The Influence of Cumulative Child and Environmental Risk on Behavioural Engagement of Primary School Children and The Moderating Role of Gender

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Supervisor:	Cathy van Tuijl
Second assessor:	Delia Burke
Date:	14-04-2020
Student's name:	Douha Hassan
Student's number:	5786460
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INFLUENTIAL RISK FACTORS ON BEHAVIOURAL ENGAGEMENT AND THE ROLE OF GENDER

Abstract

Behavioural engagement is considered to be an important factor for school success, preventing dropping out of school and later academic performance. However, behavioural engagement is assumed to be responsive to child, family, and environmental risk factors. The present study aims to examine the concurrent and longitudinal associations between risk accumulation and behavioural disengagement of children from a normative sample. Furthermore, the concurrent and longitudinal impact of child and environmental risk (at family and neighbourhood level) on behavioural engagement is examined separately. Finally, this study investigates the moderating role of gender in the associations between behavioural disengagement and risk accumulation.

In this longitudinal study, data from the project 'Preventie in de keten' was used (*N*=625). The teachers of the participating children filled out a questionnaire which provided information about the presented child and environmental risk factors and behavioural engagement of the child in class. Regression analyses were used to answer the research questions.

Results showed that risk accumulation significantly and longitudinally predicted behavioural disengagement, which confirms the findings in the literature. Child risk factors were more predictive of behavioural disengagement than environmental disadvantages (family and neighbourhood factors). No support was found for a moderating role of gender. Conclusions and explanations for the findings are discussed, as well as strengths and limitations of the study and suggestions for follow-up research.

Keywords: Behavioural engagement, child risk factors, environmental risk factors, family risk, neighbourhood risk, risk accumulation, school engagement

INFLUENTIAL RISK FACTORS ON BEHAVIOURAL ENGAGEMENT AND THE ROLE OF GENDER

Introduction

School engagement has witnessed an intensified interest in the last century as a multidimensional concept that consists of interrelated behavioural, emotional, and cognitive factors (Fredricks, Blumenfeld, & Paris, 2004; Wang, Willett, & Eccles, 2011). This multi-component concept is a critical factor in early school years for later school and academic success (Ladd & Dinella, 2009; Margetts, 2009). It refers to the quality of a pupil's participation or involvement with school activities (Skinner, Kindermann, & Furrer, 2009). Although it is generally assumed that these components are not isolated processes within the individual, some evidence suggests that only the behavioural engagement component is directly and strongly associated with effective academic performance and later academic success (Archambault, Janosz, Fallu, & Pagani, 2009; Ladd & Dinella, 2009). It also mediates the link between emotional engagement and academic competence (Li, Lerner, & Lerner, 2010). Besides, several studies showed that behaviourally disengaged students are more at risk of dropping out (Archambault et al., 2009; Rumberger & Rotermund, 2012). According to Hospel, Galans, and Janosz (2016), behavioural engagement draws on the idea of persistence, concentration, compliance with school rules, and involvement in school activities. In other words, it defines the way pupils behave in the classroom or at school, such as time needed to complete the task, degree of following the rules, and level of effort put in at school.

Scholars have attempted to investigate multiple factors that increase or decrease behavioural engagement at different levels of the Bronfenbrenner ecological system. Bronfenbrenner (1979) hypothesised that human development occurs as a function of interactions between the child's characteristics and surroundings across multiple levels of social ecology. Although most studies have focused on child characteristics such as child attention (Pagani, Fitzpatrick, & Parent, 2012), numerous other studies have underscored the importance of considering family and environmental factors as well (Greenberg et al., 2001). Besides, cumulative risk research has established the deleterious effects of high exposure to more than one risk factor simultaneously on child behavioural engagement, social learning, and future development (Fantuzzo, LeBoeuf, Rouse, & Chen, 2012; Rouse, Fantuzzo, & LeBoeuf, 2011; Whipple, Evans, Barry, & Maxwell, 2010; Margetts, 2009). Understanding how the effect of risk factors cumulatively and separately influences behavioural engagement and whether these associations differ between girls and boys could have important implications for working with high-risk children and, hence, enhance children's functioning and facilitate children's academic success. This could also help to improve early intervention

as well as to develop parenting and community programs that support young children's development.

Risk Factors and Behavioural Engagement

Risk factors refer to specific child characteristics or contextual factors or life experiences that negatively influence the behavioural engagement of a pupil, declining the likelihood of school success. At the individual level, low intelligence, high levels of hyperactivity, short attention span, and negative attitude have been found to predict behavioural disengagement (Hamre & Pianta, 2001; Merrell & Tymms, 2001).

