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Examining the effects of special education support on students' affective and motivational outcomes: An analysis using propensity score matching.

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ABSTRACT

The outcomes of studies on the effectiveness of special education (SE) remain unclear. There are only a few studies on the effects of SE that have used advanced methodology to minimize the influence of potential selection bias. This study examined the plausible effects of SE on students' affective and motivational outcomes using a quasi-experimental method of propensity score matching with longitudinal data within the context of the Finnish multi-tiered support system. The participants of this study were fifth and sixth grade students from 30 primary schools who took part in a larger study of school inclusion in Eastern Finland (ISKE). Data from 553 students included information from questionnaires on students' emotional engagement with school, self-concepts, and goal orientations from themselves, academic achievement from their teachers, and socioeconomic status from their parents. We examined the effects of receiving SE service by following students from fifth and sixth grade using three different regression models in ANCOVA. Results revealed not only the influence of selection bias on outcomes, but also that when comparing matched groups of students, SE did not have effects on students' affective or motivational outcomes.

KEYWORDS

special education; inclusive education; effects; emotional engagement; self-concepts; goal orientations; propensity score matching

Introduction

Despite extensive research, the efficacy of special education support as a school-system-level intervention remains unclear (Kvande et al., 2019; Morgan et al., 2010) although it has been evaluated in different ways. For instance, when SE students were simply compared to students who did not receive SE (N=1941), SE students showed lower levels of educational attainment (Blackorby & Wagner, 1996). When controlling the outcomes before receiving SE, Hanushek, Kain & Rivkin (2002) found that SE had a positive impact on students' educational attainment (N=767 763), but Reynolds & Wolfe (1999) that SE had null or negative impact (N=1234). The main problem with studies that have compared SE students to students without SE needs is that these two groups of students are inherently unequal (Gloski et al., 2022) and due to this selection bias, research findings on SE are very difficult to interpret (Kanaya, Wai & Miranda, 2019). More specifically, children who qualify for SE services differ on many potential confounding characteristics when compared to children who do not. These include gender, parents' educational qualifications, socio-economic status, family involvement, and home literacy practices (Sullivan, Artiles & Hernandez-Saca, 2015).

In order to properly estimate the effectiveness of SE, it is necessary to contrast the outcomes of students who receive special education support with an equivalent group of students who are not receiving such services (Kvande et al., 2019; Morgan et al., 2010). It is very difficult ethically and practically to implement experimental research designs that include randomized treatment and control groups prior to SE interventions (Bai, 2011). An increasingly common method to create statistically equivalent experiment and control groups, reduce selection bias, and estimate the causal effects of treatment is propensity score matching (PSM) (Caliendo & Kopeinig, 2008; Rosenbaum & Rubin, 1983).

The purpose of PSM method, which is regarded as equal to quasi-experimental design, is to achieve optimal balance between groups on covariates that influence both participation and the outcome of the treatment (Beal et al., 2014; Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). A propensity score is the conditional probability that a person will be in one condition rather than in another (in this case, whether they will receive SE or not) given a set of observed covariates used to predict the person's condition (Beal et al., 2014; Rosenbaum & Rubin, 1983). Proper PSM leads to rigorously derived and unbiased estimates of SE's effects on children's learning and behaviour (Dehejia & Wahba, 1999).

In recent years, there have been longitudinal studies that have used PSM to estimate the causal effects of SE. Dempsey et al. (2016) reported that after receiving SE for two years students ($N=1935$), significantly lower literacy, numeracy, and prosocial skills and significantly more behavioural problems relative to controls. In their study, Morgan et al. (2010) found that receiving SE at the ages of 8–9 years had a negative or statistically nonsignificant impact on children's learning and problem behaviours, but it had a small positive effect on learning-related behaviours in comparison to their matched peers at the ages of 10–11 ($N=6318$). Following students from first to fifth grade, Kvande et al. (2019) discovered that SE has no effect on student's ($N=745$) academic achievement or task motivation. When researchers controlled for time-invariant confounders, beneficial effects of SE from first to third grade on math skills disappeared and SE adversely affected math skills from third to fifth grade. Results from the study by Lekhal (2018) revealed that receiving SE in grades five, six, eight, or nine ($N= 2756$) did not improve student's math and language skills. Goldan, Nusser & Gebel (2022) found no positive effects of SE in relation to student's school-related, subjective well-being ($N=4021$). SE students reported also lower levels of *enjoyment in learning, mastering tasks well* and *satisfaction with school*, but no effect was found on the affective indicator "*I like going to school*".

