

Parents' perceptions of secondary school students' motivation and well-being before and during the COVID-19 lockdown: the moderating role of student characteristics

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During the COVID-19 lockdown of spring 2020, Dutch children were being homeschooled. We examined how parents' (n = 470) perceptions of secondary school students' (M_{age} = 14.23 years) need satisfaction, academic motivation and well-being differed before the lockdown (assessed retrospectively) and during the lockdown. Furthermore, we examined the differential impact of the lockdown for different groups of children based on parental educational level, academic track, gender and special educational needs (SEN). Results indicated that students' motivation and well-being as perceived by parents decreased during the lockdown and this could be explained by decreases in need satisfaction. Most student characteristics did not moderate the effects of the lockdown, except for SEN. The lockdown effects were less negative for children with SEN, especially gifted children and children with behavioural disabilities, than for children without SEN. Results are discussed with regard to their practical implications after the lockdown and for future lockdowns.

Introduction

The COVID-19 pandemic and the measures to mitigate its transmission have significantly affected education of children worldwide. This was also the case in the Netherlands. In the spring of 2020, schools in the Netherlands closed their doors for eight school weeks and children

were expected to receive online education. This raised concerns regarding various aspects of children's development. Studies that focussed on educational outcomes indicated that the lockdown had a negative impact on children's achievement and increased educational inequality (Engzell, Frey and Verhagen, 2020; Schuurman et al., *in press*), as children from more highly educated parents received more support and had more resources available to them to study at home than children from less educated parents (Andrew et al., 2020; Bol, 2020; Doyle, 2020; Jæger and Blaabæk, 2020). Moreover, there were also concerns that the lockdown would not only have a negative impact on students' cognitive development, but also their social-emotional development (Coller and Webber, 2020; Netherlands Youth Institute, 2020). Therefore, this study examined how the lockdown was associated with changes in secondary school students' need satisfaction, academic motivation, as well as their with general well-being before and during the lockdown as perceived by their parents. Furthermore, to gain more insight into the differential impact of the lockdown for different groups of children, we investigated several student characteristics (parental educational level, students' track level, gender and special educational needs) as moderators of changes in need satisfaction, motivation and well-being during the lockdown. Thereby, the present study aimed to provide insight into the social-emotional consequences of the COVID-19 school closures and to establish which students are most vulnerable to the effects of the lockdown.

Motivation, well-being and need satisfaction

Self-determination theory (SDT) states that all humans have three fundamental psychological needs which are important for motivation and well-being: a need for

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autonomy, competence and relatedness. (Vansteenkiste, Ryan and Soenens, 2020). Psychological growth is promoted when the social context fulfils these needs (Ryan and Deci, 2000; Vansteenkiste and Ryan, 2013). The need for autonomy refers to the desire of students to be able to regulate their own learning and experience a sense of volition. The need for competence refers to students' need to feel effective, to be in control and to be able to learn. Students' need for relatedness refers to the desire to feel connected to others and to experience a sense of belongingness (Deci and Ryan, 1985; Ryan and Deci, 2000; Stroet, Opdenakker and Minnaert, 2013). Within the context of education, fulfilment of students' basic needs can foster their academic motivation and overall well-being. Teachers can support students' needs for autonomy, competence and relatedness through need-supportive teaching (Stroet et al., 2013). For example, to support the need for autonomy, teachers can provide choices, explain the relevance of learning tasks, incorporate students' perspectives and acknowledge negative feelings. The need for competence can be supported by providing structure through clarity, help, guidance and encouragement and by adjusting instruction and materials to students' ability levels. The need for relatedness can be supported by showing affection, care and interest and by attuning to their students' needs (Stroet et al., 2013).

Satisfaction of these needs can contribute to students' academic motivation and well-being (Stroet et al., 2013; Van Ryzin, Gravely and Roseth, 2009). Academic motivation is considered an important prerequisite for learning (Deci and Ryan, 1985). Academic motivation occurs when students want to engage in their schoolwork, and it is associated with various beneficial outcomes, such as deeper learning strategies, higher performance and higher psychological well-being (e.g., Guay et al., 2010; Soenens and Vansteenkiste, 2005; Taylor et al., 2014). Different types of academic motivation can be distinguished based on the extent to which students' underlying motives are intrinsically regulated (e.g. interest in schoolwork) to externally regulated (e.g. pressure to perform) (Ryan and Deci, 2000). The present study focusses specifically on intrinsically regulated academic motivation as this is considered to be the most adaptive type of motivation in terms of learning outcomes but also well-being (Ryan and Deci, 2020). Students' psychological well-being refers to the experience of positive affect and overall satisfaction with life (Diener and Seligman, 2004). During adolescence, students' well-being may be threatened as this can be a time of emotional instability for many students. Disruptive events may negatively impact their well-being and result in anxiety, stress or negative coping strategies (Van Ryzin et al., 2009).

