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Social marginalisation and academic performance: a multigroup SEM analysis of key factors underlying inequality in Danish public schools

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Social marginalisation and academic performance: a multigroup SEM analysis of key factors underlying inequality in Danish public schools

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Abstract: This study's purpose was to analyse key factors underlying social marginalisation and academic performance. The 2017 data from the Danish PLM survey (N = 42,703) were analysed which contained responses by students (grades 4–10), parents, and class teachers. Multigroup structural equation modelling was applied to explore anticipated gender differences. Two critical factors were identified that were associated with reduced levels of social marginalisation: 1) the degree of teacher support; 2) the strength of the parental community. Finally, the study indicated that girls, and students at lower grade levels, tend to experience greater social marginalisation.

Keywords: marginalisation; academic performance; academic achievement; teacher support; parental involvement; parental community; SEM; students; school.

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1 Introduction

Based on a large subset of the Danish Program for Learning Management (PLM) survey (N = 42,703) this study provides research results and suggestions for promoting inclusive education. As stated by the Danish Ministry of Children and Education (MCE), public schools must improve student well-being and reduce the negative influence of social background on academic results (MCE, 2020). Sadly, research has shown that inequality is still present to a high extent in Danish public schools. Children of higher educated parents display higher academic performance both from kindergarten to 3rd grade (Jensen et al., 2020) and from 4th to 10th grade (Jensen et al., 2020; Nordahl, 2018).

Higher educated parents probably understand the language of schooling better, which is passed on to their children (Hattie, 2009). Additionally, it has been documented that girls perform better on average (Egelund et al., 2018), which was also concluded in a meta-analysis (Voyer and Voyer, 2014). Numerous social factors influence social and academic outcomes; therefore, quantitative research is needed on complex variable relations to account for moderation and mediation effects (Hattie, 2009; Nordahl, 2019). Research has suggested that marginalised students experience less well-being (Knoop et al., 2017; Messiou, 2012; Søndergaard and Hansen, 2018). Therefore, social marginalisation is crucial to address to improve public schools. However, several factors influence social outcomes related to social marginalisation, for instance, the degree of parental involvement (Jeynes, 2008), the quality of teacher support (Havik, 2017) and students' relationships with peers and classmates (Knoop et al., 2017; Perry et al., 2019). Social background variables are also important to consider since higher educated parents generally are more involved (Akselvoll, 2016; Desforges and Abouchaar, 2003; OECD, 2012). Although research has found that parental involvement strengthens both social and academic outcomes (Hattie, 2009; Jeynes, 2008, 2010), some critical researchers have feared that children of higher educated parents may gain an unfair advantage (Akselvoll, 2016, 2018; Lareau, 1987). To examine several of these core ideas in a single model, multigroup structural equation modelling (SEM) was utilised. A path diagram was created, depicting several key associations among factors and variables underlying social marginalisation and academic performance. Knowledge of such patterns may help strengthen schools' organisational capacity to promote inclusive education.

1.1 Research question

This study addressed the following research question: "Which social factors influence social marginalisation of students and their academic performance?" Four factors were included in the analysis:

1 parental community

2 teacher support

3 social marginalisation

4 academic performance.

Three observed variables specified the variable relations and acted as controls:

1 the mother's educational level

2 the father's educational level

3 the students' grade level.

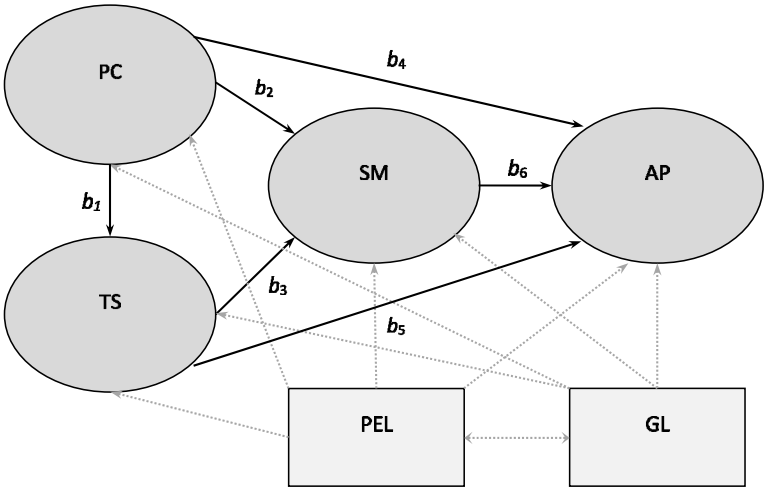
In the following theory section, the conceptual model is presented first. Subsequently, the empirical and theoretical underpinnings of the main hypotheses are explained.

2 Theory

2.1 The conceptual model and central hypotheses

In Figure 1, the main variable associations are depicted. Associations among four different factors were examined while controlling for observed background variables.

Figure 1 Conceptual model displaying all pathways



Notes: Latent variables: PC = parental community, TS = teacher support, SM = social marginalisation, and AP: academic performance. Observed variables: PE = parental educational level and GL = grade level (of students).

In Epstein's (1995) theoretical framework, 'collaborating with the community' was considered a distinct sub-dimension of parental involvement. Therefore, the term 'parental community' was used rather than the generic term 'parental involvement'. The term 'social marginalisation' was chosen to specify that the social dimension of marginalisation was measured (cf. Messiou, 2003).

The following main hypotheses were tested:

- H_1: The parental community reduces the risk of social marginalisation.
- H_2: Low teacher support increases the risk of social marginalisation.
- H_3: Social marginalisation negatively influences academic performance.
- H_4: Girls experience more social marginalisation.

To the best of my knowledge, social marginalisation has not been explicitly examined in relation to parental community, teacher support, and academic performance in any previous studies. Therefore, the hypotheses were formulated based on empirical findings of related studies since it was not possible to directly compare the conceptual model with any previous studies.

2.2 Arguments for the hypotheses

A quantitative study found that parental involvement was associated with well-being among school children (Wang et al., 2018). Research has suggested that the experience of marginalisation is often associated with emotional distress and pain (Messiou, 2003). Therefore, it could be expected that parental involvement similarly reduces the risk of social marginalisation. Research has also indicated that parental involvement can reduce the risk of discrimination (Jeynes, 2008), which is related to social exclusion and marginalisation (providing some argument for H_1).

Even though no existing study has explicitly investigated the association between teacher support and social marginalisation (using the same or similar indicators as the present study), related research has found that teacher support may protect students from developing mental health problems (e.g., Veltro et al., 2014) and that the quality of teacher-student interactions is vital for establishing positive peer interactions (Hughes et al., 2001; Luckner and Pianta, 2011). Moreover, Danish quantitative studies have indicated that positive relations with teachers enhance student well-being (Knoop et al., 2017; Perry et al., 2019) and that marginalisation is closely associated with reduced well-being (Knoop et al., 2017). Thus, it is hypothesised that low teacher support increases the risk of social marginalisation (providing some argument for H_2).

Jeynes (2008) found that parental involvement was related to a lower incidence of children being picked on or discriminated against – phenomena that are considered strongly related to marginalisation according to theorists (Messiou, 2003, 2012; Søndergaard, 2014) and associated with higher academic performance (providing some argument for both H_1 and H_3).