These studies have shown that SE predicts negative learning outcomes. However, as Lekhal (2018) suggests, the effectiveness of SE should be considered in a broader view than only student's academic progress. SE may lead to other important benefits and positive outcomes in areas such as school attendance, attitudes to school, and student's affective outcomes. As Morgan et al. (2010), Goldan et al. (2022) and Savolainen, Timmermans & Savolainen (2018) discovered, SE may have an influence on student's nonachievement outcomes such as emotional engagement with school, self-concepts and goal orientations. The purpose of this study was to analyse the efficacy of business as usual part-time special education support on these domains in the Finnish education

context. We used three different regression models to evaluate how outcomes differ when data is analysed in different ways.

Multi-tiered System of Learning and Schooling Support in Finland

In the Finnish multi-tiered system, support is provided at three levels: general, intensified, and special (FNBE, 2016). The nature of the support provision is preventative, and the aim is to identify any difficulties early on and provide additional help whenever required, whether any disability has been diagnosed or not. The support at all levels is provided in the student's own school and teaching group, unless the student's best interests require otherwise (FNBE, 2016). In Finnish schools, intensified support is provided as part-time special education mainly for 1–2 lessons/week in small groups (Savolainen, Timmermans & Savolainen (2018). These are usually for native and foreign languages or mathematics.

Outcomes of Interest

Emotional Engagement with School

Engagement is a multifactorial meta construct (Fredricks, Blumenfeld & Paris, 2004). Student engagement can be described as a composite of psychological processes involving the student's attention, investment, and effort in their schoolwork (Marks, 2000; Virtanen et al., 2018), all of which are key contributors to academic success (Henry, Knight & Thornberry, 2011) and have a significant positive impact on student's wellbeing (Virtanen et al., 2018). Student engagement can be seen as an outward manifestation of motivation (Virtanen et al., 2015).

Student engagement with the school consists of behavioural, cognitive, and emotional dimensions (Archambault et al., 2008; Fredricks et al., 2004). Behavioural engagement entails active involvement and effort in academic tasks (Archambault et al., 2008). Cognitive engagement refers to student's self-regulated strategies for learning and commitment to learning (Sedaghat et al., 2011), and emotional engagement is defined as students' positive affective response (e.g., happiness, lack of anxiety, interest) to learning activities and the people involved in those activities (Appleton et al., 2008). Students who are emotionally engaged in school are also behaviourally and cognitively engaged, and this leads to better academic outcomes (Archambault et al., 2008). They are more likely to find their schoolwork meaningful and rewarding and remain persistent when encountering problems or difficulties in their studies (Pietarinen, Soini & Pyhältö, 2014).

General and Academic Self-Concepts

A central goal of education is to develop student's positive self-concepts (Marsh & Martin, 2011). *General self-concept* reflects the broad view that an individual has about themselves (Marsh & Martin, 2011). In other words, it is the way in which people perceive their strengths, weaknesses, abilities, attitudes, and values (Shavelson, Hubner & Stanton, 2016), and has a strong influence on student's academic motivation, learning, and achievement (Hen & Goroshit, 2014). The *academic self-concept* refers to individuals' convictions that they can successfully perform given academic tasks at designated levels (Schunk, 1991). The academic self-concept can be divided into different domains: general school self-concept and self-concepts specific to subjects such as mathematics and reading (Mcinerney et al., 2012). Previous studies point out that there is a significant positive correlation between students' academic self-concept and school achievement (Trautwein et al., 2006). It is generally assumed, that pupils with special education needs have lower academic self-concept than their peers (Avramidis, 2013). This is especially true for students who have learning difficulties in mainstream educational classes but do not receive any special education support (Elbaum, 2002). Students with and without special education needs have different academic and social self-concepts (Elbaum, 2002) and different goal orientations (Schwab & Hessels, 2015).