COVID-19 school closures

On 16 March 2020, all schools in the Netherlands were closed and only children of parents with the so-called vital professions, working in sectors such as health care,

police and public transport, as well as very vulnerable children, could attend school. For eight weeks, almost all children were homeschooled and received online education. In a survey by the Dutch Inspectorate of Education (2020), almost all schools indicated that students spent less time on education during the lockdown than before the lockdown and about 75% of the schools estimated that students only spent half of the time on education compared with before the lockdown. Moreover, most schools only covered a part of their regular curriculum, and they had less contact with their students: in many cases only once a day or only a few times a week (Dutch Inspectorate of Education, 2020). On June 2nd, the secondary schools were allowed to partially reopen again, only allowing smaller groups of students to attend school at the same time. Only after the summer holiday, secondary schools fully reopened again. Although schools made great efforts to continue children's education online (Dutch Inspectorate of Education, 2020), many parents found homeschooling to be of poor quality with insufficient support from schools; a result that was also found in other countries (Thorell et al., 2020).

The lockdown may have affected children in many ways. Research into the effects of the lockdown indicated that the lockdown had a substantial effect on children's academic achievement (Engzell et al., 2020). There were also concerns about children's motivation and well-being (Coller and Webber, 2020; Netherlands Youth Institute, 2020; Thorell et al., 2020). Zaccoletti et al. (2020) studied the effects of the lockdown on students' academic motivation, based on a survey among Italian and Portuguese parents. They found a decrease in students' academic motivation during the lockdown period. They suggested this decline to be due to the lockdown threatening the satisfaction of students' basic psychological needs. That is, being taught at home may have affected satisfaction of children's basic psychological needs, and this may have subsequently affected their motivation and well-being. Especially, students' need for relatedness with teachers and classmates may not have been fulfilled during the lockdown. During the lockdown, students had less contact with their teachers and classmates, and all contact was online. Parents indeed reported that their children felt more isolated (Thorell et al., 2020). Additionally, as students received less frequent support from their school (Dutch Inspectorate of Education, 2020) and instructions were perceived to be of low quality (Thorell et al., 2020), it seems plausible that children may have also felt less competent at home. For autonomy, it could be that children felt more autonomous at home without the supervision of their teachers. However, depending on the way that the school organised online learning (e.g. allowing for more or less autonomy in the assignments for example) and the way that parents supported their children's learning, homeschooling may have been experienced as less autonomy-supportive (Zaccoletti et al., 2020).

Differences between students

The effects of the lockdown may not be the same for all students. Immediately after schools were closed, great concerns arose about the school closures exacerbating educational inequalities based on socio-economic status (Bol, 2020). Already after a few weeks, the first Dutch study during the lockdown showed that children from higher educated parents received more parental support and had more resources available, such as computers and a stable internet connection, to study from home compared with children from less educated parents (Bol, 2020). More highly educated parents also felt more capable of helping their children than less educated parents (Bol, 2020). Research by Doyle (2020) showed that although there were little differences between parents with different educational levels with regard to the amount of time parents engaged in homeschooling, less educated parents felt less confident.

In addition, the effects of the lockdown may also differ for students attending different academic tracks in secondary education. Bol (2020) found differences in the support parents and students received from schools, based on the academic track. In pre-university education (the highest educational track in the Netherlands), schools offered more online classes to students, more often sent structured weekly programmes, and homework was checked more often when compared to pre-vocational tracks.

Another source of differences may be students' gender. Research before the lockdown indicated gender differences in students' need satisfaction (Lietaert et al., 2015), academic motivation (Bugler, McGeown and St Clair-Thompson, 2015; Hornstra et al., 2013; Lietaert et al., 2015; Meece, Glienke and Burg, 2006) and well-being (Savoie et al., 2015). Overall, these findings suggest that girls experience higher levels of need satisfaction in school (Lietaert et al., 2015) are more motivated for their schoolwork than boys (Hornstra et al., 2013; Lietaert et al., 2015), but at the same time report lower well-being (Savoie et al., 2015). The lockdown may have different effects on these outcomes for boys and girls due to these initial differences, but also because of differences in homeschooling circumstances. That is, Bol (2020) found that parents felt more capable during the lockdown to guide their daughters than to guide their sons and they provided less support to boys. Furthermore, parents reported that girls enjoyed doing their homework more than boys.

Lastly, also the presence of special educational needs (SEN) may play a role in how children are being affected by the lockdown. The UN Convention of 2006 refers to 'those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others' (United Nations, 2006, § 1). In this study, SEN refers to

students who require special educational services due to either a learning or behavioural, or other disability. We also focussed on gifted children. Although they do not have a 'disability', their educational needs may differ from those of their classmates, due to which they require special provisions (Pfeiffer, 2018). To date, there are a few studies that have specifically looked into the effects of the lockdown on students with different types of SEN. This includes a study by Ludgate, Blackburn and Mears (2021) who found that UK parents of SEN children reported mostly positive experiences in regard to homeschooling their children during the COVID-19 lockdown. Homeschooling helped parents to understand their child and his or her specific needs better, and parents reported mental health benefits for their children. For example, one parent in their study said 'My eldest son is autistic and suffers from anxiety. He is more relaxed and is blossoming without the pressures to go socialise out of the house' (Ludgate et al., p. 5). However, in another study from the UK, parents indicated that homeschooling their children with SEN had a detrimental effect on their child's education and mental health (Greenway and Eaton-Thomas, 2020).

