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School Performance and Behaviour Profiles Among Finnish Adolescents, and Their Relations with Temperament Traits: A Person-centred Approach

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ABSTRACT

The aim of this study was to examine what kind of school performance and behaviour profiles could be identified among students in the final grade of basic education in the Swedish speaking parts of Finland ($N = 1149$, grade 9), how these differed in temperament and how temperament could explain profile differences in first language (L1, Swedish) grades, behaviour grades, and results from standardised reading tests. Latent profile analysis revealed three groups of students with distinct L1 performance and behaviour profiles. One profile with good grades in L1 and behaviour, and good test results – one with satisfactory grades in L1, good grades in behaviour, and poor test results – and one with low grades in L1 and behaviour, and relatively good test results. High perseverance and low impulsivity were related to good L1 and behaviour grades. The findings implicate that student's behaviour impact both the assessment of the subject and behaviour.

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Academic achievement; behaviour; first language; learning difficulty; school performance; temperament

Introduction

It is well established that behaviour difficulties and difficulties in learning are related (Larsson & Drugli, 2011). For example, a meta-analysis comparing students with and without emotional and behavioural difficulties found that those with difficulties had lower school performance (Reid et al., 2004). Although academic problems are more common among students with behavioural difficulties, it does not mean they all struggle academically (Nicholson, 2014). Similarly, although learning difficulties constitutes a risk factor for behaviour difficulties (Oldfield et al., 2017), far from all students with learning difficulties experience behavioural difficulties. Furthermore, students with behavioural difficulties have been found to receive lower grades than their peers due to their behaviour regardless if they have learning difficulties or not (Becerer et al., 2021). Both behaviour and learning difficulties have been related to unfavourable temperament traits such as impulsivity, distractibility, and problems in working persistently on school tasks (Becherer et al., 2021; Sanchez-Perez et al., 2018). Surprisingly, there is a lack of studies investigating behaviour, learning, and temperament in the same study design. Thus, the aim of this study was to examine what kind of school performance and behaviour profiles we could identify among students aged 15–16, how these profiles differ in temperament and how temperament traits can explain profile differences in first language-grades (L1, Swedish), behaviour grades, and results from L1 standardised reading tests.

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Assessment of Subjects and Behaviour in the Finnish Basic Education

Basic education in Finland encompasses nine years, starting the year a child turns seven years old (Basic Education Act, 1998). Assessment in basic education follows a national core curriculum, which includes the objectives and core contents of all school subjects. It is expected to guide and inspire students and describe to what extent the stated goals of each subject are reached. Furthermore, the assessment must be truthful and based on a variety of tests (National Core Curriculum for Basic Education, NCCBE, 2014).

Subject assessment is a central part of teachers' work. Every student's progress, work, and behaviour should be assessed relative to the goals given in the curriculum (Basic Education Act 21.8.1998/628). The assessment of the student's learning includes both assessment of study progress and level of knowledge. The level of knowledge is assessed in relation to the stated set goals and is based on national assessment criteria (NCCBE, 2004). The subject grades are based on teachers' own examinations and students' activity and conscientiousness during classes. The student's work is part of the assessment in every subject, measuring the students' ability to plan, adjust, carry out, and evaluate their own work as well as their ability to act responsibly and to communicate constructively (NCCBE, 2004). National standards of good performance (grade 8 is considered "good") are given to support teachers' assessment in different subjects, and are aimed at equalising assessment in all schools in the country (NCCBE, 2004).¹

The assessment of behaviour follows from the assignment to guide behaviour and impart skills related to good manners (NCCBE, 2014). It focuses on the pupil's way of taking other people into consideration, and following the rules of the school (NCCBE, 2004). Behaviour assessment is carried out collectively by all teachers involved in the pupil's education across all subjects, and holds a separate grade in the report. (NCCBE, 2004). There are no national guidelines for this assessment. Every municipality sets their own standards for the assessment of behaviour. The assessment is based on local objectives, including the school's educational goals, as well as the school rules and policies that determine the operating culture of the school community (NCCBE, 2014). The assessment scale is the same as mentioned before. The behaviour grade is not included in the final report (NCCBE, 2004).

In the final (9th) year of Basic education, the final reports are of special importance for all students. Based on these, students are ranked and admitted to upper secondary education, thus setting the frame for the students' future educational trajectories. The grades gained in basic education reflect how successfully the students have reached the goals of the education. Since the grades in the final report carry considerable weight for the future of each student, it is of utmost importance that these would objectively reflect the student's knowledge in the subject, and not, for example, be a reflection of his or her temperament traits.

