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The influence of the corona pandemic and the associated distance teaching on the health behavior of students at HAW-Hamburg, with a special focus on mental health - Inclusion of the project SuSy

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Master thesis

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Abbreviations

BAuA	Bundesanstalt für Arbeitsschutz und Arbeitsmedizin
BZgA	Bundeszentrale für gesundheitliche Aufklärung
CoV	Coronavirus
COVID-19	Coronavirus Disease 2019
DGUV	Deutsche Gesetzliche Unfallversicherung
MERS	Middle East Respiratory Syndrome
RKI	Robert Koch Institut
SARS	Severe Acute Respiratory Syndrome
WHO	World Health Organisation

Abstract

Background

COVID-19 is an infectious disease caused by SARS-CoV-2. It is primarily transmitted via droplets and can be associated with a wide range of symptoms. The disease spread from the Chinese megacity of Wuhan starting in December 2019, presumably after the virus jumped from an animal to a human at a pet market there. The World Health Organization (WHO) declared a pandemic as of March 2020. In the first phase of the coronavirus, which began around December 2019, China was the most affected, then other "hotspots" could be found in Europe, the United States of America and South America. In the summer of 2020, the incidence dropped noticeably again for the first time, whereupon the second phase began in September 2020 with a renewed increase in the number of cases. Due to this corona situation, university and college events have been taking place online for almost three semesters now, but studying under corona conditions poses many problems and challenges for students.

Methods

To answer the main question, a questionnaire was created, which was analyzed with the help of SPSS. Data from the surveillance system "SuSy" was also available, which was also analyzed with the help of SPSS. The specially developed questionnaire was completed online in German by the students of HAW Hamburg/Bergedorf; if required, an English version of the questionnaire was also available. The study was conducted in the form of a mainly quantitative survey, although qualitative questions were specifically added in order to obtain more detailed information on certain questions.

Results

The mental health of students during the pandemic was rated significantly worse than before the corona pandemic, with 25.5% of students rating their mental health as very good before the pandemic and only 3.2% during the pandemic. Likewise, a large number of students reported feeling mentally upset during the pandemic period (69.4%), feeling stressed (70.4%), and finding the online lectures stressful (72.4%). The health behavior of the students with regard to alcohol and cigarette consumption also changed, with 9.2% of the students having started smoking and 19.4% smoking significantly more.

Alcohol consumption showed similar results, with 5.1% of the students having started to consume alcohol and 10.2% reporting drinking significantly more alcohol than before the pandemic.

Discussion

The results support evidence that the corona pandemic and associated distance are associated with poorer mental health and may influence student health behaviors. It should be noted that bias may have influenced the results. The interviews revealed that many factors can have an impact on students' mental health, which can also result from distance learning, for example, a high stress level resulting from distance learning is a factor that can negatively impact students' mental health.

Further research is needed in this area and a re-survey would be useful to determine a long-term effect. In particular, long-term research is needed to understand the relationships between different factors and to draw conclusions about the causes.

For better readability, the masculine form has been chosen in the spelling in the present work

1. Introduction

It has been more than a year since it was reported in the German media: A "mysterious lung disease" had emerged in China, the report from early January 2020 said, which was due to a previously unknown type of coronavirus. According to reports, 60 people in the province of Hubei should have fallen ill.

That this novel coronavirus, more precisely called SARS-CoV-2, would still influence the everyday life of most people and almost every political decision in 2021, probably no one in Germany had expected in the winter of 2019. But just a few weeks after the first corona cases in China, the virus reached other continents. Coronaviruses (CoV) can cause illnesses in humans ranging from mild colds to more severe illnesses such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The SARS CoV-2 coronavirus is a new virus that has not yet been detected in humans. The associated disease is called Coronavirus Disease 2019 (COVID-19). Since the beginning of the pandemic outbreak, there have been daily reports about the disease and related policy steps. Coronavirus causes widespread restrictions on the lives of each individual. For example, many now only work from their home offices, whether they are employees of a company or even students who now have to master their studies digitally and from home. In some cases, the coronavirus has also led to restrictions on where people can go out and to the temporary closure of localities, clothing stores and leisure activities that are not essential to life. These are all factors that influence our lives, and it is precisely the isolation and the few employment opportunities that can lead to increased psychological stress (DGUV, 2020).

Social isolation, fear of prolonged study, and fear of falling ill - Many students are struggling with the Corona measures, this affects not only the financial and interpersonal, but more importantly the psyche of students. At universities and colleges, the teaching process as a whole is now largely digital in the second semester. Since the lockdown, a fatigue of students is observed, the inquiries at the psychological counseling increase, this is also observed at the Ruhr University Bochum. The main point made here is that it is perceived as stressful that there is no end in sight to the pandemic and that the semester will continue to run digitally. Many students also have self-doubts, as the exchange with others is missing and the students ask themselves the questions: Are they doing everything right? And whether they are the only person who doesn't understand the subject matter? Similarly, many students find the volume of assignments during the study period to be more than before the lockdown; in fact, much

of the work is dropped during the lockdown. The short breaks between classes that could be spent together with other students are gone, the short walk to another room or the conversations in the cafeteria are no longer there, leading to a feeling of isolation among students (Schmermund, 2021).

2. General Informations about Covid-19

COVID-19 is an infectious disease caused by SARS-CoV-2. It is transmitted primarily via droplets and can be associated with a variety of symptoms. The most common symptoms are fever, shortness of breath, loss of taste, diarrhea, fatigue and cough. In a worse case, this can also lead to pneumonia. The symptoms can occur individually or in combination. In addition to the symptoms listed above, however, there are also patients who show hardly any symptoms or none at all and who still carry the virus and can be infectious for other people (Gabler Wirtschaftslexikon, 2021).

In general, a distinction is made between whether an infectious person was already ill (symptomatic) at the time of transmission, whether he or she had not yet developed symptoms (presymptomatic stage), or whether he or she never became symptomatic later (asymptomatic infection). Transmissions from infectious individuals are of great importance if they have already developed signs of illness (symptoms) (RKI,2021). In addition, the incubation period is variable, but the median is five to six days; the duration from infection to the onset of one's own infectiousness is also variable. However, studies have shown that the ability to become infected can already be given on the day of one's own infection, but this is not always the case and can also only be given after a few days. To keep the risk of transmission as low as possible, rapid isolation of people who test positive is essential, as is rapid identification and quarantine of close contacts. As will be described in more detail later, keeping a distance from other people is also a measure that can prevent the transmission of (as yet) unrecognized infectious agents, as well as adherence to hygiene measures, regular ventilation and wearing mouth-nose protection (RKI, 2021a).

The disease spread from the Chinese megacity of Wuhan starting in December 2019, presumably after the virus jumped from an animal to a human at an animal market there. The World Health Organization (WHO) called it a pandemic from March 2020. “Long COVID" refers to the late or long-term effects of COVID-19 (Gabler Wirtschaftslexikon, 2021).

In this context, "long covid" refers to all those who still have symptoms of illness after the disease and thus have long-term or late effects. The German government cannot say how many people actually suffer from long covid at the moment. However, several studies are currently being funded to provide insights into late effects and long-term consequences of Long Covid 19 disease. So far, however, long covid is not recorded as a uniform clinical picture by the RKI (Ärzteblatt, 2020).

How many "recovered" patients are actually free of symptoms is also unclear, but the RKI noted that about 40% of patients who required treatment in a clinic still require long-term support. In a mild course of Covid-19 disease, one in ten is affected for longer than 4 weeks, according to the RKI, but little is known about the course of the disease here. The German Health Insurance (DKV) also analyzed 10.000 corona cases, but the statement of this analysis is also very vague, it is limited to the statement that patients who had to be hospitalized are not healthy after discharge. A British study in which 384 hospitalized patients (average age 59.9 years, all tested positive for SARS-CoV-2) were followed up shows that 8 weeks after discharge 69% of the patients still suffer from fatigue and 53% from shortness of breath. In addition, 34% complained of persistent cough and 14.6% reported depression. It was found that especially the severely ill patients often suffered from long-term consequences, also from a psychological point of view. Also, during this study, risk factors were found to trigger a severe course of Covid-19 disease. These include old age, high BMI and pre-existing lung disease (ibid.).

2.1 Routes of transmission

The main route of transmission for SARS-CoV-2 is respiratory ingestion of virus-containing particles produced by breathing, coughing, talking, singing, and sneezing. A distinction must be made depending on the particle size. These may be larger droplets or small aerosols, but the transition between these two particle sizes is fluid. Larger particles sink quickly to the ground when coughing, speaking, etc., whereas aerosols can remain suspended in the air for a longer period of time and can thus spread quickly and easily in enclosed spaces. However, how quickly droplets or aerosols disperse in a room and how long they remain cannot be generalized, since other factors, such as the humidity of the air, also play a role here. In general, the probability of exposure to infectious particles of any size is increased within 1-2 meters of an infected person. A mouth-nose protection can thereby reduce the risk of

infection and transmission in the immediate environment. Therefore, a mouth-nose protection is mandatory in closed rooms, in some areas of cities and in public transport. In small and poorly ventilated rooms, the likelihood of transmission through aerosols may also increase over a distance greater than 1.5 meters. In such rooms, maintaining the minimum distance may no longer be sufficient to prevent infection; especially in smaller rooms, care must be taken to ensure regular ventilation. Transmission's outdoors are rare and account for only a small proportion of total transmissions. Due to air movement, the probability of transmission outside is very low, but here, too, attention should be paid to the minimum distance. In addition to the aforementioned transmission routes, transmission through contaminated surfaces cannot be ruled out; replicable SARS-CoV-2 viruses can also be found on surfaces in the immediate vicinity (RKI, 2021a).

2.2 Spread and impact

At the beginning of 2020, other Asian countries such as Japan, South Korea and Iran and European countries such as Germany, Austria, Switzerland, France, Italy and Spain were already affected, as well as the United States and Australia, for example (Gabler Wirtschaftslexikon, 2021). In the first phase of the coronavirus, which began around December 2019, China was the most affected, followed by other "hotspots" in Europe, the United States of America and South America. In the summer of 2020, the incidence dropped noticeably again for the first time, whereupon the second phase began with a renewed increase in the number of cases in September 2020. In this phase, which is also called "second wave", SARS-CoV-2 spread rapidly and massively in Germany, as well as worldwide. This was accompanied by an increase in the number of deaths from SARS-CoV-2. Since spring 2021, many countries, including Germany, have experienced a third increase in incidence and are thus in the third phase, or the third wave of infection. Also, to be considered is the introduced incidence-controlled emergency brake, which came into force on April 23, 2021, this describes from which incidence value which uniform federal measures must be taken (DGUV, 2021).

The emergency brake is divided into three stages; the first stage of the emergency brake takes effect if the seven-day incidence in a district exceeds 100 on three consecutive days. At this point, contact restrictions and nighttime curfews would go back into effect. In addition, contact rules will be tightened in schools and daycare centers, where alternate classes will also begin again. Likewise, contact rules will be tightened in shopping (can now only take place

with an appointment), services and sports. The catering industry may only offer dishes to take away or deliver and cultural and leisure facilities are largely closed.

The second stage, on the other hand, takes effect when an incidence of 150 is also exceeded for three days in a row. The rules are tightened again, so that goods may only be picked up in retail stores by appointment, but no more "Click & Meet" may take place, whereby people could visit the retail store by appointment. Stage three takes effect with an incidence above 165 on three consecutive days, here also daycare centers, schools and universities are closed, the lessons may only take place digitally (ibid.).

All over the world, many large events were cancelled, conferences and trade fairs were postponed for the time being, took place online or were cancelled altogether. Kindergartens, schools and universities were also affected by the pandemic at an early stage, so they had to close and classes were also held online. This meant restructuring for both sides, teachers and professors as well as students. Both sides had to get used to the online events and the possibilities for everyone to participate in the online events had to be created. The novel coronavirus affected the economy of the People's Republic, and subsequently the economic performance of other countries, as shipments stopped, production was downsized, and transportation was restricted. Some countries imposed entry and exit bans, which are still in place. Curfews were also imposed in individual cities with a high incidence. In Hamburg, for example, a nighttime curfew from 11 p.m. to 5 a.m. was in effect for some time. This was only lifted when the incidence value fell below 100 (Gabler Wirtschaftslexikon, 2021).

2.3 Diagnostics

If an infection with the SARS-CoV-2 coronavirus is suspected, samples should be taken from the upper respiratory tract and, if possible and clinically indicated, from the deep respiratory tract. The upper respiratory tract includes a nasopharyngeal swab or only a throat swab, the deep respiratory tract includes bronchoalveolar lavage obtained by bronchoscopy, sputum and tracheal secretions. However, nasopharyngeal swabs currently represent the reference method in sampling for the detection of SARS-CoV-2 (RKI, 2021b).

There is also debate about whether gargle water and saliva can be used as specimen materials for diagnostic purposes. However, the use of these materials should only be used in consideration of the respective setting and in close consultation with the laboratory. It must be borne in mind that there is little experience with the sample materials and that the sensitivity of the reference method of nasopharyngeal swabbing may be inferior. For bilateral

nasopharyngeal swabs, a study found that the sensitivity of the polymerase chain reaction (PCR) was 94-96% compared to the reference method (Tu et al., 2020).

Self-testing, which takes place under the guidance and observation of knowledgeable individuals, can reduce exposure for healthcare workers. In a study of 500 patients, bilateral nasal swabs and middle turbinate swabs taken by the patients themselves were compared with swabs taken by healthcare professionals. There was good agreement between the two, so that even self-taken swabs give good results. Any sample taken should reach the laboratory for examination as soon as possible. This should be done within 72 hours if possible, the sample can be stored at 4°C and if possible sent already refrigerated. Even though the stability of SARS-CoV-2 is found to be very high, transport times should still be kept as short as possible, as action should be taken quickly, especially in case of positive results (RKI, 2021b).

The PCR detection system, which is considered the "gold standard" for diagnostics, has been developed and also validated for laboratory diagnostic testing to clarify suspected infection with SARS-CoV-2. Testing is performed when there is a suspicion of infection based on medical history, findings, or symptoms. However, the recognition of symptoms can be difficult, especially in elderly persons. Therefore, in case of clinical suspicion, it is advisable to test the specimen for other seasonally relevant pathogens, such as influenza virus. However, mass testing of asymptomatic individuals is not recommended because the significance of a negative test is too unclear and it is only a snapshot. A reason for testing asymptomatic persons is given if someone has been identified by the public health department as a close contact person of a person who has already tested positive. In the inpatient sector, it also makes sense to examine patients prior to admission, as well as employees in patient care, even if they are not symptomatic, in order to minimize transmission in the hospital. This also applies to old people's and nursing homes as well as to facilities for people with impairments and disabilities; here, too, it makes sense to test nursing staff and residents even without symptoms as a preventive measure. This should be done in coordination with the local health authority at regular intervals in order to quickly identify infected persons and thus quickly interrupt the chain of infection (ibid.).

Now, in addition to the PCR tests, rapid tests have also been introduced in pharmacies and Corona test centers, here every citizen can have a rapid test done daily, the results are then available about 15 minutes later and the test result is valid for 24 hours. If the test is positive, this must be reported. Likewise, self-tests are carried out daily by students and teachers at

schools, for example, and these are also reportable in the event of a positive result in accordance with the Infection Protection Act. In the test centers, there should also be the possibility of having a PCR test carried out after a positive rapid test. If you have done the rapid test yourself at home, you should contact your family doctor and follow the instructions to have a PCR test done (BMG, 2021).

3. Covid-19 situation in Germany

The development of Corona numbers in Germany has been tracked since February 2020. At the beginning of May 2020, the 7-day incidence per county (new infections per 100.000 inhabitants in the past seven days) has become the most important metric. It was agreed that the assessment of local outbreaks and the respective necessary containment measures should be measured according to this. This was last laid down in corresponding rules and limits on March 03, 2021.