Goal Orientations

Goal orientations refer to the students' motivational basis of learning (DeShon & Gillespie, 2005) and the purpose they adopt for learning in achievement situations (Dweck, 1986), and it plays a critical part in students' academic achievement (Mcinerney et al., 2012). According to literature, at least five goal orientations can be identified. *Mastery orientation* consists of students striving to develop competence by acquiring new knowledge and skills (Barron & Harackiewicz, 2001). *Performance orientation* refers to students' purpose to demonstrate performance in comparison to others (DeShon & Gillespie, 2005). *Failure expectation orientation* is used when a student expects to fail and uses their behaviour as an excuse for failure. That expectation to fail leads to *task avoidance orientation*, which is the attempt to avoid expected failure (Kaplan & Maehr, 2007). Students who show failure expectation or task-avoidance have negative attitudes towards education (Midgley, Arunkumar & Urdan, 1996) and are seen to perform poorly (Nurmi, Onatsu & Haavisto, 1995). *Performance avoidance orientation* reflects the avoidance of demonstrating one's incompetence, in other words, avoiding tasks not to give impression of being stupid (Hienonen, Hotulainen & Jahnukainen, 2021; Schwab & Hessels, 2015). It is associated with negative outcomes (Elliot, 1999).

Present Study

We used longitudinal data within the context of the Finnish multi-tiered support system to evaluate how SE as it is implemented in everyday school life affects students' emotional engagement outcomes in school, general and academic self-concepts, and goal orientations. It aims to answer the questions:

1. How do outcomes of students receiving SE in fifth grade differ from the outcomes of students who do not when they are simply compared in sixth grade?
2. What are the effects of SE provided in fifth grade on outcomes in sixth grade when students' fifth grade level in each outcome is controlled for?
3. What are the effects of SE provided in fifth grade on outcomes in sixth when students' fifth grade level in each outcome are compared to a PSM matched group?

METHOD

Participants and Sample

The participants of this study were fifth and sixth-grade students who took part in a larger study of school inclusion in Eastern Finland (ISKE) between 2010–2013. Students came from 30 primary schools that volunteered to participate in the study and altogether 57 classes were included. In Finland primary schools are not selective, rather they recruit students from their respective geographical catchment areas and differences between schools are in international comparison small (Bernelius & Huilla, 2021). The data for this longitudinal study was collected from the students themselves, their parents, and students' class teachers using questionnaires between April and May each year. There were total of 553 students in the fifth grade, who were included in the study. We excluded a small group of special education students having individually adapted curricula in one or more subjects and studied in separate special education classes. There were 304 girls and 249 boys in this sample, and 15% of them received intensified support (13% of girls and 18% of boys). In 2009 the corresponding national figure for 5th grade students was 15% (Kirjavainen, Pulkkinen & Jahnukainen, 2014). In general, the levels of part-time special education have remained very stable over the last 20 years. (Suomen virallinen tilasto (SVT), 2022).

Research Design

Participants had missing data because of attrition, not answering parts of the questionnaires, or because some classroom teachers and parents did not answer questions about the student. We used multiple imputation (MI) to handle missing data (Choi, Dekkers & Cessie, 2019). When using MI

in a propensity score setting, both baseline and outcome covariates should be included in the imputation model to obtain an unbiased estimate of intervention (Kupzyk et al., 2017; Leyrat et al., 2019). Also, when using MI, results must be aggregated to have one summarized finding. Mitra and Reiter (Mitra & Reiter, 2011, 2016) compared two methods, the "Within" and the "Across" approaches with combining propensity scores and MI. In the first method, the "Within" approach matching and analysis are performed on each imputed dataset and the resulting effect estimates are averaged across the imputations. In the "Across" approach propensity scores are estimated for each imputation first and then averaged across the imputations prior to matching. Although the "Across" approach is much simpler, the "Within" approach should be preferred when using MI because it results to less biased results (Kupzyk et al., 2017; Penning De Vries & Groenwold, 2017).

In this study, we used SPSS 24 and Thoemmes's Psmatching 3.04 plug-in (Thoemmes, 2012) to match and SPSS 27 to analyse the data. The use of this plug-in required full data without any missing values, and for that reason, imputation was necessary.