Temperament in a School Setting

In order to succeed in school, both academic achievement and socially acceptable behaviour is of importance. Both are influenced by student temperament (Kristal, 2005; Mullola et al., 2014). It may also bias the educational decisions made by teachers, such as grade giving (Keogh, 2003; Mullola et al., 2014). Furthermore, temperament is measured in different ways, either by adult-ratings (parents/teachers), or self-ratings made by children themselves. While teacher rated temperament often is limited to a classroom setting, children's own ratings often include a broader environment (Mullola et al., 2014). This may complicate the comparison of results from different studies, as the starting points for the given answers may differ.

¹See below (Measures, 3. school grades, L1) for an explanation of the Finnish grading system.

Temperament and Academic Performance

Temperament and academic performance have been found to be significantly related (Keogh, 2003; Kristal, 2005). The individual set of temperamental traits of each child influences the enthusiasm he or she brings to new learning and how well he or she manages to adjust to the demands given in class.

Task orientation, or the ability to get started and to stay focused on a task, including temperament traits like distractibility and persistence, is a central part of the demands of a school setting (Keogh, 1986). Task orientation correlates significantly with academic performance. A high ability to focus on and persist at tasks combined with a good ability to regulate emotions are essential for good academic performance (Al-Hendawi, 2010). Task orientation is acknowledged as an important temperament dimension for education, since it is independently associated with better reading and writing abilities, better learning capacity, and less attendance problems (Blair & Razza, 2007; Checa et al., 2008; Checa & Abundis-Gutierrez, 2017; Hoffmann et al., 2020; Valiente et al., 2008). A good task orientation seems to regulate the student's behaviour in ways that ultimately lead to better learning (Duckworth & Allred, 2012; Sanchez-Perez et al., 2018).

Studies on adolescents show a discrepancy between highly task-oriented students and their more impulsive peers, even when both have similar or the same cognitive capacities. A good task orientation (self-discipline) predicted academic performance more robustly than IQ (Duckworth & Seligman, 2005). Students with high task orientation earned higher school grades, higher achievement test scores, and had less school absences than their more impulsive peers. Temperament traits conceived as difficult, such as high activity level or non-compliant behaviour, might on the other hand inhibit achievement (Al-Hendawi, 2013).

Whilst task orientation seems to have a direct impact on learning, adaptability and reactivity are more likely to influence learning via social relations and/or interaction. Adaptability and reactivity influence students reactions and the ability to stay focused and adapt smoothly to changes are keys for good performance in academic settings. The degree of adaptability, including personal-social flexibility and the ability to adapt to changing circumstances in school, can ease or complicate a student's academic achievements (Mullola et al., 2014). High adaptability strengthens the conditions for academic achievement, whereas low adaptability brings challenges, when varying demands for change during the school day takes a lot of energy from learning.

Reactivity, measuring a person's responsiveness to change and the degree of intensity in reactions, as well as the amount of stimulation needed to arouse a reaction, and the expressive and reactive energy of the reaction itself, influences teachers' perceptions of the student's learning capacity and personal-social competencies (Keogh, 2003). Low reactivity and modest energy levels help a student to develop good relations with teachers and peers, which in turn is important for good academic performance (Wang et al., 2017).

Students react in various ways to similar environments and teachers' responses to these reactions are important. Teachers succeeding in taking into account the individual needs of students help students to achieve well. The combination of a teacher's perception of a child's temperament and the teacher's ability to promote a good fit between the individual needs of the child and the environment can either promote learning or promote maladjustment and disengagement. Maladjustment and disengagement, when students do not adapt to teachers' demands or choose not to participate in on-going teaching, influence teachers' opinions about students and colour their interactions with them (Al-Hendawi, 2013). When a student's temperament and the expectations of teachers meet, it helps the student concentrate on academic tasks. Hence, academic performance improves. Low adaptation (frustration, anger) and high reactivity (impulsivity) in children have been associated with lower grades, lower classroom participation, and poor social relationships (Valiente et al., 2008; Zhou et al., 2010).

Teachers tend to perceive students with high reactivity as less able learners, as well as being more demanding to teach and in need of more instructions. Low adaptability and high reactivity are thus misinterpreted as weak academic ability (Mullola et al., 2014).

Temperament and Behaviour

There is an extensive amount of research on temperament and behavioural difficulties or disorders. However, this was not the focus of this study. As mentioned before, Finnish teachers assess every student's behaviour in accordance with the demands of the national core curriculum for basic education. Therefore, "behaviour" here includes all students' behaviour in the school setting. Imparting knowledge and skills related to good manners, and guiding behaviour overall are part of the educational task of basic education, and behaviour assessment is mandatory for the teachers concerned (NCCBE, 2014). This assessment is based on the student's ability to take other people and the environment into consideration, and how he or she follows the rules of the school (NCCBE, 2004). Hence, the focus in our study was on the result of the teachers' assessment of students' behaviour.

