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**Conference Paper**

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# **The impact of Covid-19 related school policies on students in their final high school years**

Malte Sandner, Silke Anger, Sarah Bernhard, Hans Dietrich, Alexander Patzina\*

\*All Institute for Employment Research (IAB), Nuremberg

## **Abstract**

This paper sheds light on the impact of the COVID-19 policy measures on a wide set of career expectations, occupational beliefs, and well-being of high-school students in their final grades. For this purpose, we use a unique panel data collection, which surveyed around 6,000 students in their final or pre-final high school year in Germany. We have for the same students information about outcomes in three waves, before the outbreak of the Covid-19 pandemic (fall 2019), close after (spring 2020), and several months after (fall 2020), when the COVID-19 incidences were high again. The second survey wave includes students who responded to the survey before as well as students who participated after the school closures. We exploit this variation to apply a difference-in-differences design using students who answered the survey before the school closures as control group. We find only small effects of the pandemic on career decisions and occupational beliefs in the short and the long run. However, life satisfaction and mental-well-being strongly decreases in the ongoing pandemic.

**Keywords:** Covid-19, High School Students, Mental Health, Expectations, career planning

**JEL classification:** I24, I14, I31

## **1. Introduction**

All over the world, school closures presented a major policy tool to reduce the expansion of the Covid-19 pandemic in spring 2020. At the pike of the closures, 1.5 Billion students were not able go to school (UNESCO, 2020). Among these students, many attended final grades and aimed for a degree in summer 2020. Students in their final years may be particularly affected by school closures, as previous research has shown that the final years constitute an important time for students to form their expectations about their future career, e.g. whether to attend university or which field of study to choose. Additionally, students in their final years miss school hours that they cannot make up within the limited remaining time, and they must perform in their final exams, where insecurity and lock down may reduce effort and success. If school closures and other pandemic measures decrease performance and increase insecurity in occupational orientation, reduce career expectations, and impair occupational decisions of students in their final grades, the lockdown will add substantial costs to the overall costs of the pandemic due to the standstill of the economy. Policies to slow down the spread of the Covid-19-pandemic, which may also be relevant to encounter potential future pandemics, should account for these costs.

This paper attempts to shed light on the impact of the Covid-19 pandemic and Covid-19 related policies on high-school students in their final grades. In a first step, we study how a wide set of students' career expectations and occupational beliefs as well as mental health and well-being of students changed directly before and right after the outbreak of the Covid-19 pandemic in Spring 2020. In a second step, we investigate the longer-term effects of Covid-19 on these outcomes in the course of the ongoing pandemic. In particular, we elicit expected final grades, whether students plan to attend university or to start a vocational training, the likely field of study, and the beliefs about their future choice, labour market expectations, life satisfaction, and mental health. We conduct our analysis separately for socioeconomic groups, student ability, and gender to explore whether the pandemic has exacerbated existing inequalities.

For this purpose, we use a unique data collection, which surveyed around 6,000 students from two cohorts – graduating summer 2020 and graduating summer 2021 – in three waves. Wave 1 took place in fall 2019, wave 2 in March/April 2020 and wave 3 in November/December 2020. Thus, we have for the same students from two cohorts information about outcomes before and after the outbreak of the Covid-19 pandemic and eight to nine months after the outbreak. The last survey took place, when a second wave of Covid-19 cases hit Germany.

This rich data gives us the possibility to apply several empirical approaches to identify the effects of Covid-19 related measures on students' outcomes. First, the longitudinal design of our survey gives us the possibility to apply a difference-in-differences design to study the short-term effect of school closures using students who answered the survey before the school closures as control group. Second, we use first-difference methods within students between spring 2020 (wave 2) and autumn 2020 (wave 3) and we show differences between students in the cohort graduating in 2020 surveyed in autumn 2019 (wave 1) and students in the cohort graduating in 2021 surveyed in autumn 2020 (wave 3).

We find only small effects of the pandemic on career decisions and occupational beliefs in the short and the long run. However, we find that while in the short run students' life satisfaction and mental-well-being slightly increased, these outcomes strongly decreased in the course of the ongoing pandemic. The effect on life satisfaction and mental-well-being concentrates on students in the cohort graduating in 2021 who are in school in all three survey waves. In contrast, life satisfaction and mental-well-being do not decrease for students who graduated in summer 2020 and left school. Additionally, we find that of the students in the graduating cohort 2020 who did not fulfill their career plans up to 70% state that Covid-19 is partly and 25% strongly responsible for a change of their plans.

