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The effect of the environment on problem behaviour:
The role of school culture in secondary schools in The Hague

Master thesis

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Child and Adolescent Studies

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Abstract

According to the socio-ecological theory the environment has an impact on student's problem behaviour. Research demonstrates that on individual level, the socioeconomic status of the student is of profound influence. It has also been suggested that for European students, the neighbourhood surrounding the school could be important and consequently meaningful in explaining problem behaviour. Furthermore the social context, in which these factors are experienced, influences its impact on student's behaviour. Therefore present study proposes a mediation model linking the socioeconomic status of the student and the school environment to problem behaviour and examining the role of school culture to this relation. To test this model, students from three different schools in The Hague were asked to fill in questionnaires and information about the school environment was collected. The results did not support the mediation model. Although negative school culture was related to more problem behaviour, differences in problem behaviour outcome between students were not explained by socioeconomic status or school environment. Moreover, differences between schools were of incremental value when taking into account school culture. Explanations and implications of these results are discussed.

Keywords: problem behaviour, school culture, neighbourhood, socioeconomic status

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The Effect of the Environment on Problem Behaviour

The environment in which a child is raised is of profound influence on the development. Even the town in which the child lives could be of value in developing well adjusted or possibly maladjusted behaviour. After all, there are found differences in crime level between cities all over the world (Kribo & Peterson, 2000; Parker, 2001; Velez, Kribo, & Peterson, 2003). Even when taking into account individual characteristics, impoverished neighbourhoods or cities are often found to be influential in the development of problem behaviour (Bellair, Roscigno, & McNulty, 2003; Bingenheimer, Brennan, & Earls, 2005; Ingoldsby & Shaw, 2002; Kalff et al., 2001). In contrast to these, usually North American studies, European studies of youth delinquency do not find, or find little evidence that the neighbourhood is of value in problem behaviour (Oberwittler, 2004; Rovers, 1999; Schneider et al., 2003; Weijter, 2008). It has been suggested that these differences between Europe and the US could be explained by the idea that the lives of youth in European cities are not merely concentrated in their own neighbourhood, as it is the USA (Oberwittler, 2007; Weijters, 2008). European students often visit schools which are situated in another neighbourhood. Thus, on different levels in the environment, one can find factors which interact with an adolescent's life. This is in line with the socio-ecological theory, which also states that the relation between risk factors and problem behaviour is dependent on how the social context is experienced (Bronfenbrenner, 1986). To further examine the role of the environment in problem behaviour, current research highlights the school environment. Present research examines the role of the environment on school level (school environment) and on individual level (socioeconomic status of the student). Studies which have already focused on the role of the neighbourhood surrounding the school find contradictory results (Gottfredson, 2001). Knowing that these risk factors are dependent on the social context in which they are experienced, student's perception of the school culture will be taken into account. In future, we will address difficulties in the development of adolescents as problem behaviour.

Socioeconomic Status

The main hypothesis for socioeconomic status (SES) as a factor in the development of problem behaviour within adolescents is the social causation hypothesis (Van Oort, Van der Ende, Wadsworth, Verhulst, & Achenbach, 2011). Social causation implies that low SES causes problem behaviour because of living with adversity and/or less access to effective treatment. The accessibility of social care for groups with low SES is also a concern in the Netherlands (Smits, Droomers, & Westers, 2002). Specialized psychosocial care is not as often used by low SES groups as groups with high SES. Data from the Netherlands, but also from the UK and US, show that SES appears to be related to problem behaviour (Farrington, 1995; McLoyd, 1998; Van Oort et al., 2011). Van Oort and colleagues (2011) explained that parental socioeconomic status might raise risk for emotional and behavioural problems through parental

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conflict, parental styles, safety of the neighbourhood, and other factors which may be moderated by low socioeconomic status. Thus on individual level, SES can be seen as an important factor in explaining problem behaviour.