There is room for a wide variety within the concepts of temperament, and any particular temperamental trait should not be seen as a problem per se (Thomas & Chess, 1977). Some temperament traits may however predispose a child to behaviour or adjustment problems, such as disobedience, defiance, or aggressive outbursts, if they fit poorly to the expectations and demands of a classroom (Keogh, 2003). This does not mean that all children with certain combinations of temperamental traits develop problems at school. The interaction between individual temperamental differences and environmental demands simply may lead to behaviour problems. Hence, temperament is a contributor to, but not a direct cause of, behaviour problems (Keogh, 2003).

Adaptability seems to be of special importance when it comes to how students' behaviour is perceived by teachers. It can influence behaviour through the regulation of negative emotional reactions, such as anger or fear (Rothbart et al., 2014). Since high adaptability may help a child to pay attention and may promote persistence, it can protect against school maladjustment by enhancing social competence and reducing behavioural problems (Liew et al., 2011). Low adaptability in a student can be related to low levels of school adjustment (Al-Hendawi, 2010), since it entails difficulties in regulating emotions. This may lead to strong expressions of emotion, as well as quarrels, which in turn can complicate cooperation with both teachers and fellow students. Teachers and peers may perceive low adjustment as disobedience. Research on task-avoidant behaviour (Hirvonen et al., 2013) showed that students who do not possess adjustment skills central to handle academic tasks (regulation of activity level and distractibility), are likely to face more and more challenging situations during their years in basic education. This might entail a risk of developing vicious cycles of maladaptive behaviour in academic settings.

Temperament and Grade-Giving

Finnish teachers are obliged to include both the learning and the working skills in the assessment of each student's progress in every subject (NCCBE, 2004, 2014). Temperament does not affect cognitive ability, but it affects how students act and react when it comes to learning new things and adjusting to the demands in school, and certain traits may obstruct a student from showing his or her knowledge in school. Even though "the assessment shall not focus on the pupil's personality, temperament or other personal characteristics" (NCCBE, 2014, 50), the student's temperament may colour the teachers' perceptions of his/her learning capacity, and thereby bias the grades assigned to the student (Mullola et al., 2010). Some students are considered to be more "teachable" than others, based on teachers' perceptions of what a "good" student is like (Keogh, 2003; Mullola et al., 2012), and how well these perceptions and expectations are fulfilled by the student.

Since the academic performance of a child is influenced by temperament, it also affects assessments and grades given by teachers. Research has shown that low levels of reactivity and high levels of task orientation and adaptability predict high grades in general (Mullola et al., 2010), whereas distractibility seems to be the strongest factor for lower grades in L1 and mathematics (Mullola et al., 2012). Higher teacher-rated (of students) persistence and positive mood,² and lower teacher-rated reactivity and distractibility, were found to correlate with better grades in both mathematics and L1 (Mullola et al., 2014). Furthermore, higher self-rated task orientation was shown to correlate with better grades in both mathematics and L1, with the strongest correlation yet being with persistence. The teachers' perceptions of student temperament seemed to be associated with students' school performance independently of students' self-rated temperament (Mullola et al., 2014). In teacher-rated temperament tests, higher task orientation and adaptability combined with lower reactivity correlated with higher maths grades, whereas only higher task orientation, and lower distractibility showed the same correlation in students' self-rated results (Hintsanen et al., 2012). Statistically significant associations have also been found between task orientation, low adaptability and both L1 and mathematics grades (Mullola et al., 2010). Adjustment, including personal-social flexibility and specifically inhibition/withdrawal, was the most important predictor of grades for L1, where high inhibition/withdrawal predicted a low L1 grade.

When it comes to assessment, teachers' perceptions of students' academic achievement seem to be influenced by their perceptions of the students' temperament. Temperament has an impact on teachers' assessment, which in turn is of significance for the students' future studies.

The Present Study

This study focused on school performance (L1, grades and test-results from standardised tests), behaviour (grades), and temperament (self-reported survey data) in relation to the previous items. The aim was to examine what kind of school performance and behaviour profiles we could identify among students aged 15–16, and to examine how these profiles differ in temperament and how temperament traits can explain profile differences in first language-grades (Swedish, L1), behaviour grades, and results from standardised reading tests (Swedish, L1).