Following these recommendations, we constructed 20 imputed datasets for matching. In this study, we used two control cases matched to each treatment case with the nearest neighbour matching procedure without replacement with a caliper of .02 (see Austin, 2010; 2011; Beal et al., 2014). Balance of the means of all covariates across students who received SE and who did not were studied before and after the matching.

To obtain parameter estimates to assess the effects of SE provided at fifth grade on school emotional engagement, general or academic self-concept, and goal orientation outcomes in sixth grade, we performed for each outcome regressions in ANCOVA before and after matching on each of the 20 imputed datasets. We used the "Within" approach and the resulting effect estimates were averaged across the imputations using Rubin's rules (Beal et al., 2014; Little & Rubin, 2002).

Potential Confounders

Covariates used in the matching (Table 1) were drawn from the fifth-grade data, except the information about family structure and parents' working status, their educational level, and their participation in events organized by their child's teacher. All available parent data from the three years of follow up (while students were in the 5–7th grade) was used. In order to reduce potential selection bias, a large number of covariates should be included in the model predicting the propensity to receive treatment (Shadish et al., 2002). Variable selection was based on both theory (Bai, 2011) and prior empirical research (e.g., Morgan et al., 2010) to identify background characteristics that predict a child's probability to receive SE. Variables that help explain the

selection of a treatment or nontreatment group and variables that may explain the outcome variable should be included in creating the propensity score (Fan & Nowell, 2011). We used 23 covariates to model a child's propensity for receiving SE (Table1).

Student's gender was used as a covariate because boys are more likely to have learning problems (see Kvande et al., 2018). The math test RMAT is standardized and validated test to distinguish learning difficulties in mathematics (Räsänen, 2004). Language test ALLU is a standardized and validated reading test to measure students' reading speed and their text comprehension (Lindeman, J. 1998a). Students were asked how much help they were helped with their homework. They completed the Strengths and Difficulties Questionnaire (SDQ-FIN) (Koskelainen, Sourander & Kaljonen, 2000), which is a validated screening instrument for emotional and behavioural problems. Cronbach's alphas for internalized problems scale was .76, externalized problems scale .71 and prosocial scale .69. Students also completed the Multisource Assessment of Children's Social Competence (MACSC). Its co-operating and empathy scales has been shown to capture both behavioural and affective aspects of social competence (Junttila et al., 2006). (Empathy scale $\alpha = .72$ and co-operation scale $\alpha = .82$) *Teacher evaluation of school grades* of learning-related behaviours and student's academic performance, which predict strongly their academic performance and placement into SE (Morgan et al., 2010), were obtained at the end of fifth grade. From *the parents' questionnaire*, we obtained information on parents' marital status, educational level and their working habits for the measure of socioeconomic status (Davis-Kean, 2005). Parents' efforts to support their child's learning and schooling (Davis-Kean, 2005) consist of how worried parents were about the motivation and learning of their child and their participation in events organized by the teacher of their child.

Table 1. Potential confounders.