School Environment

One could ask if schools are dependent on individual characteristics of their students. Research showed that schools with a higher number of students, who are likely to commit delinquent acts, do indeed show a higher level of delinquency (Weijters, 2008). Yet at school level the social environment of educational settings in general can be of profound influence on problem behaviour. In fact, regardless of the individual characteristics of the students, schools differ in the amount of problem behaviour they have to face (Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Weijters, 2008). However, there is more variation between students in one school than one would find between schools. Therefore Gottfredson and colleagues (2005) concluded that all schools can expect a range of problems within their school. School characteristics that do affect problem behaviour in schools include classroom size, socioeconomic disadvantage of the student population in general and, as described above, the neighbourhood surrounding the school (Colder, Mott, Levy, Flay, & Flay, 2000; Stephenson & Smith, 1989). The latter is explained by Guerra, Tolan, Huesmann and Van Acker (1995) stating that as a way of coping, youth in impoverished urban areas frequently adopt normative positive beliefs about aggression. Social information processing implies that biases lead to the misinterpretation of social information (Dodge, 1995). Exposure to neighbourhood aggression may lead to an information processing style with hostile biases. Indeed, research showed that perceived neighbourhood aggression is related to more positive beliefs about aggression, which in turn is related to more aggression (Colder et al., 2000).

Perception of School Environment

Following socio-ecological theory, the relationship between risk factors and behavioural outcomes is dependent on the social context in which these risks are experienced (Bronfenbrenner, 1986). A range of adaptive outcomes for students, which account for differences between and within schools, is associated with the perception of the school environment, namely school climate (Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Trickett & Moos, 1973). Brand and colleagues (2003) found a strong relationship between climate ratings and gender, ethnicity and economic backgrounds. Yet, according to them, climate ratings also contribute in a unique way to problem behaviour and cannot solely be seen as a product of individual characteristics. Despite the fact that school climate is more explanatory for the experience of victimization on schools than externally determined factors, school climate itself is influenced by externally determined factors (Gottfredson et al., 2005). More specifically, Gottfredson and

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colleagues concluded that in areas of residential crowding and concentrated poverty, students and teachers experience more delinquency. Another perception of the school environment is school culture; the sense of the school as a community and the beliefs, values, and customs of the school (Higgins-D'Alessandro & Sath, 1998). School culture is found to be associated with different student outcomes as disciplinary problems, achievement and school outcomes (Lightfoot, 1983; Purkey, 1990). Moreover, this aspect is particularly interesting because it is actually adaptable through intervention (Purkey, 1990).

Current Study and Hypotheses

Summarized, problem behaviour is significantly explained by individual and school characteristics. More variation in problem behaviour is found within schools than between schools. Differences within schools are related to the perception of school context and individual characteristics as SES. This implies that all schools face problem behaviour and this behaviour is most of the time related to individual characteristics. Differences between schools are associated with the perception of the school and school characteristics. This study aims to discover in what way these factors relate to problem behaviour, so that schools and policymakers will be able to focus intervention and prevention on relevant aspects. As stated before, following the socio-ecological theory, one could say that the relation between these factors and problem behaviour is dependent on how students perceive the school environment (Bronfenbrenner, 1986). So the perception by the student of the school will be of value in this regard. Yet, as is outlined above, the perception of the school seems to be related to individual and school characteristics. Thus we propose a mediation model which describes the relationship between the school environment, which is the neighbourhood surrounding the school, and the socioeconomic status of the student. School culture will be taken into account as a mediating factor. To attain this goal, the following hypotheses are made.

Hypotheses. The first presumption of the mediation model is that SES and school environment are related to problem behaviour. Following the social causation hypothesis, we expect SES to be related to problem behaviour. Results from North American studies show that youth with low SES are at increase risk for developing problem behaviour (Farrington, 1995; Johnson, Cohen, Dohrenwend, Link, & Brook, 1999; McLoyd, 1998). In the Netherlands Van Oort and colleagues (2011) presented similar results; the differences in socioeconomic circumstances explained problem behaviour. However, others found no relation between SES and health risk behaviour (Tuinstra, Groothoff, Van den Heuvel, & Post, 1998). Despite the fact, it is commonly accepted that SES speaks about the availability of resources (Smits, Droomers, & Westert, 2002). Thus we expect that students with low SES would show more problem behaviour. Several studies show these individual characteristics are most significant in explaining problem behaviour (Gottfredson et al., 2005; Thomas, Bierman, & The Conduct Problems Prevention Research