The results of the theoretical review of children's temperament were operationalised as three teacher- and parent-rated, school-related temperamental characteristics, namely task orientation, adaptability, and reactivity. These constituted the guiding principles in measuring temperament traits important for adaptation in school, such as impulsivity/activity, distraction, persistence, and mood. Certain combinations of temperamental traits are more favourable in a school setting than others. Good persistence, and low impulsivity and distraction is in line with the expectations of the "good student" and thereby help a child to succeed academically. Well-adjusted children might be perceived as having a good educational competence and hence as more teachable by their teachers, than those who are not as well-adjusted (Mullola et al., 2010).

While earlier studies have reported correlations between temperamental traits and subject grades in L1 and mathematics, they all employed a variable-centred approach (Blair & Razza, 2007; Mullola et al., 2010, 2014). By contrast, our research takes a person-centred approach, which identifies and compares subgroups of individuals sharing similar patterns of variables within a population. In other words, it enables detection of non-linear relations between variables. Previous studies have identified distinct profiles of for instance well-being and learning (Korhonen et al., 2014), motivation and learning (Lazarides et al., 2018), and classroom behaviour and learning (Borg, 2015). Moreover, previous studies on behaviour and temperament have focused on behavioural disorders, whereas we have instead considered the behaviour of all students in a school setting. In Finnish basic education, behaviour in school is assessed with a separate grade, which we consequently included in our search for profiles among the students. Thus, we advance the current knowledge

²The areas of Pohjanmaa, Turku region, Uusimaa, and Åland

base by employing a person-centred approach and by relating students' temperament traits to these profiles.

Based on previous research we expected to find four different profiles: one with good test results and good grades in behaviour, a second with poor test results and poor grades in behaviour, a third with students with good test results and poor behaviour grades, and finally a fourth with poor test results and good behaviour grades.

More specifically, we addressed the following research questions:

1. What kind of school performance and behaviours profiles can we identify among students in grade 9 (aged 15–16)?
2. How do these profiles differ in temperament traits?
3. How can temperament traits explain differences between the profiles concerning L1-grades, behaviourgrades, and results in standardised L1 reading tests?

Method

Participants and Procedure

This study was part of the “*Vem väljer vad?*” [Who chooses what?] longitudinal study. The main aim of the project is to examine relations between learning difficulties, educational attainment, and educational dropout rates in adolescent students. A pilot study was conducted in one class (20 students) to assess the measurements, and since the methods employed by this study proved successful, no changes were made based on the pilot study. The data were collected in 14 schools in the Swedish speaking parts of Finland (see endnote 2). The respondents ($N = 1148$, 574 boys) attended their final year of basic education (grade 9). All measurements were made with groups of students in their own schools. This was done during teacher-selected lessons by researchers and trained research assistants (Table 1).

Measures

1 L1, Swedish

To measure students' reading skills we used “*Klassdiagnoser i läsning och skrivning för högstadiet och gymnasiet*,” an LS-reading ability test (Johansson, 2005). LS is a standardised test package for grades 7 through 9 in basic education (ages 13–16) and grade 1 in upper secondary school (ages 16–17). The sub-tests used were of reading comprehension, word comprehension, and a spelling

Table 1. Descriptive statistics and correlations for study variables.

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Grades L1 ^a	1143	7.79	1.12	—							
2. Grades behaviour	1045	8.45	1.06	.55**	—						
3. L1 test-results	1073	−.01	.85	.58**	.32**	—					
4. Mood	876	3.80	0.77	.05	.02	.04*	—				
5. Distractibility	866	3.10	.62	−.14**	−.11**	−.08*	−.23**	—			
6. Perseverance	865	3.27	.56	.24**	.21**	.24**	.26**	−.52**	—		
7. Impulsivity	857	2.40	.63	−.29**	−.29	−.24**	−.16**	.26**	−.47**	—	
8. Gender ^b	1148	1.50	.50	.43**	.31**	.15**	−.16**	.09**	−.07*	−.13**	—
Cronbach's alpha				—	—	.72	.74	.66	.56	.61	—

^aL1 = First language, Swedish.

^b1 = boy and 2 = girl.

* $p < .05$. ** $p < .01$.

test. Reading comprehension consists of five short texts to read. After each text students choose the correct title for the text out of four suggestions, and the correct statement out of six concerning the content of the text. Word comprehension consists of 40 items measuring word comprehension skills in L1. The students read 40 sentences which have one word underlined. Their task is to find the appropriate synonym for that word out of five given suggestions. Finally, the students completed a spelling test that consists of 50 sentences. Every sentence includes one word that the student has to write down on a paper. The test administrator reads the whole sentence and repeats the word that the students have to spell as correct as they can. Since the three tests used in this study have different maximum reward points (reading comprehension, 20 points; word comprehension, 40 points; spelling test, 50 points) we first standardised the scales so that every subtest's mean value is 0, and then created a composite score of the three measures.

