Which students need accommodations the most, and to what extent are their needs met by regular upper secondary school? A cross-sectional study among students with special educational needs

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Which students need accommodations the most, and to what extent are their needs met by regular upper secondary school? A cross-sectional study among students with special educational needs

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ABSTRACT

The aim of this study was twofold: (1) to identify factors associated with a high level of accommodation needs in school activities among students with special educational needs (SEN) in regular upper secondary education; and (2) to investigate the extent to which schools have met students’ perceived accommodation needs. Accommodation needs and their provision in school activities were assessed with the School Setting Interview for 484 students with SEN. Students’ mean age was 17.3 years and 50% did not have a diagnosis. A logistic regression analysis revealed that a high level of school absence, studying a vocational programme, and a neuropsychiatric disorder were associated with a high level of accommodation needs. In the majority of school activities, about 50% of students had not received any accommodation despite an experienced need for support. About 30% of students perceived a need for support even though they had been provided with accommodations, and around 25% stated they were satisfied with received accommodations. Regular upper secondary school students with SEN are insufficiently provided with accommodations to satisfactorily participate in education. Specific student characteristics, e.g. high level of school absence, should receive special attention when investigating and accommodating students’ needs for support in school activities.

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KEYWORDS

Person-environment fit; participation; support in school; occupational therapy; neuropsychiatric disorder; dyslexia

Introduction

Students who require additional support or adaptive pedagogical methods in order to participate and meet learning objectives in general education are considered to have special educational needs (SEN) (UNESCO 1994). The European Agency for Special Needs and Inclusive Education estimated that up to 20% of school-aged youth experience SEN (European Agency 2012). The proportionally largest categories of SEN are emotional or behavioural difficulties (Attention Deficit /Hyperactivity Disorder ADHD/ADD) and learning difficulties (LD) in reading, writing and mathematics (McCoy, Banks, and Shevlin...
In the present study, SEN is used in accordance with the Salamanca Statement to include students at risk of failing to achieve educational goals for a wide variety of reasons that impede their optimal progress (UNESCO 1994). To respond to students’ diversity, increase students’ participation, and reduce exclusion within and from education, inclusive education is advocated (UNESCO 2005). Even though the design of learning activities and environments should originate from the diversity of students’ learning needs to support participation for all students and decrease the need for individualised solutions (Booth and Ainscow 2011), the practical state of creating and implementing inclusive education has not come that far (Haug 2017). Students may therefore still need individualised changes to be made in the school environment, called ‘accommodations’, to fully participate. Accommodations are changes in timing, setting, scheduling, response or presentation of the school environment or activity that allow the student to participate in the general educational curriculum (Harrison et al. 2013; Sandall, Schwartz, and Gauvreau 2016). Examples of accommodations are modifications of tasks and/or instructions (Raggi and Chronis 2006), Information and Communication Technology (ICT) such as computers and a school’s virtual learning environment (Wastiau et al. 2013) and special education teachers. However, schools have been criticised for addressing students’ need for support on an individual level, since a general level is preferable to prevent stigmatising the student (Booth and Ainscow 2011). Based on Lawton’s ecological model addressing person-environment fit (Lawton 1986), a student’s need for support originates from the match between the characteristics of the student and the school environment, which is called the student-environment fit (Hemmingsson et al. 2014). This interaction may be seen as a foundation for participation and functioning in education since it influences whether or not the student has the opportunity to attend and be involved in school activities.

In Sweden, as well as internationally, upper secondary education is considered the minimum qualification for successful entry into the labour market and as compulsory for further education (OECD 2017). Students may choose between general education preparatory for advanced education and vocational education with labour market-relevant qualifications. Additionally, introductory programmes with adapted learning environments are available for students who need to complement their grades or qualifications for general or vocational programmes in upper secondary school (UNESCO 2011). Although inclusive policies and legislation are in place, the elimination of barriers to participation in upper secondary school depends largely on a schools’ resources and teachers’ knowledge of how to support students with SEN (Pearce, Gray, and Campbell-Evans 2010). For example, several studies have reported that adolescent students with neuropsychiatric disorders (Bolic Baric et al. 2016; Sikirica et al. 2015; Fleischer Simmeborn, Adolfsson, and Granlund 2013) and dyslexia (Gibson and Kendall 2010; Pino and Mortari 2014) experience school failures and restricted participation since their needs for support are not recognised by the educational services. A qualitative study including adolescents with ADHD and their caregivers from eight European countries showed that about 50% of the students received accommodations in school, such as extra attention from teachers, adapted homework assignments or special classes. In addition, the majority of students stated that the provided accommodations were not enough to fully support their needs. They would, for example, have required more engaged teachers and more time to complete tasks (Sikirica et al. 2015). A
systematic review of the inclusion of students with dyslexia revealed that these were not always provided with accommodations or aware of their right of support. Moreover, students emphasised that the need for support was individual and varied in different settings (Pino and Mortari 2014).