Research has also indicated that healthy learners are better learners (Basch, 2011) and that well-being to some extent is a prerequisite for learning. If socially marginalised students therefore experience less well-being on average, it seems reasonable to expect that social marginalisation leads to lower academic performance (providing additional argument for H_3).

Much research exists on the impact of parental involvement on academic variables (e.g., Griffith 1996, 1997; Hampton et al., 1998; Jeynes 2003; 2005; 2007; Ma et al., 2016). Jeynes (2008) argued that researchers have been too narrowly focused on academic achievement although parental support influences almost every dimension of a child's life. Therefore, parental community was included in the conceptual model along with both academic performance, and social marginalisation.

Finally, previous research has indicated that boys experience more social well-being while girls experience more academic well-being on average (Nordahl, 2018). Therefore, it was hypothesised that girls experience more social marginalisation (H_4).

Although there were four main hypotheses, several others were tested in an exploratory fashion based on the conceptual model that was defined a priori.

2.3 Defining social marginalisation

Although no standard way of defining marginalisation exists, researchers often distinguish between quantitative (e.g., years of education) and qualitative aspects (e.g., subjective experiences) of marginalisation (UNESCO, 2010). In this study, only qualitative aspects were considered which is why student responses were selected to measure marginalisation.

Furthermore, researchers often distinguish between social marginalisation and academic marginalisation within a school setting (e.g., Messiou, 2003, 2012). Messiou (2003) defined social marginalisation as something that children may experience when they are rejected by their peers or when they are denied the right of friendship or bullied. Academic marginalisation may occur if students cannot access the curriculum, participate fully in the classroom, or if they feel that their academic abilities are not valued. In the present study, social marginalisation was specifically measured which is why the factor was named social marginalisation (SM).

It is disputed whether marginalisation should be considered a process, a state or both (cf. Benjaminsen et al., 2015; Messiou, 2003, 2012). The perspective chosen in this paper is that marginalisation is best understood (and measured) as a process toward social exclusion (cf. Mortensen and Larsen, 2009), especially within a SEM analysis framework. Some children may experience more social marginalisation than others (e.g., feel lonelier and more isolated) which is why a simple dichotomy seems too limiting. Thus, instead of attempting to estimate the number of marginalised students, this study aimed at identifying social factors that may accelerate the process of social marginalisation. To measure students' experience of social marginalisation, a scale was formed consisting of ordinal indicators measuring peer rejection, loneliness, bullying and well-being. Social marginalisation is strongly associated with psychological pain (Søndergaard and Hansen, 2018) which is why items on well-being were included. The statistical validity and reliability of this scale is assessed and explained in the methods section.

4 Method

4.1 Sample and procedure

This study built on a subset (N = 42,703) from "Program for Learning Management" (PLM), a Nordic research program (2015–2019) designed to enhance research informed school improvement and competence development. In Denmark, more than 200 schools from 13 different municipalities participated. Three cross-sectional surveys were conducted in 2015, 2017, and 2019, respectively. At each measurement point about 70,000 students participated along with parents, class teachers, teachers, pedagogues, and school principals, covering about 10% of the school mass in Denmark (Qvortrup et al., 2016), making it the largest school development program in Danish educational history. Structural equation modelling (SEM) analysis was selected since this approach is considered superior to traditional multivariate methods when examining relations among latent constructs (Byrne, 2016). This study included 32 variables in the initial analysis (29 indicators plus three observed variables) based on responses from parents, class teachers, and students (from 4th to 10th grade).

Table 1 shows the response rate from 2015 to 2019. The response rate for both class teachers and students was ≥ 90% at each measurement point while being consistently lower for parents. Previous research has shown that it is difficult to achieve a high response rate for parents (Nordahl, 2018). To achieve the least biased estimates, the 2017 data were selected. Full information maximum likelihood (FIML) estimation was applied as this method is more apt to produce unbiased estimates (Baraldi and Enders, 2010). 3.5% of the total cases (n = 1,553) were deleted due to complete missingness. Although

multivariate normality is assumed when using maximum likelihood (ML) estimation, FIML is considered robust when facing non-normal distributions if the sample size is large (Hair et al., 2019). As data deviate from the assumption of multivariate normality, it is a generally accepted rule that there must be 10 respondents per parameter in the model (Hair et al., 2019). In this study, a total of 264 parameters were estimated which is why a total sample size of 2,640 was required to apply ML estimation. Additional information on all ordinal indicators are found in Appendix 1 (cf. Table 8). The statistical analysis prior to the CFA was conducted in SPSS version 26. The SEM analysis was conducted in Amos version 26.

Table 1 Response rate

Participants	*2015*		*2017*		*2019*	
	T1	*n*	*T2*	*n*	*T3*	*n*
Parents	51%	23,180	49%	21,581	31%	13,106
Class teachers	90%	41,325	95%	42,058	94%	40,331
Students (4–10)	90%	41,123	94%	41,551	91%	39,132

Note: Complete cases for the three groups of participants (32 selected variables).

4.2 The study's factors

The study's four factors were measured using three different respondent groups: class teachers, parents, and students – presented in the same order below.

- *Academic performance (AP)* was assessed by class teachers. This factor was created with inspiration from existing research (Gresham and Elliot, 1990; Harter, 1985) and later adapted to a Nordic context (Sørlie and Nordahl, 1998) and the PLM survey (Nordahl, 2018). Each student was assessed on a scale 1–5 [1 = very low; 5 = very high] in Danish, math, English, natural sciences, reading and music (Nordahl, 2018). In this study, the item on music (AP6) was removed from the CFA because it correlated less with the other items, decreasing the measurement validity.
- *Parental community (PC)* was assessed by parents on a scale 1–4 [1 = strongly disagree; 4 = strongly agree]. PC was originally used in research on parental involvement (Nordahl, 2000) and later adapted to the PLM survey and named 'Contact between the parents' (Qvortrup et al., 2016; author's translation). The mother or father (or both) completed a single questionnaire on behalf of both parents. The parents answered questions about the parental community (cf. Table 3).
- *Teacher support (TS)* was assessed by students on a scale 1–4 [1 = strongly disagree; 4 = strongly agree] with no neutral category. The factor was derived from existing research on classroom environment (Moos and Trickett, 1974) and later adapted to a Nordic context (Sørlie and Nordahl, 1998) and the PLM survey (Nordahl, 2018). TS was originally named 'Support and interest from the teacher' (author's translation) in the PLM survey. This factor covers the students' perception of support, interest, and praise and encouragement by the teacher.
- *Social marginalisation (SM)* was measured by merging two existing student assessed scales on social isolation and social well-being) derived from previous research

(Goodlad, 1984; Nordahl, 2018; Rutter et al., 1979). These scales were adapted to a northern context (Sørlie and Nordahl, 1998) and the PLM survey (Nordahl, 2018). On the new scale (SM), all items were weighted equally on an ordinal scale 1–5 [1 = very high; 5 = very low]. This scale was reversed so that a high score indicates a low degree of social marginalisation.

- *Social isolation and social well-being were merged for two reasons*:
  1 The EFA indicated that the factors measured a single underlying phenomenon.
  2 Research has shown that (conscious) social marginalisation is psychologically painful (Messiou, 2003, 2012) and is closely associated with reduced well-being (Knoop et al., 2017; Søndergaard and Hansen, 2018).