The subject “Modersmål och litteratur” (Swedish and literature education, first language, L1) is an essential basis for all learning. The objectives of the subject are to arouse an interest in language, literature, and interaction, and to strengthen the pupils' personal and cultural identity, and to develop their thinking skills (NCCBE, 2004). In grades 6–9, the core contents of this subject are communication, reading comprehension, writing, and speech (including spelling), information seeking, language, literature, and culture (including reading and word knowledge) (NCCBE, 2004). L1 is taught by subject teachers with a master's degree in the Swedish language.

2 School grades, L1

All subjects in Finnish basic education are assessed with the same grading scale, reaching from grades 10 to grade 4. Grade 10 equals *excellent knowledge and skills*; grade 9, *very good knowledge and skills*; grade 8, *good knowledge and skills*; grade 7, *satisfactory knowledge and skills*; grade 6, *moderate knowledge and skills*; and grade 5, *adequate knowledge and skills*. Grade 4 means a fail. (Basic Education Decree 20.11.1998/852).

The grades in L1 used in this study were collected from the pupils' latest school reports.

3 School grades, behaviour

“Behaviour” in Finnish basic education is assessed with the same grading scale as presented above, reaching from grade 10 to grade 4. The behaviour grades used in this study were collected from the pupils' latest school reports.

4 Temperament

Questions on temperament traits were included in a questionnaire for the participants. Items measuring temperament came from Martin and Bridger (1999) Temperament Assessment for Children – Revised and Windle and Lerner (1986) Temperament Dimensions Survey – Revised. Twenty-four statements from four temperament dimensions were included: seven on impulsivity/activity (e.g. “I sit calmly on my chair when somebody is reading or telling me something”), five on distractibility (e.g. “My ability to concentrate is good”), seven on persistence (e.g. “I give up easily when meeting a difficult task, like a difficult homework or a difficult game”), and five on mood (e.g. “I often feel ashamed of myself”). The students' task was to take a stance on all 24 statements and consider how well these statements resonated with themselves. This was done by choosing one out of five alternatives: “does not apply at all,” “applies quite badly,” “applies partly/partly not,” “applies quite well,” or “applies exactly.”

Data Analysis

We used Mplus (version 8; Muthén & Muthén, 1998/2001) and SPSS (version 26) statistical software packages in the analyses. To group students into different school performance profiles, we used latent profile analysis (LPA). LPA is a probabilistic, model-based version of traditional cluster analysis (Vermunt & Magidson, 2002), and aims at identifying the smallest number of latent classes (groups) that adequately describe the associations among the latent continuous variables. One group is added in each step of the analysis until the model optimally fits the data. In choosing the best fitting model, we used Bayesian Information Criterion (BIC) and the Vuong-Lo-Mendell-Rubin (VLMR) likelihood ratio test as statistical criteria. A decrease in BIC when adding an additional group indicates a better fit to the data, and a resulting p -value lower than .05 for the VLMR indicates that the estimated model is preferable over the reduced model (Lo et al., 2001).

To investigate the gender distribution in the groups we used the independent samples chisquare test (χ^2). In cross tabulation, observed frequencies are compared to expected frequencies, and χ^2 tests decide whether the differences are statistically significant or not.

To investigate differences in temperamental traits, L1 grades, behaviours grades, and L1 standardised reading test results between the profiles, we used one-way Analysis of Variances (ANOVA) and Bonferroni adjusted post-hoc tests. To examine if differences in grades (L1 and behaviour) and test results could be explained by temperamental traits, we used one-way Analysis of Covariances (ANCOVA). Temperament traits were included in the models as covariates, and both the effect sizes and model based estimated group means from the ANCOVAs were compared to the corresponding model without covariates (one-way ANOVA) in order to determine the effect of the covariates (temperaments traits) on the group differences in L1 grades, behaviour grades, and LS standardised reading test-results. To calculate the relative impact of temperamental traits we subtracted the estimated group difference from the observed group difference and divided it by the observed group difference.

Results

Research question 1: What kind of school performance and behaviour profiles can we identify among students in grade 9 (aged 15-16)?

The analysis revealed that three or four profiles was the optimal choice. Both the BIC value and the VMLR value supported a four profile solution. However, the difference in BIC values between three and four profiles were small, whereas the Entropy value was better with only three profiles. Furthermore, we considered profile sizes and interpretability in our analysis. In order to avoid having two small profiles and considering the decline in the Entropy value and the small differences in the BIC values, we chose to proceed with a three profile solution (Table 2).