Research on adolescent students with SEN and participation restrictions in school to a great extent concerns these students’ academic underachievement, low grade point average, high drop-out rate or difficulties with peer interaction, compared to students without SEN (e.g. Emmers et al. 2017; Weyandt and DuPaul 2008). Less is known about factors associated with perceived need for support in school activities among students in upper secondary education (Weyandt and DuPaul 2008). There are qualitative studies describing students’ difficulties in school and their perceived lack of support (e.g. Sikirica et al. 2015; Pino and Mortari 2014; Bolic Baric et al. 2016), but quantitative studies with larger samples to draw any conclusions are called for (Bolic Baric et al. 2016). Furthermore, knowledge is lacking concerning in which specific school activities students perceive need for accommodations and whether or not upper secondary schools successfully meet students’ needs.

Therefore, the aim of this study was to identify factors associated with a high level of accommodation needs in school activities among students with special educational needs in regular upper secondary education, and to investigate the extent to which schools have met students’ perceived accommodations needs. Awareness of factors associated with experiencing a great need for support in upper secondary education may facilitate the priority among students who may experience a need for support. Knowledge of school activities where students struggle and whether or not the school has provided accurate support may be used to guide the development of support on a general level, as well as flexible individualised support for students when needed.

**Methods**

**Study design**

This cross-sectional study was based on secondary data, consisting of a questionnaire with student characteristics, and assessments of student-environment fit using the School Setting Interview (SSI) (Hemmingsson et al. 2014), retrieved from Swedish governmental projects conducted in 2011–2014. The aim of the projects was to implement assistive technology to improve study results and ease the transition from school to working life for students with SEN in upper secondary school. Approval for the research study was obtained from the Regional Ethics Board in Linköping, Sweden, study code 2013/409–31.

**Participants**

The secondary data originates from five municipalities in Sweden, including 12 public upper secondary schools with approximately 10,000 students. School staff in these schools identified students due to inability to reach educational goals and/or noticeable difficulties with planning, problem solving, conducting and/or finishing tasks and/or a
high level of school absence and asked them about involvement in the projects (n = 549).

The present study included students in regular upper secondary school, aged between 15 and 20 years, with an identified accommodation need measured by the SSI assessment (Hemmingsson et al. 2014), able to understand and speak Swedish, and who had given written informed consent to use their data in research. Students excluded were those with an incomplete SSI assessment (e.g. less than seven ratings of items), generating a sample of 484 upper secondary school students with special educational needs.

Measurement

The School Setting Interview (SSI) is a student-centred instrument that assesses student-environment fit and focuses on how the student perceive the school environment and potential need of support (Hemmingsson et al. 2014). Students’ accommodation needs and provision thereof are identified through a semi-structured interview comprising 16 items of different school activities, such as write, read, remember things, take exams, classroom and break functioning and interaction with school staff (see Table 3 for a full presentation of items). Based on the interview and students perceived need of accommodation in school activities, each item is rated on a four-step rating scale from unfit (rating of 1) to perfect fit (rating of 4), taking provided accommodations into account. A rating of 1 (Unfit), is used when the student perceives a need for accommodations in the specific school activity but has not received any. A rating of 2 (Partial fit) is obtained when the student perceives a need for accommodations in the school activity although some accommodations have already been provided. When the student has received accommodations that satisfactorily meet the student’s need, a rating of 3 (Good fit) is obtained. A rating of 4 (Perfect fit) is obtained when the student perceives that the student-environment fit is ideal and no accommodations are needed. Psychometric studies have supported evidence of validity of the SSI (Hemmingsson and Borell 1996; Hemmingsson, Kottorp, and Bernspång 2004) and a recent Rasch analysis provided support of validity of the SSI for students with special educational needs in regular upper secondary education (Yngve et al. 2018).