4.3 Control variables

Three control variables were included as exogenous single-item measures. The controls were measured using two respondent groups:

1 parents

2 students.

The mother's educational level (MEL) and the father's educational level (FEL) were measured on an ordinal scale consisting of four categories:

1 primary and lower secondary education

2 upper secondary education (vocational and general)

3 short-cycle higher education

4 long-cycle higher education.

Grade level (GL) was measured from 4th to 10th grade.

4.4 Exploratory factor analysis

Exploratory factor analysis (EFA) was applied to assess the latent variable structure before conducting confirmatory factor analysis (CFA). In the EFA, five factors were included:

1 teacher support

2 parental community

3 academic performance

4 social isolation

5 social well-being.

Cronbach's alpha (CA) is typically reported when assessing scale reliability. CA should preferably be > .7 or > .8 (Field, 2018). As seen in Table 2, the reliability statistics were adequate ($\alpha > .7$) to very high ($\alpha > .9$). The internal reliability was excellent for the constructs measured with 6 items or more. According to general theory on factor analysis (FA), at least three measured variables (i.e., indicators) are needed for proper statistical

identification of a factor, although more are preferred (Watkins, 2018). Fabrigar et al. (1999) recommended using four to six indicators to ensure sufficient measurement validity. The pre-existing factors of the PLM survey each contained at least three indicators, which is the minimum requirement for conducting FA (Watkins, 2018). In Appendix 2 (cf. Table 9), all item inter-correlations are shown. Kline (2016) underlined three cautions regarding factor names:

1 Labels are solely for the need of communication and it does not mean that "the hypothetical construct is understood or even correctly labelled" (p. 300).

2 They should not be thought of as corresponding to real things (i.e., reification).

3 Just because two factors have the same name it does not mean that they are the same thing (jingle fallacy) or that they are different things if the names are different (jangle fallacy).

Thus, the factors were renamed (and translated into English) to reflect the underlying constructs they were intended to measure.

Table 2 Reliability statistics before the EFA

Factor	*No. of items*	*Scale*	*Cronbach's alpha (α)*
Teacher support	9	1–4	.90
Parental community	7	1–4	.89
Academic performance	6	1–5	.91
Social isolation	4	1–5	.77
Social well-being	3	1–4	.71

Source: The T2 data from 2017 were analysed

The results of the EFA are shown in Table 3. By applying Kaiser's (1970) criterion of including factors with an eigenvalue > 1, four factors were extracted instead of the anticipated five. The EFA suggests that Social Isolation and Social Well-being should be merged into one factor. Otherwise the factors would correlate too strongly and hurt the discriminant validity in the CFA. This new factor was subsequently named Social Marginalisation. Alternatively, the factor could be named 'Social Inclusion', which is often conceptualised as the opposite of social marginalisation (Benjaminsen et al., 2015; Messiou, 2003) or 'Social Exclusion' (e.g., Mortensen & Larsen, 2009). Another viable option would be 'Social Well-being' since the measured factor contains multiple questions on well-being and bullying. However, since most of the questionnaire items have been negatively phrased (e.g., 'I feel lonely in school', SM5; or 'I feel left out in school', SM7), and since the factor was measured as a continuum and not as a dichotomous state, it seemed more fitting to name the factor Social Marginalisation since this concept typically refers to a process rather than a state (cf. Benjaminsen et al., 2015). With four factors, there were no factor loadings < .4 and no substantial cross loadings, implying that the model was valid within a CFA framework. Teacher Support and Social Marginalisation were somewhat correlated (r = .33). Discriminant validity was supported since the inter-factor correlation did not exceed .7 (Hair et al., 2019). According to Messiou's (2003) rudimentary definition, students may experience social marginalisation when they are rejected by their peers (item SM5, SM6, and SM7) or when they are bullied (item SM3). Some researchers consider bullying an extreme type of social

marginalisation (e.g., Søndergaard and Hansen, 2018). This suggests that the scale has face validity (cf. Hair et al., 2019).

Table 3 Exploratory factor analysis of the study's 29 indicators

Item	*Factor*			
	TS	*PC*	*AP*	*SM*
SM1: I feel good in my class				.686
SM2: I feel good in the breaks				.694
SM3: The other students often bully me				.497
SM4: I am often sad in school				.702
SM5: I feel lonely in school				.810
SM6: I am together with the other students in the breaks				.489
SM7: I am left out in school				.710
TS1: I am in good contact with my main teacher	.685			
TS2: My main teacher likes me	.679			
TS3: When I am sad or in trouble, I can talk to my main teacher	.675			
TS4: My main teacher encourages me when I work well	.672			
TS5: My main teacher helps me learn as much as possible	.686			
TS6: My main teacher cares about how I feel	.764			
TS7: My main teacher encourages me when what I am doing does not succeed	.761			
TS8: My main teacher encourages us to stick together and be friends in class	.703			
TS9: My main teacher makes us considerate of each other	.646			
AP1: The student's performance in Danish is:			.893	
AP2: The student's performance in math is:			.791	
AP3: The student's performance in English is:			.771	
AP4: The student's performance in science is:			.767	
AP5: The student's performance in reading is:			.850	
AP6: The student's performance in music is:			.557	
PC1: The contact between parents in the class is really good		.766		
PC2: I/we often talk with other parents from the class		.877		
PC3: I/we often talk with other parents from the class about our children's well-being in school		.849		
PC4: I/we often talk with other parents from the class about the teaching		.640		
PC5: I/we know the other children from the class well		.681		
PC6: When parents agree on something action is taken		.608		
PC7: Parents do much to improve the environment in the class		.680		

Notes: Extraction method: principal axis factoring. Rotation method: Oblimin with Kaiser normalisation. Cases excluded listwise. TS = teacher support, PC = parental community, AP = academic performance, and SM = social marginalisation. Factor loadings < .4 are suppressed. KMO = .90. Bartlett's test of sphericity, $p < .001$. Extraction sum of squared loadings = 51.68%.

Recent quantitative surveys have indicated that marginalisation is strongly related to reduced levels of well-being (Knoop et al., 2017; Perry et al., 2019) which is similarly evident among victims of bullying (Søndergaard and Hansen, 2018; Rasmussen and Due, 2019). Therefore, it was considered theoretically meaningful to include items on social well-being (SM1, SM2, and SM3) to measure social marginalisation. Some items arguably measure both social well-being and social isolation (e.g., SM4 and SM5) as they involve both sadness and feelings of loneliness. In addition, item AP6 was removed ($\lambda = .55$) to improve the construct's internal reliability and validity. As seen in Table 3, item AP6 had a somewhat smaller factor loading compared to the other items of the construct.

Table 4 displays the improved reliability statistics after removing item AP6 and merging Social Well-being and Social Isolation into Social Marginalisation. All measures of internal reliability were high ($\alpha > 0.8$). Based on recommendations of Fabrigar et al. (1999) all factors were measured with more than three indicators. The resulting SEM model contained four factors with improved discriminant validity. From a statistical viewpoint, it can be discussed whether item SM3 and SM6 should have been removed from the factor SM since the factor loadings on these items were weaker. Removing these items could possibly result in a better model fit in the CFA. However, these items were retained in the initial measurement model in the CFA. All factors in the model are considered reflective (not formative) which is why it was possible to remove redundant items with lower factor loadings if deemed necessary in the CFA (cf. Kline, 2016).