At the family level, common findings indicate that low socioeconomic status, family instability, and harsh parenting directly and indirectly influence behavioural engagement (Ackerman & Brown, 2006; Burchinal et al., 2006; Pike et al., 2006). Concerning neighbourhood factors, studies show that students who perceive their peers as valuing school are more likely to be academically engaged (Garcia-Reid, 2007). Moreover, motivation norms and peer group achievement have been found to predict changes in students' behavioural engagement in middle school (Kindermann, 2007). Based on earlier studies, family and neighbourhood risk factors were measured in the current study as one group, namely environmental risks. It is well documented that environmental risks are the most crucial predictors of behavioural engagement (Fantuzzo et al., 2012; Rouse et al., 2011; Whipple et al., 2010, Pike et al., 2006). Moreover, Greenberg et al. (2001) found that a combination of environmental risk factors better predicts the increase of diverse sets of problem behaviours than individual characteristics alone.

Cumulative Risk Factors and Behavioural Engagement

As noted above, behavioural engagement is considered to be responsive to child and environmental risk factors. Exposure to one risk factor increases the probability of exposure to another (Carneiro, Dias, & Soares, 2016; Rouse et al., 2011). For instance, families in poverty and of low socioeconomic status are more likely to have high levels of conflict and low-quality childcare. Such family conditions result in less adequate school engagement (Dearing, McCartney, & Taylor, 2001). According to the cumulative risk hypothesis, the accumulation of risk factors, independent of the type of a particular risk factor, impact child development (Rutter, 1979; Sameroff, Seifer, Baldwin, & Baldwin, 1993). The more risks present, the worse the cognitive development and achievement outcomes (Rutter, 1979). A number of researchers have established the deleterious effects of co-occurring risk factors on child behavioural engagement. For instance, Prelow and Loukas (2003) found that as the number of risk factors increased, school problem behaviours increased, including

participation. Thus, the total number of risks present in the child's context seems to be more critical in affecting child behaviour than the pattern of risk factors (Appleyard, Egeland, Van Dulmen, & Sroufe, 2005; Sameroff et al.,1993).

Risk factors have also been investigated in terms of their cumulative effects over time. Studies have shown that feelings of well-being as children start school will minimise the risks of school disengagement in the middle and later years of schooling (Ladd & Dinella, 2009; Margetts, 2009). Margetts (2009) showed that children who rated high on measures of behavioural engagement in the first year of schooling rated high on that aspect at the end of fifth grade. Likewise, high levels of hyperactivity, family conflict, and inattention in the first years of schooling predicted later poor behavioural and academic outcomes (Hamre & Pianta, 2001; Merrell & Tymms, 2001). To sum up, previous cumulative studies targeted higher-risk children, whereas only a few studies targeted a normative group.

Gender Differences

Most studies on school engagement have shown consistent gender differences in the three types of school engagement, including behavioural engagement. In general, girls report higher levels of school engagement than boys (Meece, Glienke, & Burg, 2006). Girls tend to have fewer school behaviour problems, greater participation, and higher learning focus, whereas boys are less likely to report school adjustment (Wang, Willett, & Eccles, 2011). Interestingly, gender differences have been reported in the relationship between behavioural engagement and risk factors. For instance, being a boy and having a family with a low socio-economic status has been associated with higher levels of externalising behaviours and hyperactivity in the first years of schooling (Margetts, 2003), while being a girl has predicted lower levels of externalising behaviours and hyperactivity. This discrepancy can be explained by social skills such as cooperation and self-control. Girls have a higher level of these social skills than boys (Margetts, 2003). Based on this finding, gender appears to moderate the relationship between risk accumulation factors and behavioural disengagement. Nevertheless, while research on cumulative risk factors has primarily focused on gender as a risk factor on behavioural engagement, very little is known about gender as a moderator in this relationship.

Current Study

The current study aimed to longitudinally examine whether cumulative risk factors at Time 1 predicted behavioural disengagement of children at Times 1, 2, and 3 (henceforth T1, T2, and T3). This study also aimed to separately examine the impact of child risk factors and environmental risk factors at T1 on behavioural disengagement at T1, T2, and T3.

Finally, the interaction between risk accumulation at T1 and behavioural engagement at T1, T2, and T3 was examined in relation to gender.