The first case of infection in Germany was reported on January 27, 2020, and since then, as described above, three waves of infection have been observed on the basis of positive virus detections. Both in the first wave of infection and in the second, the older age groups were disproportionately affected by infections, which also led to higher numbers of deaths. From February 2021 through the end of April, the number of cases of newly added SARS-CoV-2 detections increased, and so did the 7-day incidence. However, in this third wave of infection, persons younger than 65 were mostly affected; this is due to the fact that the age group older than 65 is immunized by the vaccinations that have been available since the end of December 2020. Thus, there were also fewer deaths during the third wave than in the previous one. According to the RKI, especially since March 2021, B.1.1.7 is the predominant variant of SARS-CoV-2. Likewise, variants B.1.351 and P.1 are considered of concern because they spread faster than the original virus variant (RKI, 2021c).

Based on the infection figures, simulation studies and other data, scientists continuously analyze the current risk situation and the effectiveness of the measures taken with regard to the pandemic. Initially, the risk for the population in Germany was classified by the RKI on February 28, 2020 as low to moderate, but already in March 2020, this assessment was changed and the risk was classified as high and for risk groups as very high. From 11 December 2020, the risk was then classified as very high for the entire population in Germany.

On March 25,2020, an "epidemic situation of national significance" was identified in the Bundestag, whereupon the Law for the Protection of the Population in the Event of an

Epidemic Situation of National Significance came into force two days later (RKI, 2020a; Federal Law Gazette, 2020).

In mid-March 2020, the federal and state governments decided on far-reaching restrictions on public life to contain the pandemic; these were gradually lifted again in May. However, as the number of infections rose again, the measures, which included contact restrictions and retail restrictions, were tightened again in October. Then, in December 2020, the so-called "lockdown" took effect again, with significant restrictions on public life once more. The measures being taken are aimed at ensuring that the healthcare system has sufficient capacity to treat Covid 19 patients and that enough tests can be kept on hand for suspected cases. At the same time, the aim is to ensure infection control for patients and staff. The public was also urged to follow the AHA rules, which include keeping their distance, maintaining hygiene and wearing everyday masks. These precautionary measures are intended to minimize the risk of infection and at the same time contain the spread of the virus. In addition, in the fall of 2020, there was a call to ventilate regularly and use the Corona warning app (Federal Government, 2020).

Not only every single person had to deal with restrictions during the pandemic, but also the economy had to cope with considerable consequences due to the health protection measures. In 2020, there is talk of an economic crisis; in this context, the second quarter saw the sharpest drop in gross domestic product compared with the previous quarter since calculations began in 1970. In China in particular, Corona has led to production losses, which has also had a massive impact on German companies in some cases. It is difficult to estimate how great the impact on the economy will actually be; it also depends on how long the virus will continue to affect our everyday lives. Aid payments amounting to 100 billion euros for the economy have already been approved since the Corona pandemic, in addition to the short-time working allowance amounting to 30 billion euros and a further six major support programs will be available in 2021 (Destatis, 2020). In addition to the economy, the social aspect should not be left out. Families were faced with new challenges due to the closure of daycare centers and schools, and employees were often confronted with changes in their everyday working lives. For example, many had to adjust to home offices and often had to take care of children on the side. Many measures taken during the pandemic are the subject of legal controversy, and there have already been some decisions that have been overturned or partially overturned by court rulings in a German state (RKI, 2020a).

The figures given in the following section all refer to the status of 20 May 2021 at 22:15. Here, the RKI reports 3.626.393 laboratory-confirmed SARS-CoV-2 proven cases, including 86,902 deaths and the number of recovered is estimated at approximately 3.358.000 people. On that day, 843.978 doses of vaccine were administered in Germany, making a total of 9.901.626 people fully vaccinated, representing 11.9% of the total population. A total of 31.678.786 persons, which amounts to 38.1%, have received at least one vaccination dose. All persons who have received at least one vaccination are counted as once vaccinated persons, also persons who have already been vaccinated twice are counted accordingly. Currently, approximately 656.705 people in Germany are vaccinated per day, which corresponds to 8 people per second. Vaccination doses are distributed in principle after the population key, after the Prime Minister conference to 19 March 2021 was decided that individual particularly by mutations affected Lands of the Federal Republic receive additional deliveries, among other things Bavaria, Rhineland-Palatinate and Saxonia belong to it. This affects not only the doses delivered but also the vaccination rates of the states. Vaccination is also prioritized on the basis of a six-stage plan, with the elderly and people belonging to a special risk group being vaccinated first. Vaccine resources are limited and as long as this is the case, vaccines are distributed in the best possible way to prevent damage from the virus. Care is taken to ensure that those at high risk of a severe or fatal course are vaccinated first. The same applies to persons who have a high work-related exposure risk or who have frequent contact with persons at risk due to their work or activity (RKI, 2021d).

As described earlier, as a measure to contain the virus, people were also asked to install the Corona warning app on their smartphones; 27.811.619 people have now complied with this call. The number of new infections remains at a high level, even if the numbers are steadily decreasing. According to the RKI, there are 12.298 new infections compared to the previous day. This means for the reproduction value (R), which indicates how many average infections can be expected per infected person, it is 0.76 for the last seven days. The seven-day incidence is now 68, which describes the number of new infections per 100.000 population within the last 7 days (ibid).

The following graph shows the Covid-19 case numbers in Germany over the course of March 04, 2020 to May 20, 2021 (Fig. 1).

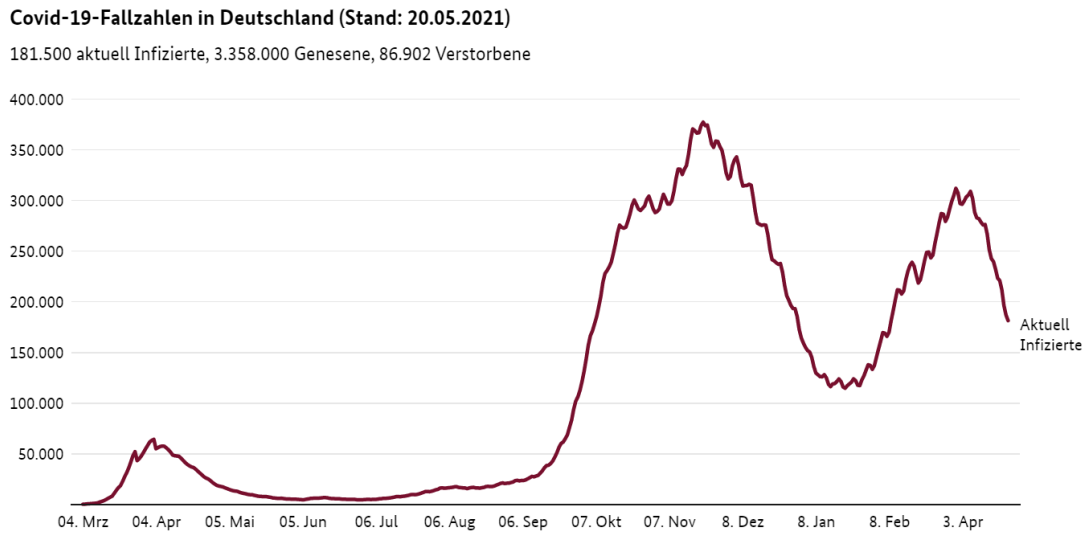

Fig. 1: Covid-19 case numbers in Germany, RKI, 2021d

This figure also shows the three waves of the pandemic, with peaks on April 4, 2020, between November and December 2020, and in April 2021. You can also clearly see here how the number of cases flattened out in the summer of 2020 and remained fairly constant for a month, until there was another very strong and rapid increase in the number of cases between September and October 2020. Now we are back in a phase where case numbers are dropping and some of the measures that were taken to contain the virus are being relaxed. These relaxations are, of course, due to the declining numbers of cases and also to the progressive numbers of people who have already been vaccinated. Whether a new wave could break out can be speculated so far only, however much hope is put into the inoculations to prevent so a fourth wave. The high case numbers were noticeable also particularly on the intensive care units, the number of the patients treated there sank up-to-date on 4000, the goal remains however the same, the hospitals with special attention to the intensive care units may not reach their capacity limits. The possibility of treating Covid-19 patients as well as any other inpatients should be ensured at all times.

Although the number of cases is falling in many places and the 7-day incidence rate is falling in Germany, there are still cities in which the 7-day incidence rate is above 165 and schools and daycare centers therefore have to remain closed. The following map shows which cities in Germany are at which level of incidence. This map is always updated at regular intervals; the last update of the present map took place on May 14, 2021 (Fig. 2).

All cities that are highlighted in gray on this map are at least below a 7-day incidence of 100 and therefore no emergency brake applies. Level two of the emergency brake is indicated by the yellow color and states that the 7-day incidence is above 100, and therefore alternate teaching takes place at schools and the contact restriction applies that a household may meet with one additional person. Level three of the emergency brake is indicated on the map with the light red color and applies to all cities that have a 7-day incidence above 150, here it also applies that retail is closed and no more "Click & Meet" may take place. All cities that have an incidence of over 165 fall into level three and are marked with the dark red color in the figure. This map is subject to change and therefore represents only a snapshot of the situation. It cannot be assumed that the same picture will be obtained if this map is looked at again. Since the number of cases is falling again at the moment, a large part of the map falls into the gray area and thus into the area where no emergency brake applies. However, it can also be seen that many cities are still above an incidence of 100 and thus restrictions are still to be expected. However, it should also be noted that some cities are already scheduled to leave the current stage at a certain date, i.e. at the exact time when the 7-day incidence leaves the value of the stage. An example is Ludwigslust-Parchim, which is in the yellow area, but the current 7-day incidence is only 41.1 and therefore the emergency brake will no longer apply from 22.05.2021 and it will then be highlighted in gray (Fig. 3).

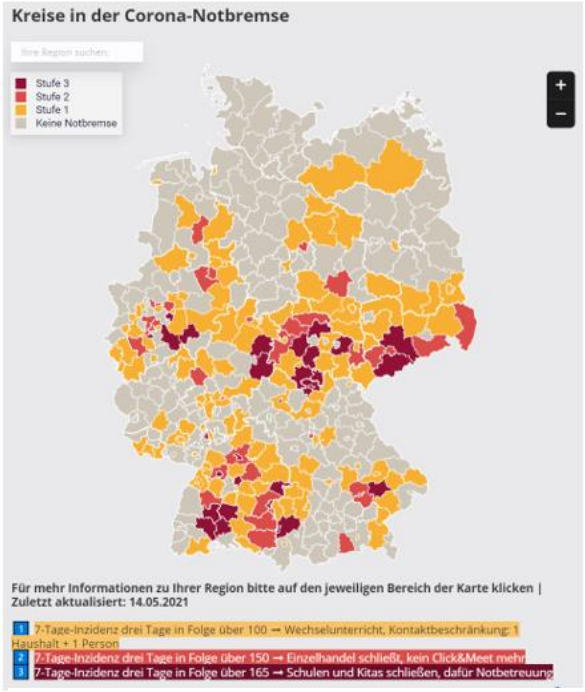

Fig. 2: Stages of the corona emergency brake, MDR, 2021.

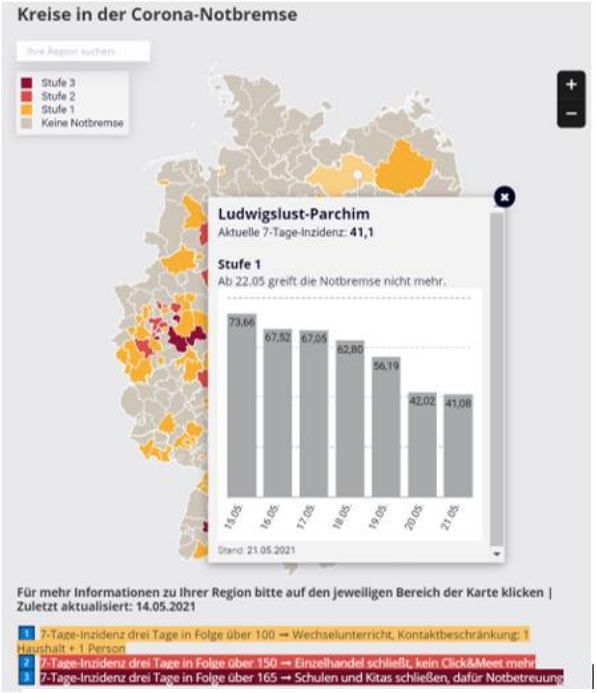

Fig. 3: Stage from Ludwigslust-Parchim, MDR, 2021.

4. Challenges for students

University events have been taking place online for almost three semesters now, but studying under Corona conditions presents students with many problems and challenges. Dr. Hofmann, a psychologist at the Psychosocial Counseling Center for Students at the Heidelberg Student Union, observes that in addition to concerns that existed even before Corona, such as depressive symptoms, a variety of anxieties and conflicts in partnerships, fears about the future with regard to jobs and internship positions in particular have increased. Many students have integrated a compulsory internship into their studies, which must take place within a semester, but many internships could not take place due to Corona or could not take place in the form in which they would otherwise have been scheduled, which also brings a change for the students. This is also associated with increased questions about stress management and states of exhaustion, and the students find it visibly more difficult to deal with the uncertainties, since many regulations (e.g., the organization of exams, the organization of lectures) were still uncertain, especially at the beginning of the pandemic (Hofmann, 2020).

Above all, the loss of social contacts plays a major role in the mental health of students, communal events are completely omitted and also the support of other students is not as given as in face-to-face events. Things that help to balance out the studies, such as going to concerts, are also eliminated and cannot be used as a stress-balance. Another point, which is positive for social contacts but can have a negative effect on learning behavior, is the housing situation of students. Many students live in shared apartments, which presents them with challenges in terms of their learning environment. Often students have a somewhat smaller room to which they can retreat, but everything has to take place in this room, learning, lectures and also much of their own free time is spent in the room. In addition, one cannot assume that everyone in the shared apartment has the same learning rhythm and so one must coordinate so that one can learn undisturbed and in peace. In addition, in contrast to employees, for example, students often have fewer clearly defined tasks and no clearly defined working hours. On the one hand, this is positive because they can manage their own time, but the demands on self-direction are significantly higher, which requires good self-organization. Students can be overwhelmed by this to organize the entire daily routine themselves and to adhere to specifically prescribed learning times.

The lockdown leads to the fact that familiar structures are no longer available and the need to define and build the structures for everyday life itself. For this purpose, time periods have

to be defined and activities have to be created for these time periods. What was previously defined by attendance times at the university must now be actively planned by oneself. Especially when starting a study program, the central challenge for students is that they have to be very active and have to take care of things just as actively. While there are many opportunities to exchange information with fellow students or teachers during face-to-face sessions, students have to actively take care of getting the information they need during online sessions. Either questions need to be prepared to be asked during an online event or students need to ask fellow students or faculty via online platforms for an answer to their question (ibid.)

The lack of structure and orientation, which normally creates a routine, leads to an increase in uncertainty. Many things that are taken for granted are called into question, and it is also impossible to predict when university operations can fully return to normal. This lack of knowledge leads to students experiencing more stress and becoming internally agitated more quickly, according to a study conducted by the University of Würzburg (University of Würzburg, 2020). Likewise, concentration problems and poorer sleep occur more quickly.

Special activities and positive events are hardly foreseeable for students in the coming weeks, which can lead to frustration (Hofmann, 2020).

However, initial feedback showed that the dropout rate in higher education has not increased and thus remains at a stable level, as it was before the start of the pandemic. To this end, the universities have also taken numerous measures to cushion the disadvantages caused by the pandemic for students. The support for students in financial emergency situations is the responsibility of the universities, the provision of federal funds or a public-private partnership with the participation of the federal government is therefore not appropriate according to the Federal Council (BMG, 2020).

Yet financial aid would be urgently needed for some students. Student advertisements are much more frequently asked about offered that include financial aid. According to a study by the team of the Institute for Social and Organizational Pedagogy at the University of Hildesheim around Severine Thomas and Anna Traus, 40% of the students have to get by with less money than before the pandemic. Many have lost their part-time jobs or could no longer perform them, which means that a major source of income is no longer available and students have significantly less money at the end of the month. As a result, savings must also be used for daily needs and handsome support in the form of bridging aid and interest-free loans must

be taken out, but there have been repeated problems with bridging aid as well, as in some cases it has not been issued because the financial hardship could not be attributed to the pandemic. This exacerbates a structural problem and that is poverty among students, this problem could become even greater as more people are studying in Germany than ever before. The financial assistance offered also varies greatly from region to region, with some universities and foundations offering interest-free emergency loans and scholarships, but this should apply uniformly to all universities (Traus, Höffken, Thomas, et al., 2020).