Table 4 Reliability statistics after the EFA

	No. of items	*Cronbach's alpha (α)*
Teacher support	9	.90
Parental community	7	.89
Academic performance	5	.91
Social marginalisation	7	.84

Source: The T2 data from 2017 were analysed

4.5 Model fit and validity analysis

Model trimming was applied to compare hierarchical models. First, a more complicated model was formed which was gradually simplified by removing parameters and items (cf. Kline, 2016). A multigroup structure was created (to compare all students, boys and girls, separately).

Following Kline's (2016) recommendation, chi-square (χ^2) is reported for all tested models. The χ^2 test evaluates the model's overall fit, allowing for comparisons between alternative models. The χ^2 goodness-of-fit statistic "assesses the magnitude of the discrepancy between the sample and fitted covariance matrices" (Hu and Bentler, 1999). A good model fit provides an insignificant result at the .05 threshold (Byrne, 2016). It must be stressed, that the χ^2 test is highly sensitive to sample size, which is whyit is nearly always significant in large samples (Kline, 2016). Therefore, one can choose to ignore the p-value for the χ^2 test in samples > 200 (Awang, 2014). Wheaton et al's (1977) relative/normed chi-square (χ^2/df) adjusts for sample size which is why this fit statistic is also reported. According to general theory, χ^2/df should preferably be < 2 (Tabachnick &

Fidell, 2014) or < 5 (Wheaton et al., 1977). Although these cut-off points are not useable in large samples, the test is useful for comparing different models to determine best fit (Kline, 2016).

Based on recommendations of Kline (2016), three other fit indices are reported: Steiger's root mean square error of approximation (RMSEA; Steiger, 1990; Steiger and Lind, 1980), the standardised root mean square residual (SRMR) and the comparative fit index (CFI; Bentler, 1990). The RMSEA is a measure of how well the model would fit the population covariance matrix (Byrne, 2016), which is regarded as one of the most informative fit indices due to its sensitivity to the number of estimated parameters in the model (Diamantopoulos and Siguaw, 2000). The RMSEA ranges from 0 to 1 with values closer to 0 being indicative of a good fit. The RMSEA should be below .08 (Kline, 2016). The SRMR similarly ranges from 0 to 1 with values close to 0 being indicative of a good fit. Values as high as .08 are deemed acceptable (Hu & Bentler, 1999), with well-fitting models obtaining values less than .05 (Byrne, 2016). The CFI (Bentler, 1990) is a revised form of the normed-fit index (Byrne, 2016). This statistic assumes that all latent variables in the model are uncorrelated and compares the sample covariance matrix with the null model. The value of CFI ranges from 0 to 1 (with 0 indicating a poor fit and 1 indicating a good fit). A CFI > .95 is typically recognised as indicative of a good fit (Hu and Bentler, 1999).

Table 5 Fit indices and model comparisons

Model	χ^2	$\Delta\chi^2$	*df*	χ^2/df	*CFI*	*RMSEA*	*SRMR*
Single group							
1 Measurement[1]	20,046***	-	450	44.55	.92	.05	.03
Multigroup							
2 Measurement[2]	38,732***	-	1260	30.74	.92	.03	.03
3 Measurement[3]	17,858***	20,874	609	29.34	.95	.03	.03
4 Measurement[4]	21,153***	3,295	827	25.58	.95	.03	.03
5 Measurement[5]	23,707***	2,554	871	27.22	.94	.03	.03
Multigroup							
1 Structural[6]	33,646***	-	873	38.54	.92	.03	.05
2 Structural[7]	24,596***	9,050	870	28.72	.94	.03	.03
3 Structural[8]	9,858***	14,738	786	12.54	.98	.02	.03
Multigroup (FIML)							
1 Structural final model[9]	26,318***	-	786	33.48	.97	.02	-

Notes: ML estimation was applied on all models. [1]The initial single-group measurement model. [2]The multigroup model containing three groups (all students, girls, and boys). [3]Item SM3, SM6, TS4, TS9, PC6, and PC7 were removed to improve convergent validity. [4]All regression weights were constrained (only this model). [5]All regression weights and intercepts were constrained (only this model). [6]The first structural model. [7]Added a covariance arrow (↔) between the mother's and the father's educational level. [8]Inspected the modification indices and allowed covariance between selected error terms to reduce model discrepancy (ε3 ↔ ε4, ε6 ↔ ε7, ε13 ↔ ε14, ε19 ↔ ε21). [9] The final model was analysed using FIML on the complete dataset from 2017. ***$p < .001$.

Table 5 displays the results of the model trimming process (cf. Kline, 2016) from the initial measurement model until the final structural model. The fit indices for all multigroup models reflect model fit for three different groups (all students, girls, and boys) as ML estimation yields one set of test statistics across the multiple groups (Byrne, 2016). Configural invariance was confirmed since the multigroup measurement model achieved good fit when estimated freely (Hair et al., 2019). Even though the fit indices of the initial measurement model were acceptable, adjustments resulted in both improved fit indices for RMSEA, SRMR, and CFI while the reduced value of the χ^2 statistic indicated a better absolute fit. Each model was tested using complete responses (n = 15,901) to enable inspection of modification indices and subsequent evaluation of model fit. RMSEA, SRMR, and CFI did not worsen when factor loadings and intercepts were constrained to being equal among groups, indicating sufficient metric and scalar invariance (Chen, 2007). The final model was analysed in Amos (v. 26) using FIML, since this method is robust to violations of normality when the sample size is large (Awang, 2014). FIML is an appropriate method when analysing ordinal data with fewer categories (e.g., < 6) and when response distributions are asymmetrical (Kline, 2016). To ensure sufficient convergent validity, statistically insignificant covariances were removed from measurement models before proceeding to the structural model (Awang, 2014). Six items with low factor loadings were deleted to achieve a high level of average variance extracted (AVE) on each construct (Awang, 2014). Item TS4 and TS9 were considered redundant. Reflective indicators are generally considered interchangeable (Kline, 2016).

Table 6 shows that AVE is > .5, on all factors, confirming convergent validity (Gaskin and Lim, 2019). Furthermore, CR is > .6 on all factors implying high composite reliability (Awang, 2014). Discriminant validity is confirmed since the square root of AVE (marked in bold) is higher than the correlation between latent variables (Hair et al., 2019). This suggests that each factor explains a sufficient degree of shared variance and that the factors are sufficiently distinct from each other. After inspecting problematic modification indices, some redundant items were removed to improve discriminant validity (Kline, 2016).

Table 6 Validity analysis

	CR	*AVE*	*MSV*	*MaxR(H)*	*SM*	*AP*	*TS*	*PC*
SM	.843	.519	.118	.848	*.721*			
AP	.904	.656	.015	.928	.111***	*.810*		
TS	.875	.501	.118	.877	.344***	.123***	*.708*	
PC	.884	.609	.097	.922	.101***	.106***	.138***	*.780*

Notes: CR = composite reliability, AVE = average variance extracted, MSV = maximum shared variance and MaxR(H) = maximum reliability. ***p < .001.