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Group, 2009). However, it seems that schools are not merely dependent on the demographic composition of their students. Particularly interesting results came from Botticello (2009) who showed that the significant variation across schools for alcohol misuse is not completely accounted for by individual characteristics. Although, as Botticello stated, results for alcohol misuse are not always applicable to problem behaviour and vice versa. Though, it could be possible that the social causation variables which negatively effect students with low SES could be the same variables which cause them to go to schools in disadvantaged neighbourhoods. However, perceived neighbourhood aggression is related to more positive beliefs about aggression, which in turn is related to more aggression. Indeed, exposure to violence in the community is associated with problem behaviour in school, poor school attendance and low grades (Bowen & Bowen, 1999). Thomas and colleagues (2006) concluded that children attending schools in high-crime impoverished neighbourhoods are more likely to experience aggressive classroom behaviour. Especially for European students, the context of the school could be, apart from the neighbourhood, an independent factor in explaining problem behaviour (Oberwittler, 2007). We expect therefore the school environment to be related to problem behaviour of the student.

The second assumption of the mediation model is that SES and school environment are related to the perception of the school context. Brand and colleagues (2003) found that 4-14 percent of the variation in climate differences could be explained by the differences between schools. Moreover they found a relation between school climate ratings and demographically different subpopulations within schools, including SES. Yet, there is no consensus of opinion in these different subpopulations. These results have been confirmed by other researchers who found SES and school characteristics as school environment to be predictive for student's perception of the school (Aneshensel & Succo, 1996; Gottfredson et al., 2005). So we expect student's perception of the school culture to be explained by SES and school environment.

The third assumption is that school culture is related to problem behaviour, even when taking into account SES and school environment. Exposure to violence in the community is associated with positive beliefs about aggression and misinterpretation of social information (Colder et al., 2000). Indeed, in previous studies a significant part of variance in problem behaviour was explained by the perception of school climate (Brand et al., 2003; Gottfredson et al., 2005; Trickett & Moos, 1973). Although Welsh, Green, and Jenkins (1999) found that not school climate, but local (the community surrounding the school) and imported (the economic situation of students) community poverty was a predictor of school disorder. Nevertheless, this study was a small sample of 11 schools. Brand and colleagues (2003) found a strong relationship between climate ratings and gender, ethnicity and economic backgrounds. Yet, according to them, climate ratings do also contribute in a unique way to problem behaviour and cannot solely be seen as a product of individual characteristics as SES. So we expect problem behaviour to be

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related to a negative perception of the school, even when taking into account SES and school environment.

The final assumption of the mediation model is that demographic factors are reduced related or not related to problem behaviour, when taking into account school culture. Several studies found characteristics of the school and the student to be related to both school climate and problem behaviour (Brand et al., 2003; Gottfredson et al., 2005; Welsh, Green, & Jenkins, 1999). So we expect SES and school environment to be less related to problem behaviour when school culture is taken into account.

Method

Procedure

This study was part of an effect study examining specialized secondary school services. Present research was solely focused on students in regular secondary schools in The Hague and included three schools of the original sample which offered vmbo or mavo (preparatory middle-level applied education). Eventually students from first and second grade of school A, B, and C were asked to fill in the questionnaires, while a supervisor checked if students filled in the questionnaire seriously. Time of documentation for school A is May 2011 and questionnaires of school B and C were administered in September 2011.

Sample

Participants (48.9% boys) were students from secondary schools in The Hague in The Netherlands. The sample consisted of 165 vmbo students and 149 mavo students from 12 to 16 years old ($M_{age} = 13.44$, $SD = .91$). Overall, 64.6 percent of the sample indicated their ethnicity as other than Dutch and 82.2 percent was actually born in a country other than the Netherlands.

Measures

A basic questionnaire was used to attain background information about the students. For the assessment of problem behaviour, SES, school environment and school climate the following instruments were used.