Variable	M(SD)%	Range	% covered	Source
Student				
.Intensified support	15.2%		100	
1. Gender: Boys	45%		100	
2. Math test	39.42(6.37)	12 – 56	91.5	RMAT (Räsänen, 2004)
3. Language test Decoding sumscore	146.90(34.17)	64 – 214	85.7	ALLU (Lindeman, J. 1998a)
4. Language test Reading comprehension sumscore	31.08(6.55)	12 – 47	84.0	ALLU (Lindeman, J. 1998a)
5. Empathy scale	3.49(0.46)	1.67 – 4.00	94.0	MACSC (Junttila et al., 2006).
6. Co-operation scale	3.34(0.48)	1.60 – 4.00	94.0	SDQ-FIN (Koskelainen, Sourander, & Kaljonen, 2000).
7. Externalized problems scale	1.48(0.31)	1.00 – 2.70	94.4	
8. Internalized problem scale	1.47(0.33)	1.00 – 2.80	94.4	
9. Prosocial scale	2.55(0.36)	1.00 – 3.00	94.4	
10. My parents keep watch that I have done my homework	3.53(1.33)	1 – 5	93.9	
11. I get help from home to do my homework if I ask it	4.55(0.89)	1 – 5	93.7	
Teacher evaluation of school grades				
12. Diligence (e.g. taking care of assignments and belongings)	8.79(0.98)	4 – 10	85.7	
13. Behaviour (towards students and teachers)	8.84(0.94)	4 – 10	85.7	
14. Mathematics	8.22(1.00)	4 – 10	86.3	
15. Reading	8.46(0.89)	4 – 10	86.1	
16. Writing	8.13(0.96)	4 – 10	86.3	
Parents				
17. What is the form of your family?			74.5	
Nuclear family	55.3%			
Blended family	8.7%			
Single parent	10.5%			
18. Father's education			67.8	
Less than secondary	5.8%			
Secondary	21.2%			
Lower tertiary	35.6%			
University	14.5%			
19. Mother's education			73.8	
Less than secondary	2.4%			
Secondary	19.0%			
Lower tertiary	35.6%			
University	16.8%			
20. Working status			74.5	
At work	65.8%			
Unemployed	2.7%			
Temporarily not at work	3.6%			
Stay-at-home mother/father	2.2%			
Retired	0.2%			
21. How much do you worry about the learning and school success of your child?	2.31(1.08)	1 - 5	53.5	
22. How much do you worry about your child's motivation and interest in learning?	2.55(1.11)	1 - 5	53.5	
23. I participate in events organized by the teacher of my child	2.28(1.24)	1 - 5	63.8	

Support in fifth grade was coded dichotomously (0=No support, 1=SE support)

To assess the balance of control and treatment group differences, we compared the means and standard differences for continuous variables or distributions and standardized differences for categorical variables before and after matching (Table 2) (Beal et al., 2014).

Table 2. Descriptive statistics of covariates used in matching at 5th grade.

Variable	Before matching				After matching				
	SE support (n=84)		No support (n=469)		SE support (n=65.8)		No support (n=106.2)		
	N	%	N	%	N	%	N	%	
Gender: Boy	45	53.6	204	43.5	31.8	48.3	45.6	42.9	
	M(SD)		M(SD)		M(SD)		M(SD)		
Student				d				d	
RMAT total score. Standardized Finnish math test.	35.39(7.55)***		40.02(6.26)		36.01(7.51)		36.87(6.81)		-0.14
ALLU: Decoding sumscore	132.68(34.93)***		149.37(36.01)		137.32(35.67)		140.67(34.76)		-0.10
ALLU: Reading comprehension sumscore	24.63(5.82)***		32.19(6.45)		25.86(5.83)		26.86(6.49)		-0.17
MASK: empathy scale	3.46(0.52)		3.48(0.46)		3.48(0.53)		3.48(0.50)		-0.02
MASK: co-operation scale	3.36(0.53)		3.33(0.48)		3.36(0.56)		3.34(0.56)		0.04
SDQ: Externalized problems scale	1.51(0.33)		1.50(0.33)		1.50(0.34)		1.51(0.38)		0.05
SDQ: internalized problem scale	1.49(0.37)		1.49(0.37)		1.49(0.36)		1.49(0.40)		-0.02
SDQ: Prosocial scale	2.56(0.36)		2.52(0.40)		2.57(0.37)		2.56(0.42)		0.01
My parents keep watch that I have done my homework.	3.64(1.39)		3.48(1.34)		3.69(1.42)		3.66(1.56)		0.04
I get help from home to do my homework if I ask it.	4.37(1.08)		4.54(0.87)		4.42(1.12)		4.47(1.17)		-0.03
Teacher evaluation (4 to 10 Finnish standard subject rating)									
Diligence (e.g., taking care of assignments and belongings)	8.22(1.10)***		8.85(0.95)		8.31(1.15)		8.43(1.16)		-0.12
Behaviour (towards students and teachers)	8.51(1.07)**		8.85(0.95)		8.58(1.05)		8.64(1.09)		-0.07
Mathematics	7.33(1.03)***		8.37(0.95)		7.46(1.01)		7.56(0.96)		-0.11
Reading	7.58(1.02)***		8.60(0.82)		7.76(1.01)		7.93(0.90)		-0.20
Writing	7.23(1.04)***		8.28(0.91)		7.38(1.08)		7.58(0.97)		-0.24
Parents									
What is the form of your family?	1.48(0.70)		1.49(0.76)		1.49(0.71)		1.50(0.87)		-0.02
Father's education	2.40(0.97)**		2.72(0.95)		2.45(0.92)		2.50(1.06)		-0.03
Mother's education	2.67(0.75)*		2.88(0.87)		2.71(0.79)		2.72(0.92)		-0.01
Working status	1.39(0.80)		1.33(0.69)		1.42(0.81)		1.42(0.87)		-0.01
How much do you worry about the learning and school success of your child?	3.06(1.24)***		2.33(1.23)		2.95(1.18)		2.87(1.23)		0.08
How much do you worry about your child's motivation and interest in learning?	3.18(1.13)***		2.59(1.36)		3.08(1.13)		3.08(1.39)		0.05
I participate in events organized by the teacher of my child.	2.23(1.26)		2.38(1.32)		2.28(1.31)		2.32(1.34)		-0.03