Source: AMOS plugin (Gaskin and Lim, 2019)

4.6 Correlating error terms

Correlating error terms is an effective method of enhancing model fit but this practice should always be explained and theoretically justified (Hooper et al., 2008). In this study, four error terms were set to covary since the congenial indicators arguably measure similar aspects of the construct. For instance, ε2 and ε3 are connected to item PC2 and PC3, respectively (cf. Table 3), which measure how often parents talk to each other (in

general or about their children's well-being). In relation to teacher support, ε6 and ε7 are both related to items that measure how students perceive the student-teacher relationship. In this study, these adjustments contributed substantially to improving model fit, including the CFI, RMSEA, and SRMR (cf. Table 5).

Post hoc modification is debated within the SEM literature because data-driven adjustments can potentially lead to models that cannot be replicated across samples (Weston and Gore, 2006). This problem is more likely when researchers

1 use small samples

2 when they perform changes that are not theoretically justified (Green et al., 1998).

5 Results and discussion

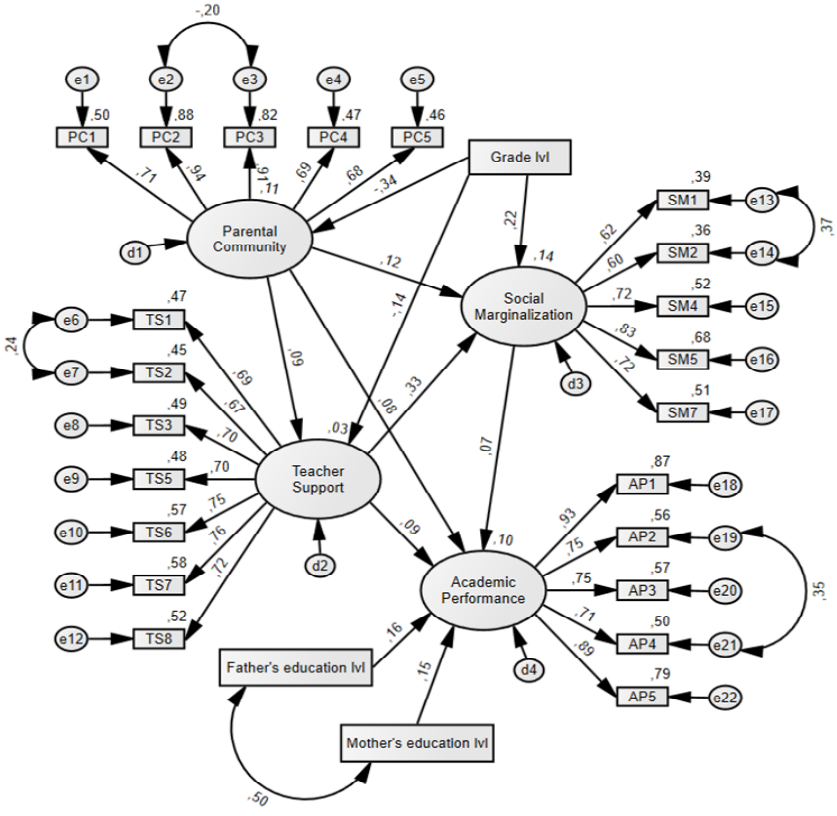
In the following section, the results for all students (N = 42,703) are presented and discussed. First, the social factors underlying social marginalisation are examined for all students (H_1 and H_2, cf. Figure 1). In continuation, it is examined whether social marginalisation leads to lower academic performance (H_3). Finally, the results of the multigroup analysis are presented where subgroups of boys (n = 21,920) and girls (n = 20,766) are compared (H_4). Since the path diagram (cf. Figure 2) is identical for all three groups, the results of the multigroup analysis are presented in Table 7 allowing for easy comparison between groups. It should be stressed that n represents the number of cases. Each case contains responses from students, parents, and class teachers. Throughout the analyses, both statistical and practical significance is evaluated by reporting and interpreting p-values and effect sizes (R^2). Furthermore, the direct (unmediated), indirect, and total effects are reported. The standardised regression weights are reported as recommended by Tabachnick and Fidell (2014) since these are easier to interpret and compare across studies.

5.1 Predicting social marginalisation

In this part of the analysis, it is explored whether it is possible to explain social marginalisation as a function of the quality of teacher support and the strength of the parental community while controlling for the importance of grade level. As expected, the path diagram shows that teacher support is an influential factor in relation to preventing social marginalisation (NB: a low score on this scale is indicative of a high degree of social marginalisation). The association between teacher support and social marginalisation (β = 0.33, R^2 = .11) is the strongest among any of the model's factors. The squared correlation coefficient (R^2), suggests that 11% of the total variance in social marginalisation can be directly attributed to teacher support (close to a moderate effect, cf. Cohen, 1988). This finding suggests that teachers' emotional (e.g., TS2 and TS3) and academic support (e.g., TS5) as well as teachers' practice of promoting an inclusive classroom environment (e.g., TS8) are important in terms of preventing social marginalisation in school (cf. Table 3). Related research (Kiuru et al., 2014) has shown that warm and supportive teacher support may increase peer acceptance (i.e., strengthen social inclusion among students) which can be perceived as role modelling. The strength of this specific variable association implies that class teachers hold a large part of the responsibility of promoting an inclusive learning environment where students feel safe

and accepted. Previous research has also found that teachers must encourage peer inclusion and peer acceptance so that students feel supported and safe (Shepard, 2000; Wilen et al., 2008). Thus, the data indicate that social marginalisation is partly caused by circumstances within schools. To prevent social marginalisation, schools could therefore focus on improving teachers' relational competencies to ensure that students receive sufficient emotional and academic support. It must be emphasised that teacher support could not explain all of the variance, indicating that there are other (unmeasured) factors underlying social marginalisation. However, causal interpretations should be made with caution. It is likely that the relationship between teacher support and social marginalisation is more complex in reality. For instance, it is plausible that students with behavioural problems may develop poor relationships with teachers (Nurmi, 2012) and that teachers may find it difficult to establish close relationships with introverted students because they reject teachers' attempt to establish contact (Drugli et al., 2011).

Figure 2 The hypothesised (recursive) SEM model, T2 (2017)



Notes: The SEM model displays the standardised effects between observed variables (squares) and factors (ellipses) for all cases (N = 42,703). All depicted pathways are statistically significant ($p < .001$). Squared multiple correlations (R^2) are shown for each endogenous factor for all cases (N = 42,703) from T2 (2017). FIML was applied on this final structural model to estimate missing values (cf. Table 1 for the actual response rate).

Grade level was identified as the second most important predictor in terms of explaining social marginalisation. The statistically significant ($p < .001$) association between grade level and social marginalisation ($\beta = .24$, $R^2 = .06$) accounted for 6% of the total variance in social marginalisation. The standardised beta coefficient indicates that students generally become less marginalised (i.e., experience more social inclusion) as they progress in grade level. Students tend to experience less loneliness, less social isolation, and more social well-being as they become older. This is interesting since grade level was negatively associated with teacher support ($\beta = –.14$, $R^2 = .02$), indicating that students experience less teacher support as they get older. Grade level explained about 2% of the variance in teacher support, equal to a small difference (Cohen, 1988). Previous studies have also found that students' perception of teacher support becomes more negative as they progress from primary to lower secondary education (e.g., Bokhorst et al., 2010; Ertesvåg, 2009) and that it becomes increasingly negative from 5th to 10th grade (Bru et al., 2010). Grade level both had an indirect negative effect on social marginalisation (mediated through teacher support) and a positive direct effect on social marginalisation. Therefore it is crucial to interpret the total effects.