Problem Behaviour. Problem behaviour was measured by the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997). The instrument is a short questionnaire considering twenty-five items, which are divided into five scales; emotional symptoms, conduct problems, hyperactivity inattention, peer problems, and pro-social behaviour. Both strengths and difficulties are considered and the items can be rated *not true*, *somewhat true*, or *certainly true*. Furthermore the questionnaire includes five impact items. The SDQ was found to be a reliable and valid instrument in several countries and a good

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predictor of clinical diagnosis (see Achenbach et al., 2008, for discussion; Goodman, Renfrew, & Mullick, 2000; Goodman, & Goodman, 2011). Also for Dutch sample the SDQ proved to be a reliable and valid instrument (Widenfelt et al., 2003). This study used the self-report version for the age group 11 to 16 (Goodman, Meltzer, & Bailey, 1998). For the total scale in the Dutch sample concurrent validity and internal consistency was shown (Muris, Meesters, & Van den Berg, 2003; Widenfelt et al., 2003). Although conduct problems and peer problems had low internal consistency in both studies. Widenfelt and colleagues concluded that for self-report one must be cautious with interpreting the scales conduct problems and peer problems. Muris and colleagues showed that, when compared to similar scales of the YSR, consistent reports have been found. Also test-retest was satisfactory. Youth might not be able to give valid answers on these scales, because they are not completely aware of these problems. Thus it seems more a problem of validity than reliability. Internal consistency in current study is low with Cronbach's alpha ranging from .24 to .46 for the different subscales peer and conduct problems and from .62 to .75 for the subscales emotional symptoms and hyperactivity inattention.

Next to the SDQ as a measure for problem behaviour, the How I Think Questionnaire was used (HIT; Gibbs, Barriga, & Potter, 2001). The questionnaire contains fifty-four items which can be answered on a 6-point Lickert scale. There are thirty-nine items which are divided into four cognitive distortion scales, namely self-centred, blaming others, minimizing/mislabelling, and assuming the worst. Every scale has at least two items which belong to an antisocial behavioural category. These categories can be divided into an overt scale, with the categories opposition-defiance and physical aggression, and a covert scale, with the categories lying and stealing. Furthermore, the questionnaire contains seven positive questions which camouflage the thirty-nine main questions. The remaining eight items are anomalous-responding items (AR). The questionnaire was developed to measure self-serving, cognitive distortions. These cognitions facilitate problem behaviour as aggression and antisocial behaviour (Barriga, Morrison, Liao, & Gibbs, 2001). The HIT has proved to be a valid instrument for measuring antisocial behaviour (Wallinius, Johansson, Larden, & Dernevik, 2011). Nas, Brugman, and Koops (2008) demonstrated the reliability, and convergent and divergent validity of the Dutch translation. Van der Velden (2009) found that for the Dutch population less antisocial behaviour is related to less cognitive distortions. This particular study found that for the Dutch sample the anomalous-response scale does not add value when speaking about internal validity. Therefore this scale was not included in present study. Cronbach's alpha for the present sample varied from .74 to .8 for the cognitive distortions scales and from .75 to .81 for the antisocial behavioural category.

Socioeconomic Status. Socioeconomic status was measured using the questionnaire, Family Affluence Scale II (FASII) (Currie, Elton, Todd, & Platt, 1997). This questionnaire was developed to measure the income of the parents through the eyes of youth. The questionnaire contains four questions

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about material goods in the family. One question can be answered with *yes* or *no* and three others give the possibility to indicate for example how many cars or computers the family owns. The questionnaire was found to be valid and reliable (Boudreau & Poulin, 2009; Boyce, Torsheim, Currie, & Zambon, 2006), although internal consistency in current study is moderate ($\alpha = .54$)

School environment. To measure the factor school environment, the Leefbaarometer (Livelihood scale) was used (Leidelmeijer, Marlet, Van Iersel, Van Woerkens, & Van der Reijden, 2008). This instrument is developed to offer online information about the current situation and development of neighbourhoods. By investigating forty-nine indicators, five dimensions were created; housing, public space, facilities, demographics (social/economic), social cohesion of the population, and safety. The scores for the different dimensions (-50 to +50) are a comparison with the national mean of 2006. The total score was indicated with *extremely positive*, *very positive*, *positive*, *moderately positive*, *moderate*, *negative*, *very negative*, and *extremely negative*. Since only three schools were included in this study, the sample ratings for the neighbourhood varied from *moderate* to *moderately positive* to *positive*.