A central problem, which according to the survey also affects the students, is the lack of communication and thus the lack of information on the part of the university. Especially at the beginning of the pandemic, when the changeover to online courses and online exams took place, there was some missing information that was not passed on to the students or organizational factors that were not communicated. However, it must be remembered that the whole situation was not only a change for the students, but also for all the teachers. 30% of the students further stated that they probably wanted to extend their studies because they were not able to take all exams of the semester or because not all exams were offered in this semester. Also the scientific work due to the library restrictions or even closures is made more difficult, which also leads to the fact that scientific works are finished among other things only late. Three quarters of the respondents stated that they felt the workload during online courses was higher than during normal classroom courses. Also, at some universities, lectures with a practical component, such as laboratory tests, could not take place, which also leads to students having to extend their studies or provide substitute work for the actual lecture. Of course, the universities tried to let all lectures take place even during the pandemic and solutions were found for the laboratories, so some practical lectures could still take place, either it was divided into groups so that not all students were on site at the same time or quick tests were offered (Hofmann, 2020).

In addition, there are some students with children, studying with a child is already difficult without pandemic conditions, but becomes a real challenge when daycare centers close. On the one hand, students are flexible in their time due to online studying, but the challenges already described in the previous are just as given for the students, but in addition there is the upbringing and care of their own child. It is becoming increasingly difficult to study in peace and quiet and to complete assignments on time, and there is usually no place to retreat to in order to concentrate on studying, as the focus is also on caring for the child. Some took

semesters off due to childcare and emergency care was set up for single parent students. However, some students who are not single parents were critical of this emergency care, since students who have a partner were often left to their own devices during the day when their partner is at work. Thus, some students considered it unfair not to have the option of emergency care as well (FAU, 2020).

5. Mental health of the students

Social isolation, fear of prolonged study and the fear of falling ill - Many students struggle with the Corona measures, this affects not only the financial and interpersonal, but especially the psyche of students. At universities and colleges, teaching is now largely digital in the third semester overall.

Psychologist Wilfried Schumann, who is employed in the Psychological Counseling Service at the University of Oldenburg, speaks of the fact that the "psychological resistance forces will be overwhelmed in a large number of students" and that more students than usual will make use of the psychological counseling services. He also speaks of the fact that, especially in the winter months, the lack of light also plays an important role when considering psychological well-being.

Humans, who already have pre-existing conditions and a smaller psychological well-being, are particularly strongly affected by the Lockdown, this emerges from a report of the German depression assistance. Here the lockdown in spring 2020 was considered and examined, here the people, which are already ill with depressions suffered more strongly under the lockdown, thereby it is not to be assumed that this group of persons has more fear to Corona to become ill, it concerns here much more that the lockdown time was experienced as more load. In addition, treatment appointments with specialists and psychotherapists were often cancelled or postponed during the lockdown. This meant that the structure of the day was lost. Affected individuals were almost twice as likely to suffer from the lack of daily structure as the general population (Schmermund, 2021).

Since the lockdown, student fatigue has been observed, and inquiries to psychological counseling are increasing; this is also observed at Ruhr University Bochum. The main point made here is that it is perceived as stressful that there is no end to the pandemic in sight and that the semester will continue to run digitally. Many students also have self-doubts, as the exchange with others is missing and the students ask themselves the questions: Are they doing everything right? And whether they are the only person who doesn't understand the subject

matter? Similarly, many students find the volume of assignments during the study period to be more than before the lockdown; in fact, much of the work is dropped during the lockdown. The short breaks between classes that you could spend together with other students are gone, the short walk to another room or the conversations in the cafeteria are no longer there, which leads to a feeling of isolation among students.

The point of self-management also plays a major role, how well can the daily routine be organized by the students themselves, how independently can the students work and how motivated are they to complete their tasks. The experiences of the psychological counseling centers also show that the decisive factor is how strongly the students are already rooted in their place of study, which of course goes hand in hand with which network they can fall back on. This time is most difficult for students who have just moved to a new place of study; they cannot build on existing contacts and new contacts can hardly be made. It is often reported that these students first move back to their parents in order to at least have a social connection. This possibility exists, of course, since most students are not bound to one location by digital instruction. If the students nevertheless have an apartment, because it was thought at the beginning of the study that the events can take place normally, often only the roommates, if these are available, remain as contact persons. It is very difficult to establish social contacts in a foreign city without having the opportunity to go to events, the university or other places. The lack of reference persons can lead to the fact that already existing psychological stress increases or a psychological stress arises only thereby (ibid.).

In Germany, 43 of the 57 student unions have a psychological counseling center. More than 34000 students sought counseling and there were more than 105000 counseling contacts. In comparison, there were only 66000 contacts in 2006. In general, there has been an increase in demand for psychological counseling services since the introduction of the Bachelor and Master system. In addition it comes that the consultation often cannot take place in such a way as used, also here it is so that many consultation offers can be offered only by telephone or video, since also here no personal contacts are take place. The established counseling channels were thus interrupted and it was also a change and challenge for the counseling centers to meet the concerns of the students also by telephone contact or via video conferencing (Süddeutsche Zeitung, 2020).

In this context, the financial aspect also influences the mental health of students; many students work at least a few hours a week in addition to their studies in order to earn a living,

and some students were also strongly affected by the pandemic and lost their jobs. This is an aspect which in turn puts additional pressure on students. Feelings such as loneliness or self-doubt can be intensified. Especially students who have worked in the catering industry and in social institutions now have to deal with additional financial worries. If students get into money trouble, many students first turn to the “Studierendenwerk” or to the "AStA", here they can first inform themselves about possible financial aid. Areas that previously often led to psychological stress among students, such as exam anxiety, are moving into the background. This is explained primarily by the fact that students have one more failed attempt per semester, and thus the pressure has decreased somewhat, at least for exams. Nevertheless, many students want to complete their studies in the standard period of study and not drag out the study, for this the universities have tried to let all exams take place as best as possible, this takes away the concern of the students not to be able to write all exams, but not all exams could take place in an online format, so that some exams have taken place in the universities in presence, many students considered this also stressful, because they had to expose themselves to a risk of infection and have perceived this as psychologically stressful (Schmermund, 2021).

Above all, a political response to the psychological stress of students due to the pandemic is lacking; at the federal level, only the FDP (Free Democratic Party) has spoken out on the issue. Members of parliament submitted a motion in the Bundestag calling on the federal government to systematically record the mental state of students and to create more offers that would strengthen the mental health of students. This motion is still being discussed in the responsible committee and a decision is pending (ibid.).

According to a study from an app for students, students are particularly concerned about the progress of their studies, and many are sure that the measures taken due to Corona will hinder their studies and that they could lose semesters as a result. 55% of the students stated that they have the feeling that their studies will be delayed. However, it is not clear whether this improvement is due to students getting used to the situation and being able to cope with it better, or whether there has been an improvement in the organization and improvement of courses.

A significant difference between the forms of study at colleges, universities, and colleges of education was evident in the question surrounding the current teaching load. Slightly more than half of the students who study at universities feel overwhelmed by the current teaching

load, but the other students cope well with the current workload, and a third even feel rather underchallenged. At universities of applied sciences and universities of teacher education, on the other hand, a clear majority feels overwhelmed by the current teaching load (two-thirds at universities of teacher education and about 80% at universities of applied sciences) (Zick, 2020).

6. Health Behavior

In the Roche Encyclopedia of Medicine, the term health behavior is defined as follows: "Health behavior is the behavior of an individual on health-related issues, which varies according to the personality structure, e.g. participation in preventive medical check-ups, smoking, nutrition, etc." (Roche Encyclopedia of Medicine, 2003).

Going further, actions of healthy people are referred to as health behaviors that have been shown to reduce the risk of becoming ill or increase the chance of becoming healthy. Disease behavior, on the other hand, is defined as actions that people with symptoms of disease take. The term health behavior is often seen as a counter term to risk behavior, which includes all behaviors and habits that can be scientifically proven to increase the likelihood of developing a specific, but also non-specific disease. Behavioral risk factors include the above-mentioned factors such as smoking and diet, as well as somatic (e.g. high cholesterol) and psychosomatic factors such as stress and risky personality traits. These factors contribute to the explanation of serious and chronic diseases.

On the other hand, behaviors such as sufficient exercise or sport, adequate sleep, safer sex and a balanced diet are classified as health behaviors, including the use of preventive and screening examinations. However, it is difficult to empirically prove which behaviors could maintain health, to what extent, and for how long. There are some models that try to explain health behavior by cognitive, social and socio-demographic factors. These include, for example, the Health Belief Model, which is based primarily on a subjective cost-benefit trade-off. The model is based on subjective health beliefs, i.e., people estimate themselves how high the risk is, for example, from a disease, and preventive behavior is exhibited when a risk is recognized and seen as threatening and, in addition, the benefits of preventive measures are estimated to be higher than the costs of the measure. However, this is only one of a large number of models (BZgA, 2020).

7. Mental Health

It is very difficult to formulate mental health in general terms, because there are not only different perceptions depending on the culture, country and religion to which a person belongs, but also individual factors such as gender, age, type of education experienced by a person can cause different perceptions of one's own mental health and also provide for different perceptions of what mental health actually is. In this paper, we will work primarily on the basis of the WHO definition. The WHO defines mental health as a valuable source of human capital or well-being. Going further, we all need good mental health in order to take care of ourselves and interact with others. Therefore, it is important not only to define the needs of individuals who have a defined mental disorder, but also to protect and promote the mental health of all people. Mental health is influenced not only by individual characteristics, but also to a large extent by the social circumstances in which people find themselves and the environment in which they live. These factors can influence the mental state of a person both positively and negatively. Mental health can also be seen as a state of well-being in which a person can use his or her full abilities and cope with normal life stresses and strains, can work productively to the greatest extent possible, and can contribute to the community. Mental health disorders often result from a combination of stressful thoughts, emotions, behaviors, and relationships. Examples of mental health disorders in this regard include depression, anxiety disorders, and conduct disorders (WHO, 2019). Mental health should be seen as a component of overall health and it is more than the absence of mental impairments and disorders thus mental health includes well-being and addresses many aspects of life (BAuA, 2021).

8. Pandemic

A pandemic describes a wide-ranging epidemic, which can cover entire regions or continents and spread globally. An example besides the current Corona epidemic is the so-called Spanish flu. During the First World War, approximately 500 million people worldwide fell ill and up to 50 million people died as a result of the pandemic. The term pandemic, however, is not linked to a certain number of affected people, this is shown by the example of the SARS pandemic 2002/2003, here about 8000 people worldwide were infected with the virus and a total of 774 people died from this virus, this was also classified as a pandemic. The term pandemic is derived from the ancient Greek word "pandemia" and means "for all the people". In general, epidemics differ from pandemics in their spread, while epidemics are locally limited,

pandemics spread worldwide. Both definitions have an epidemic medical background, since both epidemics and pandemics involve a larger number of infected people. However, classification as a pandemic does not necessarily mean that foci of infection must be detected in every country, but the probability of this is high, so that the pandemic pathogen can also spread rapidly worldwide.

Pandemic pathogens are also feared so much because they can overload existing health care systems in a short period of time. If an outbreak of infection is classified as a pandemic, special attention is primarily focused on the more intense epidemiological danger of a pathogen and all countries are motivated to take countermeasures. Pandemics vouch for increased risk because they are widespread and transboundary, threatening the entire population and health systems, rather than isolated infected individuals or localized groups (Klein, 2020).

9. Surveillance System- SuSy

9.1 Background

The topic of student health is becoming more and more important, especially due to the changeover to digital teaching, student health has become even more important. The subject project "Surveillance and Health Reporting" which is offered at the University of Applied Sciences (HAW) under the direction of Prof. Dr. Ralf Reintjes since the summer semester 2014, also deals intensively with this topic. This subject project was able to complete its pilot phase and establish itself as a long-term surveillance system, which runs under the name "SuSy". Since the winter semester 2014/2015, an almost complete survey of health science students has been conducted every year except for the summer semester 2016. These successful implementations at HAW were followed by the collaboration with Manchester Metropolitan United (MMU) around winter semester 2016/2017, thus for the first time the SuSy survey took place at MMU and a data set from two countries was available (Tobisch et al. 2015).

In addition to prevention and health promotion, attention must also be paid to the health behaviors of each individual, as people significantly influence their health through their lifestyle and actions. Therefore, prevention and health promotion must start with the behavior of the individual, since many risk factors that can burden health are preventable by oneself (BZgA, 2020). In the evaluation of the Global Burden of Disease Study (GBD), one sees the impact of certain behavioral risk factors; in 2017, for example, 7.1 million people died as a

result of smoking (GBD, 2017). Approximately 3 million more people die as a result of alcohol use and another 207,400 people die as a result of illicit drug use. In addition to the more obvious behavioral risk factors, an unhealthy diet such as insufficient fruit and vegetable consumption or a diet too high in sugar is also a risk factor, again accounting for approximately 11 million deaths per year (ibid.). Since the population group of the students rather a generally good health is ascribed, there are still few studies regarding the health condition of the students, however the topic moves in the last years again and again into the foreground. The “Techniker Krankenkasse” (TK) in particular has also repeatedly addressed the issue of student health. From the study of the TK it results that a quarter of all studying indicates to be in the permanent stress and to feel accordingly also frequently psychological loaded. In order to respond to the high demands and to make everyday study life health-promoting, HAW, together with the TK, was the first university in Hamburg to introduce a Student Health Management (SGM). On the one hand, this is intended to create a more health-oriented design of studies and teaching and, on the other hand, to support health-oriented behavior. The aim of the project is to improve the qualifications of graduates in terms of health-promoting competencies and to evaluate this. In this context, behavioral and relationship preventive measures are also offered to the students (TK, 2020). Results showing that students are under constant stress and feel psychologically burdened make it clear that the introduction of student health management is appropriate and that there is a need for further research in order to be able to effectively promote the health of students (ibid.). The surveillance system "SuSy" addresses this need for research and in the following, the topics that SuSy addresses will be examined in more detail.

9.2 Project presentation

In the Surveillance System "SuSy" data is collected with the help of a questionnaire, this questionnaire is changed over the semesters, only small changes can be made by the students, who take over the surveys and evaluations in the respective semester. To ensure that as many students as possible take part in the survey and that the maximum number of students can be reached, the questionnaires are distributed in lectures with special attention to those lectures in which attendance is compulsory or in which there are known to be many students. In addition to socio-demographic characteristics such as age, gender and financial status, the questionnaire also asks about health-related factors. In addition to questions requiring a

subjective assessment, questions are also asked about health behavior, including questions about fruit and vegetable consumption and smoking and drinking behavior. Sexual behavior has also been asked in the questionnaire since the winter semester 2016/17. The evaluation is carried out using a statistics and analysis software IBM Statistics SPSS 25. Following the evaluation, a time series analysis is also created, this is intended to capture the development of trends over the last few semesters and thus create a long-term overview of how the health and health behavior of students is developing. Through the regular surveys, behavioral changes of the students can be determined and trends of certain behavioral patterns can be shown. Of course, it must always be considered which factors may have caused the changes in the respective semesters. A distortion of the data can never be ruled out during the survey; this can always occur in the form of bias and confounders. However, standardized procedures can put these biases into perspective, since trends show the real development. The data therefore nevertheless provide the opportunity to illuminate and explore various public health aspects. To this end, SuSy is primarily concerned with five main risk factors, which are tobacco consumption, diet, sport, medication and alcohol. In the following, these factors are examined in more detail in order to explain the importance of the topics queried (SuSy, n.d.).