To our knowledge, this is the first study to shed light on the effects of COVID-19 on students who graduate from high school during the Covid-19 Pandemic. Looking at this specific group is important because in contrast to students in lower grades these students have to make long lasting decisions at a time of high insecurity. For example, students may decide for less gap years as the possibility to spend a year abroad is reduced and more costly. On the other hand, students may do more gap years as universities just offer online courses, which may reduce the attractiveness of a university study. Therefore, the magnitude and the direction how the pandemic affects decisions, expectations, and well-being of high school students is an open empirical question.

In more general, we contribute to a literature, which looked at the impact of Covid-19 related school closures on education outcomes of (e.g. Aucejo et al 2020; Grewenig et al. 2020; Anger et al. 2020). While these papers show negative effects on student effort, performance and equality, our paper analyses how Covid-19 measures affect students' future human capital decisions (such as continuing with their education, choice of major, etc.) and their well-being. Furthermore, existing studies base their results on questionnaire answers by parents and questionnaires, which were conducted only after the school closures. In contrast, in our study

students answer the questionnaires and we have observations from the same students before, shortly after and long after the pandemic started.

We also contribute to the literature how Covid-19 affects well-being and life satisfaction. In general, this literature demonstrates that life satisfaction and mental health of the people decrease the longer the Covid-19 measures continue (Shanahan et al. 2020; Giuntella et al. 2020 for young adolescents and Hübener et al. 2020 for mothers). Our results show that high school students experience a strong drop in mental health and in life satisfaction. However, as this decrease is only concentrated on high school students, whereas high school graduates are less affected, our results also give hints about protecting factors for a decrease in life satisfaction and mental health. The results suggest that a change in life (transition from school to university) has a preventing effect. Finally, our results are important because few studies, which investigate the effects of Covid-19 on students, have the possibility to collect longitudinal data reaching in a new infection wave.

In more general, our study gives new insights about the stability of high school students' career expectations and occupational beliefs and their determinants. By showing that students' expectations are surprisingly unaffected by the Covid-Crisis despite a decrease in students' well-being, we contribute to a large literature on the formation of student expectations. Our results show that short-term life satisfaction and mental health are not major drivers of expectation adaption.

## **2. Covid-19 measure related to students in final grade in Germany**

In Germany, the educational system comprises three tracks of secondary school: the lower and the intermediate track prepare students for a vocational training, whereas the highest track results - after successful completion - in the high school diploma (Abitur), which qualifies students to enter university. This academic track continues until grade 12 and ends with final examinations. These exams usually take place in March, and students receive the results of the exams in May, before they enrol at university or start a vocational training in fall. As a pandemic prevention measure, all schools were closed within a few days after March 13th, 2020 in Germany.

On 23 April 2020, Germany started reopening schools, albeit with huge regional and institutional variations. Since educational policy is the responsibility of the federal states, there was no uniform school closing policy for Germany. Furthermore, local developments of the

pandemic affected the closing of whole schools, grades, or single classes. After the summer break schools in most federal states started on a regular basis, and then went gradually back to limited schooling, first by allowing only alternating parts of the classes to enter school and from November on with a complete switch to homeschooling.

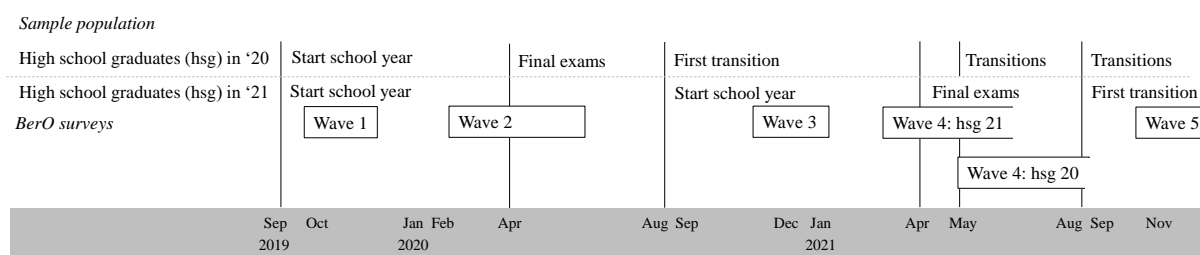
### 3. Data

The baseline survey (Q\_0) took place as a Paper And Pencil Interview (PAPI) in schools, where students filled out the questionnaire during class between September and November 2019, instructed by a professional data collection team. Overall, around 9,000 students participated in Q\_0.