The questionnaire with student characteristics generated information about students’ age, gender, diagnosis, native language, educational programme affiliation, study year, amount of school absence and whether or not they had special educational support in school from a subject teacher, teacher assistant or special education teacher at inclusion. All information in the questionnaire was solely based on what students stated.

One special education teacher and six occupational therapists conducted the data collection including the SSI assessment and the questionnaire. Before the data collection, all interviewers completed a course in the use and administration of the SSI. The students’ views on how environmental factors influenced opportunities to perform and participate in desired or required school activities were explored during the interview. When the student perceived a need for accommodation, the interviewer and student discussed how to facilitate the students’ opportunity to participate in the school activity. The interviewer administered the rating of SSI items based on what emerged in the
interview with the student. In total, the data collection took about one hour per student and was conducted at the student’s school.

**Analyses**

Logistic regression analysis was used to identify factors associated with the dependent variable i.e. a high level of accommodation needs, by generating a predictive equation (Field 2016). Prior to running the analysis, students total amount of accommodation needs in the 16 SSI items was calculated and ratings of 1, 2 and 3 in the SSI items were regarded as indicating a perceived need of accommodation. The cut-off for dichotomising the dependent variable was based on the quartile where students had the highest amount of accommodation needs. The fourth quartile included students that perceived between eight and fifteen accommodation needs (out of 16), which was considered a high level of accommodation needs (n = 185). Student characteristics from the questionnaire constituted independent factors in the analysis. Thirteen percent students (n = 65) had missing information in one or more independent factors and could not be included in the regression analysis. Thus, the sample in the logistic regression analysis consisted of 419 students. No significant difference in the dependent variable was present among dropped-out students and those included

<table>
<thead>
<tr>
<th>Table 1. Characteristics of included regular upper secondary school students.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics (n)</td>
</tr>
<tr>
<td>Age (425) mean 17.28, median 17 (15–20)</td>
</tr>
<tr>
<td>Gender (484)</td>
</tr>
<tr>
<td>Boy</td>
</tr>
<tr>
<td>Girl</td>
</tr>
<tr>
<td>Diagnosis (484)</td>
</tr>
<tr>
<td>No diagnosis</td>
</tr>
<tr>
<td>Neuropsychiatric disorder</td>
</tr>
<tr>
<td>Dyslexia</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Native language (476)</td>
</tr>
<tr>
<td>Swedish</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Educational program (479)</td>
</tr>
<tr>
<td>Introductory</td>
</tr>
<tr>
<td>Vocational</td>
</tr>
<tr>
<td>General</td>
</tr>
<tr>
<td>School year (482)</td>
</tr>
<tr>
<td>Introductory</td>
</tr>
<tr>
<td>Year 1</td>
</tr>
<tr>
<td>Year 2</td>
</tr>
<tr>
<td>Year 3</td>
</tr>
<tr>
<td>Presence of support in school* (484)</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>School absence (421)</td>
</tr>
<tr>
<td>Low &lt; 5%</td>
</tr>
<tr>
<td>Median 6–20%</td>
</tr>
<tr>
<td>High &gt; 20%</td>
</tr>
</tbody>
</table>