Notes: *M* = Mean, *SD* = Standard deviation, *d* = effect size measured with Cohen's *d*. Values of .20 refers to small effects, values of .50 to medium effects and values of .80 large effects (Cohen, 1988)

Continuous variables are presented as means and standard deviation; dichotomous ones are presented as *N* (%).

Continuous variables were analyzed using independent samples t-tests.

*** Means of pupils with SE and with no support are statistically different at the $p < 0.001$ level.

** Means of pupils with SE and with no support are statistically different at the $p < 0.01$ level.

* Means of pupils with SE and with no support are statistically different at the $p < 0.05$ level.

After matching number of students (*n*) are decimals because all 20 imputations differ from each other and *n* values are pooled values.

Outcome Measures

Students completed the same questionnaires in both the fifth and sixth grade. Emotional engagement was evaluated with propositions such as, “How happy are you to go to school?” (Cronbach’s $\alpha=.82$). The Self-description Questionnaire (SDQ-I, Marsh, 1990b) is a widely-used instrument to measure eight self-concept domains. We focused on general self-concept (e.g., “Overall, I have a lot to be proud of”, $\alpha =0,89$) and three academic self-concepts: general school (e.g., “I am interested in all school subjects”, $\alpha =0.89$), mathematics (e.g., “I enjoy doing work in mathematics”, $\alpha =0.95$), and reading (e.g., “I like reading”, $\alpha = 0.91$) self-concept subscales. Each scale contains eight items, all written in a positive direction and describe domain-specific characteristics. The Strategy and Attribution Questionnaire (SAQ) (Nurmi, Salmela-Aro & Haavisto, 1995) was used to assess five different goal orientations. Positive goal orientation strategies consist of mastery orientation (e.g., “I try hard to do difficult assignments and things too”, $\alpha =0.78$, 4 items), performance orientation (e.g., “I want to show to teacher that I’m more skilled than other students”, $\alpha =0.58$, 2 items), negative task avoidance (e.g., “If something at school is too difficult, I leave it off”, $\alpha= 0.70$, 5 items), failure expectations (e.g., “When we are doing exercises at school, I’m afraid I can’t do them”, $\alpha =0.72$, 2 items), and performance avoidance orientation (e.g., “If something goes wrong at school, I think teachers and other students consider me stupid”, $\alpha =0.55$, 2 items). Prior to matching we examined if there were statistical differences between the students receiving SE and the students who did not using independent samples t-test (Table 3).

Table 3. Descriptive statistics of outcome variables for SE students and students with no SE before matching at fifth and sixth grade (n=553).