The present study

The present study aimed to examine how the lockdown affected secondary school students' need satisfaction and subsequent changes in their motivation and well-being as perceived by parents. In addition, the present study aimed to provide more insight into the differential effects of the lockdown for different groups of children based on parental educational level, academic track, gender and SEN. Parents rather than the students themselves were involved in this study as the lockdown and ethical concerns made it difficult to reach students themselves. Moreover, several studies indicated that reports from parents can be used as reliable sources to assess these types of outcomes (e.g. Allerhand, 2018; De Los Reyes et al., 2012; Saçkes et al., 2016). The following research questions were examined:

1. To what extent did children, according to their parents, experience less motivation and less well-being at home during the lockdown compared with at school before the lockdown? And to what extent can this be explained by changes in their need satisfaction?
2. To what extent did the changes in need satisfaction, motivation and well-being as perceived by parents differ based on parental educational level and students' academic track, gender and presence of SEN?

By answering these questions, this study aimed to increase our understanding concerning the overall effects of the lockdown on students' social-emotional development and to show which students are most vulnerable to the effects of the lockdown. This may provide educators insights into which students may need additional support after the lockdown or in case of future school closures.

Methods

Design

The present study has a retrospective pre-test–post-test design (Little et al., 2020). With this design, the data for the pre-test and post-test are collected at the same time. Respondents are asked to report on the current situation and think back to a specific point in time and report on that in retrospect. Besides practical advantages (in this case, the absence of a measurement before the lockdown), another advantage of this design is that participants have a consistent frame of reference on which they evaluate both time points. This is not always the case for traditional pre-test–post-test designs where response shift bias may occur, which means that an individual's frame of reference may change between two measurements (Little et al., 2020).

Participants and procedure

After obtaining approval for the research project by the institutional ethics committee, parents of students in two schools for secondary education were invited to participate in a survey that was administered during the lockdown (April–May 2020). An email containing information about the study and the link to the online questionnaire was sent by the school. Parents filled out the survey for only one of their children. Additionally, an invitation to participate in the online survey was shared in the networks of the researchers and through social media. Parents of 470 secondary school students (47.3% girls) participated. The average age of their children was 14.23 (SD = 1.53) years. Parents reported the highest level of education attained by either parent, and 35.5% completed vocational education, 44.7% professional education and 19.8% academic education. According to their parents, 8.2% of the children were diagnosed or suspected of being gifted, 10.2% of having a learning disorder (dyslexia or dyscalculia), 7.9% of having a behavioural disorder (e.g. autism spectrum disorder and ADHD) and 9.8% of having another diagnosis or multiple diagnoses (answers included a variety of SEN, including, for example, deafness, high sensitivity, and depression).

Instruments

Parents filled out a survey that included demographic questions and several questionnaires to assess the constructs of the present study. Parental level of education was measured by asking the highest level of education that was completed by one of the parents. SEN were measured by asking whether the child (presumably) had dyslexia, dyscalculia, ADHD, giftedness, an autism spectrum disorder, or another type of SEN.

The questionnaires for need satisfaction, motivation, and well-being were based on existing instruments (see below), which were adapted in several feedback rounds to fit the context of the present study.

Need satisfaction. To assess children's autonomy satisfaction, competence satisfaction, and relatedness satisfaction with regard to children's education at school prior to the lockdown and their education at home during the lockdown, we used shortened and adapted versions of the scales of the Basic Needs Satisfaction and Frustration Scale (BNSFS) by Chen et al. (2015). For each scale, two parallel versions were administered, one retrospectively referring to the situation before the lockdown and one referring to the situation during the lockdown.

Autonomy satisfaction was assessed with two four-item scales. An example of an item for autonomy satisfaction before the lockdown is 'School situation: My child felt that he/she had a sense of choice or freedom in the things he or she did'. The parallel item referring to the situation during the lockdown is 'Homeschooling/online education: My child feels that he/she has a sense of choice or freedom in the things he or she does'. Both autonomy subscales had sufficient internal consistency, $\alpha_{\text{school}} = 0.76$ and $\alpha_{\text{homeschooling}} = 0.74$.

Competence satisfaction was assessed with two three-item scales. An example of an item for competence satisfaction before the lockdown was 'School situation: My child felt competent that he/she could do the assignments well'. The parallel item referring to the situation during the lockdown is 'Homeschooling/online education: My child feels competent that he/she can do the assignments well'. The competence subscales had reasonable to sufficient internal consistency, $\alpha_{\text{school}} = 0.66$ and $\alpha_{\text{homeschooling}} = 0.77$.