*Students had special educational support from a teacher, teacher assistant or special education teacher at inclusion.
in the regression analysis. The independent factors (except age), were categorised as appropriate, ranging from dichotomous variables to variables with four different categories, see Table 1. Since no recognised categorisation of school absence exists (Gentle-Genitty et al. 2015), ‘high’ level of school absence was set to > 20% as this implies that students are absent at least one school day per week. This categorisation has been applied in the Swedish context before (Öhman 2016). First, binary analyses between the dependent variable and independent factors were performed, where significant factors were incorporated in a manual stepwise regression analysis. Modelling was performed until the final regression model, including five factors, was generated. Included factors were school absence, educational programme, diagnosis, presence of special educational support in school and gender. Age, school year and native language were excluded due to non-significance. A logistic regression analysis was conducted, using a stepwise backward method and likelihood ratio statistic as the removal criterion. The overall fit of the model was assessed by the \(-2\) log-likelihood statistic and its associated Chi\(^2\) statistic, which when less than .05 indicates significant fit of data. To assess the substantive significance of the model, the measures of Nagelkerke and Cox-Snell were applied. Values varies between 0 and 1, indicating how well the model predicts the outcome variable, with 1 as the highest value. Hosmer & Lemenshow’s goodness-of-fit was applied to test whether the model’s estimates fit the data and were acceptable when not significant. A confidence interval (CI) of 95% and odds ratios (OR) were used to interpret the results of the analysis (Field 2016). Data were analysed using IBM SPSS Statistics for Windows, Version 24.0 (IBM 2016) and the level of statistical significance was overall set at \(p < 0.05\).

To analyse in which school activities the students perceived a need for accommodations and to what extent they had received needed support, the frequency distribution of students’ total accommodation needs (rating 1–3) in each of the 16 SSI items was investigated. The frequency distribution was divided into students with unmet needs (rating 1), students with accommodations that partly met their need (rating 2), and students with accommodations that satisfactorily met their need (rating 3). To identify the proportion of students with each rating, students with a rating of 1 were divided by the total number of students with accommodation needs (rating 1–3) in the specific item. The proportion of students with accommodations that partly (rating 2) and satisfactorily met students’ need (rating 3) in school activities, was calculated in the same way. Missing data varied for each SSI item and ranged between 0 and 28%. Therefore, the percentages reported are based on students with a valid SSI rating in the particular item. Furthermore, systematic differences concerning the presence of educational support in school at inclusion and other student characteristics, e.g. gender, were investigated with Chi\(^2\).

**Results**

**Participants**

Student characteristics of the 484 upper secondary school students included in the study are presented in Table 1. Their mean age was 17.3 years and the majority were boys (59.3%). About half of the students did not have a diagnosis (51.7%) and the
greater part studied in a vocational programme (57.8%). More than half (56.6%) of the students reported that they had special educational support in school from a teacher, a teacher assistant or a special education teacher at inclusion. However, all students perceived need of additional accommodations. At inclusion, there were no differences in student characteristics between students that had special educational support and students without support, with the exception of school absence where students with special educational support had a higher level of school absence ($\chi^2 = 6.57, p = .037$).

Students with a high level of accommodation needs in school activities

The result of the logistic regression analysis of factors associated with students with a high level of accommodation needs in school activities is presented in Table 2. The OR values show that the odds of students perceiving a high level of accommodation needs in school activities rose in line with the level of school absence. Students with a high level of school absence had more than three times the odds of perceiving a high level of accommodation needs ($\text{OR} = 3.5$) compared to students with a low level of school absence. Studying within a vocational programme ($\text{OR} = 2.8$) or a neuropsychiatric disorder ($\text{OR} = 2.2$) were associated with more than twice the odds of perceiving a high level of accommodation needs in school activities. Further, the OR values indicated an increased risk of a high level of accommodation needs for students that already had received some special educational support in school ($\text{OR} = 1.8$) or were of female gender ($\text{OR} = 1.7$).

Overall, the model reliably distinguished between students with and without a high level of perceived accommodation needs ($\chi^2 = 61.79, p < .001, \text{df} = 9$). The model’s estimates fit the data at an acceptable level (H-L goodness-of-fit 0.338), and the $R^2$ value of Nagelkerke implied that the logistic model explained 19% of the variation in the dependent variable.
Table 3. Students’ total accommodation needs in the 16 school activities in SSI. Categorised into students with accommodations that satisfactorily met their needs, students with accommodations that partly met their needs, and students with unmet needs who had not received any accommodations.