We identified three different profiles based on mean grades behaviour, and L1 standardised test score means. Said profiles included a typical profile ($N = 917$), a learning difficulty profile ($N = 185$), and a behaviour difficulty profile ($N = 42$). The typical profile (TYP-profile) consisted of 406 boys and 511 girls, who in average had a “very good” grade (9) in behaviour, and good results in the L1 standardised reading test (0.28). The learning difficulty profile (LD-profile) consisted of 126 boys and 59 girls, who in average had a “good” grade (8) in behaviour, and low results in the L1

Table 2. Information criterion values for different class solutions.

Number of groups	BIC	VMLR	Entropy	Group sizes
1	5809.971			1149
2	5663.178	.0000	.671	926, 223
3	5645.940	.0283	.732	919, 188, 42
4	5636.817	.0006	.694	711, 347, 52, 39
5	5655.601	.6548	.591	494, 359, 211, 47, 38

standardised reading test (-1.35). The behaviour difficulty profile (BD-profile) consisted of 40 boys and 2 girls, who on average had “moderate” grades (6) in behaviour, and results slightly below average in the L1 standardised reading test (-0.38).

Students in the TYP-profile had significantly higher L1 grades than the other profiles (Table 3). In L1 grades the differences were large between the TYP-profile and the LD-profile ($d = 1.38$), and the TYP-profile and the BD-profile ($d = 2.06$). The profile difference between the LD-profile and the BD-profile in L1 grades was moderate ($d = 0.72$), in favour of the LD-profile. Students in the TYP-profile had significantly higher behaviour grades than the other profiles. The difference between the TYP-profile and the LD-profile was large ($d = 1.25$), as were the difference between the TYP-profile and the BD-profile ($d = 3.63$). The difference between the LD-profile and the BD-profile was also large ($d = 2.76$), in favour of the LD-profile. Finally, students in the TYP-profile had significantly higher L1 standardised test-results than the other groups. The differences between the TYP-profile and the LD-profile ($d = 2.75$) and BD-profile ($d = 1.11$) were large. The difference between the LD-profile and the BD-profile was large ($d = 1.66$), in favour of the BD-profile.

There was an association between gender and profiles [$\chi^2(2, N = 1144) = 70.669, p < .001$]. Girls were overrepresented in the TYP-profile ($z = 2.5, p < .05$), while boys were overrepresented in the LD-profile and the BD-profile (LD-profile: $z = 3.5, p < .05$, BD-profile: $z = 4.1, p < .05$). The TYP-group consisted of 572 girls (56%) and 406 boys (44%). The LD-profile constituted of 59 girls (32%) and 126 boys (68%). The largest difference in gender distribution was found in the BD-profile, which consisted of 2 girls (5%) and 40 boys (95%). Overall, 71% of boys belonged to the TYP-profile, 22% belonged to the LD-profile, and 7% belonged to the BD-profile. The corresponding distribution between girls was 89.3% in the TYP-profile, 10.3% in the LD-profile, and 0.3% in the BD-profile.

Research question 2: How do the profiles differ in temperament traits?

No statistically significant group differences were found concerning mood and distractibility (see Table 3). When it comes to perseverance and impulsivity there was a significant main effect for

Table 3. Mean comparisons in grades, reading, and temperament traits between performance and behaviour groups.

	LD-profile			BD-profile			TYP-profile			$F(df_b, df_w) = F\text{-value}$	$p\text{-value}$	η_p^2
	n	M	SD	n	M	SD	n	M	SD			
Grades L1	184	6.76	.94	42	6.10	.85	915	8.07	.96	$F(2, 1138) = 214.51$	<.001	.27
LD-profile					$d = .72$			$d = 1.38$				
BD-profile								$d = 2.06$				
Grades behaviour	167	7.70	.75	42	5.71	.60	836	8.73	.84	$F(2, 1042) = 354.79$	<.001	.36
LD-profile					$d = 2.76$			$d = 1.25$				
BD-profile								$d = 3.63$				
LS	175	-1.35	.57	32	-.38	.64	866	.28	.60	$F(2, 1070) = 553.71$	<.001	.51
LD-profile					$d = 1.66$			$d = 2.75$				
BD-profile								$d = 1.11$				
Mood	127	3.71 ^a	.77	22	4.08 ^a	.82	725	3.80 ^a	.77	$F(2, 871) = 2.30$	=.10	.01
LD-profile					$d = .47$			$d = .12$				
BD-profile								$d = .36$				
Distractibility	122	3.21 ^a	.59	21	3.16 ^a	.61	721	3.08 ^a	.62	$F(2, 861) = 2.27$	=.10	.01
LD-profile					$d = .08$			$d = .20$				
BD-profile								$d = .13$				
Perseverance	127	3.01 ^a	.51	22	3.15 ^{ab}	.60	714	3.32 ^b	.56	$F(2, 860) = 17.41$	<.001	.04
LD-profile					$d = .27$			$d = .56$				
BD-profile								$d = .30$				
Impulsivity	125	2.68 ^a	.61	21	2.95 ^a	.74	710	2.33	.61	$F(2, 853) = 26.31$	<.001	.06
LD-profile					$d = .43$			$d = .58$				
BD-profile								$d = 1.01$				