The data of our analyses are based on two follow-ups, which took place outside the school context as Computer-Assisted Web or Telephone Interview (CAWI/CATI). Students were interviewed from February to March 2020 (Q\_1) and from October to December 2020 (Q\_2). The questionnaires include information about career expectations, occupational beliefs, wellbeing and mental health, personality measures, school performance, and further information to capture the primary and secondary outcomes described below.

Furthermore, we enrich our data collection with administrative data of students and parents who gave consent to data linkage. The administrative data include information about students' meetings with the career counselors of the employment agencies and labor market outcomes such as employment, wages, and occupation.

Figure 1 shows the timeline and Table 1 shows the summary statistics.



**Figure 1: Timeline**

#### 4. Empirical Framework

For analyzing the short-term effects of school closures, we estimate a difference-in-differences estimation shown in equation 1:

$$Y_{i,t} = \beta_1 SC_i + \beta_2 W_{i,t} + \beta_3 (SC_i W_{i,t}) + \varepsilon_{i,t} \quad (\text{Equation 1})$$

where  $Y_{i,t}$  is the outcome of interest of individual  $i$  at wave  $t$ , i.e. occupation plans, believes, happiness of student.  $SC_i$  (**S**chool **C**losure) is a binary variable that takes the value 1 for students who answered t1 in March 2020 after the school closure and 0 for students who answered t1 in March 2020 before the school closure,  $\beta_1$  captures the difference between those individuals.  $W_{i,t}$  (**W**ave) contains a wave dummy for t1 interviews, where  $\beta_2$  captures the corresponding coefficient.  $\varepsilon_{i,t}$  is a standard error term. Finally,  $SC_i W_{i,t}$  is the interaction term of  $SC_i$  and  $W_{i,t}$  that takes the value 1 for student in Wave t1 who answered the questionnaire after the school closure. The coefficients  $\beta_3$  then measures the divergence in the outcome between those who answered after the school closure, i.e. treatment group, and those who answered pre-event/policy, i.e. control group, which indicates the Average Treatment effect of the Treated (ATT). This is the effect of interest, i.e. the school closure effect. This approach captures the tread that students who respond after the school closures show different characteristics as students who answered before the school closures.

For investigating long-term effects of the Covid-Pandemic, we observe changes within the same students over time and we compare students in the two cohorts in their graduation year.

$$Y_{it,} = \beta_1 W_t + X_i + \varepsilon_{i,t} \quad (\text{Equation 2})$$

In equations, 2, similar to equation 1,  $Y_{i,t}$  is the outcome of interest. We estimate equation 2 separately for the graduating cohort 2020 and 2021 using wave 2 and 3. Additionally, we estimate equation 2 with pooling graduating cohort 2021 and 2020 but only including graduating cohort 2020 at wave 1 and cohort 2021 at wave 3. We are aware that besides Covid-19 measures age effects may partly explain changes in  $Y$  in our identification explained in equation 2 and 3. Additionally, besides Covid-19 unobservable characteristics, cohort effects

and the interview mode may explain changes in Y in equation 4. However, we are sure that we can get a clear picture on what is happening due to the different approaches. Table 1 reports the sample characteristics in the different waves.

	Fall 2019	Spring 2020		Fall 2020
	October/November	pre school closure	post school closure	October/November
<i>Male</i>	0.387	0.318	0.398	0.336
<i>1st/2nd generation</i>	0.227	0.219	0.215	0.204
<i>Age</i>	17.52	17.87	17.91	18.47
<i>Parent with university education</i>	0.53	0.548	0.521	0.529
<i>Pre-graduation class</i>	0.548	0.514	0.56	0.525
<i>Observations</i>	7,591	3,566	2,027	5,339

**Table 1: Sample characteristics**

## 5. Results

### 5.1. Effects on Effort and Worries during school closures

We start our analysis with a description about students' effort and worries during the school closures. The results in Table 2 show that a large share of students (37%) spent less than two hours a day on school related activities. The next two rows demonstrate that 45% of the high school students are worried about their school performance and 28% are worried about their future career. Additionally, in average they believed that after 7.6 months life would get back to normal again after the pandemic. Overall, these figures suggest that the pandemic influenced the effort of the students, worried a large share of the students and the thought the Covid-19 pandemic is not a short-term event. Therefore, we would also expect that the career plans and expectations may be affected by the school closures.