Based on the previously discussed literature (Greenberg et al., 2001, Ladd & Dinella, 2009; Lucio et al., 2012; Margetts, 2009; Rutter, 1979), a positive predictive value was expected between risk accumulation at T1 and behavioural disengagement at T1, T2, and T3. It was further expected that family and neighbourhood disadvantages would have more effect on behavioural engagement than child risk factors. Based on the gender differences found by Margetts (2003), it was expected that the relationship between risk accumulation and behavioural disengagement would be moderated by gender. It was also hypothesised that the relationship between behavioural disengagement and risk accumulation would be stronger for boys than for girls. Due to the little empirical evidence, this aspect of the study is exploratory.

Method

This study used the data collected from the longitudinal project called ‘Preventie in de Keten’. That project aimed to determine which students in a normative sample were at risk of having a negative school career (van Tuijl, Endedijk, & Abbing, 2012).

Participants

Participants were 625 pupils with an age range of 4–10 years, of which the majority were Dutch. All the pupils were studying in 13 primary schools in Twente in the Netherlands. For this study, data from two age groups were used: 1) kindergarten pupils followed until 1st grade (N=268; 137 boys, 131 girls), and 2) 2nd-grade pupils followed until 4th grade (N=352; 173 boys, 179 girls). Five participants' gender was not given in the study

Procedure

As mentioned above, this quantitative study used data collected at three annual moments for the project ‘Preventie in de Keten’. School boards participated in the grant proposal. These were selected and approached after a subsidy was granted for the project. The purpose of the study was clearly explained to the teachers. Additionally, parents of students were asked to give their informed consent. Only those pupils whose parents gave their permission were studied. The participation of teachers and children was voluntary, and parents could withdraw their consent at any time without giving a reason. A child could also refuse to take part or complete the test battery at any point. The data was anonymised and only the main researcher had access. Teachers then filled in structured questionnaires about

their pupils around the same time of year in October or November (van Tuijl, Endedijk, & Abbing, 2012).

Measures

Behavioural Engagement

The judgment of behavioural engagement was based on the scale for the assessment of school engagement for children from 5 to18 years old: the COOL5-18 Questionnaire (Driessen, Mulder, & Roeleveld, 2011). This teacher questionnaire consists of eight items measured on a five-point Likert scale. For instance, one item specifies, 'Is the pupil easily distracted?', and the participant teacher would respond on a numerical scale (1 = certainly not true, 2 = not true 3 = no opinion, 4 = true, 5 = strongly true). The instrument was found to be reliable (behaviour: α= 0.83; work attitude: α= 0.89). Validity is assumed since it is a pre-existing instrument already used in different nationwide studies (Driessen, van Langen, & Vierke, 2002). The inter-item reliability analysis was run to determine the consistency and agreement between the eight items that make up the behavioural disengagement scale in the current study: Cronbach's Alfa α = .87, meaning that the eight items together form a reliable scale.

Child, Family and Neighbourhood Risk Factors

To assess the child and environmental risks, items based on the research of Orobio de Castro, Veerman, Bons, and De Beer (2002) were used. This instrument consists of three items concerning child characteristics (attention problems and hyperactivity, inappropriate behaviour, low IQ) and four items concerning family and neighbourhood risks (family instability, economic deprivation, poverty, living in a neighbourhood with a lot of school dropouts). These items were measured on a three-point scale. For instance, the participant teacher responded to items such as 'low IQ?', 'poverty?', or 'family instability?' with the extent to which they apply to the child (0 = no, 0.5 = probably, 1= yes).

Statistical Analyses

To examine the research questions and test hypotheses, linear regression analyses were conducted. These were the most appropriate analyses for this study because the expected outcome of behavioural disengagement is continuous (Field, 2013). This dependent variable is measured on a ratio scale. All items were then recoded to ensure a consistent outcome for behavioural disengagement (Field, 2013). The mean of the items was then computed as a new variable (*BhDis*) in *SPSS*. A high score on the new scales meant a positive school engagement, and a low score meant disengagement.

The predictor variables – the seven risk factors – are dichotomous variables measured on a ratio scale. Answers on the risk factors were recoded to produce an index variable (0 = no risk, 0.5 = probably, and 1 = risk). For the cumulative analysis, the independent variable risk accumulation (*RisAcc*) was the sum of risks. The sum of the seven dichotomous risks was considered as an index that ranges from 0 (no risks present) to all seven risks present. A score of 0 or 1 was considered low risk, while 1.5 upwards was considered high risk. This choice was based on earlier research on risk accumulation and school outcomes, which also made use of a normative sample (Lucio, Hunt, & Bornovalova, 2012). The moderator variable was gender, a categorical variable measured on a nominal scale (0 = male and 1 = female).

Descriptive statistics were calculated. Additionally, the assumptions of linear regression were checked before the analyses. In order to test the first hypothesis, simple and hierarchical linear regression analyses were conducted. For the second hypothesis, simple and hierarchical multiple regression analyses were conducted for child and environmental factors separately. For the third research question, a Hayes process model was used. All analyses were conducted using *IBM SPSS Statistics 26*.