9.2.1 Tobacco consumption

Tobacco use is one of the most preventable causes of death and disease. Among the WHO regions, Europe has the highest prevalence of tobacco smoking among adults and one of the highest prevalence among adolescents. One of the nine voluntary global targets is to reduce premature mortality from noncommunicable diseases by 25% by 2025. Reducing tobacco consumption would greatly contribute to achieving this goal. While in the past it was mainly men who smoked, the difference in prevalence between men and women is now very small (<5%). However, there are also strong regional differences in this regard, with 19% of women aged 15 years and older smoking in the European Region in 2013 and only 2-3% in the African, Southeast Asian and Western Pacific regions. Looking ahead, WHO projects that 31% of men and 16% of women will smoke by 2025. Comparing the European Region with the rest of the world, it is striking that the European Region has among the highest number of deaths attributable to tobacco use (WHO, 2021). Although there has been a slight decrease in cigarette use, at least among young people, alarming trends are emerging, with lifetime and current use of cigarettes increasing dramatically with age. At the age of 11. 5% of boys and 2%

of girls have smoked, at the age of 15, it was already 29% of boys and 27% of girls. These are very high numbers and also have an impact on adult life (WHO, 2020).

Indeed, tobacco smoke is a psychotropic substance and can lead to dependence and is also a risk factor for secondary diseases. If tobacco is consumed over a long period of time, the risk of heart attacks, strokes and a variety of cancers, including lung cancer, increases. Smoking can also lead to weight loss, as the basal metabolic rate is increased, but at the same time the body's performance decreases. Other diseases that can result from the use of tobacco include chronic gastritis, and the risk of peripheral vascular disease and hypertension also increases. Compared to non-smokers, the general mortality risk is up to 80% higher (ibid.).

However, those who manage to quit smoking at any given time have both immediate and long-term health benefits. Within the first day of quitting smoking, carbon monoxide levels approach those of non-smokers and women who quit smoking before pregnancy have a very high chance of giving birth to children with the same birth weight as women who have never smoked (WHO, 2011).

9.2.2 Nutrition

A leading risk factor affecting the health and well-being of people in every country in the European Region is an unhealthy diet. The risk of becoming overweight and obese, of developing cardiovascular diseases, and of developing certain types of cancer is increased by excessive consumption of saturated fats, trans fatty acids, sugar and salt. Of the six WHO regions, Europe is the most affected by noncommunicable diseases, with the four most common noncommunicable diseases being cardiovascular disease, diabetes, cancer and respiratory disease. These diseases account for 77% of mortality and morbidity and nearly 86% of premature deaths in the European Region.

Globally on the rise are mainly calories and nutrients drawn from meat, sugars, oils and fats, these have become relatively cheap and are mass produced. In contrast, foods such as whole grains, legumes and root vegetables, which should represent the bulk of our diet, but the caloric intake that comes from these products is declining in trend. Mainly the changes in trade and agricultural policies, lead to these price but also consumption changes. Especially convenience products, which have a high content of saturated fatty acids, trans fatty acids, sugar or salt due to the processing methods, are available in many countries in masses and at

very affordable prices. However, it is often difficult for the consumer to recognize whether a product is healthy or unhealthy, and more knowledge and education is needed.
Health-promoting aspects, on the other hand, are attributed to the consumption of fruit and vegetables. Here, the daily consumption of fruit and vegetables can help to minimize the risk of non-communicable diseases and also ensure an adequate supply of dietary fiber. The WHO therefore recommends a daily amount of at least 400g of fruit and vegetables for an adult (WHO, 2014).

9.2.3 Physical exercise

Most people are not physically active enough, although it has very positive effects on our entire body. Approximately two billion people do not exercise enough, which is more than a quarter of the world's population. Also the many possibilities, like driving, office jobs and delivery services contribute to the fact that humans move in the everyday life less, whereby lack of movement is just like smoking, high blood pressure or diabetes a risk factor for the health. It was found that people who sit more than 8 hours a day, like people who smoke, have an 80% increased risk of death. According to the WHO, adults aged 18-64 should engage in at least 150 minutes of moderate physical activity per week, including exercise at 50-70% of maximum heart rate while still being able to converse, or 75 minutes of vigorous exercise (70-85% of maximum heart rate), which can include a mix of both types of activity. Physical activity is also suitable for the prevention of cardiovascular diseases, high blood pressure, obesity and burnout. Just 15 minutes of exercise a day is said to reduce the mortality risk of individuals by 14%, and each additional quarter of an hour reduces the risk by an additional 4%. It has been found that regular endurance exercise increases the activity of the telomerase enzyme, which "rejuvenates" body cells. Natural killer cells are also said to be activated, which is also said to fight cancer cells. Those who are physically active can thereby reduce the risk of certain cancers by up to 42%. Also persons, who are already ill with cancer, should be physically active as far as possible, for example patients with prostate cancer could reduce their mortality probability by 61%, if more than 3 hours of intensive sporty activity took place. Especially in diabetes, physical activity plays a crucial role and can delay or even prevent the disease. The cardiovascular system can also be positively influenced by regular exercise, with just 5-10 minutes being enough to minimize the risk of cardiovascular disease. The brain also benefits from physical exercise; just 10 minutes of walking is enough to improve the

networking of neurons in the brain and thus improve memory performance. In addition to the positive effects on the body, physical activity also has a positive influence on the psyche. Sports increase the concentration of dopamine and norepinephrine and activate the reward system. This makes physical activity also a positive remedy against depression. For example, one study shows that 30 minutes of jogging per week has almost an effect as an antidepressant (Ärzteblatt, 2019a).

9.2.4 Medication

When you have a headache, a runny nose or a sore throat, almost everyone takes medication. It is practical and easy at first and relieves the pain, but very few people are aware of any addictive dangers or side effects. Pharmaceutical companies have annual profits in the billions, which they make with drugs, especially older people are often dependent on medication. According to a survey by the Federal Association of German Pharmacy Associations, many Germans take more than two different medications a day. Often, people take medication for minor ailments and it becomes a habit. This can lead not only to a psychological dependence, but also to a physical one. Especially headache pills are taken regularly, since these are also available without a prescription, but package inserts are often not read and side effects that can result from taking them are ignored. Side effects of medications are very diverse and can cause, among other things, gastrointestinal complaints or skin rashes or long-term consequences such as liver damage. Up to 60.000 people die each year from the side effects of medications. Even antibiotics, which have saved millions of lives and continue to do so, have some side effects that can occur. In addition, some bacteria that the drug was supposed to fight are now resistant and the drug is therefore no longer effective. Especially in hospitals, this can be dangerous for patients. Broad-spectrum antibiotics are often prescribed even for minor illnesses; although this usually helps against a wide range of bacteria, it can also lead to resistance if some bacteria survive the treatment. From a study it further results that 66.6% of the studying in the last past 30 days medicines took, thereby above all pain means are consumed. Which gives an indication that the inclusion of this factor in the questionnaire of SuSy is quite important (Ärzteblatt, 2019b).

Sleeping pills and tranquilizers are also indicators for the health of students; on the one hand, these can also cause side effects, as already described for other medications, and on the other hand, it can be concluded how many underlying complaints are present as a result of which

medications are consumed in the first place. Within the framework of SuSy, the causes are not investigated further, but possible further studies can result from this and areas become apparent in which health-promoting measures would have to be taken. Sleeping pills and sedatives are drugs that act on the central nervous system and produce sleep-inducing or sleep-initiating effects or have non-specific, depressant effects on the body. An example of a sedative is benzodiazepine, which can also have a sedative effect. Tranquilizers, like sleeping pills, belong to the group of psychotropic substances and can lead to addiction (Ginko Foundation, n.d.).

9.2.5 Alcohol consumption

Alcohol is a psychoactive substance that can lead to addiction. Alcohol consumption, which is considered harmful to health, is considered a contributor to more than 200 diseases. Furthermore, alcohol consumption is counted among the five strongest risk factors responsible for diseases, impairments and deaths worldwide. Not only the consumer can suffer consequences from excessive alcohol consumption, but also socioeconomic consequences for those affected and harm to others can result. In addition to direct costs to the health care system and loss of production, intangible costs such as loss of quality of life can also occur (RKI, 2020b).

In order to be able to better classify risky alcohol consumption, there are defined threshold values for this purpose; for women, a quantity of more than 10g of alcohol per day is considered risky alcohol consumption; for men, this value is 20g. According to the 2014/2015 data from "Gesundheit in Deutschland aktuell" (GEDA), 13.8% of women have at least weekly risky alcohol consumption and 18.2% of men. It was also found that women from higher educational groups have a higher prevalence of risky alcohol consumption than women from lower educational groups, but this is not evident among men. In the WHO "Global action plan for the prevention and control of non-communicable diseases" it is stated that the aim is to reduce risky alcohol consumption by 10% by 2025. Consumer statistics already show a downward trend in Germany, but it should still be noted that the per capita alcohol consumption in Germany is significantly higher than the average of the European member states. Risk consumption is also defined as a behavioral pattern or consumption pattern that can contribute to an increased chance of physical or psychological harm. The RKI estimates that between 42.000 and 74.000 people die each year as a result of alcohol consumption,

although the number of unreported cases may be even higher. Binge drinking is particularly often associated with acute health risks, while risky consumption is more likely to be associated with the development of chronic diseases (Lange, Manz, Kuntz, 2017).

Alcohol consumption can also quickly lead to physical reactions in this context, alcohol can physically lead to, among other things, dizziness, increased pulse and impaired brain capacity. This is only a small selection of possible physical reactions. Alcohol consumption can also lead to psychological reactions; in small quantities it can have a euphoric effect, but it can also lead to risky behavior due to a lowering of the inhibition threshold and can increase the risk of developing depression. Looking at the long-term consequences of excessive alcohol consumption, damage to the liver can occur in particular, dependence with accompanying withdrawal symptoms such as headaches and nausea can occur, and the risk of cardiovascular disease increases (Rummel, Kreider, 2018).

10.Methodology

In this section, the methodological principles of the study are described in detail. Based on my own research approach, a questionnaire was chosen as the instrument for analysis. The study conducted in this thesis is subject to scientific standards, which will be explained later on. For the theoretical part, a systematic literature research is conducted, whereby attention is paid to the scientificity of the data used. Furthermore, in addition to the self-designed questionnaire, an analysis of already existing data from the project SuSy is carried out. The data, which are collected with the project SuSy continuous, were made available to me for the present work, in this project data are queried to different health-relevant factors, these questionnaires are likewise filled out by the students of the HAW Hamburg/Bergedorf, which simplifies a comparability with the data from the online questionnaire. The evaluation of the data from the Susy project is intended to contribute to the representation of a long-term effect and to see whether there are changes in the health behavior of the students and whether, above all, the mental health of the students is changing. Thus, not only a snapshot of the current mental health and health behavior can be presented, it can also possibly be shown that changes can be seen. Surveys are one of the most frequently used methods for data collection in empirical social research. In this context, scientific surveys can be distinguished from surveys in everyday life by a systematic preparation, a goal-oriented scheme and theory-based questions. Surveys can be roughly categorized into oral surveys via

interviews and written surveys in the form of questionnaires. In the present study the method of questionnaires was chosen. Surveys are always dependent on self-referential information of the respondents, as well as on memory, self-knowledge and personal attention. For the survey thereby students of the University of Applied Sciences are invited to participate in an online survey, especially via the HAW Hamburg mailing list. In addition to the official distribution list, the possibility of social networks is also used. In this way, individual groups can be made aware of the survey once again, so that a higher number of participants can be reached. A survey at the university is unfortunately not possible at the moment, because most events take place online and contacts should be avoided as much as possible.

This analysis of the data is carried out by means of the statistical program SPSS. The study was conducted in the form of a mainly quantitative survey, although qualitative questions were specifically added in order to obtain more detailed information on certain questions. The question "What support would you like from the university with regard to psychological well-being during the pandemic?" was chosen as an open question, since a wide variety of answers is expected and for this reason no specific answer options should be given. Providing answer options here could possibly lead to important approaches being disregarded. Also formulated as an open question was the following question: “What would contribute to improving your psychological well-being?” This is primarily about personal feelings and is therefore difficult to summarize in categories. Again, food for thought should be provided by the students and a closed question in this case could also come to the loss of important content. With the evaluation of these open questions thereby in the connection both individually on the answers are looked however also over categories are formed, in order to receive a compact result representation. Important and informative answers are highlighted and analyzed once again.

The standardized questionnaires contain 27 questions for the students of HAW Hamburg, two of which are open. Quantitative questionnaires were chosen as the method because, in contrast to qualitative methods, they are characterized by a high degree of comparability and objectivity of the results, since the data are collected under the same conditions, such as the same instructions and the same data collection instrument. In addition, the criteria on the basis of which the sample was selected are presented transparently in the further, which makes a renewed survey with a comparable sample possible. In addition, a higher representativeness and validity of the results of quantitative research methods is expected, moreover, the one quantitative research method is usually cheaper and time-economically

also more positively to evaluate. All procedures, which serve for the numerical representation of empirical facts, are described thereby as quantitative methods.

The two complementary research strategies of qualitative and quantitative questioning are often combined in practice and are used together; this is also the case in the questionnaires created for the present study. In the questionnaires for the students, two questions were formulated as open-ended questions, as these are detailed questions about well-being. Nevertheless, for better comparability of the data, care was taken to include as few open-ended questions as possible in the study. Care was also taken to formulate the questions simply and precisely, as it was intended to be simple and comprehensible, since the form of the online survey makes it impossible for participants to ask follow-up questions.

10.1 Scientific standards

The present work contains beside the statistical evaluations just in the already preceding part a lot of literature research, with both forms of the scientific work thereby it was paid attention to the scientific standards. The principles of scientific work, which include the truthfulness, objectivity, scientific distance, traceability and verifiability were observed at all times and according to these principles, the present work was created. By a clearly structured outline, which the present work follows consistently, finally an answer of the leading question should take place. In the development and formulation of the guiding question, thematic backgrounds, causes and effects were included in order to deal critically with the topic (DGSA, 2020).

The principles of scientific work include above all working "lege artis", this means that with regard to one's own findings and also to the findings of third parties, the truth is told at all times, further, all results are consistently challenged and critically considered, thereby a critical discourse in the scientific community may also take place and should be further encouraged (DFG, 2019, P.9).

Going further, with regard to the right of informational self-determination, no more data should be collected than necessary to answer the research question, therefore the questions of the questionnaire were chosen with consideration and tailored to answer the research question. Ensuring anonymization and pseudonymization should also be maintained in a scientific paper. Personal data such as names and dates of birth were not requested in the present study and questionnaires were numbered for later traceability. The respondents were

informed that no personal data would be requested and that it would not be possible to trace the data back to the individual. The participants were also informed about the purpose for which the data they provided would be used and that it would be retained for a certain period of time. It is also important to keep the risks and burdens for the participants as low as possible, as the topic of mental health could be stressful for some participants or could act as a trigger, the questions were chosen carefully and care was taken to keep the burden for the participants as low as possible. Care has also been taken during the research process to ensure that all research relevant people have been appropriately involved in the research, so a variety of students have been given the opportunity to access the research field, in this case the questionnaire, and thus participate in the study (DGSA, 2020).

The entire present work is based on the preceding principles of scientific work, attention was also paid to the citation of third parties and to the correct citation method associated with it. At all times, the correct scientific handling of all existing data was thus ensured.

10.2 Literature research

The literature, on which the theoretical part of this paper is based, was selected using PubMed, Google Scholar and articles that currently address the topic. The terms "mental health" and "corona pandemic" were used as search terms at PubMed and they were combined with the term "AND", later it was also combined with the term "health behavior" or "distance teaching". Thus, when the term "AND" was used, the search orders ((mental health) AND (corona pandemic)) were obtained. AND ((health behaviour) OR (distance teaching)). Limits such as time publication, language and study design were applied. Additional records were identified through Google Scholar. It was not considered from which country the publications and articles originate, however, only texts were used, which were written in the languages German and English, furthermore it was considered to use only data, which are not older than 10 years, unless it was an important point, which was not to be found in newer data. In addition, data were mainly used in which the focus of the study was on the students, but further studies were used for comparison and for parts of the present work that were general and not specifically related to the students.

10.3 Questionnaire and Instruments

The questionnaire, which was answered by the students for this master thesis, was created independently, it contains 27 questions, of which five questions were formulated as open questions. Two questions were expected to have longer answers, as they are more in-depth and these are located at the end of the questionnaire and were chosen because the answer options would be too undifferentiated in a closed question and so important information could be missing. In order to ensure better comparability, many of the questions were formulated as closed questions with predefined answer options. However also the questions 2, 5 and 6 were likewise asked as open questions, thereby it concerns on the one hand in question 2 around the query of the age, here as already mentioned likewise no categorization was selected in the apron, since this is still possible in the analysis and one has so first a stronger differentiation possibility and it results under circumstances other more meaningful groups, than one would have specified these at the beginning. Question 5 refers to the course of study and was kept open just like the semester, since there are, for example, also some students who study part-time and therefore already study in higher semesters. In order not to restrict this, an open question was chosen.