Note: ^aGroup means within a row sharing the same superscripts are not significantly different at the $p < .05$ level with Scheffe's post-hoc test.

LD-profile: learning difficulties group; BD-profile: behaviour difficulties group; TYP-profile: typical group.

group, and post-hoc tests revealed that the TYP-profile differed from both the LD-profile and the BD-profile. The TYP-profile had higher perseverance and lower impulsivity than both other groups. In perseverance, the effect sizes were moderate between the TYP-profile and the LD-profile ($d = 0.56$) and between the TYP-profile and the BD-profile ($d = 0.30$). Regarding impulsivity, the effect sizes were moderate between the TYP-profile and the LD-profile ($d = 0.58$) and large between the TYP-profile and BD-profile ($d = 1.01$).

Research question 3: How can temperament traits explain differences between the profiles concerning L1-grades, behaviour grades, and L1 standardised reading tests?

In order to investigate how temperament traits can explain differences in grades and test results between the examined groups we used temperament traits as covariates in ANCOVAs. Both covariates (perseverance and impulsivity) were related to the outcome (L1-grades, behaviour grades, and L1 standardised reading test) in all models. In all models, the significant group differences remained when the temperament traits were included as covariates, but the overall effect sizes decreased in all outcomes (L1-grades: $D\eta_p^2 = 0.08$; behaviour grades: $D\eta_p^2 = 0.06$; L1 standardised reading test: $D\eta_p^2 = 0.06$). In L1 grades temperament traits explained 11.7% of the differences between the TYP-profile and the LD-profile, 10.1% of the differences between the TYP-profile and the BD-profile, and 6.7% of the differences between the LD-profile and the BD-profile. In behaviour grades temperament explained 11.9% of the differences between the TYP-profile and the LD-profile, 5.0% of the differences between the TYP-profile and the BD-profile, and 1.5% of the differences between the LD-profile and the BD-profile. In L1 standardised reading test temperament explained 5.1% of the differences between the TYP-profile and the LD-profile, 15.5% of the differences between the TYP-profile and the BD-profile, and 3.5% of the differences between the LD-profile and the BD-profile.

Discussion

This study investigated what kind of school performance and behaviour profiles we could identify among students in the final (9th) grade of basic education. Additionally, we examined how these profiles differed in temperament and how temperament traits could explain profile differences in L1-grades, behaviour grades, and standardised reading test results.

Regarding our first research question on school performance and behaviour profiles, we found three profiles. The first, and largest (80%), profile consisted of students with good grades in L1, very good grades in behaviour, and good test results in L1 standardised reading tests. The gender distribution in the profile was fairly even, with slightly more girls (56%) than boys. The second, LD-profile (16%) consisted of students with satisfactory grades in L1, good grades in behaviour, and poor results in L1 standardised reading tests. Two thirds of the students in this profile were boys, which is in line with previous studies on reading difficulties (Arnett et al., 2017). Poor test results can indicate learning difficulties or poor learning capacities (Wong, 2008), which might be the case in this profile. On the other hand, the L1 standardised reading tests used comprised only partly the content of the L1-curriculum. The students might have performed well in areas not tested, which in turn could explain the discrepancy between weak test results and satisfactory grades. The third, BD-profile consisted of students with poor grades in both L1 and behaviour, and average L1 standardised reading test results. Boys were overrepresented in this profile, in line with previous studies on behaviour difficulties (Arnett et al., 2015). A notable feature in the BD-profile was the discrepancy between L1 standardised reading test results and grades in L1, which might be due to the limitations in our tests compared to the curriculum of the subject. The students might have performed poorly in areas not tested in this study, which in turn could explain the discrepancy between good test results and poor grades. Or, if the students' relationship to the teacher, the school, or to the school work in some way had been problematic, a reading test led by outsiders, unrelated to the school, could have been perceived as non-school work and thus contributed to presenting

their actual knowledge. Students' behaviour difficulties could also be a plausible explanation to this discrepancy when influencing the teachers' subject assessments. These results are also in line with previous studies that have found students with behaviour difficulties being at risk for underperforming in school (Al-Hendawi, 2013; Sánchez-Pérez et al., 2018). In Finland, the subject assessments are expected to be based on academic achievement and classroom behaviour as well as students' working styles (Mullola et al., 2014). Thus, the student's behaviour may have an impact on both the assessment of the subject and behaviour. This indicates that students with behaviour problems might be exposed to double "punishment," as their bad behaviour is weighed into both the subject grade and the behaviour grade.