Variable	Fifth grade			Sixth grade		
	SE support (n=84)	No support (n=469)	<i>d</i>	SE support (n=84)	No support (n=469)	<i>d</i>
	<i>M(SD)</i>	<i>M(SD)</i>		<i>M(SD)</i>	<i>M(SD)</i>	
Emotional engagement	2.81(0.56)	2.95(0.54)*	-0.27	2.69(0.59)	2.89(0.59)**	-0.35
General self-concept	3.90(0.74)	4.04(0.69)	-0.19	3.76(0.74)	3.95(0.70)*	-0.28
General school concept	2.96(0.78)	3.42(0.75)***	-0.63	2.93(0.74)	3.38(0.81)***	-0.59
General math concept	2.91(1.11)	3.45(1.05)***	-0.52	2.79(1.00)	3.31(1.06)***	-0.52
General reading concept	3.20(0.91)	3.87(0.81)***	-0.82	3.14(0.97)	3.71(0.86)***	-0.69
Mastery orientation	3.09(0.95)	3.45(0.88)***	-0.41	3.05(0.76)	3.25(0.90)	-0.24
Performance orientation	2.53(1.10)	2.39(1.06)	0.14	2.60(1.12)	2.28(1.00)**	0.33
Failure expectation	2.87(1.03)	2.28(0.93)***	0.63	2.81(0.90)	2.25(0.89)***	0.66
Task avoidance	2.76(1.00)	2.45(0.90)**	0.35	2.85(0.75)	2.49(0.92)***	0.43
Performance avoidance orientation	2.31(0.99)	2.10(0.88)*	0.25	2.39(0.95)	2.07(0.89)**	0.37

Notes: *M* = Mean, *SD* = Standard deviation, *d* = effect size measured with Cohen's *d*. Values of .20 refers to small effects, values of .50 to medium effects and values of .80 large effects (Cohen, 1988)

Continuous variables were analyzed using independent samples t-tests.

*** Means of pupils with SE and with no support are statistically different at the $p < 0.001$ level.

** Means of pupils with SE and with no support are statistically different at the $p < 0.01$ level.

* Means of pupils with SE and with no support are statistically different at the $p < 0.05$ level.

At 5th grade there were statistical differences between the groups in all outcome variables except general self-concept and performance orientation, but at 6th grade in all variables except mastery orientation.

To answer our research questions we performed three regression models for each outcome in ANCOVA to obtain parameter estimates to examine if receiving SE in the fifth grade had effects on students' emotional engagement in school, their general and academic self-concepts and their goal orientations in the sixth grade (Table 4). In the first models (a) we examined how outcomes of students receiving SE in fifth grade differ from the outcomes of students who do not when they are simply compared in sixth grade. In the second regression models (b), we examined the effects of fifth grade SE placement on outcomes in the sixth grade, with the fifth grade level controlled. In our third regression models (c), we studied the effects of fifth grade SE placements on sixth grade outcomes in matched groups with fifth grade level controlled.

Results

Table 4. Estimated effects of fifth grade SE placement on outcomes of study variables in the sixth grade: three types of models with increasing control of confounders.

Variable	Outcomes on sixth grade		Outcomes on sixth grade with fifth grade level controlled			
	(a)Before matching (n=553)		(b)Before matching (n=553)		(c)After matching (n=172)	
	<i>B</i>	η_p^2	<i>B</i>	η_p^2	<i>B</i>	η_p^2
Emotional engagement	-.193**	.015	-.104	.007	-.012	.003
General self-concept	-.185*	.010	-.104	.005	-.034	.003
General School self-concept	-.449***	.043	-.195*	.012	-.051	.003
Math self-concept	-.523***	.034	-.170	.007	-.053	.004
Reading self-concept	-.565***	.058	-.123	.005	-.062	.003
Mastery orientation	-.213	.008	-.026	.001	.002	.002
Performance orientation	.319**	.014	.262*	.012	.257	.023
Failure expectation	.559***	.054	.309**	.021	.158	.011
Task avoidance	.369***	.053	.223*	.011	.129	.009
Performance avoidance orientation	.310**	.017	.196*	.010	.077	.005

Partial eta squared, η_p^2 = effect size. Values of .01 refers to small effects, values of .06 to medium effects and values of .14 large effects (Cohen, 1988).

*** Students with intensified support and pupils with no support were statistically different at the $p < 0.001$ level.

** Students with intensified support and pupils with no support were statistically different at the $p < 0.01$ level.

* Students with intensified support and pupils with no support were statistically different at the $p < 0.05$ level.

The models under (a) answer our first research question and results showed that receiving SE was related to negative outcomes on students' emotional engagement in school, task avoidance, failure expectations, performance avoidance orientation, general self-concept, general school self-concept, math self-concept, and reading self-concept. SE had a positive impact on performance orientation.