The questionnaire was designed to answer the main question: "To what extent does the Corona pandemic and the associated distance teaching influence the health behavior of students at HAW-Hamburg, with a special focus on mental health? - Inclusion of the project SuSy" was conceived and pursues the following questions in more detail:

1. Is there a change in the psychological well-being of the students? - On the basis of which parameters can this be recognized?

2. Is there a change in mental health among students during the pandemic period?

In answering these questions, the objectives are:

1. to investigate the situation of students during the corona pandemic
2. to determine whether distance teaching had an impact on students' mental health
3. to explore whether students' health behaviors changed as a result of their time during the corona pandemic

4. to explore whether changes in students' health behaviors can be attributed to the time during the corona pandemic

5. to determine whether there are significance associations between the time of the coronal pandemic and the possible changes in students' mental health

6. to determine whether there are Significant Associations between the time of the corona pandemic and the possible change in students' health behaviors

10.4 Data collection

The term sample describes a smaller part of a population, which is considered representative for this population. The selection of this sample should be made according to certain criteria, in order to be able to guarantee a transferability to similar samples. The purpose of drawing a sample is to be able to represent the population, since a survey of the entirety is not possible within the scope of this study (Raab-Steiner, Benesch, 2015, p.20). In the present work, the sample was not selected manually, it resulted from the students who voluntarily participated in the study and the associated completion of the questionnaire. Students of the HAW Hamburg with the location Bergedorf were asked to fill out the questionnaire completely, this was done as already described by an online questionnaire. Criteria that had to be met in order to participate in the study were that the participants had already studied at least one semester at the university, so all newly enrolled students were excluded, as this could lead to distortions in the results. Another prerequisite for participation in the study was an understanding of the German language, since the majority of courses at HAW-Hamburg/Bergedorf are also taught in German. An alternative questionnaire in English was prepared and could be requested, which was made clear, but the questionnaire, which was available online, was in German.

The students were contacted via their HAW-internal email addresses and asked to take a short time to fill out the online questionnaire. Furthermore, social networks were used to draw attention to the study, using groups that are also HAW-internal and asking them to participate in the study if they have not already done so. Also in existing WhatsApp groups, which also include fellow students, it was asked to participate in the study. In addition, it would also have been possible to go to lectures at the HAW itself or to ask students to participate in the study during the break, but only a few events (such as laboratory practicals) took place at the HAW, most of which continue to be solved in the form of online events. In addition, the face-to-face

interviews were not conducted in order to have less contact with others to minimize potential infection.

10.5 Data from SuSy

As already briefly described in the previous section, I was also provided with data from the surveillance system "SuSy" for the long-term analysis. This data had already been entered and I was able to use it for the further analyses without having to transfer it independently into SPSS or Excel. This should enable a long-term analysis to take place for the answer to the key question and thus more statements can be made about whether the data from the specially developed questionnaire are only short-term phenomena, or whether the results can actually be traced back to the time of the corona pandemic. Although the analysis and comparison with the SuSy data will not allow us to say this definitively, it will make it easier to identify tendencies and give the statements a higher weighting. The evaluation of the data will also be done with SPSS, Excel will also be used as an analysis tool and for the creation of graphics.

11.Statistical analysis

The following chapters describe the statistical analyses. The data analysis was carried out with the statistics program IBM SPSS Version 27. In order to make the results comprehensible and the analyses replicable, all commands in SPSS were performed and provided with the syntax in Appendix A. The data includes questionnaires which are registered and entered in SPSS up to 08.07.2021. The significance level of (sig.) 95% is used with an error probability of $\propto = 0.05$. For the specially developed questionnaire, a syntax had to be created, this was also done in SPSS, as already mentioned, and all closed questions of the questionnaire were included in the syntax. For the analysis of the data from SySy a syntax already existed, this could be used for the analysis and did not have to be newly created.

For the open-ended questions, an attempt was made to find categories and to assign the individual answers to a category accordingly; this was done in order to be able to evaluate the answers with SPSS as well. If there were specific answers that could not be assigned to a category, these were considered separately and are included in the subsequent presentation of results. As already described, the criterion that at least one semester of study had already been completed was chosen for participation in the study, so all participants who did not meet this criterion were excluded from further analysis. In the case of missing data, these were also

declared as "missing" and are therefore visible in the analysis. Since participation in the study was voluntary, a selection bias cannot be ruled out, since, for example, not all semesters are equally represented in the study, which can lead to over- or underrepresentation of some groups.

In the following presentation of the results, first of all the results of the descriptive analysis of the own questionnaire are presented, followed by the results of the bivariate analysis. Afterwards the results of the descriptive and bivariate analysis of the data, which resulted by Susy follow and in the connection the discussion of the results and methods follows and it follows an outlook into the future. Finally, the conclusion, with which the present work is concluded, follows.

11.1 Descriptive analysis: Sample description

A total of 98 students participated in this study and the associated questionnaire. Of these, 63 participants are female (64.3%) and 35 participants are male (35.7%). All participants indicated their gender, so there were no missing values. Figure 4 shows the percentage distribution of gender.

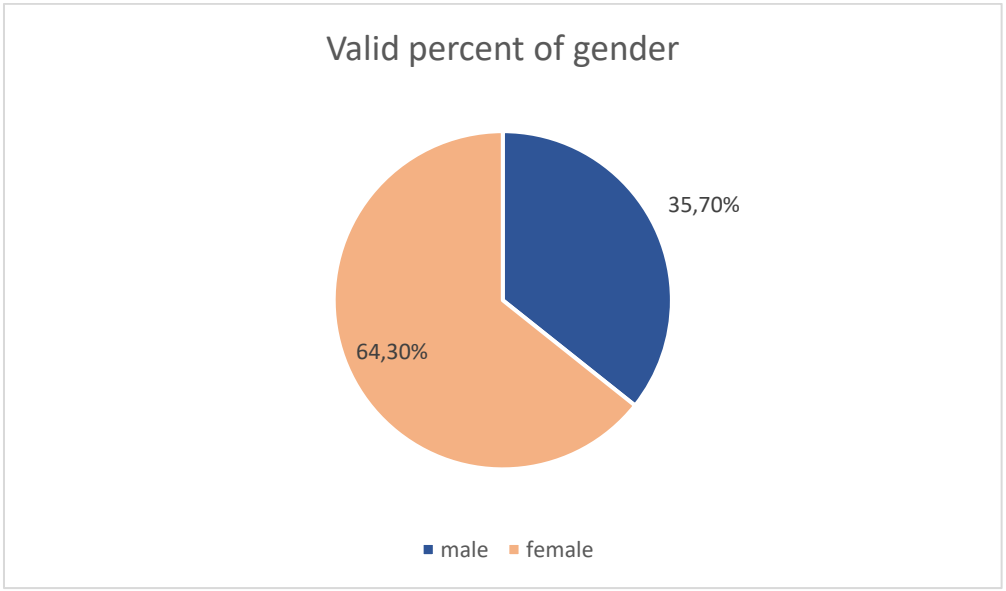

Fig. 4: Valid percent of gender

The participants who completed the questionnaire were between 19 and 29 years old, with a mean of 21.6 years. The age distribution is shown in Figure 5. 82.7% of the participants were single, 11.2% married and 2% stated that they were in an "other" marital status. 4 participants did not answer the question about their marital status (4.1%).

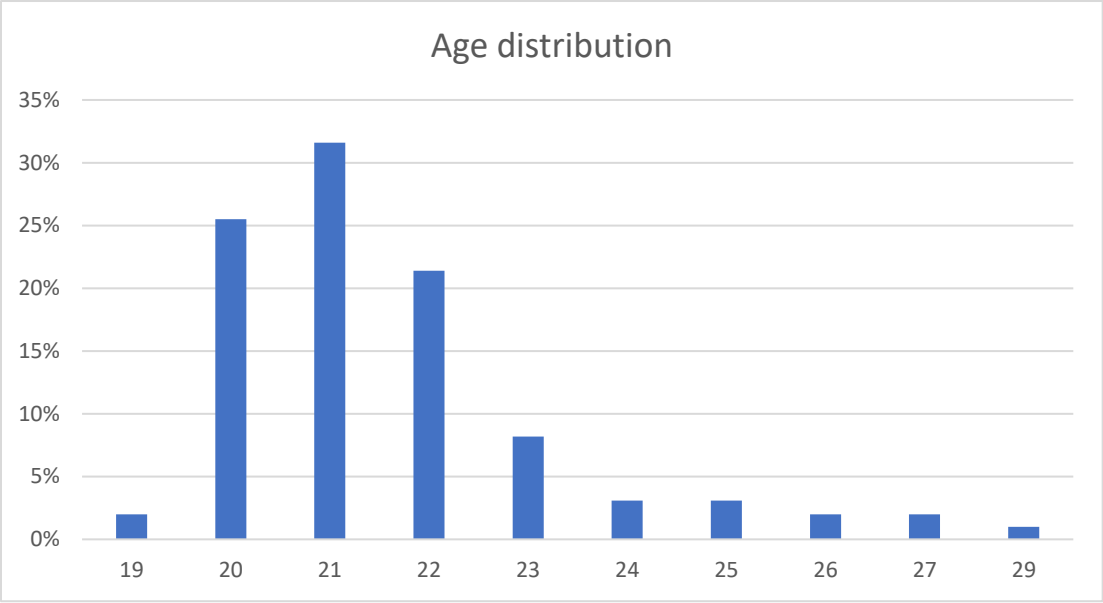

Fig. 5: Age distribution

When asked about the highest level of education, 15 participants (15.3%) stated that they had already completed an apprenticeship, training or technical college, 70 participants (71.4%) stated that they had the advanced technical college entrance qualification (Abitur) and a further 4 people (4.1%) had already completed a technical college/university degree and 6 people (6.1%) had other educational qualifications. 3 participants did not answer this question and are therefore missing (3.1%). Figure 6 shows the valid percentages of the distribution of the highest educational qualification.

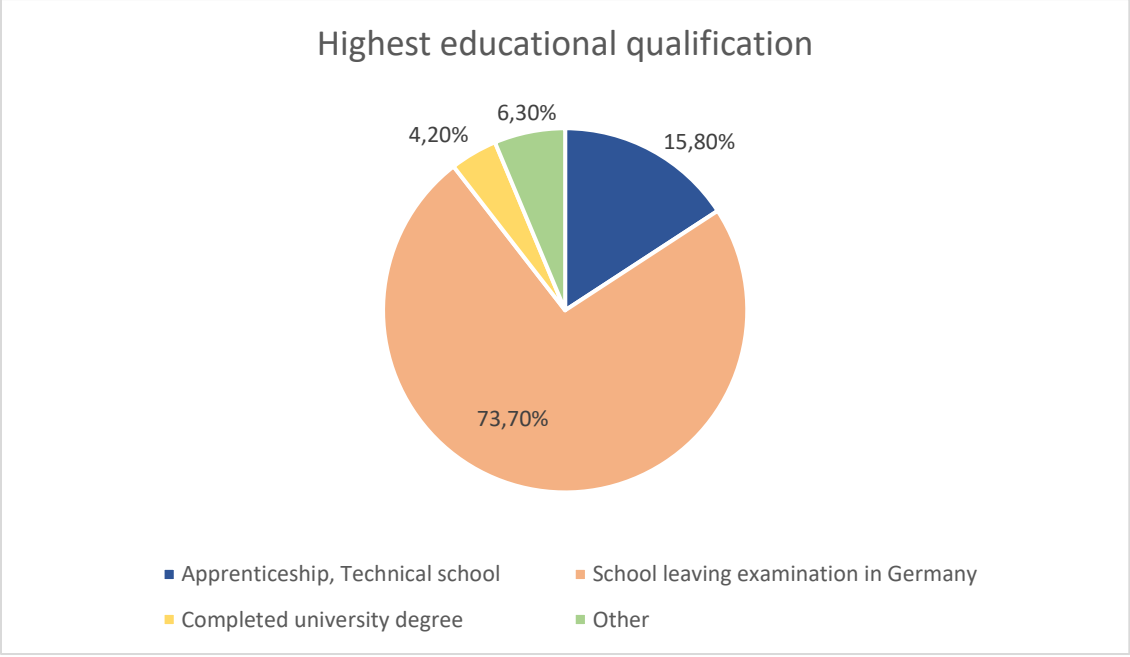

Fig. 6: Highest educational qualification

The questionnaire was completed by students from eight different study programs, with 13 participants from Health Science (Bachelor)(13.3%), Medical Technology (24.5%), Biotechnology (3.1%), Health Science (Master)(27.6%), Public Health (28.6%), Process Engineering (1%), Industrial Engineering (Bachelor)(1%), Industrial Engineering (Master)(1%). Of the 98 participants, 95 participants also indicated their current semester of study. Accordingly, 6 students were in their first semester at the time of the survey (6.1%), 21 participants were in their second semester which corresponds to 21.4% of the total cohort. 38 other participants were in their third semester (38.8%). There were 15 students in the fourth semester (15.3%) and 11 students in the fifth semester (11.2%). There was only one participating student in each of the sixth and eighth semesters, which also equals one percent, and there were two participants in the seventh semester (2%). As mentioned earlier, no response was given to this question by three participants.

37 of the participating persons additionally stated that they would describe themselves as having a migration background (37.8%), in contrast to 53 participating persons who stated that they did not have a migration background (54.1%). 7 persons did not give any information for this question and can therefore be described as missing (7.1%).

The current living situation of the students was also asked in order to be able to see later on whether the living situation has an influence on the mental health or well-being of the students. 22 of the students stated that they live alone (22.4%), another 39 people (39.8%) live in a shared apartment and 17 students live with their partner (17.3%). Sixteen people stated that they still live with their parents or relatives (16.3%) and four people did not answer this question (4.1%). In the following figure 7, the current living situation is shown graphically with the valid percentages.

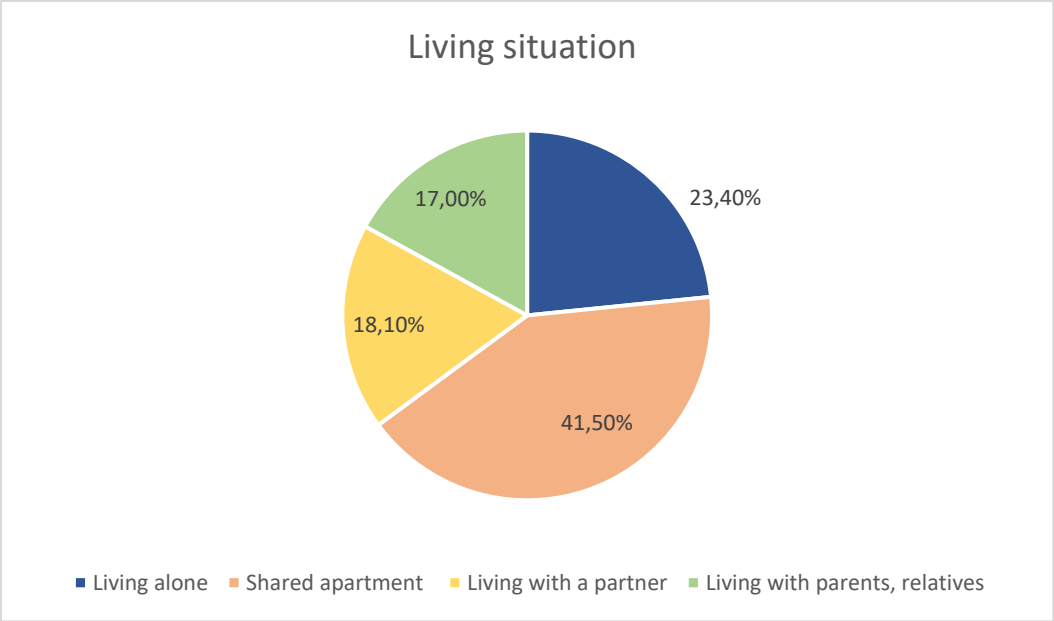

Fig. 7: Living situation

In addition, the occupational status of the students was also queried; the evaluations showed that 55 participating students are not employed (56.1%). 6 students are job seekers (6.1%), another participating person is fully employed and 34 students are employed part-time or hourly (34.7%).