Relatedness with classmates was assessed with two four-item scales. An example of an item before the lockdown is 'School situation: My child was involved with classmates'. The parallel item referring to the situation during the lockdown is 'Homeschooling/online education: My child is involved with classmates even though we're home now'. The internal consistency of the four-item scales was very low ($\alpha_{\text{school}} = 0.30$ and $\alpha_{\text{homeschooling}} = 0.24$), and the first two items of both scales had to be removed in order to obtain sufficient internal consistency ($\alpha_{\text{school}} = 0.63$ and $\alpha_{\text{homeschooling}} = 0.64$).

Relatedness with teachers was assessed with two six-item scales. The scales were based on the scale 'Well-being with the teacher' by Peetsma, Wagenaar, and De Kat (2001), because the aforementioned relatedness scale from the BNSFS only referred to classmates and not the teachers. All items were to be answered on a five-point Likert scale ranging from (1) not applicable to (5) totally applicable. An example of an item before the lockdown is 'School situation: When my child felt unhappy, he/she can talk about with the mentor/teacher/coach'. The parallel item referring to the situation during the lockdown was 'Homeschooling/online education: When my child

feels unhappy now, he/she can talk about with the mentor/teacher/coach'. The four-item scales had good internal consistency ($\alpha_{\text{school}} = 0.91$ and $\alpha_{\text{homeschooling}} = 0.92$).

Motivation and well-being. A one-item and two-item scale were used to assess motivation and well-being, respectively, to limit the time investment by the participants. Findings by Gogol et al. (2014) indicated that in case of clear and rather unambiguous constructs, brief measures of motivational-affective constructs are a suitable alternative to longer measures. Moreover, they found that such brief scales correlate sufficiently with results of full scales and have similar correlational patterns with external criteria.

Students' *motivation for school* was assessed with a single item referring to the situation before the lockdown (i.e. 'Was your child motivated for schoolwork?') and a single item referring to the situation during the lockdown (i.e. 'Is your child motivated for schoolwork in the new situation?'). The items were to be answered on a five-point Likert scale ranging from (1) not applicable to (5) totally applicable.

Students' *well-being at school* before the lockdown was assessed with a two-item scale ('How did your child feel at school while the school were open?' and 'How was your child doing while the schools were still open?') and a parallel scale referring to the situation during the lockdown ('How does your child feel now, in the situation of homeschooling?' and 'How is your child doing now?'). The items were to be answered on a five-point Likert scale ranging from (1) not well at all to (5) very well. The scales had sufficient internal consistency, $\alpha_{\text{school}} = 0.83$ and $\alpha_{\text{homeschooling}} = 0.76$.

Data analyses

Paired *t*-tests were conducted to examine differences in children's need satisfaction, well-being, and motivation, before and during the lockdown. Two-condition within-participant mediation analyses were conducted to examine changes in students' motivation and well-being before and during the lockdown and the extent to which these changes were mediated by changes in satisfaction of students' need for autonomy, competence, and relatedness. Using the tool MEMORE in SPSS (Montoya and Hayes, 2017), the total, direct and indirect effects of the independent variable X (repeated measurement, that is, before and during the lockdown) on a dependent variable (Y: either motivation or well-being), via multiple mediators (M: changes in need satisfaction) were estimated. The indirect effects were estimated using 95% bias-corrected bootstrap intervals with 5000 bootstrap samples (Preacher and Hayes, 2004). Next, to examine to what extent the effects of the lockdown on students' need satisfaction, motivation, and well-being differed based on parental educational level, students' academic track, gender, and presence of SEN, a repeated measures multivariate analysis (MANOVA) was

conducted. In this analysis, we examined the direct effect of time (within-subjects effect: before vs during the lockdown) on the outcome variables (students' need satisfaction, motivation and well-being), with direct effects indicating significant differences in these variables before and during the lockdown. In addition, we examined whether there were significant interactions between time and the moderator variables (between subject effects: parental educational level, students' academic track and gender), which would indicate different effects of the lockdown for student with different background characteristics. In all analyses, predictors were grand mean-centred before entering them in the model and categorical variables were entered as dummy variables.

Results

Descriptive statistics and correlations

Table 1 reports the descriptive statistics of the variables of the present study. Paired *t*-tests indicated significant differences in children's need satisfaction, well-being and motivation, before and during the lockdown according to their parents. More specifically, parents perceived that their children's need for autonomy, competence, relatedness with classmates and teachers, well-being and motivation were lower during the lockdown, compared with before the lockdown. The effect sizes range from $d = 0.16$ (small, in the case of well-being) to $d = 0.76$ (strong, in the case of relatedness with classmates). Table 2 reports the bivariate correlations between the variables of the present study.

Effects of lockdown on children's motivation and well-being and mediation by need satisfaction

Two separate two-condition mediation models were performed for the two outcome variables: motivation and well-being. The findings in Table 3 shows that there was a significant total effect of the lockdown on students' motivation (i.e., a significant difference in motivation between the measurement before and during the lockdown), indicating that parents reported their child to be more motivated for schoolwork before than during the lockdown. The findings furthermore suggest that this effect was mediated by changes in students' need satisfaction. More specifically, the relation between 'condition' (before vs. during the lockdown) and students' motivation was mediated by changes in satisfaction of the needs for autonomy and competence, which were both higher before compared with during the lockdown. Furthermore, even though parents reported the most substantial changes in satisfaction of students' need for relatedness with the teachers and with classmates during the lockdown (see Table 1), these variables did not mediate the relation between condition (before vs. during the lockdown) and motivation. The findings furthermore showed a non-significant direct effect of the lockdown on motivation, which indicates that there was full mediation.