	Observations	All	Pre- graduation class	Male	Parent with university education	school good	received material
<i>Less than 2 hours school activities per day</i>	1,542	0.379	0.331	0.472	0.394	0.328	0.512
<i>Concerns about school performance</i>	1,982	0.443	0.452	0.371	0.455	0.408	0.443
<i>Worried about future career</i>	1,985	0.279	0.251	0.22	0.294	0.25	0.268
<i>Expected End of Covid (months)</i>	1,847	6.955	6.857	7.19	6.667	7.024	6.822

**Table 2: Students' attitudes and behaviour during school closures in spring 2020**

## **5.2. Short term effects of school closures on beliefs, school outcomes, career choice, health, and well-being**

Table 3 presents the short-term effects of the school closures on several outcomes. Overall, we find only small effects of the school closures on expectations and career plans. The only significant effect occurs for the expected GPA for which students expects are worse GPA after the school closures. Table 4 present the effects of the school closures on short-term life satisfaction, self-reported health, and mental well-being. The results show that while the school closures have no effect on life satisfaction, they improved mental health and self-reported health. The effects have a meaningful size with 0.24 SD for health and 0.11 for mental health.

	Mean Wave 1	Mean Wave 2 pre School Closures	Mean Wave 2 post School Closures	DID in % or SE	p-value DID
<b><i>Educational Paths</i></b>					
<i>How sure what to do after degree (1-5)</i>	3.51	3.74	3.62	-0.04	0.13
<i>Subject Health or Social (1-100)</i>	33.36	34.43	34.79	0.68	0.29
<i>Important for Occupation Choice: Secure Job (1-5)</i>	4.32	4.21	4.17	0.01	0.64
<i>Important for Occupation Choice: Healthy Enviroment (1-5)</i>	4.55	4.44	4.41	-0.04	0.17
<i>Important for Occupation Choice: Help Others (1-5)</i>	3.64	3.61	3.58	-0.01	0.61
<i>Expected GPA (1-6)</i>	2.20	2.20	2.27	0.06	0.00
<b><i>Believes about Studying (0-10)</i></b>					
<i>Completing degree</i>	9.45	9.24	9.15	0.01	0.91
<i>Very good final grade</i>	7.46	7.40	7.35	0.01	0.77
<i>Enough money during studies</i>	6.63	6.75	6.87	0.03	0.64
<i>Living near parents</i>	6.06	6.34	6.23	-0.09	0.18
<i>Financial support by parents</i>	9.10	9.00	9.07	0.08	0.18
<i>Heavy financial burden on oneself and family due to the cost of studying</i>	4.41	4.69	4.62	0.16	0.03
<i>Years until graduation</i>	4.60	4.50	4.42	-0.01	0.70
<i>If I attend university at the age of 30, I would...</i>					
...work full time.	8.60	8.60	8.63	-0.02	0.80
...have flexible working hours.	6.61	6.83	6.88	0.04	0.62
...have fun at work.	8.90	8.66	8.65	0.00	0.94
...have a socially respected job.	8.60	8.54	8.43	-0.04	0.51
...have good career advancement opportunities.	8.37	8.27	8.19	0.01	0.92
...perform predominantly physical tasks.	4.55	4.67	4.80	0.10	0.11
...have been frequently unemployed.	2.28	2.70	2.75	0.01	0.88
...have a steady life partner.	7.71	7.59	7.71	0.09	0.12
...have children.	6.24	6.24	6.25	0.04	0.49
...have enough money for family and hobbies.	8.60	8.17	8.19	-0.02	0.74
<i>Gross annual income at the age of 30</i>	52310.77	53251.13	53590.49	104.91	0.89
<i>Gross annual income at the age of 30 (log)</i>	10.82	10.82	10.82	-0.01	0.62
<i>Observations</i>	5,287	3,289	1,998		