Results

Before examining the research questions, and testing the hypotheses, descriptive statistics were calculated for the variables of interest. Table 1 presents the means and standard deviations of each age group and the numbers of girls and boys per group category. Table 2 presents the means, standard deviations, and minimum and maximum scores of the dependent variable *(BhDis).* Table 3 presents the accumulated risks *(RisAcc*) per group category.

Table 1

Means and standard deviations of age group and number of boys and girls per group

	M	SD	Girls	Boys	Total
Group 1	1.00	0.00	131	137	268
Group 2	2.00	0.00	179	173	352
Total gender	0.50	0.50	310	310	620
Missing					5
Total groups	1.57	0.49	271	354	625

Table 2

Means and standard deviations of the dependent variable (BhDis) per group

Groups	BhDis	N	Minimum	Maximum	Mean	Std. Devi
Group 1	T1	266	0.75	4.38	2.26	0.77
	T2	253	1.00	3.88	2.20	0.64
	T3	248	1.00	4.25	2.16	0.73
	Valid N	242				
Group 2	T1	351	1.00	4.25	2.31	0.68
	T2	320	1.00	4.63	2.24	0.74
	T3	328	.88	4.13	2.12	0.67
	Valid N	306				
Total	Valid	548				

Note. The theoretical minimum = 1 and the maximum = 5 apply to all variables.

Table 3

Accumulated risks per group

	N- Group 1	%	N- Group 2	%
RiskAcc= .0	187	69.0%	271	76.6%
RiskAcc= .5	28	10.3%	39	11.0%
RiskAcc= 1.0	30	11.1%	19	5.4%
RiskAcc= 1.5	9	3.3%	3	0.8%
RiskAcc= 2.0	3	1.1%	12	3.4%
RiskAcc= 2.5	2	0.7%	3	0.8%
RiskAcc= 3.0	5	1.8%	2	0.6%
RiskAcc= 4.0	1	0.4%	2	0.6%
RiskAcc= 6.5	1	0.4%	0	0
Total	266		351	
Missing	5		3	

Note. N= 617 If missing deleted

Furthermore, the data was checked for missing values. There was an increased number of selective missing values on questions that addressed environmentally sensitive information. Of the 625 participants there were 33 (5.3%) missing answers on family instability, 64 (10.6 %) on economic deprivation, 44 (7.0%) on poverty, and 156 (25.1%) on neighbourhood with school dropout items.

Prior to the main analyses, several assumptions were tested, and checks were performed. First, the scatterplots showed that both risk accumulation index variables and child and environmental risk factors had a linear relationship with the independent variable behavioural disengagement at the different times of study. Second, a bell-shaped histogram confirmed the fulfilment of normality for behavioural disengagement at the three different times. Third, for the three times of measurement, there were Durbin Watson values that were not less than 1 and not greater than 3. This means that the assumptions of independence of errors proven correct. Fourth, the scatterplot of the residuals indicates that the assumption of homoscedasticity was met. Additionally, all the standardised residual cases were normally distributed. For further analyses, the assumption of multicollinearity was checked using the Variance Inflation Factor (VIF), and there were no VIF values higher than 10 found. This indicated that multicollinearity would not interfere with the interpretation of the outcome.

For all regression analyses, there were some outliers detected. Since some of these outliers represented legitimate cases – for instance, the small number of cases of children with high-risk accumulation who represent individuals from the normative population – it was decided for these causes not to exclude them from the analyses (Field, 2013). Furthermore, due to the high variability in the data and the fact that there was a significant portion of children who had no risks (*ceiling effect*), it was more likely that a type II error would be made. Results, therefore, had to be interpreted with caution.

Hypothesis 1: *"Risk accumulation T1 will predict behavioural disengagement at T1, T2, and T3".*

Results showed that risk accumulation at T1 accounted for a significant 18.6% of the variance in behavioural disengagement at T1, $R^2 = .19$, $F\ (1, 615) = 140.35$, $p < .001$. To determine if the variable behavioural disengagement at T1 had a unique contribution to the variance in behavioural disengagement at T2, this variable was entered into the first block of the regression analysis to account for its influence. Risk accumulation and behavioural disengagement T1 explained 30.8% of the variance in behavioural disengagement at T2: $R^2 = .31$, $F(2, 564) = 125.68$, $p < .001$; adjusted $R^2 = .31$. At T3, risk accumulation and controlling prior behavioural disengagement T2 explained 35.1% of the variance in behavioural disengagement at T3, $R^2 = .35$, $F(2, 545) = 46.45$, $p < .001$; adjusted $R^2 = .35$. The effect of risk accumulation on behavioural engagement can be considered 'medium-strong' at T1 ($R^2 > .13$); and 'strong' at T2 and T3 ($R^2 > .26$) (Field, 2013). Furthermore, results showed that although the main effect of risk accumulation as the only predictor was smaller than the full

regression models, it was capable of explaining a significant medium-strong proportion of behavioural disengagement at T2: $\beta = 0.14$, $p < .001$ and T3: $\beta = 0.13$, $p < .001$ (See table 4).