Table 1: Descriptive statistics of study variables

	School (before the lockdown)			Home (during lockdown)			<i>t</i> -test	<i>d</i>
	N	<i>M</i>	<i>SD</i>	N	<i>M</i>	<i>SD</i>		
Autonomy satisfaction	359	2.86	0.52	359	2.74	0.56	4.31***	−0.22
Competence satisfaction	358	3.71	0.58	358	3.58	0.78	3.96***	−0.19
Relatedness (classmates)	358	3.64	0.71	358	3.04	0.87	11.90***	−0.76
Relatedness (teachers)	359	3.66	0.68	359	3.24	0.85	13.88***	−0.55
Motivation	422	3.44	0.90	422	3.25	1.01	4.10***	−0.20
Well-being	422	3.88	0.72	422	3.77	0.72	2.55*	−0.16

* $P < 0.05$ level (two-tailed); ** $P < 0.01$ level (two-tailed); *** $P < 0.001$ level (two-tailed).

Table 2: Correlations between variables of the present study

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
<i>School (before lockdown)</i>												
1. Autonomy satisfaction												
2. Competence satisfaction	0.28***											
3. Relatedness (Teachers)	0.38***	0.23***										
4. Relatedness (Classmates)	0.29***	0.26***	0.28***									
5. Motivation	0.48***	0.37***	0.22***	0.29***								
6. Well-being	0.44***	0.37***	0.27***	0.39***	0.44***							
<i>Home (during lockdown)</i>												
7. Autonomy satisfaction	0.55***	0.23***	0.18**	0.12**	0.32***	0.16**						
8. Competence satisfaction	0.06	0.61***	0.06	0.08	0.17**	0.04	0.47***					
9. Relatedness (Teachers)	0.25***	0.17**	0.63***	0.05	0.15**	0.06	0.36***	0.36***				
10. Relatedness (Classmates)	0.14**	0.15**	0.15**	0.48***	0.19***	0.15**	0.36***	0.34***	0.40***			
11. Motivation	0.20***	0.19***	0.11*	0.09	0.50***	0.10	0.52***	0.49***	0.32***	0.35***		
12. Well-being	0.04	0.25***	0.04	0.03	0.12*	0.21***	0.41***	0.58***	0.32***	0.34***	0.43***	

* $P < 0.05$ level (two-tailed). ** $P < 0.01$ level (two-tailed). *** $P < 0.001$ level (two-tailed).

Also for well-being, a significant total effect was found which indicated that parents reported that their children had a higher level of well-being before the lockdown than during the lockdown. The relation between ‘condition’ (before vs. during the lockdown) and students’ well-being was partially mediated by changes in satisfaction of their need for autonomy, competence and relatedness with classmates, which were higher before compared with during the lockdown. Relatedness with teachers did not mediate the relationship between ‘condition’ and well-being. In addition to this positive indirect effect through need satisfaction, there was also a significant negative direct effect of the lockdown on well-being. This indirect effect suggests that if students’ need satisfaction would not have declined, students would have had higher well-being at home during the lockdown than at school before the lockdown. However, this was not actually the case as there were substantial declines in need satisfaction. As this direct effect was smaller than the indirect effect, the net total effect of the lockdown was negative (Table 3).

Effects of lockdown: differences by parental educational level, students’ academic track, gender and special educational needs

To examine differences based on parental educational level and students’ gender, academic track and SEN concerning the effects of the lockdown, a repeated measures MANOVA was conducted with students’ need satisfaction, motivation and well-being being the dependent variables. The repeated measures analysis included time (i.e., before vs. during the lockdown) as a predictor to indicate differences in the outcomes variables between the two measurements. Multivariate tests indicated a main effect of time ($F(6, 224) = 14.837, P < 0.001$). Aligning with the previous findings, this indicated that the outcome variables changed over time. Multivariate tests further indicated significant interactions between time and SEN ($F(24, 890) = 1.699, P = 0.020$), time and parental educational level ($F(12, 446) = 2.242, P = 0.009$), but not for time and students’ track ($F(12, 446) = 1.572, P = 0.097$) or time and students’ gender ($F(6, 224) = 1.637, P = 0.138$). Hence, this suggests that the effects of the

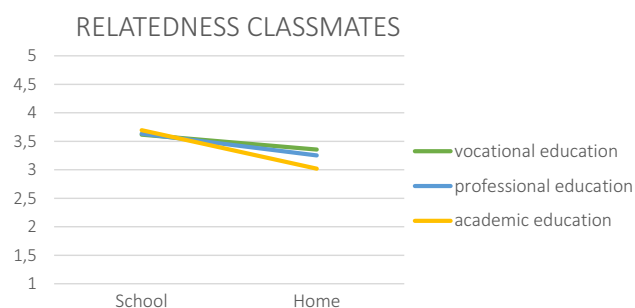
Table 3: Total, direct and indirect effects of lockdown on motivation and well-being (reported by parents)