The third most influential predictor was the parental community. There was a significant ($p < .001$) pathway between parental community and teacher support ($\beta = 0.12$, $R^2 = 0.01$). Teacher support mediated a small part of this effect ($\beta = .03$, $R^2 < .01$). The total effect of parental community on social marginalisation ($\beta = .15$, $R^2 = .02$), explaining 2% of the variance in social marginalisation. Thus, parental support seemingly reduces the risk of social marginalisation to a small extent (cf. Cohen, 1988). The model shows that parents' degree of involvement in the parental community drops gradually ($\beta = –.35$, $R^2 = .12$) as students become older, confirming earlier research (e.g., Desforges and Abouchaar, 2003, Napolitano, 2013).

Finally, hypothesis 3 was tested, yet no significant interaction (moderation) was found between parental community and teacher support, indicating that both parental community and teacher support explain a unique portion of the variance in social marginalisation. The squared multiple correlation suggests that 14% of the variance in social marginalisation can be explained through the *combined* effect of teacher support, grade level, and parental community. Thus, the hypothesised model significantly increased the ability to predict social marginalisation in Danish public schools.

5.2 Predicting academic achievement

The hypothesised SEM model estimates to what extent social marginalisation is associated with academic achievement. The path diagram shows that social marginalisation is significantly ($p < .001$) but weakly related to academic performance ($\beta = .07$, $R^2 < .01$). This low effect size suggests that this variable association only has limited practical significance. The same applies to the association between parental community and academic performance ($p < .001$) with a total effect ($\beta = .09$, $R^2 < .01$) that explained barely 1% of the variance (cf. Table 7). Even though the parental community and the degree of social marginalisation were both statistically significant in terms of predicting academic performance, the effect sizes were weak. Thus, it cannot be concluded that social marginalisation leads to lower academic performance (or vice versa).

Still, the statistical model underpins a key finding of previous research (e.g., Jensen et al., 2020; Nordahl, 2018) that the parents' educational level is an important predictor of academic performance. Both the mother's (β = .16, R^2 = .03) and the father's (β = .17, R^2 = .03) educational level were significant ($p < .001$) and influential predictors. Surprisingly, the teachers' emotional and academic support were measured as being more effective in terms of preventing social marginalisation (i.e., promoting inclusion) than improving students' academic performance. Previous research has suggested that teacher support may broadly improve educational outcomes (Jennings et al., 2000). Teacher support is the second most influential predictor of academic performance in the proposed model, but the measured effect was rather weak.

In total, the model explained 10% of the variance in academic performance, suggesting that other (unmeasured) factors may affect students' academic performance. In contrast to social marginalisation, the statistical model indicates that students' academic performance is influenced mostly by background variables (e.g., parental educational level), suggesting that it may be easier for schools to prevent social marginalisation than it is to eliminate the influence of social background on academic performance.

5.3 The multigroup analysis

Table 7 displays the results of the multigroup analysis. Associations carrying low effect sizes ($\beta < .15$) were not analysed individually, and differences between girls and boys were only highlighted when sufficiently large (≥ 2% in terms of explained variance). Overall, the multigroup analysis displayed similar results for both boys (n = 21,920) and girls (n = 20,766), yet a few important moderation effects were discovered. The data provide evidence that girls tend to experience a greater reduction in teacher support from 4th to 10th grade. When assessing the total effect of grade level on teacher support, this variable association explained more for girls (β = –.17, R^2 = .03) than boys (β = –.11, R^2 = .01). Earlier studies have found that perceptions of teacher support become more negative from 5th to 10th grade (Bru et al., 2010). This study adds that the perception of teacher support is moderated by gender. This is unfortunate since teacher support is seemingly more critical for girls (β = .38, R^2 = .14) than boys (β = 0.33, R^2 = .11) in terms of preventing social marginalisation. Furthermore, the multigroup analysis revealed a minor difference between boys and girls in relation to how social marginalisation is perceived across grade levels. The total effects indicate that boys experience less social marginalisation from 4th to 10th grade (β = 0.16, R^2 = .03) than girls (β = 0.22, R^2 = .01). Apparently, this tendency is part of the reason boys experience a greater increase in social well-being from 4th to 10th grade. All multigroup differences were confirmed using $\Delta\chi^2$ tests ($p < .001$).

Table 7 Maximum likelihood estimates of unstandardised and standardised regression weights

	Boys	*Girls*	*All students*	*Boys*	*Girls*	*All students*
	b	*b*	*b*	*β*	*β*	*β*
Direct effects						
GL → PC	–.10***	–.12***	–.11***	*–.33*	*–.35*	*–.34*
GL → TS	–.03***	–.05***	–.04***	–.11	*–.17*	–.14
GL → SM	.06***	.06***	.06***	*.25*	*.22*	*.22*
PC → TS	.08***	.08***	.08***	.08	.09	.09
PC → SM	.09***	.11***	.10***	.13	.13	.12
PC → AP	.16***	.09***	.13***	.11	.05	.08
TS → SM	.23***	.36***	.28***	*.33*	*.38*	*.33*
TS → AP	.12***	.10***	.16***	.06	.05	.07
SM → AP	.26***	.23***	.15***	.11	.12	.07
MEL → AP	.18***	.18***	.18***	*.16*	*.16*	*.16*
FEL → AP	.18***	.16***	.17***	*.18*	*.16*	*.17*
Indirect effects						
GL → TS	–.01	–.01	–.01	–.03	–.03	–.03
GL → SM	–.02	–.04	–.03	–.09	–.12	–.10
PC → SM	.02	.03	.02	.03	.03	.03
PC → AP	.04	.04	.03	.02	.02	.02
TS → AP	.06	.08	.04	.04	.05	.02
Total effects						
GL → TS	–.04	–.06	–.05	–.14	*–.20*	*–.17*
GL → SM	.04	.03	.03	*.16*	.10	.13
PC → TS	.08	.08	.08	.08	.09	.09
PC → SM	.11	.14	.12	*.16*	*.16*	*.15*
PC → AP	.20	.13	.16	.12	.08	.09
TS → SM	.23	.36	.28	*.33*	*.38*	*.33*
TS → AP	.18	.18	.20	.11	.10	.11