<table>
<thead>
<tr>
<th>SSI item (n)</th>
<th>Students’ total accommodation needs</th>
<th>Students with met needs</th>
<th>Students with partly met needs</th>
<th>Students with unmet needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remember things (484)</td>
<td>433 (89.5)</td>
<td>30 (6.9)</td>
<td>154 (35.6)</td>
<td>249 (57.5)</td>
</tr>
<tr>
<td>Write (484)</td>
<td>430 (88.6)</td>
<td>45 (10.5)</td>
<td>164 (38.1)</td>
<td>221 (51.4)</td>
</tr>
<tr>
<td>Do homework (448)</td>
<td>346 (72.2)</td>
<td>51 (14.7)</td>
<td>105 (30.3)</td>
<td>190 (55)</td>
</tr>
<tr>
<td>Take exams (458)</td>
<td>336 (73.3)</td>
<td>81 (24.1)</td>
<td>78 (23.2)</td>
<td>177 (52.7)</td>
</tr>
<tr>
<td>Read (484)</td>
<td>350 (72.3)</td>
<td>30 (8.6)</td>
<td>116 (33.1)</td>
<td>204 (58.3)</td>
</tr>
<tr>
<td>Do mathematics (447)</td>
<td>290 (64.8)</td>
<td>86 (29.7)</td>
<td>99 (34.1)</td>
<td>105 (36.2)</td>
</tr>
<tr>
<td>Get assistance (430)</td>
<td>243 (56.5)</td>
<td>100 (41.1)</td>
<td>84 (34.6)</td>
<td>59 (24.3)</td>
</tr>
<tr>
<td>Participate in the classroom (477)</td>
<td>179 (37.5)</td>
<td>50 (28)</td>
<td>44 (24.6)</td>
<td>85 (47.4)</td>
</tr>
<tr>
<td>Speak (483)</td>
<td>173 (35.8)</td>
<td>52 (30.1)</td>
<td>35 (20.2)</td>
<td>86 (49.7)</td>
</tr>
<tr>
<td>Participate in sports activities (402)</td>
<td>109 (27.1)</td>
<td>31 (28.4)</td>
<td>32 (29.4)</td>
<td>46 (42.2)</td>
</tr>
<tr>
<td>Participate in practical subjects (399)</td>
<td>83 (20.8)</td>
<td>24 (28.9)</td>
<td>15 (18.1)</td>
<td>44 (53)</td>
</tr>
<tr>
<td>Interact with staff (482)</td>
<td>99 (20.5)</td>
<td>28 (28.3)</td>
<td>43 (43.4)</td>
<td>28 (28.3)</td>
</tr>
<tr>
<td>Practical activities during breaks* (445)</td>
<td>74 (16.6)</td>
<td>13 (17.6)</td>
<td>25 (33.8)</td>
<td>36 (48.6)</td>
</tr>
<tr>
<td>Go on field trips (348)</td>
<td>52 (14.9)</td>
<td>19 (36.5)</td>
<td>26 (50)</td>
<td>7 (13.5)</td>
</tr>
<tr>
<td>Access the school (465)</td>
<td>25 (5.4)</td>
<td>9 (36)</td>
<td>4 (16)</td>
<td>12 (48)</td>
</tr>
<tr>
<td>Social activities during breaks* (481)</td>
<td>24 (5)</td>
<td>9 (37.5)</td>
<td>0 (0)</td>
<td>15 (62.5)</td>
</tr>
</tbody>
</table>

*Participate in.
**Perceived need of accommodations in school activities**

Table 3 reports students’ total accommodation needs in the 16 SSI items, divided into students with accommodations that satisfactorily met their needs, students with accommodations that partly met their needs and students with unmet needs that had not received any accommodation in the particular school activity. The proportion of students’ total accommodation need among school activities included in the SSI ranged from 5% in ‘participate in social activities during breaks’, to 89.5% in ‘remember things’. The students’ perceived need of accommodation in 1–15 school activities, with seven accommodation needs as the median number of perceived needs. Over 60% of the students experienced need of accommodation in the following school activities: remember things, write, do homework, take exams, read and do mathematics (presented in descending order in Table 3). Thus, school activities related to academic achievement proved to be most challenging for the students. Few students expressed need for accommodations in school activities of a more practical nature, such as participating in break activities, accessing the school and going on field trips, indicating a better student-environment fit.

**Provided accommodations in school activities**

As Table 3 shows, about 50% of the students perceived that they had not received any support, despite need of accommodation, in the majority of school activities. This was particularly evident in school activities related to academic achievement, see upper half of the table. Over 50% of the students experienced an unmet need in these school activities, with the exception of ‘do mathematics’.