	Motivation			Well-being		
	<i>B</i>	SE	95% CI	<i>B</i>	SE	95% CI
Total effect	0.20	0.05	0.10, 0.30	0.11	0.05	0.02, 0.21
Direct effect	0.00	0.05	−0.10, 0.10	−0.15	0.05	−0.25, −0.06
Indirect effect through						
Autonomy satisfaction	0.05	0.02	0.02, 0.10	0.05	0.02	0.02, 0.08
Competence satisfaction	0.09	0.03	0.04, 0.15	0.07	0.02	0.04, 0.12
Relatedness satisfaction (classmates)	−0.01	0.04	−0.05, 0.06	0.06	0.03	−0.06, 0.13
Relatedness satisfaction (teachers)	0.07	0.04	−0.02, 0.15	0.08	0.04	−0.01, 0.15
Total indirect	0.20	0.05	0.11, 0.29	0.26	0.05	0.18, 0.36

lockdown differed based on SEN and parental educational level, but not based on track or gender.

More specifically, the findings of the univariate tests for the interactions between time and parental educational level indicated that only for relatedness with classmates, but not for the other outcomes, the effects of the lockdown significantly differed by parental educational level ($F(2) = 6.49, P = 0.002$). That is, the lockdown had the strongest effect on relatedness with classmates for students whose parents had attended academic education (Figure 1).

Furthermore, the univariate tests for the interaction between time and SEN indicated that the effects of the lockdown differed by SEN for autonomy satisfaction ($F(4) = 2.55, P = 0.040$), competence satisfaction ($F(4) = 3.57, P = 0.008$), relatedness with teachers ($F(4) = 2.50, P = 0.044$), motivation ($F(4) = 3.25, P = 0.013$) and well-being ($F(4) = 5.40, P < 0.001$), but not relatedness with classmates ($F(4) = 1.73, P = 0.143$). Figures 2a–e graphically display the differences. Overall, the findings indicate that for children without SEN, need satisfaction, motivation, and well-being decreased during the lockdown. Yet, for children with SEN, the results were mixed. The findings for children with dyslexia or dyscalculia were mostly similar to the results for the children without SEN. Notably, for gifted children, unlike the

Figure 1: Relatedness with classmates for children with varying parental educational levels

children without SEN, need satisfaction, motivation and well-being did not significantly change or it even improved during homeschooling. As their initial levels of need satisfaction, motivation and well-being (with the exception of competence satisfaction) at school were lower compared with children without SEN, this implied that the differences between gifted children and children without SEN became smaller during the lockdown. Also for children with ASS/ADHD, their need satisfaction, motivation and well-being remained stable or improved during the lockdown. As these scores were below the scores of children without a diagnosis before the lockdown, this implies that these differences also became smaller during the lockdown. Children with another or multiple diagnoses had the lowest scores of all groups on all variables both before and during the lockdown, but for motivation and well-being, the differences became somewhat smaller.

In all, these findings suggest that the lockdown tends to attenuate the differences between children with and without SEN, as the lockdown more negatively impacted need satisfaction, motivation and well-being of children without SEN who previously scored more favourably on these outcomes.

Discussion

School closures due to the COVID-19 have presented a huge challenge to children, their parents, and their teachers. It raised major concerns about students' learning and development. Besides widening achievement gaps between children from different backgrounds, there were immediate concerns that the school closures also had a strong impact on students' motivation and well-being. The findings of the present study indeed give reason for concern. The findings show that, according to their parents, secondary school students' basic psychological needs for autonomy, competence, and relatedness with teachers and classmates were less fulfilled during homeschooling than at school. This explained students' decreased motivation and well-being. Furthermore, the findings of the present study indicate that the effects are not the same for all students. The effects of the lockdown