When children were divided into two groups (low risk, and high risk), children who were characterised as high risk (*M*= 2.33, *SD*= 0.96) were more likely than low-risk children (*M*= 0.14, *SD*= 0.31) in the sample to evidence early-onset and persistent behavioural disengagement. The high-risk children scored 2.33 points, 95% CI [2.03, 2.62], above the average for low-risk children. This difference was found to be statistically significant (t (42) = 15.84, p <.001) and large (d = 2,26) (Field, 2013).

Table 4

Unstandardised (B) and Standardised (β) Regression Coefficients, (NT1 = 617, NT2= 567, NT3= 548)

	Risk accumulation		
	B [95% CI]	*β*	*p*
BhDis T1			
Risk Acc	0.46 [0.39, 0.53]	.43	.001
BhDis T2			
Control T1	0.47[0.40, 0.54]	.48	.001
Risk Acc	0.17[0.07, 0.26]	.14	.001
BhDis T3			
Control T2	0.55 [0.47, 0.62]	.54	.001
Risk Acc	0.16 [0.06, 0.24]	.13	.001

Note. CI = confidence interval, Control T1 = BhDis at T1, Control T2 = BhDis at T2
* p <.001.

Hypothesis 2: *"Family and neighbourhood disadvantages will have more effect on behavioural engagement than child risk factors"*

First, the variance in behavioural disengagement was examined using the child risk variables. At T1, child risks accounted for a significant 25% of the variance in behavioural disengagement ($R^2 = .25$, F (1, 614) = 208.20, $p < .001$). This effect size is considered 'medium-strong' ($R^2 > 0.13$) (Field, 2013). Further analyses showed that the longitudinal effect of child risks increased over time: T2: $R^2 = .31$, F (2, 563) = 125.44, $p < .001$; $\beta = 0.14$ and T3: $R^2 = .37$, F (2, 544) = 160.54, $p < .001$; $\beta = 0.19$.

Second, the variance in behavioural disengagement was examined using environmental risks. At T1, the analysis predicted 4% of the variance in behavioural disengagement: $R^2 = .04$, F (3, 425) = 6.44, $p < .00$. This effect size is considered a 'small' effect ($R^2 > 0.02$). Interestingly, the analysis with environmental risks was not able to predict behavioural disengagement at T2: $R^2 = .02$, F (3, 389) = 3.23, $p = .02$ and T3: $R^2 = .00$, F (3, 394) = 0.67, $p = .67$. The main effect of risks as the only predictor was also not significant at T2: $\beta = 0.06$, $p = 0.08$ and T3: $\beta = -0.07$, $p = 0.88$.

To conclude, the second hypothesis was not supported by these findings. Child risk factors were more able to explain higher variance in behavioural disengagement than environmental disadvantages.

Hypothesis 3: *"The relationship between behavioural disengagement and cumulative risk factors is stronger for boys than for girls"*

Using the PROCESS macro (Hayes, 2013), the moderating effect of gender on the relationship between risk accumulation and behavioural disengagement was examined at T1, T2, and T3. Results indicated that gender did not moderate this relationship: T1: $b = - 0.092$, 95% CI [-0.247, 0.063], $t = -1.168$, $p = .24$, T2: $b = -0.102$, 95% CI [-0.288, 0.83], $t = -1.08$, $p = .28$, and T3 $b = -0.148$, 95% CI [-0.339, 0.424], t = -1.52, p = .12. The simple slopes graphs confirm our results (See Figure 1). The direction of the relationship between risk accumulation and behavioural disengagement does not appear to be different for boys and girls, indicated by the fact that the two regression lines do not slope in different directions. Specifically, even though the effect is higher for boys than for girls, there was no significant interaction effect of gender on the relationship between risk accumulation and behavioural disengagement.