**Table 3: Short-term effects on beliefs, school outcomes and career choice**

	Mean Wave 1	Mean Wave 2 pre School Closures	Mean Wave 2 post School Closures	DID in % or SE	p-value DID
<i>Overall Life Satisfaction (0-10)</i>	7.38	7.03	7.11	-0.016	0.556
<i>Happy with School (1-5)</i>	3.26	3.16	3.19	0.059	0.018
<i>Overall Health (1-5)</i>	3.87	3.62	3.88	0.241	0.000
<i>Good Health (0 vs.1)</i>	0.87	0.83	0.90	0.067	0.000

				Mean Diff. pre and post school closures	p_value
<i>HSCL (1-5)</i>		1.86	1.74	-0.116	0.000
<i>HSCL above threshold (0 vs. 1)</i>		0.42	0.34	-0.040	0.001
<i>Observations</i>	5,287	3,289	1,998		

**Table 4: Short-term effects on well-being**

After showing these surprising short-term results that the school closures had no negative effects on students' expectations and well-being, we turn to the long term effects of the Covid-19 pandemic.

### **5.3. Long term effects of the pandemic on beliefs, school outcomes, career choice, health, and well-being**

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#### ***Graduation Cohort 2021***

Table 5 shows the comparison between the graduation cohorts 2020 and 2021 at the beginning of their respective graduation year. The results show only small differences between the cohorts for beliefs about their study and expected career decisions. However, the graduation cohort 2021 shows worse life satisfaction, mental-well-being and self-rated health than the graduation cohort 2020 at the same time one year earlier.

	Wave 1 Graduate Cohort 2020	Wave 3 Graduate Cohort 2021	DIFF in % or SE	p-value DIFF
<b>Education Decision</b>				
<i>Education after high school diploma</i>	3.634	3.652	0.027	0.295
<i>Gap year yes/no</i>	5.295	5.485	0.073	0.003
<i>University or technical college studies</i>	61.552	62.586	0.457	0.552
<i>Expected GPA (1-6)</i>	2.292	2.181	-0.185	0.000
<b>Believes about Studying (0-10)</b>				
<i>Enjoying studying</i>	7.112	7.166	0.047	0.320
<i>Completing degree</i>	8.418	8.223	-0.185	0.000
<i>Very good final grade</i>	6.287	6.463	0.197	0.000
<i>High learning effort</i>	7.633	7.751	0.108	0.023
<i>Developing personally</i>	8.552	8.709	0.157	0.000
<i>Making friends for life</i>	6.949	7.070	0.095	0.085
<i>Enough money during studies</i>	5.602	5.961	0.337	0.000
<i>Living near parents</i>	5.132	5.274	0.174	0.012
<i>Contact with current friends</i>	7.566	7.309	-0.241	0.000
<i>Parents are happy with choice of studies</i>	8.349	8.401	0.075	0.165
<i>Financial support by parents</i>	8.062	8.108	0.008	0.895
<i>Heavy financial burden on family</i>	3.391	3.647	0.235	0.001
<b>Well-Being</b>				
<i>Overall Life Satisfaction (0-10)</i>	7.327	6.594	-0.368	0.000
<i>Happy with School (1-5)</i>	3.227	3.046	-0.195	0.000
<i>Overall Health (1-5)</i>	3.845	3.630	-0.200	0.000
<i>Good Health (0 vs.1)</i>	0.872	0.832	-0.039	0.000
<i>Observations</i>	3,552	3,038		

**Table 5: Changes between graduation cohorts 2020 and 2021 in autumn 2019 and 2020**

Table 6 shows the comparison within the graduation cohorts 2021 between spring and autumn 2020. These results are in line with the results in Table 5. Also within the graduation cohort 2021, life satisfaction, mental well-being and self-rated health strongly declined between spring 2020 and autumn 2020. In contrast, the beliefs about their study and expected career decisions change only marginally.