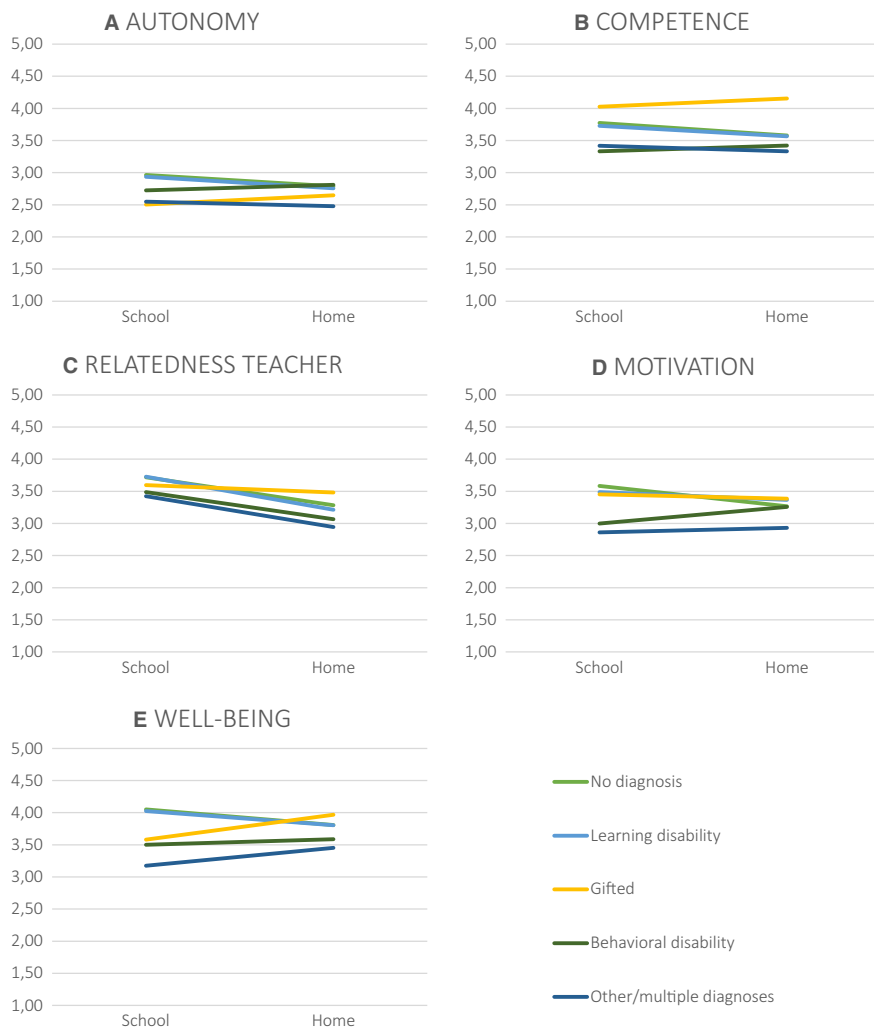


Figure 2: (a–e) Need satisfaction, motivation and well-being for children without a diagnosis, and children with special educational needs

differed especially for children with and without SEN. The findings are discussed in more detail below.

Although there have been concerns that the most vulnerable students suffer the most from the school closures (e.g. Andrew et al., 2020; Bol, 2020; Doyle, 2020), the findings of the present study suggest that this was not the case for students with SEN. That is, the lockdown actually appeared to have a more negative impact on children *without* SEN, whose needs were previously more fulfilled at school and who, in general, were more motivated and had higher well-being at school compared with the other groups. Aligning with Ludgate et al. (2021) who reported that parents experienced homeschooling their SEN rather positively, the present study's findings indicated that for students with different types of SEN, especially gifted children and children with behavioural disabilities, the impact of the lockdown was less negative and in some cases their parents even reported more positive outcomes at home compared with school. The finding that children with behavioural disorders (ADHD and autism) were also more motivated at home than at school according to their parents suggests that homeschooling attenuated pre-

existing differences between children with and without special needs. Especially for gifted students, parents reported higher well-being when learning at home, compared with school. This might suggest that for some children with SEN, the home environment may be more conducive for their development and well-being than the school context, which may not always fit their specific educational needs.

Contrary to our expectations, we did not find any differences in students' need satisfaction, motivation and well-being based on track, gender and hardly any differences based on parental educational level. Some first studies concerning the effects of the school closures (e.g. Andrew et al., 2020; Bol, 2020; Doyle, 2020) indicated that children from less educated families would be more vulnerable to the effects of the school closures. While this has been confirmed for educational achievement (Engzell et al., 2020; Schuurman et al., *in press*), the findings of this study suggest that the effects of the school closures on need satisfaction, motivation and well-being were less dependent on parental educational level. This could be because differences in educational levels may especially

cause differences in the extent to which parents can offer cognitive support, rather than differences in socio-emotional support. Another explanation for the difference in findings could be that these prior studies mostly focussed on younger children in primary school, who may be more dependent on the resources, support, and motivational encouragement of their families, compared with children in secondary school. Alternatively, many of the investigated schools provided children in need with adequate hardware (e.g. laptops), and additional resources to study, and the most vulnerable children were still allowed to go school. This may have lessened the socio-emotional impact of the school closures on the children who were most at risk.

Our findings indicate that especially changes in autonomy and competence satisfaction explained the decrease in students' motivation and well-being during the lockdown. Research has indicated the support of students' need for autonomy and competence has the most direct impact on students' outcomes. Although supporting students' need for relatedness is also important, it plays a more distal role in facilitating motivation (Ryan and Deci, 2020). Moreover, we only assessed how relatedness with teachers and classmates changed during the lockdown. These sources of relatedness are situated at school. Yet at home, other people like parents or siblings may fulfil students' need for relatedness and thereby compensate for the decrease in relatedness with teachers and classmates. The fulfilment of students' psychological needs for competence, autonomy and relatedness during homeschooling also likely depends on parents' behaviours (see, for example, Grolnick, 2009) and the type of homeschooling environment they provide for their children (Bell, Kaplan and Thurman, 2016).