School Culture. To measure the perception of the school culture, the School Culture Scale was used (Higgins-D'Alessandro & Sath, 1997). This instrument, with originally four scales, was developed for assessing and comparing students' sense of school community. Higgins-D'Alessandro and Sath demonstrated internal consistency and concluded the scale had good construct validity. The Dutch version is adapted by Veugelers and De Kat (1998) and included three of the four original scales, namely normative expectations, student-teacher relationships, and student relationships. This adapted questionnaire contains twenty items which can be answered on a 5-point Lickert scale ranging from *totally disagree*, to *totally agree*. Cronbach's alpha for this study varied for the different subscales from .80 to .91.

Statistical Analysis

Descriptive analyses were used to describe the normality of the data. Outliers and missing values for the total sample were investigated and this was examined separately for boys and girls. To test the mediation model, the different hypotheses were tested with statistical analyses. Hierarchical regression analysis was used to test whether socioeconomic status and school environment explain variance in problem behaviour and school culture. Within this model, school environment ratings were included as dummy variables. Since the sample only included three schools and the schools were unbalanced in size, means are presented for problem behaviour, school culture and socioeconomic status, differentiated per school environment. The final hypotheses, school culture is related to problem behaviour, controlling for SES and school environment, and SES and school environment are reduced related to problem behaviour, controlling for school culture, were both tested with hierarchical regression analysis. In all regression

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analyses student characteristics were entered first and step two contained school characteristics. For the final hypotheses the perception of the student was entered in step three. For the different problem behaviour outcome variables, separate analyses were run.

Results

Descriptive Statistics

Descriptive statistics were used to test normality of data, an assumption of regression. Considering the categorical variable school environment, which is used as a dummy variable in regression analyses, statistics showed that the groups are unbalanced in size. Therefore we decided to compare the two smallest groups, moderately positive and moderate school environment, with the largest group, positive school environment. Nonetheless, we must be careful in interpreting school environment results. Regarding the numerical variables, both indicators of problem behaviour, HID and SDQ were positively skewed, but considering the nature of the construct problem behaviour we expected the sample to be representative for the population. Also notable was that SDQ is peaked in the centre. However, considering the large sample we did not expect the kurtosis to make a substantial difference in the analysis. For SES, bivariate analysis showed no significant correlation with other numeric variables, which will be of value with regard to further analyses. Regarding school culture, descriptive analysis showed that the distribution of this variable is approximately normal. As to the residual plots, when problem behaviour and school culture are explained by SES and school environment, residuals were centred in groups, which reflect the differences between the schools which are not accounted for by the model.

Considering outliers, univariate data inspection showed that one student scored extremely high on SDQ. This outlier is not removed or adapted, because extreme scores are of value in problem behaviour. In bivariate data inspection two outliers were found. These outliers were also extreme in residual plots and were of value for the regression line. Therefore these outliers were removed. As to the missing values of the independent variables, twenty-two missing values were found for HID, of which five students had missing values on all variables. Additionally one missing value was found for SDQ, resulting in a total sample of 295 respondents with valid scores for problem behaviour. Considering that 272 respondents had valid scores on all variables, missing values were treated listwise.

Problem Behaviour

Hierarchical analysis was used to investigate if students with low SES and negative school environment show more problem behaviour. Within this model, moderate and moderately positive environment were recoded as dummy variables and compared with a baseline variable, the school with a positive school environment. Socioeconomic status was tested at the first step and school environment at

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the second. As was expected from descriptive results, analysis showed that SES did not significantly contribute to the prediction of problem behaviour (HID and SDQ). When school environment was added in the next step, explained variance significantly changed in SDQ ($\Delta R^2 = .25$, Sig *F*. Change = .024). However explained variance in the outcome was still not significant. As to HID, adding school environment to the model did not account for the amount of variation in HID. None of the differences between the school environment categories contributed to the prediction of the outcome variables SDQ and HID. Regarding the means, Table 1 shows that the means of HID, but not of SDQ, are linear with the ordered variable school environment.