	Wave 2 Graduate Cohort 2020	Wave 3 Graduate Cohort 2020	DIFF in % or SE	p-value DIFF
<b>Education Decision</b>				
<i>Education after high school diploma</i>	3.562	3.663	0.094	0.000
<i>Gap year yes/no</i>	5.224	5.475	0.081	0.000
<i>Expected GPA (1-6)</i>	2.178	2.166	-0.016	0.204
<b>Expectations Study (0-10)</b>				
<i>Enjoying studying</i>	6.987	7.202	0.203	0.000
<i>Completing degree</i>	8.200	8.244	0.039	0.283
<i>Very good final grade</i>	6.373	6.486	0.104	0.001
<i>High learning effort</i>	7.586	7.767	0.173	0.000
<i>Developing personally</i>	8.566	8.718	0.148	0.000
<i>Making friends for life</i>	7.026	7.081	0.053	0.180
<i>Enough money during studies</i>	5.834	5.982	0.145	0.001
<i>Living near parents</i>	5.224	5.266	0.043	0.354
<i>Contact with current friends</i>	7.210	7.275	0.065	0.151
<i>Parents are happy with choice of studies</i>	8.423	8.401	-0.021	0.616
<i>Financial support by parents</i>	8.026	8.110	0.082	0.051
<i>Heavy financial burden on oneself and family</i>	3.686	3.654	-0.031	0.528
<b>Well-Being</b>				
<i>Overall Life Satisfaction (0-10)</i>	7.082	6.573	-0.251	0.000
<i>Happy with School (1-5)</i>	3.189	3.057	-0.146	0.000
<i>Overall Health (1-5)</i>	3.719	3.623	-0.089	0.000
<i>Good Health (0 vs.1)</i>	0.859	0.829		0.000
<i>HSCL (1-5)</i>	1.791	1.974	0.290	0.000
<i>HSCL above threshold (0 vs. 1)</i>	0.369	0.495	0.126	0.000
<i>Observations</i>	2,806	2,806		

**Table 6: Changes within graduation cohorts 2021 between spring and autumn 2020**

### **Graduation Cohort 2020**

We now turn to the Graduation Cohort 2020. As this cohort has already graduated in autumn 2020, we don't report study expectations. Instead, we present the results for mental health, life satisfaction and self-reported health (Table 7, Panel A). In addition, we report for those students who have not fulfilled their plan after graduation how strong Covid in their own perception influenced their decision.

	Wave 2 Graduate Cohort 2020	Wave 3 Graduate Cohort 2020	DIFF in % or SE	p-value DIFF
<b>Panel A</b>				
<i>Overall Life Satisfaction (0-10)</i>	7.023	6.679	-0.163	0.000
<i>Overall Health (1-5)</i>	3.719	3.717	0.025	0.323
<i>Good Health (0 vs.1)</i>	0.863	0.847	-0.008	0.414
<i>HSCL (1-5)</i>	1.857	1.841	-0.045	0.020
<i>HSCL above threshold (0 vs. 1)</i>	0.416	0.415	-0.011	0.345
<i>Observations</i>	2,654	2,654		
<b>Panel B</b>				
<i>Plan at W2</i>	Share in W2	Share which have not conducted plan in W3	Covid played role in W3	Covid played strong role in W3
<i>University or technical college &gt;70%</i>	0.548	0.434	0.754	0.234
<i>Vocational training &gt;70%</i>	0.219	0.683	0.630	0.152
<i>Gap 70%</i>	0.349	0.338	0.761	0.301
<i>Observations</i>	4,320			

**Table 7: Changes within graduation cohorts 2020 between spring and autumn 2020**

Table 7, Panel A shows the comparison within the graduation cohorts 2020 between spring and autumn 2020. The results show that self-rated health, mental health and life satisfaction decrease much less than for the cohort which is still in school. Self-rated health does not even decline significantly. Panel B reports that of those students who have not executed their plans between 60% and 75% stated that the pandemic played at least a small role and 15% to 30% stated that the pandemic played a strong role.

## 6. Discussion and Conclusion

This paper shed light on the question whether and in which way the Covid-19 pandemic affected students' career expectations and beliefs as well as mental health and well-being measures. We make use of a unique data collection, which surveyed around 6,000 students from two cohorts – graduating summer 2020 and graduating summer 2021 – in three waves. We find that while in the short run students' life satisfaction and mental-well-being slightly increased, these outcomes strongly decreased in the longer run. The effect on life satisfaction and mental-well-being concentrates on students in the cohort graduating in 2021 who are in school in all three waves. In contrast, life satisfaction and mental-well-being do not decrease for students who graduated in summer 2020. Additionally, we find that many students in the graduating cohort 2020 who did not fulfill their plans made attributed their change of plans to the Covid-19 pandemic.

The finding that the pandemic affects well-being and life satisfaction stronger than expectations is surprising, as it suggest that current well-being only weakly affects expectations and career decisions. The finding that the well-being of high school students declines more than the well-being of those students who graduated is highly relevant for identifying protective factors against in a well-being decline due to the pandemic.

## Literature

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