Limitations

When interpreting the results of this study, some limitations must be kept in mind. First, we measured children's need satisfaction, motivation and well-being through the perceptions of their parents. Although parents can be accurate source to assess these constructs (Allerhand, 2018; De Los Reyes et al., 2012; Saçkes et al., 2016), self-reports of students might have given a more accurate picture of students' beliefs and including both parent and children's self-reports would have yielded a more complete picture of children's need satisfaction, motivation, and well-being.

Second, motivation and well-being were assessed with brief one- or two-item scales. Gogol et al. (2014) compared psychometric properties of single-item measures for motivational-affective constructs with corresponding long scales. Although longer scales are more reliable, one-item measures showed substantial correlations with long scales and correlational patterns with educational student characteristics, such as school satisfaction, gender, academic track, and socio-economic status, were comparable to

those obtained with the corresponding long scales. Moreover, we assessed motivation as a unidimensional construct, even though previous research has distinguished between different types of motivation (Ryan and Deci, 2000). Since the present study relied on parental perceptions of motivation and because parents may not be aware of the exact types of motives underlying their children's motivation, a more general measure of motivation was deemed more suitable.

Third, although our sample was rather heterogeneous in terms of parents' educational level, our sample might not be representative of the entire Dutch parent population. The parents who were willing and able to fill out a survey were most likely not the most stressed or most vulnerable parents. It may be that the effects of the lockdown are even more worrisome among children from parents who did not participate.

Fourth, we did not take into account the resources and circumstances at home such as parental stress, perceived competence of parents to guide homeschooling, the availability of devices or other resources, or the number of siblings with whom devices and space must be shared. Research has shown that differences in such resources and circumstances contribute to educational inequalities during the lockdown, as children from more highly educated parents received more support and had more resources available to them to study at home than children from less educated parents (Bol, 2020; Doyle, 2020).

Lastly, parents reported on their children's need satisfaction, motivation and well-being in school, retrospectively. While we refer to 'effects' of the lockdown, this design does not fully allow for drawing causal conclusions. As such, we cannot fully exclude the possibility that, although unlikely, the declines in these variables were due to other factors than the lockdown, or the possibility that parents have an idealised memory of the situation before the lockdown.

Implications for practice

Despite these limitations, results of this study may suggest relevant practical implications. The findings are reason for concern. The school closures in the spring of 2020 have impacted many children, and the findings suggest that they led to lower motivation and well-being. During the winter of 2020-2021, a second national lockdown was ongoing in The Netherlands as well as in many other countries, and although national lockdowns have not occurred since then, many classes were temporarily sent home due to quarantines. The cumulative effects of multiple lockdowns and other educational disruptions could have substantial consequences for students' motivation and well-being. In case of future lockdowns or educational disruptions, teachers may enhance students' motivation and well-being by applying online teaching

practices that specifically aim to satisfy students' psychological needs for competence, autonomy, and relatedness (Deci and Ryan, 1985; Ryan and Deci, 2000) and may support parents to do so as well. For instance, they could offer students choices in their schoolwork and the learning process or introduce online collaborative learning methods. Teachers can also establish rules for online attendance and learning, give students tasks with clear goals, guidelines and deadlines and give students opportunities for appropriate feedback. Hereby, a learning environment that resembles the school structure can be created. Support for parents can be created by sending them proper and concrete information and by offering opportunities for consultation.

The lockdown had the strongest impact on students' relatedness with teachers and classmates compared with the other variables. Although the decline in these aspects of relatedness was not found to directly impact students' well-being and motivation during the lockdown, prior research has shown the importance of experiencing relatedness with teachers and classmates (e.g. Niemiec and Ryan, 2009). Hence, it is important for teachers to maintain regular contact with their students and to facilitate contact between classmates. Besides online collaborative learning, teachers can stimulate students to work cooperatively online on their school tasks or get together physically with a classmate if possible (in accordance with COVID-19 guidelines). Furthermore, social online activities can be organised, like quizzes or games, and teachers could plan one-on-one meetings with their students to check on their motivation and well-being.

The finding that for students with different types of SEN the impact of the lockdown was less negative and in some cases even positive shows that the school context may not always fit these students' specific educational needs. Especially gifted students felt somewhat better while learning at home and felt more competent. Teachers can discuss with students which elements of the home environment were most helpful for them. Maybe some of these elements can also be realised in the school context. Partial homeschooling or a hybrid form of offline and online education may also have benefits for these students.

Finally, the lockdown impacted not only children's achievement, but (on average) also their motivation and well-being. It is unknown whether students fully recovered from this after reopening the schools. The findings suggest that teachers need to be aware not only of the potential learning losses, but also the social-emotional effects the lockdown may have had on many students. After COVID-19 and the complete and permanent reopening of the schools, the focus should not only be on having students catch up academically. Focussing on restoring students' motivation and well-being by

providing need-support may be more important than ever and needs to be a priority as well.

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Declarations of interest

None.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author, LH. The data are not publicly available as they could compromise the privacy of research participants.

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