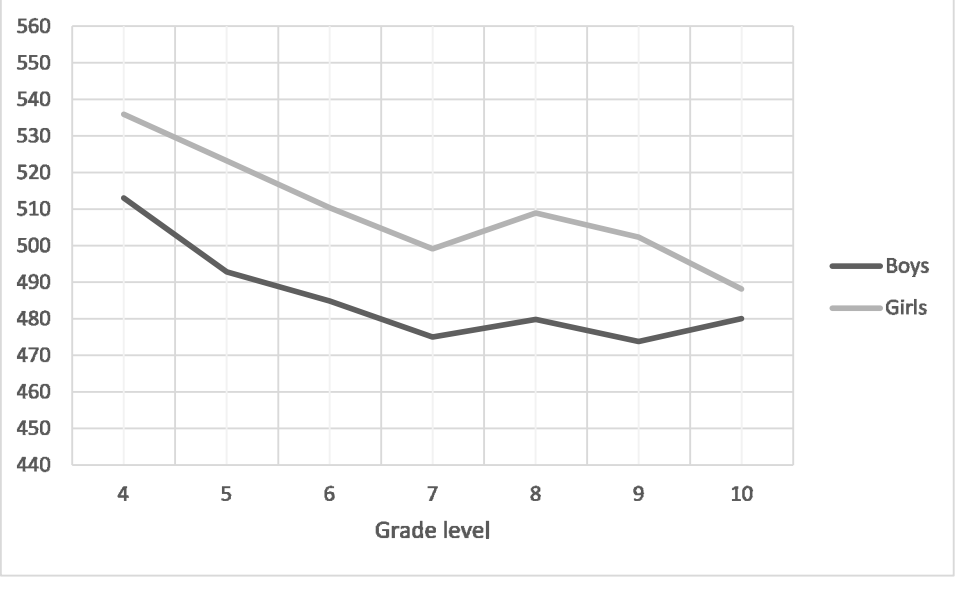
Notes: GL = grade level, PC = parental community, TS = teacher support, SM = social marginalisation, and AP = academic performance. MEL = mother's educational level, FEL = father's educational level, *b* = unstandardised regression coefficients, and *β* = standardised regression coefficients. Standardised regression coefficients > .15 (R^2 > .02) are highlighted in bold to display the most important effects. Significance tests were conducted on all unstandardised regression coefficients. **p* < .05, ***p* < .01 and ****p* < .001.

5.4 Grade level and social marginalisation

One of the strongest predictors of social marginalisation was the students' grade level. The direct association between grade level and social marginalisation was > .20 for all groups (cf. Table 7). Although this association was present for both genders, girls

experienced slightly more social marginalisation across all grade levels. This is illustrated in the following graph.

Figure 3 Grade level and social marginalisation by gender, 2017



Notes: 500 (points) represents the grand mean for both boys (n = 21,467) and girls (n = 20,395) across all grade levels. Each item (SM1–SM7) of the social marginalisation scale was rescaled [1–5] to achieve equal weighting of items. The scale was reversed so that a high score is indicative of a high degree of marginalisation. The unstandardised social marginalisation scale was converted to a standardised 500-point scale by using the formula $\hat{d} = \frac{\bar{x}_1 - \bar{x}_2}{SD_{pooled}} \times 100 + 500$.

Figure 3 depicts the linear relationship between grade level (4–10) and social marginalisation. Based on Hattie's (2009) standard interpretation of effect sizes measured in standard deviations (SD) units, differences of .20, .40 and .60 are considered small, medium, and large, respectively. Applying Hattie's guidelines, the data shows that girls experienced most marginalisation in 4th grade (almost a moderate difference). From 4th to 7th grade both girls and boys generally experienced more social inclusion (i.e., they felt less isolated and lonely). From 7th to 8th grade there was a slight increase (about .1 SD), indicating a rather stable level of social marginalisation. From 8th to 10th grade, girls experienced more social inclusion while the score remained almost unchanged for boys. The average difference between boys and girls from 4th to 9th grade was 28 points (a small difference) while the difference was smallest in 10th grade (8 points). Although it is positive that the difference was diminished in 10th grade, it is problematic that girls reported more social marginalisation on average since this is indicative of a lower degree of social well-being (cf. Knoop et al., 2018). The analysed data were gathered from 189 public schools in 13 different municipalities in Denmark suggesting that the results have strong external validity.

It is possible that the association between grade level and social marginalisation is partly caused by a natural maturation process. It can be hypothesised that as students enter adolescence, they feel less marginalised on average because they start developing deeper friendships, including intimate relationships. As students become older they develop an increasing sense of autonomy and a deeper need for belonging (e.g., Kuperminc et al., 2001). Another possible explanation is that socially constructed typifications and prejudices are replaced by more personal perceptions as students gradually learn more about each other (Berger and Luckmann, 2004). Research has similarly found that the number of bullying victims decreases with age (Ertesvåg and Vaaland, 2007), which is connected to social marginalisation (Søndergaard and Hansen, 2018). However, it is thought provoking that girls reported a higher degree of social marginalisation. Unfortunately, the data do not provide any direct explanation for this finding. Thus, further research is required to reveal the complex social processes underlying these quantitative measures.

6 Limitations

The paths of the hypothesised SEM model were formed based on empirical research and theory, but this does not rule out alternative interpretations. Causal effects should therefore be interpreted with caution, especially when using correlational data (Byrne, 2016). Based on previous research, it is likely that certain groups are more at risk of experiencing marginalisation (Messiou, 2019). Therefore, additional variables from the PLM survey could have been included, such as ethnicity, diagnoses, or disabilities. Another limitation is the relatively low response rate of parents (about 50%). To offset this weakness, FIML was applied to estimate means of missing values (Baraldi and Enders, 2010). Furthermore, this study enabled use of self-report data, but according to qualitative research some students may be considered marginalised even when they do not experience it consciously (Messiou, 2012) or in all social contexts (Gilliam, 2009). For instance, some students may hide their true emotions due to feelings of shame (Messiou, 2012). Thus, it is conceivable that certain types of marginalisation cannot be measured with self-report data. Moreover, qualitative research suggests that all students may experience brief moment marginalisation at some point (Messiou, 2003). It is unclear whether quantitative measures reflect a temporary or more permanent type of marginalisation. To provide more clarity on this issue, a longitudinal design could be applied in a future study.

Another limitation is the possible impact of common methods bias (CMB). To reduce CMB, researchers should use multiple raters if possible (Podsakoff et al., 2003). In this study, responses from three participant groups were used to measure associations among four factors. To assess the influence of CMB, Harman's (1967) single-factor test was applied. All indicators used in the final SEM model (22 variables) were loaded into an EFA (with principal axis factoring), after which the unrotated factor solution was examined. The basic assumption of Harman's diagnostic technique is that if a substantial amount of common methods variance is present either

1 a single factor will emerge

2 one general factor will account for the majority of covariance between measures (Podsakoff et al., 2003).

Harman's single-factor test revealed 19.92% of shared variance, which is acceptable. Still, teacher support and social marginalisation were measured from a common source (students) which is why interpretations involving these factors should still be made with caution since Harman's approach is purely diagnostic and does not correct for CMB.

7 Conclusions

In regard to predicting social marginalisation, this study concludes (ranked from most to least important) that students are more likely to experience social marginalisation if

1 they experience less teacher support (emotional and academic)

2 they are (preteens) at lower grade levels (e.g., in 4th grade)

3 their parents are less involved in the parental community.

If social marginalisation is an issue at a specific school, it would therefore be reasonable to, first and foremost, focus on enhancing the quality of teacher support. The findings indicate that teachers carry a large part of the responsibility of ensuring that students feel safe and accepted (corroborating H_2).

Furthermore, the findings suggest that schools could involve parents more to increase students' social well-being (corroborating H_1). Early interventions might prove most effective as the data indicate that it is increasingly difficult to involve parents as the students become older. It is possible that students wish to distance themselves from their parents as they mature and become more independent (cf. Desforges and Abouchaar 2003).

In relation to predicting academic performance, this study concludes the following:

- Students of highly educated parents have higher academic performance (the mother's and the father's educational level being equally important).