Regarding health behavior, the students were asked in the questionnaire about their smoking behavior, first 47 students stated to smoke, which corresponds to 48% and 51 students stated not to smoke, which corresponds to 52%. Of particular interest was whether smoking behavior had changed during the pandemic period. This showed that 9 students stated that they had started smoking during the pandemic period (9.2%), 19 other students stated that they smoked significantly more during the pandemic period (19.4%) and also 19 students smoked somewhat more (19.4%). One participant each reported smoking significantly less and smoking somewhat less (1.0%). 10 students indicated that they had stopped smoking (10.2%) and for 36 students smoking behavior remained unchanged (36.7%). 3 persons did not give any information (3.1%). Figure 8 shows the smoking behavior graphically in valid percentages.

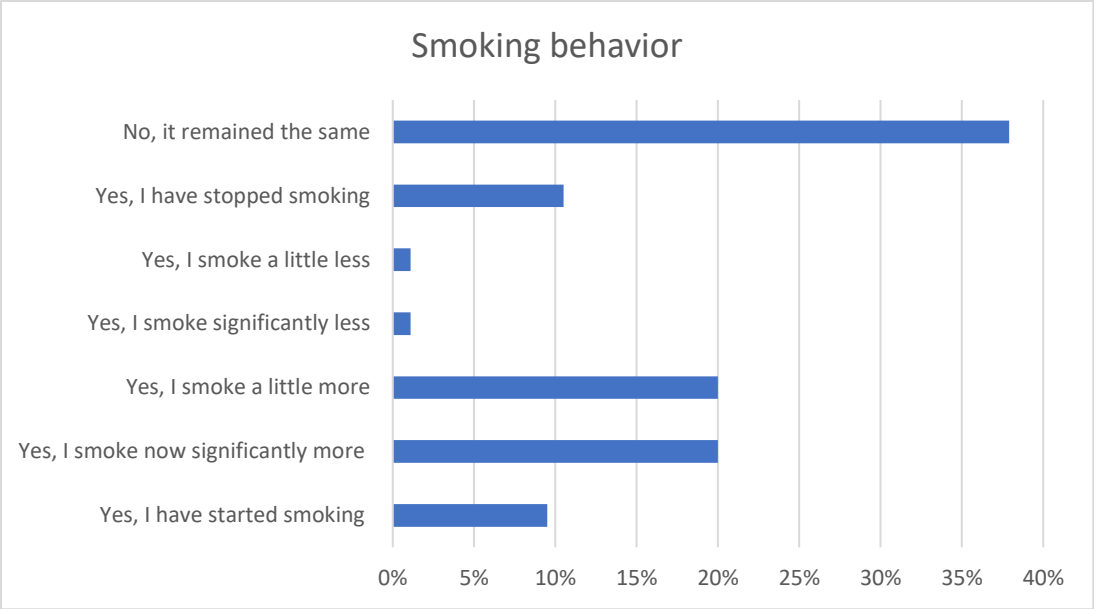

Fig. 8: Smoking behavior

In addition to smoking behavior, the consumption of alcohol was also surveyed; this was also intended to pick up on and reflect the health behavior of the students. First of all, it was asked how often alcohol is consumed, 6 students stated that they never consume alcohol (6.1%), 33 participants stated that they consume alcohol about once a month (33.7%) and another 44 persons stated that they consume alcohol about one to four times a month (44.9%). 7 people reported drinking alcohol about one to three times a week (7.1%) and another five people even reported drinking alcohol four or more times a week (5.1%). 3 participants gave no answer to the question regarding alcohol consumption (3.1%). This question was also subsequently asked whether alcohol consumption had changed during the pandemic period. Through analysis, it became apparent that 5 participants indicated that they had started drinking alcohol (5.1%), 10 individuals indicated that they drank significantly more alcohol during the pandemic period (10.2%), and another 57 participants drank somewhat more alcohol during the pandemic period (58.2%). Furthermore, 17 individuals reported drinking slightly less alcohol during the pandemic period (17.3%) and 6 individuals reported that their alcohol consumption remained unchanged (6.1%). Again, 3 participants gave no answer and are therefore missing (3.1%). The valid percentages are shown graphically in Figure 9 below.

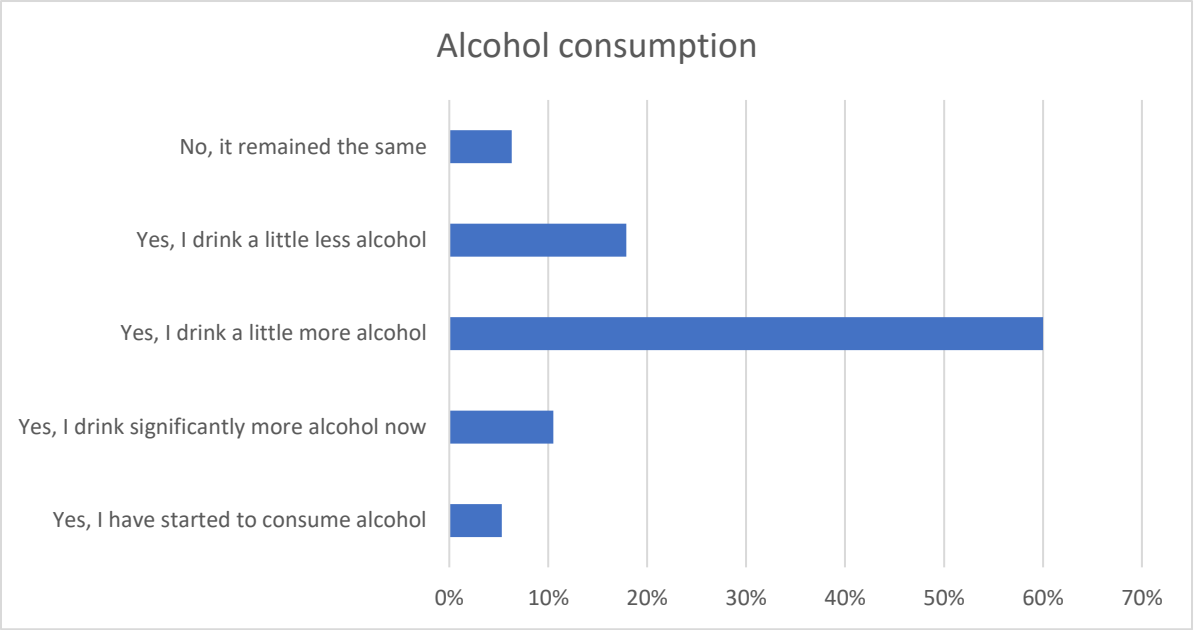

Fig. 9: Alcohol consumption

Of the 98 people who took part in the questionnaire, 95 said they had already taken part in an online lecture (96.9%) and one person had not yet taken part in an online lecture (1.0%), while two other people did not answer this question (2.0%). The question was also asked whether, in addition to the online lectures, at least one semester of regular face-to-face study had taken place. All participants gave an answer and 84 persons have already studied at least one semester regularly (85.7%) and 14 persons have not yet studied in presence and only know the online lectures (14.3%).

Furthermore, the questionnaire asked the students to assess whether they found online lectures burdensome under the condition that they had already attended an online lecture. 71 students answered the question with "yes" and found the online lectures burdensome (72.4%). In contrast, 14 students stated that they did not find the online lectures burdensome (14.3%). 10 students saw no change and indicated that they did not feel more burdened by the online lectures than usual (10.2%) and another 3 people did not answer this question (3.1%).

Also related to the online lectures, students were asked if they felt more stressed by the online lectures, with 69 students indicating they felt more stressed by the online lectures (70.4%) and 16 students indicating they did not feel more stressed by it (16.3%). In contrast, 10 students were not more stressed than usual by the online lectures (10.2%) and again 3 students gave no answer (3.1%).

In order to be able to shed more light on the mental health of the students, it was first asked whether the students had felt mentally upset during the pandemic period. 68 people stated that they had felt mentally upset during this time (69.4%), 26 participants stated that they had not felt mentally upset (26.5%) and 4 people did not want to give any information (4.1%).
The following questions had the same answer options, which were divided as follows: "not applicable at all", "hardly applicable", "somewhat true", "mainly applicable" and "completely applicable". In the following Table 1, the results are presented graphically and concise results are highlighted in more detail.

	not applicable at all	hardly applicable	somewhat true	mainly applicable	completely applicable
I felt psychologically stable during the pandemic period	43.20%	29.50%	10.50%	11.60%	5.30%
I have felt listless and unmotivated	0.00%	9.70%	29.00%	41.90%	19.40%
My living situation is not suitable for the forms of digital teaching	4.30%	19.60%	39.10%	27.20%	9.80%
I miss the personal exchange with the professors	0.00%	10.60%	34.00%	38.30%	17.00%
I miss the personal exchange with the students	1.10%	9.70%	29.00%	36.60%	23.70%
I have accomplished less than I set out to do	3.30%	10.90%	38.00%	28.30%	19.60%
I felt optimistic about the future	15.10%	32.30%	37.60%	12.90%	2.20%

Tab. 1: General questions about dealing with the Corona pandemic

Particularly striking in Table 1 is that 43.2% of the students answered, "not applicable at all" to the question of whether they felt psychologically stable, and a further 29.5% stated "hardly applicable". Likewise concise numbers resulted with the question whether the students felt listless and unmotivated, here 41.9% said that this is mainly applicable and further 19.4% that this is completely applicable. Also missing is personal interaction with both students and

professors, 38.3% said that it is "mainly applicable" that they miss interaction with professors and 17% said that it is "completely applicable". Personal interaction with students was also lacking, with 36.6% indicating "maily applicable" and 23.7% indicating "completely applicable". 15.1% further stated when asked if they felt optimistic about the future that this was not applicable at all, 37.3% stated hardly applicable and another 37.6% stated somewhat true on this.

Further questions were asked about the mental health in connection with the online events, here the answer options were divided into "always", "mostly", "sometimes", "rarely" and "never". The questions were, "How often were you calm and relaxed during the time of the online events?", "How often were you stressed during the time of the online events?" and "How often were you sad during the time of the online events?". The results are summarized in Table 2 and examined in more detail below.

	always	mostly	sometimes	rarely	never
Calm and relaxed	8.40%	36.80%	35.80%	15.80%	3.20%
Stressed	23.40%	34.00%	26.60%	12.80%	3.20%
Sad	0.00%	4.10%	33.00%	53.60%	9.30%

Tab. 2: Mental health in connection with the online events

When asked how often students felt calm and relaxed during the time of the online events, 8.4% answered that they always felt calm and relaxed, 36.8% felt calm and relaxed most of the time. Another 35.8% said they sometimes felt calm and relaxed and 15.8% only rarely. 3.2%, on the other hand, said they never felt calm and relaxed.

During the time of the online events, 23.4% of the students who participated in the questionnaire always felt stressed, another 34% felt stressed most of the time, and 26.6% felt stressed sometimes. 12.8% of students reported rarely feeling stressed and 3.2% reported never feeling stressed during the time of the online events.

None of the students who participated in the questionnaire reported always feeling sad during the time of online events, however, 4.1% reported feeling sad most of the time and another 33% reported feeling sad sometimes. More than half of the students (53.6%) reported rarely feeling sad during the time of the online events and 9.3% reported never feeling sad.

In the further course of the questionnaire, it was asked whether the contact to other people was impaired by the physical or mental condition during the pandemic. Here, 46 students indicated that contact with other people was impaired (46.9%) and 50 students indicated that contact was not impaired (51.0%). Two other people did not give an answer here (2.0%).

Prior to the pandemic, 24 students described their mental health as very good (24.5%) and a further 48 as good (49.0%). 18 students would describe their mental health as less good (18.4%) and 4 students would describe it as poor (4.1%). Likewise, 4 students gave no response to this question (4.1%).

Building on this, students were also asked how they would describe their mental health during the online semesters, here 3 students indicated that their mental health during the online semesters was very good (3.1%), 20 students indicated that their mental health was good (20.4%), 47 of the students rated their mental health during the online semesters as not so good (48.0%), and 24 students indicated poor mental health during the online semesters (24.5%). There were 4 missing responses (4.1%). In figure 10 and 11 the mental health before the pandemic is compared to the mental health during the online semesters, the valid percentages are shown.

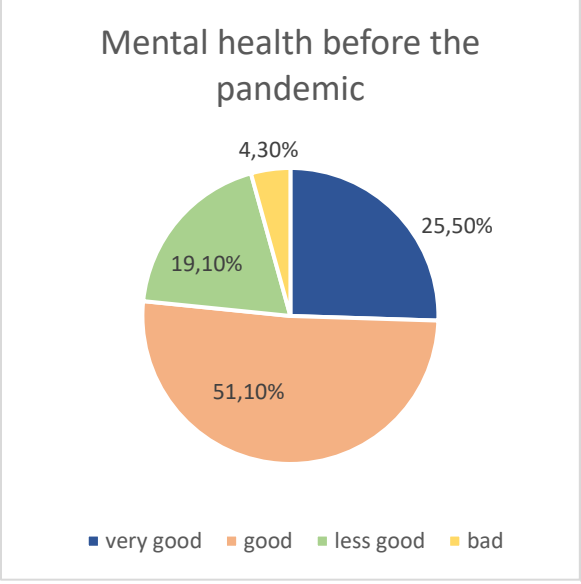

Fig. 10: Mental health before the pandemic

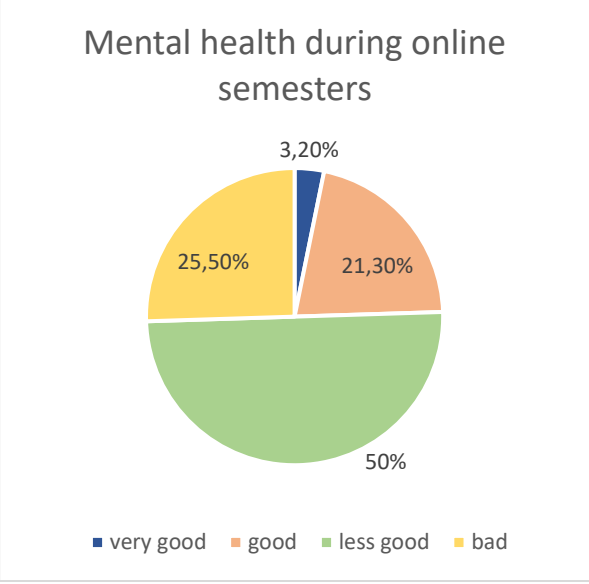

Fig. 11: Mental health during online semesters

Since social contact in particular also plays a major role in mental health, students were asked how often they maintained social contact in various forms during the online semesters,

covering physical contact, contact via phone calls and video calls, and contact via emails and chats. Two (2.0%) of the students said they always had physical contact with people and thus maintained social contact, eight (8.4%) said this happened mostly through physical contact, and another 25 students said it happened mostly through physical contact (25.5%). Forty-eight of the students (49.0%), indicated that they rarely had physical contact with others and 12 students indicated that they never had physical contact during the online semesters (12.2%). Three students did not answer this question and are considered absent (3.1%).

Contact was always maintained via phone calls and video calls by three students (3.1%), another 13 students said that contact was mostly maintained via phone calls and video calls (13.3%), and 42 students said that it was sometimes (42.9%). 33 students said they rarely maintained contact in the form of phone calls and video calls (33.7%) and 3 students said they never maintained contact in such ways (3.1%). 4 students did not provide an answer in this regard (4.1%).