Table 1

Means for problem behaviour (SDQ and, HID) school culture, and SES, differentiated per school environment

<i>Variable</i>	<i>n</i>	<i>M (SE)</i>	<i>SD</i>
SDQ			
Moderate school environment	86	2.03 (.120)	1.11
Moderately positive school environment	61	2.55 (.151)	1.18
Positive school environment	148	2.32 (.091)	1.11
HID			
Moderate school environment	86	23.56 (.800)	7.41
Moderately positive school environment	61	23.03 (.789)	6.17
Positive school environment	148	22.03 (.508)	6.19
School culture			
Moderate school environment	85	52.88 (1.589)	14.65
Moderately positive school environment	61	48.64 (.883)	12.41
Positive school environment	148	49.11 (1.645)	10.74
SES			
Moderate school environment	85	7.09 (.175)	1.616
Moderately positive school environment	61	6.90 (.220)	1.720
Positive school environment	147	4.80 (.130)	1.579

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Table 2

Summary of hierarchical regression analysis for variables predicting problem behaviour (SDQ and HID)
($N = 292$)

Variable	SDQ			HID		
	<i>B</i>	<i>SEB</i>	β	<i>B</i>	<i>SEB</i>	β
Model 1						
SES	.00	.03	.00	.17	.20	.05
<i>R</i> ²		.00			.00	
<i>F</i>		.00			.71	
Model 2						
SES	.02	.04	.03	-.05	.24	-.02
Moderately positive school environment	.18	.19	.07	1.11	1.12	.07
Moderate school environment	-.31	.18	-.12	1.75	1.06	.12
<i>R</i> ²		.02			.01	
<i>F</i>		2.34			1.17	
Model 3						
SES	.03	.04	.05	-.00	.23	-.00
Moderately positive school environment	.18	.18	.06	1.08	1.07	.07
Moderate school environment	-.43	.17	-.17*	1.00	1.01	0.7
School culture	.03	.01	.30**	.17	.03	.32**
<i>R</i> ²		.11			.11	
<i>F</i>		9.17**			8.86**	

Note. * $p < .05$, ** $p < .001$

School Culture

To examine if students with low SES and negative school environment have higher rates for school culture, hierarchical regression analysis is used. Socioeconomic status was tested in the first step and the dummy variable school environment in the second. In the first model, SES did not contribute to the amount of variation in school culture. When school environment is added in the second step, the amount of explained variance slightly changed ($\Delta R^2 = .022$, $p < .05$). However this model did not significantly contribute to explained variance in school culture. Besides, the differences between positive school environment and moderately positive school environment were not predicting school culture

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outcome. Though, school culture was predicted in outcome by changing school culture from positive into moderate ($\beta = .16$, $t = 2.28$, $p < .05$). Moreover Table 1 shows that the mean score on school culture is smaller in the moderately positive environment compared to the school culture mean in the moderate environment, which is against the assumption of linearity of school culture with the ordered variable school environment.

School Culture and Problem Behaviour

Hierarchical regression was used to examine the relation between problem behaviour and school culture, SES and school environment. Socioeconomic status was tested at step one and the dummy variables for school environment were added in step two. To test the mediation hypothesis, school culture is related to problem behaviour, controlling for SES and school environment, school culture was added in the third step. In the third model 11 percent of the variation in outcome in both SDQ and HID was explained by the independent variables together. Table 2 shows the unique contribution of school culture in the outcome of both SDQ and HID.

The final hypothesis, SES and school environment are reduced related to problem behaviour when including school culture, was tested with the same model. As shown before, SES and school environment together did not explain variance in problem behaviour, nor was this relation mediated by school culture. On the contrary, Table 2 shows that when school culture is added, change from positive to moderate school environment predicts outcome in SDQ.