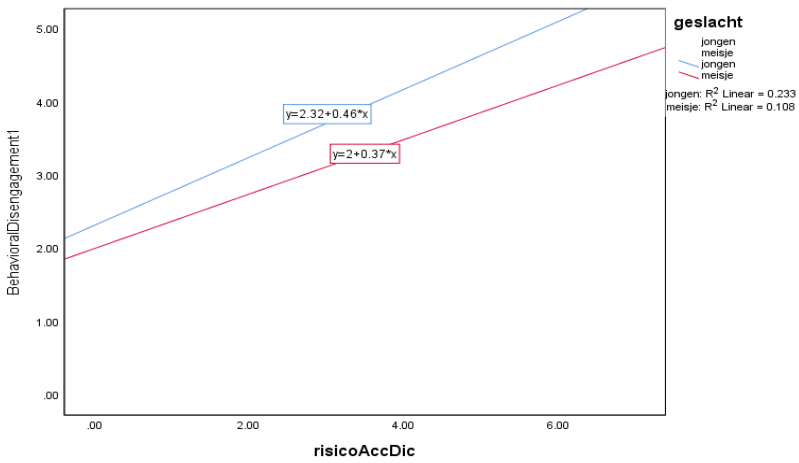

Figure 1. Interaction effect of gender on behavioural disengagement at T1 and risk accumulation

Discussion

The aims of this longitudinal study were to examine whether cumulative risk factors predicted behavioural disengagement of children from a normative sample, the impact of child and environmental risk factors on behavioural disengagement separately, and finally the interaction between risk accumulation and behavioural engagement in relation to gender. All results are discussed below.

As expected, cumulative risk factors concurrently and longitudinally predicted behavioural disengagement. This is in line with previous findings and consistent with the cumulative risk hypothesis that when many risk factors are presented, the behavioural engagement is significantly more affected (Greenberg et al., 2001, Ladd & Dinella, 2009; Lucio et al., 2012; Margetts, 2009; Rutter, 1979). Thus, the strong effect of risk accumulation also applies in a normative sample. Furthermore, this study extends what is known about early engagement trends that are not always stable during early school years (Ladd & Dinella, 2009). In this study, behavioural disengagement progressively increased over time after controlling for prior behavioural disengagement (Hamre & Pianta, 2001; Margetts, 2009; Merrell & Tymms, 2001). This increasing trend may also be attributable to other children's characteristics or context-dependent factors, for instance negative classroom climates and peer rejection (Fredricks, Blumenfeld, & Paris, 2004; Ladd, Herald, & Kochel, 2006), and the interplay among these factors (Ladd, 2003).

Furthermore, the results revealed that child risk factors had a more negative effect on behavioural engagement than environmental disadvantages. Although this result is contrary to the hypothesis, it corresponds to some authors' findings that child characteristics mainly predict the increase of diverse sets of problem behaviours (Hamre & Pianta, 2001; Merrell &; Pagani et al., 2012). A possible explanation for this contrast could be that in the current study a typical sample was used instead of a high-risk sample. Moreover, there was a lot of missing data regarding environmental risks. Teachers were either not familiar with the children's family and neighbourhood or found it difficult to report on such sensitive issues. As a result, environmental risks were presented in only 17.1% of the sample, which may have reduced the ability of the study to find significant results. Moreover, there could be other environment-specific variables that were not covered in this study. Furthermore, the inconsistencies with the literature may be due to the behaviours used as indicators of engagement (Buhs, Ladd, & Herald, 2006). Future research should, therefore, address these inconsistencies by including indicators that reflect the multidimensional concept of

behavioural engagement and that allow for a more comprehensive look at environmental factors.

Results further indicated that even though mean-level differences emerged between boys and girls, risk processes were similar across gender. Since being a boy is a well-established risk factor for behavioural problems in childhood, gender may not be relevant to risk accumulation. Future research should, therefore, mainly investigate the plausibility of the theories regarding gender in the relationship between risk accumulation and behavioural engagement.

Implications

The results discussed have implications for schoolwide, and children's interventions. Overall, it was found that risk accumulation contributed to behavioural disengagement. Because it did not seem to matter so much which risk factors the child was exposed to, but rather the number of risk factors that were related to less behavioural engagement, high-risk children should be recognised as early as possible. This should be implemented in a broader context in line with the bioecological model of Bronfenbrenner (1979). High-risk children can then receive special attention from their families and teachers and be placed into an intervention that can be applied regardless of the types of risk factors present, and subsequently gradually move towards one that addresses their specific needs. Moreover, schools would be advised to invest in practices that are designed to promote various forms of behavioural engagement, including productively cooperative classroom participation (Ladd & Dinella, 2009).