Last in this category, students were asked to indicate how often they maintained social contact in the form of emails and chats. Here, 23 students said it was always the case (23.5%), 53 other students said it was most of the time (54.1%), and 14 participating students said they sometimes maintained their social contacts through emails and chats (14.3%). Only 3 students indicated that they rarely sought and attempted to maintain contact in this manner (3.1%) and one person further indicated that they never maintained contact in this manner (1.0%). Here, too, 4 statements were recorded as missing (4.1%). In the following table these results are shown again, here the valid percentages are represented, so that the missing values are not included.

	always	mostly	sometimes	rarely	never
Physical contact	2.10%	8.40%	26.30%	50.50%	12.60%
Phone calls and video calls	3.20%	13.80%	44.70%	35.10%	3.20%
Emails and chats	24.50%	56.40%	14.90%	3.20%	1.10%

Tab. 3: Ways of social contact

The final closed-ended question asked if the frequency of social contact had changed since the pandemic, with more than three-quarters of the students surveyed indicating that social contact had decreased (76.5%), only 4 students indicating that frequency had increased (4.1%), and 14 students indicating that frequency had remained the same (14.3%), with a further 5 students recorded as absent (5.1%).

At the end of the questionnaire, two open-ended questions were asked. In the first of the two questions, the students were asked to answer what support they would like to receive from the university with regard to psychological well-being during the pandemic. There were 21 answers, which could be divided into 4 categories. In this context, 5 students stated that they would like there to be more offers to which one can turn within the university and that these are also presented, so that all students are informed about which offices one can turn to in case of problems. 7 students would like there to be group offers where you can talk about problems, these could also take place digitally, but these should take place at regular intervals. Another 4 students stated that they would like to have more support from the professors, they would especially like to see a more clearly structured planning of the online lectures. 5 students additionally stated that they would like to have more exchange with the students and that they would like the university to create offers in which one can meet online for exchange and that these are led by one person.

In the second open question, the students were asked to state what would contribute to improving their psychological well-being. 18 students gave an answer, which could be classified into three subcategories. On the one hand, 7 students stated that the beginning of face-to-face events would improve their psychological well-being and also the taking place of exams in face-to-face, another 5 students stated that social contacts and especially the exchange with other students would improve their psychological well-being and 6 students stated that the normality, without masks, without distance rules and without the worry of another wave would improve their psychological well-being. Following the descriptive analysis of the data, the bivariate analysis of the data from the questionnaire now follows in the next section.

11.2 Bivariate analysis

At the beginning of the bivariate analysis, the Kolmogorov-Smirnov test was first used to test for normal distribution of the data. It was found that the p-value was 0.00 and therefore the 0-hypothesis, which states that there is a normal distribution, must be rejected. Thus, it could be determined that no normal distribution can be seen in the available data, whereby a non-parametric analysis was chosen.

First, the correlations between the dependent and independent variables were looked at. Here, the ordinal variable Mental Health forms the dependent variable and is related to the independent variables. Spearman's ρ is used for the correlations, which are at least all ordinally scaled.

		Mental Health
Smoking behaviour	Correlation Coefficient	-0.014
	Sig. (2-tailed)	0.895
	N	91
Alcohol consumption	Correlation Coefficient	-0.023
	Sig. (2-tailed)	0.830
	N	91
Psychological stability	Correlation Coefficient	-0.032
	Sig. (2-tailed)	0.760
	N	91
Unmotivated and listless	Correlation Coefficient	0.226
	Sig. (2-tailed)	0.033
	N	89
Exchange with professors	Correlation Coefficient	0.199
	Sig. (2-tailed)	0.060
	N	90
Less accomplished than planned	Correlation Coefficient	0.072
	Sig. (2-tailed)	0.505
	N	88

Seeing the future optimistically	Correlation Coefficient	0.150
	Sig. (2-tailed)	0.160
	N	89
Social contacts	Correlation Coefficient	0.126
	Sig. (2-tailed)	0.235
	N	90
Online lectures stressful	Correlation Coefficient	-0.120
	Sig. (2-tailed)	0.257
	N	91

Tab. 4: Correlations between the ordinal variables and Mental Health

In the above table the results of the Spearman test are presented, where it can be seen that there were no significant correlations in the studied variables "Smoking behavior", "Alcohol consumption", "Psychological stability", "Less accomplished than planned", "Seeing the future optimistically", "Social contacts" and "online lectures stressful".

The variable "Unmotivated and listless" showed that there was a very slight positive correlation, so it says that the more unmotivated and listless a student is, the better that person's mental health is. Also a very slight positive correlation can be seen in the variable "Exchange with professors", here the correlation says that the more exchange with professors, the higher is the mental health of the student.

In the following, the independent variables are also examined for correlations; here, too, Spearman is used for analysis.

Smoking behaviour

Alcohol consumption	Correlation Coefficient	-0.134
	Sig. (2-tailed)	0.204
	N	92
Psychological stability	Correlation Coefficient	-0.010
	Sig. (2-tailed)	0.926

	N	92
Unmotivated and listless	Correlation Coefficient	-0.001
	Sig. (2-tailed)	0.933
	N	91
Exchange with professors	Correlation Coefficient	-0.035
	Sig. (2-tailed)	0.744
	N	91
Less accomplished than planned	Correlation Coefficient	0.043
	Sig. (2-tailed)	0.691
	N	89
Seeing the future optimistically	Correlation Coefficient	-0.280
	Sig. (2-tailed)	0.007
	N	91
Social contacts	Correlation Coefficient	0.237
	Sig. (2-tailed)	0.023
	N	92
Online lectures stressful	Correlation Coefficient	-0.411
	Sig. (2-tailed)	0,001
	N	92

Tab. 5: Correlations between the ordinal variables: Smoking behavior

Table 5 shows the correlations between the independent variables, initially referring to smoking behavior, and in the subsequent tables referring to a different independent variable. For the variable "Alcohol consumption" a low negative correlation (ρ =-0.134; p=0.204) can be seen, which is however not significant. Also for the variable "Psychological stability" a weak negative correlation can be seen, which would state that the less the students felt

psychologically stable, the more they smoked, however this correlation is also not significant (ρ =-0.010; p=0.929).

For the variable "Unmotivated and listless", only a minimal negative correlation is evident, but this is also not considered significant (ρ=-0.001; p=0.933). For the variable "Exchange with professors" a weak negative correlation can be found, but the result is also not significant (ρ=-0.035; p=0.744). The variable "Less accomplished than planned" shows a slight positive correlation, but this is not significant (ρ=0.043; p=0.691). For the variable "Seeing the future optimistically", a significant weak negative correlation can be found. Here, the data states that the more optimistic one is about the future, the less one smokes (ρ=-0.280; p=0.007). A significant result is also evident in "social contacts", this is a weak positive correlation stating that the more social contacts were maintained, the less smoking was done (ρ=0.237; p=0.023). Another significant moderate negative correlation can be seen in the variable "Online lectures stressful", here it must be assumed that the more the online events are perceived as a stressor, the more the students smoked (ρ=-0.411; p=0.001).

Alcohol consumption

Psychological stability	Correlation Coefficient	-0.094
	Sig. (2-tailed)	0.372
	N	92
Unmotivated and listless	Correlation Coefficient	-0.074
	Sig. (2-tailed)	0.488
	N	90
Exchange with professors	Correlation Coefficient	-0.125
	Sig. (2-tailed)	0.239
	N	91
Less accomplished than planned	Correlation Coefficient	-0.164
	Sig. (2-tailed)	0.124
	N	89
Seeing the future optimistically	Correlation Coefficient	0.091
	Sig. (2-tailed)	0.395

	N	90
Social contacts	Correlation Coefficient	0.080
	Sig. (2-tailed)	0.451
	N	91
Online lectures stressful	Correlation Coefficient	0.143
	Sig. (2-tailed)	0.175
	N	92

Tab. 6: Correlations between the ordinal variables: Alcohol consumption

When looking at the independent variable "Alcohol consumption", it can be seen that there are no significant results with any of the other independent variables. In the following, however, the correlations are briefly summarized, but no significance is to be assumed here. With the variable "Psychological stability" a negative correlation of ρ=-0.094 with a p-value of 0.372. Also with the variable "Unmotivated and listless" a negative correlation can be found, with the following values: ρ=-0.074 and a p-value of 0.488. With the exchange with the professors a negative correlation can also be found, which would state with a significant result that the less contact with the professors existed, the more alcohol was consumed. However, as described above, no significance can be found for this result. Another weak negative correlation can be seen with the variable "Less accomplished than planned", ρ=-0.164 with a p-value of 0.124. On the other hand, a slight positive correlation can be seen with the variable "Seeing the future optimistically" with the values ρ=0.091 and with a p-value of 0.395. Another weak positive correlation can be seen for the variable "Social contacts" (ρ=0.080; p=0.451), as well as for "Online lectures stressful" (ρ =0.143; p=0.175).

Psychological stability

Unmotivated and listless	Correlation Coefficient	-0.045
	Sig. (2-tailed)	0.676
	N	90
Exchange with teachers	Correlation Coefficient	-0.036
	Sig. (2-tailed)	0.734

	N	91
Less accomplished than planned	Correlation Coefficient	-0.009
	Sig. (2-tailed)	0.936
	N	89
Seeing the future optimistically	Correlation Coefficient	-0.050
	Sig. (2-tailed)	0.638
	N	90
Social contacts	Correlation Coefficient	0.001
	Sig. (2-tailed)	0.991
	N	91
Online lectures stressful	Correlation Coefficient	-0.006
	Sig. (2-tailed)	0.956
	N	92

Tab. 7: Correlations between the ordinal variables: Psychological stability

Also in the consideration of the independent variable "Psychological stability" no significant results and thus correlations were found, also here there is a short summary of the results, without which a significance of the results can be assumed. First, a negative correlation between the independent variables "Psychological stability" and "Unmotivated and listless" can be seen, this is only weak and as already described not significant (ρ=-0.045; p=0.676). Also for the variables "Exchange with teachers" (ρ=-0.036; p=0.734), "Less accomplished than planned" (ρ=-0.009; p=0.936) and "Seeing the future optimistically" (ρ=-0.050; p=0.638) we can speak of a negative correlation, which can be classified as not significant. A minimal positive correlation can be noted with social contacts, which would mean that the more social contacts are kept, the more psychologically stable the students feel (ρ=-0.001; p=0.991). Another negative correlation occurs with the independent variable "Online lectures stressful", which would mean that the less the online events are perceived as a stressor, the higher the students' psychological stability.

		Unmotivated and listless
Exchange with professors	Correlation Coefficient	0.805
	Sig. (2-tailed)	0.001
	N	93
Less accomplished than planned	Correlation Coefficient	0.404
	Sig. (2-tailed)	0.001
	N	91
Seeing the future optimistically	Correlation Coefficient	0.026
	Sig. (2-tailed)	0.810
	N	89
Social contacts	Correlation Coefficient	0.160
	Sig. (2-tailed)	0.130
	N	91
Online lectures stressful	Correlation Coefficient	-0.175
	Sig. (2-tailed)	0.049
	N	90

Tab. 8: Correlations between the ordinal variables: Unmotivated and listless

In Table 8, which can be found above, the independent variable "Unmotivated and listless" was examined more closely, and it was found that there was a significant positive correlation with the variable "Exchange with professors", where the data indicate that the more exchange with professors is wanted, the more the students felt unmotivated and listless (ρ=0.805; p=0.001). Also a weak to moderate positive correlation was evident in the variable "Less accomplished than planned", this states that the more students felt they accomplished less than they intended, the more unmotivated and listless they became, this result is also significant with a p-value of 0.001 (ρ=0.404). The studied variables "Seeing the future optimistically" (ρ=0.026; p=0.810) and "Social contacts" (φ=0.160; p=0.130) also show a weak positive correlation, but these results cannot be considered significant. On the other hand, a significant negative correlation can be seen in the variable "Online lectures stressful", here it can be assumed that the more the students feel stressed by the online events, the less unmotivated and unmotivated they are (ρ=-0.175; p=0.049).

		Exchange with professors
Less accomplished than planned	Correlation Coefficient	0.586
	Sig. (2-tailed)	0.001
	N	92
Seeing the future optimistically	Correlation Coefficient	0.008
	Sig. (2-tailed)	0.939
	N	90
Social contacts	Correlation Coefficient	0.100
	Sig. (2-tailed)	0.345
	N	91
Online lectures stressful	Correlation Coefficient	-0.186
	Sig. (2-tailed)	0.047
	N	91

Tab. 9: Correlations between the ordinal variables: Exchange with professors

In Table 9, the independent variable "Exchange with professors" is examined in more detail, here it can be seen that there is a significant positive correlation with the variable "Less accomplished than planned", this correlation is additionally significant and states that the more students feel they accomplished less than they set out to do, the more contact and exchange with professors they need (ρ=0.586; p=0.001). The variables "Seeing the future optimistically" (ρ=0.008; p=0.939) and "Social contacts" (ρ=0.100; p=0.345) also both show a slight positive correlation, but neither result is significant. A slight negative correlation, which is significant, can be seen in the variable "Online lectures stress-full", here it can be assumed that the more stressed the students are from the online lectures, the less contact they need and want with the professors (ρ=-0.186; p=0.047).

		Less accomplished than planned
Seeing the future optimistically	Correlation Coefficient	0.008
	Sig. (2-tailed)	0.939
	N	90
Social contacts	Correlation Coefficient	-0.010

	Sig. (2-tailed)	0.925
	N	89
Online lectures stressful	Correlation Coefficient	0.000
	Sig. (2-tailed)	1.000
	N	88

Tab. 10: Correlations between the ordinal variables: Less accomplished than planned

Seeing the future optimistically

Social contacts	Correlation Coefficient	0.130
	Sig. (2-tailed)	0.224
	N	89
Online lectures stressful	Correlation Coefficient	0.099
	Sig. (2-tailed)	0.351
	N	90

Tab. 11: Correlations between the ordinal variables: Seeing the future optimistically

When analyzing the independent variable "Less accomplishes than planned" (Table 10) and the independent variable "Seeing the future optimistically" (Table 11), no significant results were found. The analysis of the variables "Less accomplishes than planned" and "Seeing the future optimistically" showed a minimal positive correlation (ρ=0.008; p=0.939), this is also true for the variable "Online lectures", although here the correlation is at zero (ρ=0.000; p=1.000). A slight negative correlation, on the other hand, can be seen for the variable "Social contacts", this would mean that the more social contacts were maintained, the less students were able to accomplish what they set out to do, however, as described earlier, this result is not significant (ρ=-0.010; p=0.925).

The results from Table 11 show that there is a slight positive correlation between the variables "Seeing the future optimistically" and "Social contacts", this would mean that the more social contacts students have, the more positive they are about the future as well, however, no significance could be found here either (ρ=0.130; p=0.224). A slight positive correlation was also found for the variable "Online lectures stressful", which is also not significant (ρ=0.099; p=0.351).

		Social contacts
Online lectures stressful	Correlation Coefficient	-0.350
	Sig. (2-tailed)	0.001
	N	91

Tab. 12: Correlations between the ordinal variables: Social contacts

The last independent variable to be analyzed is the variable "Social contacts", here a slight negative correlation could be found, this means for the interpretation that the more the online events were perceived as stressful by the students, the less social contact the students had.

12.Analysis of the SuSy data

In the following section, we will take a closer look at the analysis of the data that resulted from the SuSy research project. In the following interpretation of the results, the analyses of the data from the questionnaire and the analyses of the data, which resulted from SuSy, are put in connection with each other. First the descriptive analysis and the bivariate analysis of the data from the Surveillance System SuSy follow. The analysis is also carried out with the SPSS program and Excel is also used for the presentation of the results.

12.1 Descriptive analysis SuSy

A total of 247 participants took part in the survey of the Surveillance System SuSy, of which 197 participants were female (79.8%), 47 participants were male (19.0%) and 2 participating students stated that they were diverse (0.8%). One person did not provide an answer for this question and should be noted as missing (0.4%). A graphical representation of the valid percentages can be found in Figure 12 below.