Table 3

Summary of hierarchical regression analysis for variables predicting problem behaviour (SDQ) (N = 294)

<i>Variable</i>	<i>B</i>	<i>SEB</i>	β
Model 1			
Moderate school environment	-.34	.14	-.14*
<i>R</i> ²		.02	
<i>F</i>		5.61*	
Model 2			
Moderate school environment	-.45	.14	-.18*
School culture	.03	.01	.30**
<i>R</i> ²		.11	
<i>F</i>		17.52**	

Note. * $p < .05$, ** $p < .001$

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Suppression could be the reason that part correlation ($r = .30, n = 294, p < .001$) between SDQ and school culture was even somewhat higher than zero-order correlation ($r = .28, n = 294, p < .001$). This was also true for the correlation for the change in school environment from positive to moderate (zero-order correlation, $r = -.08, n = 294, p < .05$, part correlation $r = -.13, n = 294, p < .05$). Therefore another model was tested with the dummy variable, change in school environment from positive to moderate, entered in the first step and school culture in the second. Table 3 shows that the relative outcome in SDQ decreased when school environment is moderate. When school culture was added, this change was even more predictive.

Discussion

Present research aimed firstly to investigate in what amount socioeconomic status and school environment are related to adolescents' problem behaviour and secondly if school culture mediates this relation. We found that school culture is related to problem behaviour, but we found no support for the mediation model. To test this mediation model several hypotheses were made. We expected SES and school environment to be related to problem behaviour and school culture. Then, we expected school culture to be related to problem behaviour, when SES and school environment are taken into account. Finally, we expected SES and school environment to be reduced related to problem behaviour, when controlling for school culture.

Our first important finding concerns the relation between SES and problem behaviour. Contradictory to the social causation hypothesis and an amount of research confirming this theory (Farrington, 1995; Johnson, Cohen, Dohrenwend, Link, & Brook, 1999; McLoyd, 1998; Van Oort et al., 2011), we found that SES did not affect students' problem behaviour. Several explanations can be given for this finding. Current sample was derived from one city and included data of students from three schools. Consequently, differences in availability of resources between students could be too small to detect in present research. Also, the validity of the instrument Family Affluence Scale II could be affected by the fast changing society, as others did find SES to be related to problem behaviour. For example, Hopson and Lee (2011) used family income as predictor variable and consequently did find its impact on problem behaviour.

Hence, school environment was, against expectations, not related to problem behaviour. Several studies showed that exposure to violence in the community is associated with (positive beliefs about) aggression (Bowen & Bowen, 1999; Thomas et al., 2009). We expected that, for European students, the neighbourhood of the school would be an important community where student are or are not exposed to violence. Again, we must keep in mind that this sample only included three schools, but no support was found regarding the importance of school environment in the development of problem behaviour. These

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results point towards what was stated before by Gottfredson and colleagues (2005); all schools can expect a range of problems within their school.

A third unexpected finding is that differences between the socioeconomic status of the students did not predict how students experience school culture. We did, however, find some evidence that students from a school which was located in a moderate neighbourhood experienced the school culture as less positive compared with students from a school in a positive neighbourhood. Since this sample included only three schools we must be careful in attributing these differences to differences in school environment instead of other school characteristics. In addition, we must note that we based our hypotheses about school culture mainly on findings derived from research about the perception of school climate. In literature, climate ratings are related to differences between and within schools, but they also contribute in a unique way to problem behaviour and cannot solely be seen as a product of individual characteristics as SES (Brand et al., 2003). A possible explanation for the results of current research is that school culture is even less related to individual and school characteristics compared to school climate. Indeed Higgins-D'Alessandro and Sadh (1997) explain that school climate and culture both contribute to students' outcomes, but that school culture is separated from other aspects of schooling. Moreover, Purkeys (1990) states that culture is more than the sum of individuals and thus less vulnerable for individual factors as SES. However the concepts school climate and school culture are used interchangeable. For example, Hopson and Lee (2011) described the student-teacher relation as an aspect of school climate. Consequently, they did not find any differences in the perception of the school environment between students from poor families compared to students from affluent families.