Our second research question was examined in models of type (b), where the fifth grade level of each outcome was controlled. Results indicated that receiving SE was related to negative outcomes on task avoidance, failure expectation, performance orientation, task avoidance orientation, and lowered general school self-concept.

Finally, to answer our third research question, we estimated the effects of SE after controlling for the fifth grade level in PSM matched groups in the third set of models (c). Receiving SE no longer predicted any changes in emotional engagement in school, goal orientations, and general or academic self-concepts.

Discussion

The purpose of this study was to analyse efficacy of business as usual part-time SE support in the Finnish education context on students' emotional engagement with school, their general and academic self-concepts, and their goal orientations using two waves of data collected from fifth to sixth graders in a larger study of school inclusion in Eastern Finland (ISKE). We used three different regression models to illuminate the variance of the outcomes when the data is analysed in different ways.

First, the results of this study highlight the advantages of using PSM when evaluating the results of SE when randomization is not possible. To answer our first research question we simply compared students who received SE and those who did not after one year and similar to previous studies, SE was related to negative outcomes. Students' emotional engagement in school, all their self-concepts, and all their negative goal orientations: task avoidance, failure expectation, and performance avoidance orientation were more negative than their peers. Of positive goal orientations, it lowered performance orientation but did not have any influence on mastery orientation. In our second regression model we controlled the fifth grade level on outcomes in the sixth grade and SE was not quite as strongly related to negative outcomes. SE did not have any effects on students' emotional engagement in school, mastery orientation, general self-concept, or math and reading self-concepts, but it still had a negative influence on general school self-concept, task avoidance, failure expectations, performance orientation, and performance avoidance orientation. Finally, when comparing PSM matched groups and controlling for the fifth grade level on sixth grade outcomes, receiving SE did not have any effects, neither positive nor negative, on students' emotional engagement in school, goal orientations, or academic self-concepts.

Second, our findings on the missing effects of SE are similar to previous studies made in other countries using either regression-based or PSM approaches. Measured effects of SE among previous studies and this study are surprisingly similar regardless of different schooling systems. The similarity of these results suggests that SE has no effect on either students' learning or the affective and motivational factors behind learning. Why isn't SE able to improve the basis for students' learning? And if SE has any positive effects at some point why do they disappear? One

explanation may be that since the criteria to receive SE are neither straightforward nor standardized especially for students with less severe learning or behavioural problems (Ballis & Heath, 2019), it can be difficult to identify the causal impacts of their support. Perhaps one of the main reasons for the lack of positive outcomes of SE is the provided SE itself: What are its goals to improve the basis of students' learning? How is SE organized and what actions are performed to achieve these goals?

Strengths and Limitations

The strength of this study is using a quasi-experimental technique, PSM, for the purpose of reducing estimating bias, which makes the groups in a comparison analysis statistically equivalent. Propensity score matching is gaining prominence in educational research since it can produce more accurate estimates of treatment effects when randomization is not feasible. We also used regression in ANCOVA to statistically adjust for group differences on the covariates when making statistical comparisons using the outcome variables.

However, this study also has its limitations. First, due to some missing values, selection bias is possible. That said, we followed the best practices recommended for handling missing values in longitudinal studies and combining estimates in a PSM setting after multiple imputations. Second, we did not have information about all the potential confounds that affect receiving SE (e.g., students' health issues or the culture of learning in the class). It is also possible that there are unknown, unobserved confounding factors that may affect the results as well. Third, the effects of SE were measured only for a period of one year and plausible long-term effects remain unclear. On the other hand, Savolainen, Timmermans & Savolainen (2018) discovered that receiving SE for a period on one year had a positive impact on boys' reading self-concept. Fourth, the data used in this study was collected more than 10 years ago, but the actual form of SE support has not changed in Finland after that. Furthermore, we did not have knowledge how long the students received SE and for what reason. Fourth, the quality and intensity of SE support was not measured in this study.

Conclusions

Students receive SE for various educational needs and at varying intensities. The findings reported in this study suggest that SE provided for students has not improved their affective or motivational basis of learning: their emotional engagement with the school, their goal orientations, or their self-concepts related to learning. Instead of examining the effects of SE support overall, future studies should identify and examine interventions that have evidence of efficacy.

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