This confirms previous research that highlights the significance of the parents' educational level (Hattie, 2009; Jensen et al., 2020; Nordahl, 2018). Furthermore, the proposed statistical model provides some evidence that schools may be able to improve students' academic performance by strengthening the parental community and by preventing social marginalisation of students (e.g., by raising the quality of teacher support in the classroom). However, the measured effects of the parental community and social marginalisation were both minor. Although H_3 was corroborated through a hypothesis test, it must be stressed that the discovered relationship was relatively weak.

Finally, the multigroup analysis revealed some minor (yet statistically significant) differences between girls and boys. Based on the multigroup analysis, the following (ranked in order of importance) is concluded:

1 girls experience more social marginalisation on average

2 girls experience a steeper decline in teacher support as they progress in grade level

3 the association between teacher support and social marginalisation is stronger for girls.

The hypothesised model therefore suggests that resolving issues on social marginalisation is (partly) possible within schools since teacher support is a critical factor. Strengthening

teachers' relational competencies could thus represent an effective and direct way of preventing social marginalisation. The SEM model indicates that a combined approach would likely be the most effective since multiple factors influence social marginalisation. Involving parents more could thus be relevant besides strengthening teacher support. The findings suggest that the parental community promotes social inclusion and improves peer relations. Further research is required to determine whether causal links exist between the measured factors and whether more complex variable associations are present. The conclusions presented could be applied as hypotheses in future studies.

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Appendix 1

Table 8 Descriptive statistics

	N	*Minimum*	*Maximum*	*Mean*		*Std. dev.*	*Skewness*		*Kurtosis*	
	Statistic	*Statistic*	*Statistic*	*Statistic*	*Std. error*	*Statistic*	*Statistic*	*Std. error*	*Statistic*	*Std. error*
PC1	21,646	1.00	4.00	2.786	.005	.790	–.435	.017	–.088	.033
PC2	21,719	1.00	4.00	2.557	.006	.842	–.093	.017	–.577	.033
PC3	21,687	1.00	4.00	2.379	.006	.805	.065	.017	–.491	.033
PC4	21,699	1.00	4.00	2.043	.005	.702	.379	.017	.170	.033
PC5	21,704	1.00	4.00	2.633	.005	.796	–.218	.017	–.367	.033
TS1	41,622	1.00	4.00	3.374	.004	.765	–1.145	.012	.904	.024
TS2	41,234	1.00	4.00	3.491	.003	.693	–1.368	.012	1.785	.024
TS3	41,405	1.00	4.00	3.219	.005	.941	–.988	.012	–.069	.024
TS5	41,562	1.00	4.00	3.612	.003	.657	–1.776	.012	2.994	.024
TS6	41,420	1.00	4.00	3.318	.004	.788	–.989	.012	.389	.024
TS7	41,325	1.00	4.00	3.139	.004	.839	–.729	.012	–.118	.024
TS8	41,380	1.00	4.00	3.465	.004	.738	–1.328	.012	1.302	.024
SM1	41,812	1.00	4.00	3.552	.004	.715	–1.593	.012	2.033	.024
SM2	41,618	1.00	4.00	3.660	.003	.621	–1.933	.012	3.666	.024
SM4	41,786	1.00	5.00	4.303	.004	.825	–1.299	.012	1.934	.024
SM5	41,707	1.00	5.00	4.457	.004	.841	–1.776	.012	3.248	.024
SM7	41,657	1.00	5.00	4.632	.003	.697	–2.348	.012	6.592	.024
AP1	43,169	1.00	5.00	3.199	.005	1.037	–.102	.012	–.420	.024
AP2	42,307	1.00	5.00	3.200	.005	1.050	–.122	.012	–.452	.024
AP3	41,583	1.00	5.00	3.091	.005	1.017	–.065	.012	–.304	.024
AP4	40,862	1.00	5.00	3.126	.004	.890	–.056	.012	.232	.024
AP5	42,370	1.00	5.00	3.227	.005	1.048	–.126	.012	–.412	.024

Notes: PC = parental community, TS = teacher support, SM = social marginalisation, and AP = academic performance. Descriptive statistics of the 22 reflective indicators included in the final structural model. Valid N (listwise) 18,047.

Appendix 2

Table 9 Correlation matrix

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*
SM1	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SM2	.60*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SM4	.48*	.43*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SM5	.49*	.50*	.60*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SM7	.43*	.42*	.49*	.61*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PC1	.13*	.08*	.05*	.08*	.05*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PC2	.11*	.07*	.03*	.08*	.03*	.69*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PC3	.09*	.06*	.01	.06*	.03*	.60*	.82*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PC4	.06*	.04*	.01	.05*	.02*	.43*	.60*	.70*	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
PC5	.10*	.05*	.00	.07*	.02*	.54*	.65*	.59*	.44*	1.00	-	-	-	-	-	-	-	-	-	-	-	-
TS1	.24*	.18*	.14*	.16*	.14*	.10*	.10*	.09*	.05*	.10*	1.00	-	-	-	-	-	-	-	-	-	-	-
TS2	.23*	.17*	.15*	.15*	.14*	.08*	.09*	.07*	.04*	.08*	.59*	1.00	-	-	-	-	-	-	-	-	-	-
TS3	.23*	.18*	.15*	.17*	.14*	.09*	.09*	.08*	.05*	.09*	.53*	.49*	1.00	-	-	-	-	-	-	-	-	-
TS5	.24*	.19*	.16*	.17*	.16*	.09*	.09*	.08*	.06*	.09*	.47*	.48*	.47*	1.00	-	-	-	-	-	-	-	-
TS6	.19*	.16*	.11*	.14*	.13*	.06*	.05*	.05*	.03*	.05*	.51*	.52*	.53*	.52*	1.00	-	-	-	-	-	-	-
TS7	.22*	.17*	.15*	.16*	.14*	.08*	.08*	.07*	.05*	.08*	.51*	.49*	.52*	.52*	.59*	1.00	-	-	-	-	-	-
TS8	.28*	.21*	.17*	.19*	.18*	.12*	.11*	.09*	.06*	.10*	.48*	.47*	.48*	.52*	.54*	.57*	1.00	-	-	-	-	-
AP1	.10*	.07*	.05*	.07*	.08*	.07*	.11*	.09*	.03*	.09*	.13*	.13*	.07*	.08*	.08*	.06*	.11*	1.00	-	-	-	-
AP2	.12*	.08*	.10*	.10*	.09*	.08*	.11*	.08*	.03*	.09*	.11*	.11*	.06*	.07*	.06*	.06*	.09*	.70*	1.00	-	-	-
AP3	.08*	.06*	.06*	.06*	.07*	.03*	.05*	.04*	-.00	.05*	.07*	.07*	.03*	.04*	.03*	.02*	.06*	.69*	.61*	1.00	-	-
AP4	.10*	.06*	.08*	.07*	.07*	.07*	.09*	.08*	.03*	.08*	.11*	.12*	.06*	.07*	.07*	.06*	.10*	.66*	.70*	.62*	1.00	-
AP5	.09*	.06*	.04*	.05*	.06*	.06*	.09*	.08*	.02*	.09*	.09*	.10*	.04*	.05*	.05*	.03*	.08*	.84*	.65*	.67*	.61*	1.00

Notes: Pearson correlation (2-tailed). SM = social marginalisation, PC = parental community, TS = teacher support, and AP = academic performance. The 22 indicators were included in the final CFA. Pairwise deletion applied. N = 42,703. *$p < .001$.