Strengths and Limitations

A strength of this study is the relatively large sample. This study also provides new empirical knowledge about school engagement in a normative sample. Another positive is that it was longitudinal, enabling it to demonstrate long-term consequences. Finally, the questionnaire used can be seen as reliable. There was no question of self-reporting, as the teacher was the informant for both the risk factors and behavioural engagement.

However, this study has some limitations. Notably, children were from a normative sample: 73.3% of cases had no accumulation risk factors. This underrepresentation of children with cumulative risk may have limited findings on the influence and power of risk accumulation. It would, therefore, be interesting to extend this study to more at-risk children. Another limitation could be that the effect of risk accumulation was only examined at Time 1. Unfortunately, the current study did not control for continuity and change in these risks in the children's context during the two subsequent years.

Conclusion

The present study supports the previous findings in which risk accumulation concurrently and longitudinally predicted behavioural disengagement. Generally, child risk factors and environmental risk factors were found to significantly interact in the prediction of behavioural disengagement. As the number of risk factors increased, behavioural disengagement increased. It is, therefore, important to train all teachers and parents to ensure early recognition and hence to prevent exhibiting lower growth in achievement.

References

Ackerman, B. P., & Brown, E. D. (2006). Income poverty, poverty co-factors, and the adjustment of children in elementary school. *Advances in Child Development and Behavior 34*, pp. 91–129. JAI. doi:10.1016/S0065-2407(06)80005-4

Archambault, I., Janosz, M., Fallu, J. S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*(3), 651–670. doi:10.1016/j.adolescence.2008.06.007

Appleyard, K., Egeland, B., van Dulmen, M. H., & Alan Sroufe, L. (2005). When more is not better: The role of cumulative risk in child behavior outcomes. *Journal of Child Pychology and Pychiatry, 46*(3), 235–245. doi:10.1111/j.1469-7610.2004.00351.x

Bronfenbrenner, U. (1979). *The ecology of human development.* Harvard University Press.

Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement?. *Journal of Educational Psychology, 98*(1), 1. doi:10.1037/0022-0663.98.1.1

Burchinal, M., Roberts, J. E., Zeisel, S. A., Hennon, E. A., & Hooper, S. (2006). Social risk and protective child, parenting, and childcare factors in early elementary school years. *Parenting: Science and Practice, 6*(1), 79–113. doi:10.1207/s15327922par0601_4

Carneiro, A., Dias, P., & Soares, I. (2016). Risk factors for internalizing and externalizing problems in the preschool years: Systematic literature review based on the Child Behavior Checklist 1½–5. *Journal of Child and Family Studies, 25*, 2941–2953. doi:10.1007/s10826-016-0456.

Dearing, E., McCartney, K., & Taylor, B. A. (2001). Change in family income-to-needs matters more for children with less. *Child Development, 72*, 1779–1793. doi:10.1111/1467-8624.00378

Driessen, G., Mulder, L., & Roeleveld, J. (2011). *Cohortonderzoek COOL5-18. Technisch rapport basisonderwijs, tweede meting 2010/11.* Amsterdam: Kohnstamm Instituut.

Driessen, G., van Langen, A., & Vierke, H. (2002). Basisonderwijs: Veldwerkverslag, leerlinggegevens en oudervragenlijsten. *Basisrapportage PRIMA-cohortonderzoek. Vijfde meting, 2003*.

Fantuzzo, J., LeBoeuf, W., Rouse, H., & Chen, C. C. (2012). Academic achievement of African American boys: A city-wide, community-based investigation of risk and resilience. *Journal of School Psychology, 50*(5), 559–579. doi:10.1016/j.jsp.2012.04.004

Field, A. (2013*). Discovering statistics using IBM SPSS statistics*. Sage.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*, 59-109. doi:0.3102/00346543074001059

Greenberg, M. T., Speltz, M. L., DeKlyen, M., & Jones, K. (2001). Correlates of clinic referral for early conduct problems: Variable- and person-oriented approaches. *Development and Psychopathology*, *13*(2), 255-276. https://doi.org/10.1017/s0954579401002048

Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625–638. doi:10.1111/1467-8624.00301

Hospel, V., Galand, B., & Janosz, M. (2016). Multidimensionality of behavioural engagement: Empirical support and implications. *International Journal of Educational Research, 77*, 37–49. doi:10.1016/j.ijer.2016.02.007

Kindermann, T. A. (2007). Effects of naturally existing peer groups on changes in academic engagement in a cohort of sixth graders. *Child Development, 78*(4), 1186–1203. doi:10.1111/j.1467-8624.2007.01060.x

Ladd, G. W., & Dinella, L. M. (2009). Continuity and change in early school engagement: Predictive of children's achievement trajectories from first to eighth grade?. *Journal of Educational Psychology*, *101*(1), 190–206. doi:10.1037/a0013153