Another important finding considers the relation between school culture and problem behaviour, when taking into account SES and school environment. As was expected, students' sense of community, as measured by school culture, is related to their problem behaviour, controlling for SES and school environment. This finding is constant with prior findings (Brand and colleagues, 2003; Hopson & Lee, 2011). It is notable that in present research, this finding is constant for the two instruments which are used to measure problem behaviour. However, contrary to the expectation that SES and school environment are less related to problem behaviour when school culture is taken into account, the before mentioned differences in school culture between schools with positive and moderate environment were also evident in SDQ when school culture was added to the model. The model which only included significant variables even showed that the school with the moderate environment differed significantly from the two other schools for outcome variable SDQ. When school culture was added to this model, these differences had incremental value. These findings correspond with what Gottfredson and colleagues (2005) found; student delinquency is better explained by school characteristics of the school when school climate factors are added. The before mentioned results provide no evidence for the mediation model, on the contrary,

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differences between schools were not accounted for by school culture. However these findings are only valid for SDQ and this could be explained in several ways. These results could be due to the differences in construct of SDQ and HID. The first questionnaire concerns items which cover behaviour of the student and the second concerns cognitive distortions. This could mean that the relation between school culture and SDQ has another character in different schools. In fact, we have found that the school in the moderate environment faces less problem behaviour and a more negative school culture compared with the other schools. A possible explanation is that these schools have different policies regarding problem behaviour. Schools may refer students with problematic behaviour to specialized services like Rebound. Interestingly, these students would only show problem behaviour as measured by SDQ, which could indicate that that this particulate problem behaviour does not necessarily reflect more cognitive distortions. The before mentioned research concerning specialized secondary school services will probably provide more clarity on this issue.

When considering these findings in the light of the socio-ecological theory, we find the perception of the school context, which is school culture, of value in explaining problem behaviour. However, the role of the school culture in the relation between SES, school environment and problem behaviour seems somewhat different than expected. In stead of a mediation model, our findings point to an interaction model. Recent studies that have examined the perception of the school environment and problem behaviour found this model to be meaningful (Crosnoe & Cooper, 2010; Hopson & Lee, 2011; Loukas & Murphy, 2005). Hopson and Lee (2011) connected the socio-ecological theory with concepts of risk and resilience. In an interactive model, the intensity of the risk factors is changed by the protective factors (Rutter, 1985). Thus, the impact of risk factors could be limited by enhancing the social context. Moreover, the impact of the protective factors is most markedly displayed in the context of risk factors. Indeed previous studies showed that the impact of a positive perception of the school is most evident in high poverty schools (Battistich, Solomon, Kim, Watson, & Schaps, 1995). Regarding the socio-ecological levels of the environment, this research did not find support for the role of the individual environment, which is student's SES, in problem behaviour. The role of the school environment remains unclear. This could be due to several limitations.

We have already mentioned that our sample only included three schools, so no firm conclusions could be drawn. Another limitation, which limited our view on the true differences between schools, was that no other school characteristics were available. For example, school size and student-teacher ratio seem to be important in explaining differences between schools (Payne, Gottfredson, & Gottfredson, 2003). Moreover this study used cross-sectional data and therefore causal relations cannot be made. Longitudinal data would have shed more light on the relation between SES and problem behaviour. For example, research which did use follow-up data supported the social causation model in which factors,

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resulting from low parental SES, raise risks for problem behaviour (Van Oort et al., 2011). Despite these limitations, current research shows that intervention focused on school culture could be of value in limiting problem behaviour. Research investigating such interventions showed that investing in a supportive adult-adolescent relationship can facilitate a positive adjustment for youth at risk of for developing problem behaviour (Domitrovich & Bierman, 2001). Interventions based on enhancing the school culture, including investing in the relation between students, or between students and their teacher, could be promising in limiting problem behaviour. This argues for the inclusion of school culture in the measurement of school quality. Therefore future research needs to examine in which way schools can be supported in improving their school culture, so that the school may operate as a protective factor for students from non affluent families. Finally, in order to better understand the role of the environment, we recommend that future research should investigate at which level the environment plays an important role in problem behaviour. In that way, we hope that this and future research will provide clues for intervening in the environment of the student and creating possibilities for increasing resilience.

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