reveal a need for item refinement.

A three-dimensional structure was identified by a factor analysis, and these three factors were reasonably labeled warmth and support, rules and control, and psychological pressure. The items dealing with control keeping and obedience loaded on rules and control as well as on psychological pressure because such aspects can occur in the context of behavioral control as well as in a more compulsive and disapproving context. Accordingly, a high correlation between the two dimensions rules and control and psychological pressure was found that was even higher than that between warmth and support and rules and control. All these aspects are in accordance with research on parenting styles (Reitzle et al., 2001). In addition, the three-dimensional structure was confirmed by confirmatory factor analysis that revealed an acceptable model fit (Ullman, 2001). Furthermore, the items of warmth and support revealed high inter-correlations resulting in a satisfactory Cronbach's alpha value. However, most of these items are heavily skewed to the right end of the scale ("totally agree"). This might be due to the fact that teachers tend to have a positive image of their personal work which might not always be confirmed by the students' reports. The internal consistency value of the psychological pressure scale in particular was rather low. Furthermore, a positive correlation between the two dimensions warmth and support, and psychological pressure was found which was not the case for parenting styles in previous research (Reitzle et al., 2001). This positive correlation appears to be due to the fact that there were also some ambivalent teachers who applied devaluations and harsh sanctions but tried to be empathetic and supportive at the same time.

The findings demonstrate the parallels between parenting and teaching but also their discrepancies. Whereas the present items appear to measure empathetic and supportive teaching reliably, parenting aspects of rules, control, and pressure can not be easily transferred to the classroom. Refinements of the STSQ should pay attention to formulated additional items (a) on warmth and control that are supposed to be less skewed and to provide more variance and (b) that measure psychological pressure more reliably and better distinguishes it from warmth and support.

The second aim was to determine the association between teaching dimensions and adolescent problem behaviors. Results of the first series of multi-level models reveal that the dimension warmth and support was negatively related to bullying and psychological pressure was positively related to students' low academic achievement, physical violence, and delinquency. These results are in accordance with previous research on teaching styles showing that the dimension warmth and support was related to adolescents' positive developmental outcomes, whereas psychological pressure was negatively related (Reitzle et al., 2001). Wentzel (2002) argues that by creating a learning context that is free of harsh criticism and in which students are ex-

pected to do their best, teachers might be better able to convey information clearly and efficiently, to encourage students engagement, and therefore contribute to the students academic, social, and psychological adjustment.

Additionally, the interaction between the dimensions warmth and support and rules and control was taken into account as their combination is supposed to be particularly beneficial for adolescents' development (e.g., Hughes et al., 1999; Paulson et al., 1998; Pianta, 1999; Rowan et al., 1997). Accordingly, the results confirm that the interaction was negatively related with students' cigarette smoking, cannabis use, and delinquent activities. These results point to the importance of authoritative teaching (defined as a combination of providing support and responding to the students' needs as well as setting and reinforcing clearly defined rules) in the prevention of adolescent problem behaviors. Although teachers tend not to receive basic training on effective instruction (Kellam et al., 1998), such skills appear to be an important factor not only for academic, social, and psychological adjustment in adolescence (e.g., Paulson et al., 1998; Roeser et al., 1996, 1998; Wentzel, 1997, 2002) but also for the prevention of various problem behaviors.

The third aim of the present study was to determine homogenous groups of teachers working in Swiss schools who apply a particular combination of warmth and support, rules and control, and psychological pressure. Here again, parallels and discrepancies between parenting and teaching were found. According to the literature on teaching styles (e.g., Reitzle et al., 2001; Steinberg, 2002), teachers who scored low on all three dimensions measured were labeled indifferent, and teachers who showed a certain degree of warmth and support but a low level of rules and control and psychological pressure were labeled indulgent. However, the parenting styles, namely authoritative (high warmth and support, high rules and control, low psychological pressure) and authoritarian (low warmth and support, high rules and control, high psychological pressure), could not be confirmed. Instead, teachers who showed only a high level of warmth and support were labeled supportive, and teachers who scored high on all three dimensions were labeled ambivalent as they support and pressurize students at the same time.

The fourth aim of the present study was to assess if different teaching styles have an impact on the students. A second series of hierarchical linear models was carried out to determine the association between a certain group membership and adolescent problem behaviors. Results show that indulgent teachers are likely to have lower levels of bullying, physical violence, and delinquency in their class, whereas ambivalent teachers are more likely to be confronted with higher levels of low academic achievement. It appears that the combination of a certain degree of warmth and support as well as low levels of rules and control and psychological pressure prevent violent and delinquent behavior among students. In relation to academic failure, psychological pressure appears to be particularly important, independent of the level of warmth and support. It appears

that when teachers are too demanding or too negative in their feedback, students are likely to lose concentration and academic performance (Moos, 1978; Wentzel, 2002).

This study has several strengths. For example, we used a multiple informant approach and large representative samples at different aggregation levels. To our knowledge, this was the first assessment of different teaching dimensions and styles based on a reliable and culturally tested questionnaire on parental behaviors and their relations to adolescent problem behaviors. The limitations of the study concern the fact that our information came from one teacher and from self-reports only. We tried to minimize the influence of other teachers by selecting only those who are main class teachers and who taught the class for at least three hours a week. Eder (2004) concluded that even among students who are taught by several teachers, it only takes one teacher to have a fundamental influence on the students' well-being and health behaviors. However, the fact that the other teachers might extenuate the beneficial or detrimental behavior of the surveyed teacher can be a reason for the rather moderate effects.

Another limitation is the cross-sectional nature of the study. For example, it might be the case that teachers are more empathetic and supportive if they perceive low levels of violence in their class, or that they react by exerting more pressure when the class does not perform well. In this context, it would be interesting to investigate what happens when teachers adopt a more authoritative teaching style. Therefore, we recommend group-specific intervention programs with long-term evaluation research, because together they are likely to provoke and measure such changes in teaching and its impact on adolescent subsequent development.

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