Contrary to our expectations, we found three profiles instead of four. Due to properties of LPA, including the 5% criterion, our sample was probably too small to distinguish a fourth profile characterised by combined LD and BD, even though our results indicate this possibility. Learning difficulties and behaviour difficulties exist both separately and combined. Studies have found that students with behavioural difficulties perform significantly lower in maths and spelling than those without difficulties (Reid et al., 2004), and hyperactive behaviours and emotional difficulties are related to learning difficulties in reading and maths (Castro et al., 2020). In addition to identified learning difficulties, unrecognised learning difficulties can also contribute to the development of behavioural difficulties (Hall, 2008). Students with unrecognised learning difficulties do not necessarily get the help they need, get frustrated, and thus start to cause behavioural problems. Nonetheless, the result of our study could be regarded as compatible, not only with unrecognised difficulties but with recognised difficulties as well.

The second research question focused on how the profiles differ in temperament traits. We found that temperament traits could partially explain differences between them. Previous studies have found distractibility to be of importance for how well a student pays attention and stays focused on a task (Hirvonen et al., 2013; Liew et al., 2011). We did not identify any significant differences between the profiles on distractibility or mood. However, there were significant differences between the profiles on perseverance and impulsivity. The first profile with the best test results and the highest grades constituted of students with lower impulsivity and higher perseverance when compared with the other profiles. The third profile, with the lowest grades and good test results, had the lowest perseverance and highest impulsivity of all profiles. These findings are in line with previous studies showing the connection between high perseverance and good academic performance, and vice versa (Al-Hendawi, 2013; Hoffman et al., 2020).

The third research question investigated if temperament traits could explain profile differences in L1 grades, behaviour grades, and L1 standardised reading tests. Both perseverance and impulsivity were significant covariates and could partly explain the profile differences in the outcomes. These findings are in line with previous research, which emphasises the connection between high task orientation (high perseverance) and good school performance (Al-Hendawi, 2013; Blair & Razza, 2007; Duckworth & Allred, 2012; Duckworth & Seligman, 2005; Sanches-Perez et al., 2018), as well as the association of high impulsivity with lower grades (Valiente et al., 2008; Zhou et al., 2010). Temperament influences students' behaviour in school and has a clear connection to both school performance and social adjustment (Sanson et al., 2004), where adaptability and attention persistence seem to be of special importance (Fernández-Vilar & Carranza, 2013). However, it should be noted that the effect sizes concerning differences in temperament traits between the profiles were small, as were the effects of the covariates in explaining profile differences in grades and test results.

Limitations and Implications for Research

As mentioned, in the quite large survey that was used, the questions about temperament came at the end. This could have contributed to the uncertainty of some of the responses. First, the respondents might at this phase already have been drained and might not have given each question much

thought. Second, answering the questions also set requirements on the respondents' temperamental traits, such as perseverance and impulsivity. Third, both the respondents' tiredness and the temperamentally demanding survey might have contributed to the respondents giving a more positive image of themselves than they otherwise would have done. These aspects could (partly) explain the low response rate and some of the uncertainty of the results. In our study, as in previous corresponding studies measuring self-reported temperamental dimensions, the reliability is relatively low (e.g., Luby et al., 1999; Mullola et al., 2012; Urgesi et al., 2012). This indicates that self-reports might not be suitable for measuring temperament traits, at least not with the operationalisation used in this study. Thus, in comparison to the self-reported data, a triangulation of methods, including self-reported, teacher-reported, and parents-reported data, might potentially have given an overall more fair picture and sustainable results.

Anyhow, this study shows a need for further research on how temperament affects the behaviour of all students. More knowledge is needed for teachers to be able to distinguish between behaviour difficulties and temperamental traits. Further also to learn how temperament affects students' achievements, as well as how students approach the tasks and manage to complete them. According to the National Core Curriculum (2014), all students have a right to differentiated teaching, and student assessment is expected to be based on many different kinds of evaluations. Since students' work is part of the subject assessment and grade, a student's temperament may obscure the real knowledge and potential of the student. The decisions teachers make about differentiating teaching and assessment should thus also include an evaluation of every student's temperament.

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