Concerning school activities where students were satisfied with provided accommodations, the proportion of students ranged from 6.9% in ‘remember things’ to 41.1% in ‘get assistance’. About a quarter of the students experienced that their provided accommodation met their perceived need for support in the particular school activity, see Table 3. However, fewer students were satisfied with accommodations for ‘remember things’ (6.9%), ‘read’ (8.6%), ‘write’ (10.5%) and ‘do homework’ (14.7%).

In the majority of school activities, about 30% of students experienced their accommodation to partly meet their perceived need of support. Hence, even with the support that school had provided, students perceived additional need of support. The school activities with the largest number of students that, despite accommodation, perceived additional need of support were ‘write’ (n = 164) and ‘remember things’ (n = 154), see Table 3.

**Discussion**

**Who are the students with a high level of accommodation needs in school activities?**

Based on the results from the regression analysis, upper secondary school students with a high level of school absence, studying in a vocational programme or with a neuropsychiatric disorder, have an increased risk of experiencing a high level of accommodation needs in school activities. The findings suggested that schools should prioritise
these students when it comes to assessing and accommodating their need for support in school activities, since these students perceived the lowest student-environment fit. To the best of our knowledge, factors associated with a high level of support needs in regular upper secondary school have not been studied before among students with SEN. Perhaps teachers know that the school needs to focus on students with specific characteristics, but this is not concluded in literature. The findings of the present study showed that schools had prioritised students with a high level of school absence when providing special educational support, since these students to a higher extent than other students, had special educational support at inclusion. However, other factors associated with a high level of accommodation needs, such as a neuropsychiatric disorder, were not acknowledged by the school in relation to providing support.

A high level of school absence was the factor with the strongest association with a high level of accommodation needs and may be a result of a low fit between characteristics of the school environment and the student. Being unable to achieve what is expected due to difficulties that are not recognised or adjusted for in school activities may cause feelings of low self-esteem that reduce students’ motivation to attend school (APA 2013; Reid 2008). Strand and Granlund (2014) found that students with learning difficulties were over-represented in a sample of 90 Swedish ninth-grade students with a high level of absenteeism, but that those students receiving support from the school had lower levels of absence. The reason for school absence and the student’s school situation should therefore be thoroughly investigated, as an accommodation to enhance the student-environment fit could potentially have implications for school attendance.

Students studying in vocational programmes were more than twice as likely to experience a high level of accommodation needs compared to students in other programmes. Vocational programmes focus on labour market qualifications (UNESCO 2011) and may attract students with reading and writing difficulties (Savolainen et al. 2008) since subjects with an academic focus may be extra challenging for students with SEN. A recent report from the Swedish National Agency for Education (SNAE 2017) found that the most common reason why students in vocational programmes did not obtain a vocational diploma was failed grades in Mathematics, English and religion. Taken together with the findings from the present study where students expressed most accommodation needs in school activities related to academic achievement, this suggests that the accommodation needs of students in vocational programs require increased attention, particularly in school activities and subjects with an academic focus.

Students with a neuropsychiatric disorder were twice as likely to have a high level of accommodation needs compared to students without a diagnosis or with another diagnosis. Perhaps this was not surprising since students with ADHD and Asperger’s have been identified by other studies, e.g. Bolic Baric et al. (2016), Fleischer Simmeborn, Adolfsson, and Granlund (2013), as experiencing difficulties in school. Further, students with emotional or behavioural difficulties are over-represented among students identified with SEN by teachers (Banks, Shevlin, and McCoy 2012; Smeets and Roeleveld 2016), which along with findings from the present study suggests that they are a group of students with major challenges in school.

Teachers perceive executive functioning deficits, common in neuropsychiatric disorders (APA 2013), as the most difficult to address in the regular classroom (Pearce,
Gray, and Campbell-Evans (2010) which appear to adversely affect many school activities.