Ladd, G. W., Herald, S. L., & Kochel, K. P. (2006). School readiness: Are there social prerequisites? *Early Education and Development, 17*, 115–150. doi:10.1207/s15566935eed1701_6

Ladd, G. W. (2003). Probing the adaptive significance of children's behavior and relationships in the school context: A child by environment perspective. In R. Kail (Ed.), *Advances in Child Behavior and Development* (Vol. 31, pp. 43–104). Wiley. doi:10.1016/s0065-2407(03)31002-x

Li, Y., Lerner, J. V., & Lerner, R. M. (2010). Personal and ecological assets and academic competence in early adolescence: The mediating role of school engagement. *Journal of Youth and Adolescence*, *39*(7), 801–815. doi:10.1007/s10964-010-9535-4

Lucio, R., Hunt E., & Bornovalova, M. (2012). Identifying the necessary and sufficient number of risk factors for predicting academic failure. *Developmental Psychology, 48*, 422–428. doi:10.1037/a0025939

Margetts, K. (2009). Early transition and adjustment and children's adjustment after six years of schooling. *European Early Childhood Education Research Journal, 17*(3), 309–324. doi:10.1080/13502930903101511

Margetts, K. (2003). Children bring more to school than their backpacks: Starting school down under. *European Early Childhood Education Research Journal,* 5–14. doi:10.1080/1350293X.2003.12016701

Meece, J. L., Glienke, B. B., & Burg, S. (2006). Gender and motivation. *Journal of School Psychology, 44(*5), 351–373. doi:10.1016/j.jsp.2006.04.004

Merrell, C., & Tymms, P. B. (2001). Inattention, hyperactivity and impulsiveness: Their impact on academic achievement and progress. *British Journal of Educational Psychology, 71*(1), 43–56. doi:10.1348/000709901158389

Orobio de Castro, B., Veerman, J. W., Bons, E., & Beer, L. D. (2002). Kansen gekeerd? Criminaliteitspreventie door gezinsondersteuning.

Pagani, L., Fitzpatrick, C., & Parent, S. (2012). Relating kindergarten attention to subsequent developmental pathways of classroom engagement in elementary school. *Journal of Abnormal Child Psychology, 40,* 715–725. doi: 10.1007/s10802-011-9605-4.

Pike, A., Iervolino, A. C., Eley, T. C., Price, T. S., & Plomin, R. (2006). Environmental risk and young children's cognitive and behavioral development. *International Journal of Behavioral Development, 30,* 55–66. doi:10.1177/0165025406062124.

Prelow, H. M., & Loukas, A. (2003). The role of resource, protective, and risk factors on academic achievement-related outcomes of economically disadvantaged Latino youth. *Journal of Community Psychology, 31*(5), 513-529. doi:10.1002/jcop.10064

Rouse, H. L., Fantuzzo, J. W., & LeBoeuf, W. L. (2011). Comprehensive challenges for the wellbeing of young children: A population-based study of publicly monitored risks in a large urban center. *Child Youth Care Forum, 40(*4), 281–302. doi:10.1007/s10566-010-9138-

Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M. W. Kent, & J. E. Rolf (Eds.), *Primary prevention of psychopathology,* (Vol. 3: social competence in children, pp. 49–74). University of New England Press.

Rumberger, R. W., & Rotermund, S. (2012). The relationship between engagement and high school dropout. In Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.), *Handbook of research on student engagement* (pp. 491–513). Springer.

Sameroff, A. J., Seifer, R., Baldwin, A., & Baldwin, C. (1993). Stability of intelligence from preschool to adolescence: The influence of social and family risk factors. *Child Development, 64*, 80–97. doi:10.1111/j.1467-8624.1993.tb02896.x

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493–525. doi:10.1177/0013164408323233

Van Tuijl, C., Endedijk, M. D., & Abbing, J. (2012). Rapportage nulmeting Preventie in de Keten: leerlinggegevens.

Wang, M. T., Willett, J. B., & Eccles, J. S. (2011). The assessment of school engagement: Examining dimensionality and measurement invariance by gender and race/ethnicity. *Journal of School Psychology*, *49*(4), 465-480. doi: 10.1016/j.jsp.2011.04.001

Whipple, S. S., Evans, G. W., Barry, R. L., & Maxwell, L. E. (2010). An ecological perspective on cumulative school and neighborhood risk factors related to achievement. *Journal of Applied Developmental Psychology*, *31*(6), 422–427. doi:10.1016/j.appdev.2010.07.002