**Does regular upper secondary school provide an inclusive environment and are students’ accommodation needs met?**

Although an inclusive school environment is emphasised in the Swedish educational system, the findings reported another reality, which according to Haug (2017) might reflect today’s practical state of inclusive education in Europe. The findings revealed that this heterogeneous group of students with SEN perceived a need for accommodations in school activities to a high extent, primarily in school activities related to academic achievement, which indicates a non-inclusive school environment. In the majority of school activities, about 50% of students had not received any accommodation despite an experienced need for support, and about a third of the students had been provided with accommodations but nevertheless perceived an additional need for support. As emphasised by Pearce, Gray, and Campbell-Evans (2010), most upper secondary school teachers are subject specialists with limited time for each student, which might reduce their possibilities to create a supportive environment that caters for students’ diverse support needs. This study provides important information concerning in what specific school activities in upper secondary school students perceive a need for support, which may be used to develop support on a general level, as well as flexible individualised accommodations when needed. School activities such as remembering things, writing and doing homework involve multiple abilities, tasks and environments, which adds to the complexity of addressing all students’ needs for support on a general level. As a result, individualised accommodations may be required and justified until the practical state of inclusive education is further developed. In those cases, using the SSI (Hemmingsson et al. 2014) as in this study, to reveal the students’ experiences of participation in school activities by considering the interaction between characteristics of the student and the school environment to identify accommodation needs may be preferable. Furthermore, the students’ preferences for support and the priority of school activities are taken into account to guide the planning and implementation of support. Such a comprehensive and student-centred approach facilitates the identification of accommodation needs and potential accommodations that may be required when the student does not perceive the school environment to be inclusive enough. As an example related to the school activities identified in this study, such as remembering things and writing, assistive technology for cognition (ATC) that aims to support cognitive skills and to provide compensatory methods or strategies for task performance that alter the environment to match the abilities of the individual (Frank Lopresti, Mihailidis, and Kirsch 2004) could be beneficial. To implement and evaluate individualised support including ATC in these school activities for students with special educational needs would be a fruitful area for further investigation.

**Methodological limitations**

Limitations of the present study are related to the selection of students and factors in the logistic regression analysis. Secondary data was retrieved from governmental projects where the identification and inclusion of students were performed by school staff, which
means that the authors had no control over this process. Students who were considered to require additional support in school were asked about involvement in the projects. Hence, students were all in need of support at inclusion but how they perceived their school environment, in what school activities, and to what extent they perceived a need for support and had been provided with accommodations was unknown. Even though the projects duration, several years, was sufficiently long there is potential bias related to the characteristics of eligible students. Students with the greatest difficulties might have been missed since struggling students are more often absent and more likely to drop out of school (APA 2013): consequently, they may not have been asked if they wished to be included in the projects. With this in mind, the sample’s high level of accommodation needs may actually give a more positive picture than the reality. The results should be interpreted with this in mind. However, the generalisability of the findings is strengthened by the relatively large sample size (n = 484).

The explanatory power ($R^2$) of the regression model (19%) might be considered quite low, but actually complies with many empirical studies that are published with $R^2$ less than 20%. Cross-sectional data tend to generate lower $R^2$ values (Eisenhauer 2009), which might be contributing to the explanatory power of 19% in this case. It has been reported that poor socioeconomic status is associated with children and adolescents identified with SEN (Banks, Shevlin, and McCoy 2012; Smeets and Roeleveld 2016). Therefore, such factors would have been preferable to include in the regression analysis as they might have increased the model’s explanatory power of the dependent variable ‘high level of accommodation needs’.

The results of the present study are solely based on information given by students, which is advocated in the literature (De Vroey, Struyf, and Petry 2016) and one of the strengths with using a student-centred assessment as the SSI. Nevertheless, this information would be interesting to compare with teachers’ perceptions of students’ need of support and their knowledge about provided accommodations. This is because identified needs are not always consistent or prioritised in the same way among students and teachers (Kocher Stalder et al. 2018).

**Conclusion**

In general, regular upper secondary school students with SEN do not perceive their school environment to be inclusive. They are insufficiently provided with adequate accommodations within school activities, for which they perceive a need for support to satisfactorily participate. Students with a high level of school absence, studying in a vocational programme or with a neuropsychiatric disorder proved to have the lowest student-environment fit.

**Implications**

Specific school activities, such as remembering things, writing and doing homework, should receive special attention when investigating and accommodating students’ perceived need for support. Information concerning students’ perceived need for accommodations could be used by professionals to develop support on a general
level, as well as flexible individualised accommodations when needed, to improve the conditions for an inclusive school environment.

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