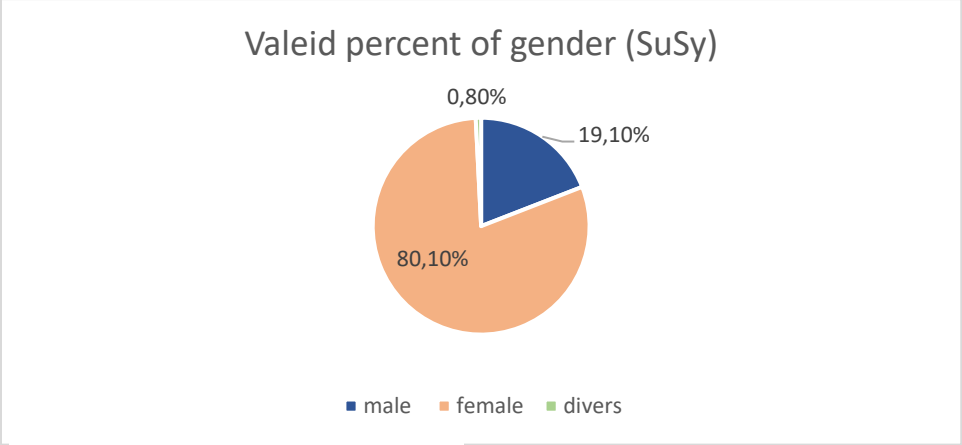

Fig. 12: Valid percent of gender (SuSy)

In terms of age, 246 of the 247 participants also stated their age, and thus one person is to be seen as missing here as well. The participating students were between 18 and 53 years old, with a mean of 24.97 and a median of 23.00. Furthermore, students from three study programs took part in the survey; of the 245 people who answered this question (missing: 2 people, 0.8%), 142 studied in the Bachelor's program in Health Sciences (57.5%), 28 students took the Master's program in Health Science or Public Health (11.3%) and a further 71 participants studied in the Bachelor's program in Medical Technology (28.7%).

Also in the SuSy survey the question about the living situation was asked, here 31 of the students indicated to live alone in an apartment (12.6%), 52 further students indicated to live in a shared apartment (21.1%) and 75 participants live together with their partner (30.4%). There were 59 students living with their parents or other relatives (23.9%) and lastly, 26 of the students reported living in a dormitory (10.5%). For this question, 4 students gave no response and are recorded as missing (1.6%).

Specific questions about coronavirus were also included in the SuSy questionnaire, here it was asked how many times students have had a coronavirus test performed. 85 participants have never had a coronavirus test performed (34.4%). 138 of the students stated that they had already had a coronal test performed 1-4 times (55.8%). 15 further students stated to have had a coronary test performed 5-7 times (6.0) and finally 7 students stated to have had a coronary test performed 8-12 times (2.8). 2 persons did not give an answer (0.8%).

Also the vaccination status was asked, here one indication is to be noted as missing (0.4%) and 63 of the students indicated to be already vaccinated (25.5%). 154 of the students stated that they had not yet been vaccinated but planned to do so (62.3%) and 29 of the students stated that they had neither been vaccinated nor planned to do so (11.7%).

In Figure 13 below, physical well-being is shown graphically, using valid percentages. Here, students were asked to rank their physical well-being on a scale of 1-10, with 10 representing the best physical well-being. The graph clearly shows that the students mainly classify their physical well-being in the range between 7 and 8. Here, it is 26.0% of the students who classify their physical well-being at both 7 and 8. Another 8.5% of participants rated themselves at a 9 and 2.4% rated their physical well-being at the highest possible number of 10. A total of 9.7% of students rated their physical well-being between 1 and 3 in this process.

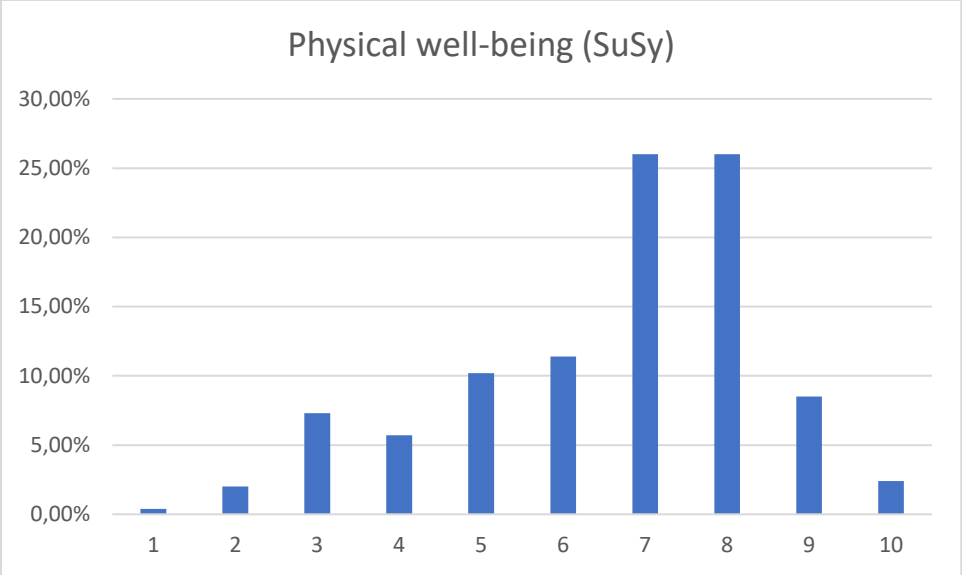

Fig. 13: Physical well-being (SuSy)

In addition to physical well-being, mental well-being was also surveyed using a scale of 1-10. Here, too, 10 is the highest possible psychological well-being. Figure 14 below shows the results graphically, using the valid percentages. 3 students estimated their psychological well-being on the scale at a 1 (1.2%), further 15 students estimated their psychological well-being at a 2 (6.1%) and 18 of the participants indicated a 3 (7.3%). Between 4 and 8 most of the students estimated their psychological well-being, this results in a total of 188 students and thus 76.4% of the total participants. 16 more students rated their psychological well-being at a 9 (6.5%) and 6 students rated their psychological well-being at the highest possible point on the scale, which is 2.4% of the participants.

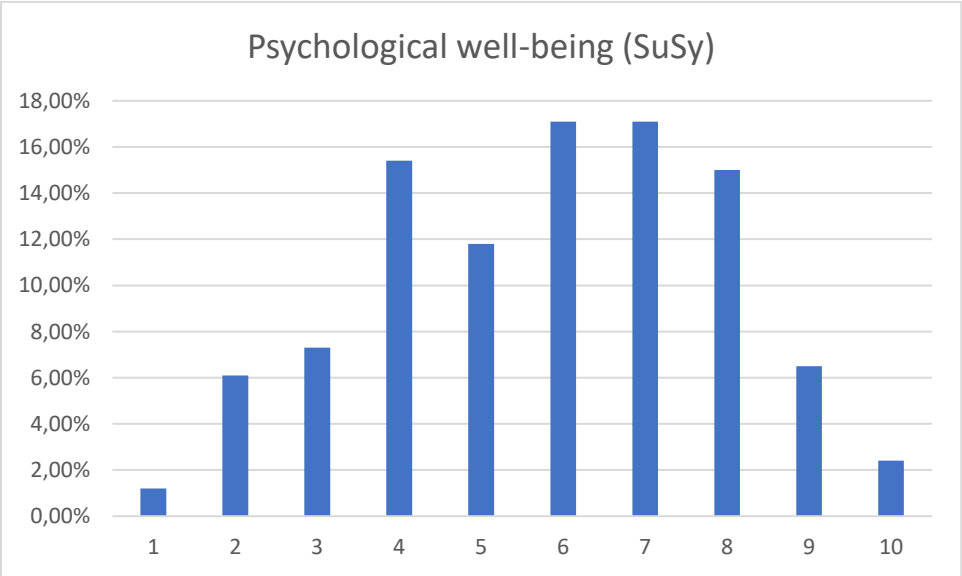

Fig. 14: Psychological well-being (SuSy)

An assessment of stress level was also made using a scale of 1-10, with no participant indicating that their stress level was 1, 10 students indicating that their stress level was 2 (4.0%) and 13 students indicating a stress level of 3 (5.3%). At a stress level of 4, 20 of the students estimated themselves (8.1%) and 38 of the students each estimated themselves at a stress level of 5 and 7 (15.4%) At a stress level of 6, 31 of the participating students estimated themselves (12.6%). Most students reported a stress level of 8 (20.2%) and an additional 34 students considered themselves at a stress level of 9 (13.8%). The highest possible stress level of 10 was reported by 13 of the students, resulting in 5.3% of the participants.

In order to be able to make a comparison with the self-prepared questionnaire later on, a presentation of the results for the questions on alcohol consumption and cigarette consumption was also chosen here, which allows conclusions to be drawn about health behavior. In the present questionnaire of SuSy the alcohol consumption of the last 30 days was inquired, here 5 of the students gave no answer and are missing (2.0%). 26 of the students stated that they had never drunk alcohol, which corresponds to 10.5%. A further 62 students stated that they had drunk alcohol before, but not in the last 30 days (25.1%). The most frequent answer given by 107 students was that they had drunk alcohol on 1-4 days in the last 30 days (43.3%). Another 37 students, or 15.0%, reported drinking alcohol on 5-10 days in the past 30 days. On 11-20 days, 8 of the students drank alcohol (3.2%) and 2 of the students reported drinking alcohol on 21 days to daily in the past 30 days (0.8%).

When asked about cigarette use, 170 of the students reported never having smoked, which is 68.8% of the participants. Another 35 of the participating students stated that they had smoked before, but not in the last 30 days (14.2%). On 1-4 days in the last 30 days, 18 of the students smoked (7.3%) and another 2 students reported smoking on 5-10 days (0.8%). 4 students reported smoking on 11-20 days in the past 30 days (1.6%). The remaining 15 participating students reported having smoked on 21 days to daily (6.1%), with three students providing no information and thus to be reported as missing (1.2%).

12.2 Bivariate Analysis

In the following section of the bivariate analysis, it was first determined using the Kolmogorov-Smirnov test that the p-value was 0.000 and the 0-hypothesis, which states that there is a normal distribution, must be rejected. Thus, it was determined that there was no normal distribution of the data and thus a non-parametric analysis was chosen for the further analysis steps. Spearman's ρ was therefore selected for the correlations. In the following, all significant results of the bivariate analysis are presented; here, care was taken to ensure that all variables were at least ordinally scaled.

First, the dependent variable psychological well-being was related to the independent variables, it was found that there are two significant results. First, the psychological well-being correlates significantly with the variable physical well-being, this means that the higher the physical well-being, the higher the psychological well-being, Spearman`s ρ is 0.541, which is a medium correlation with a significance of p=0.001. There is also a significant result between the variables psychological well-being and stress, here there is a p-value of 0.001. The correlation coefficient is -0.274, which represents a moderate negative correlation. Thus, it can be stated that the more stress students have, the lower their psychological well-being.

In addition to the analysis of the dependent variable in relation to the independent variables, an analysis of the independent variables among themselves was also performed. First, the variable "Corona-tests" was considered, and two significant results were obtained, which are shown in Table 13. First, a significant result can be seen with the variable "alcohol consumption", here there is a low correlation of ρ=0.319 with a p-value of 0.001. This has to mean that the higher the alcohol consumption, the more corona tests have already been performed by the students. Also a significant result with a p-value of 0.012 was present for the variable "cigarette consumption". The correlation coefficient ρ is 0.162 and represents a low correlation, this is equal to the interpretation of the variable "alcohol consumption", so it means that the more cigarettes are consumed by the students, the more corona tests have already been performed by the students.

		Corona-tests
Alcohol consumption	Correlation Coefficient	0.319
	Sig. (2-tailed)	0.001
	N	240
Cigarette consumption	Correlation Coefficient	0.162

	Sig. (2-tailed)	0.012
	N	242

Tab. 13: Correlations between the ordinal variables: Corona-tests (SuSy)

Further on, there is also a significant correlation between the variable "physical well-being" and "stress", the p-value is 0.002 and the correlation coefficient ρ is -0.034, this represents a slight negative correlation and means that the higher the physical well-being of the students, the lower the stress level of the students.

In relation to the variables "stress" and "alcohol consumption", there is also a significant result (p-value=0.003), here there is a slight negative correlation of ρ= -0.188, which means that the higher the stress level of the students, the less alcohol the students consume.

The last significant result is a correlation between the variables "alcohol consumption" and "cigarette consumption", here the correlation coefficient is ρ=0.241 with a p-value of 0.001, which means that the higher the alcohol consumption of the students, the higher the cigarette consumption of the students.

After the results have been presented, the following section discusses the results and the methods, followed by an outlook and the conclusion.

13.Discussion of the results

In the following, the results will be discussed, here also the link to the theoretical part will be made. First of all, the age difference between the groups of the self-made questionnaire and the SuSy questionnaire is noticeable. The participants of the self-made questionnaire were between 19 and 29 years old and the age range of the SuSy questionnaire was significantly larger and extended to 18-53 years. 3% of the participants were female and 35.7% male in the SuSy questionnaire, the difference was even more obvious, here 80.1% of the participants were female and only 19.1% male, also there was one person who indicated diverse as gender (0.8%).

The participants of the own designed questionnaire mainly lived in shared flats (41.5%) and in the SuSy survey most of the students stated to live together with their partner (30.4%) closely followed by the answer option to live with parents or relatives (23.9%). It is not possible to explain conclusively how these different groups came about, but it may also be the result of a

smaller number of participants in the specially designed questionnaire, which leads to a different accumulation of answers. Subsequently to the living situation it is also to be mentioned that by the specially developed questionnaire it is to be recognized that a multiplicity of students are in a living situation, which is not perfectly suitable for the digital teachings. Thus, 9.8% of the students stated that they are in a living situation that is not at all suitable for digital teaching and another 27.2% stated that their living situation is only conditionally suitable for digital teaching. Especially in shared apartments, it is often difficult to have a quiet environment, which also emerged from the literature research.

In relation to health behavior, both questionnaires looked at alcohol and cigarette consumption, 68.8% of the participants in SuSy stated that they had never smoked and a further 14.2% had not smoked in the last 30 days, whereas in the specially developed study only 52% of the students stated that they did not smoke, of the other 48% 9. 8% stated that they had started smoking and a further 19.4% smoked significantly more. It was also found that there is a correlation between online lectures, which are seen as stressful, and higher cigarette consumption. Thus, it can be assumed that the online lectures have a negative influence on cigarette consumption and thus also a negative influence on the health behavior of the students. Similar results can be seen for alcohol consumption: 10.5% of the students in SuSy stated that they had never drunk alcohol and 25.1% had not drunk alcohol in the last 30 days. In the specially created questionnaire, only 6.1% of the students stated that they never drank alcohol. In this questionnaire, the question was formulated differently than in the questionnaire that was submitted for SuSy, because it was supposed to show how many students consume more alcohol or have even started drinking alcohol due to the situation. Here it came to the conclusion that 5.1% of the students started to consume alcohol during the time of the coronavirus and 10.2% consumed significantly more alcohol than before. This also suggests a negative impact on students' health behaviors and may indicate that there is a relationship between the coronavirus situation and associated limitations and poorer health behaviors among students. As also indicated by the literature review, both alcohol consumption and tobacco use are risk factors for health and should be minimized.

As already described, it had a negative effect on the health behavior of the students if they perceived the online lectures as stressful. However, it must also be considered that 72.4% of the students stated that they found the online lectures stressful. This is a very high number and should give cause to think about adapting the online lectures, but this can only be done

in close exchange with the students. In addition, 70.4% of the students also stated that they felt more stressed by the entire Corona situation and the online lectures, and this should also give cause to think about possible offers of help for the students. Stress has a negative effect on the whole body and can also lead to psychological upsets of the students (Ergo, 2021). A correlation was also found between stressful online lectures and being unmotivated. Students who perceive the online lectures as stressful are less motivated. This can have the consequence that less learning is done and thus the performance decreases and this also has a negative effect on the mental health of the students. The results of SuSy also show that many students feel stressed; on a scale of 1-10, most students rate themselves at an 8 (20.2%). There is also a negative correlation between stress and psychological well-being, which underlines the results of the literature research. The negative correlation states that the more stress the students have, the lower their psychological well-being.

Regarding the mental health of the students, which was influenced by the Corona situation, it could be found out by the specially developed questionnaire that during the Corona pandemic 69.4% of the students felt psychologically upset, in addition to that 43.2% of the students also stated that they did not feel psychologically stable, if one looks at the results of SuSy, one sees that at the time of the survey the assessment of the mental well-being was even more distributed on a scale of 1-10. Most of the students were about equally distributed between 4 and 8 (76.8%). It can be seen that the specially developed questionnaire, which was used at a later point in time than the SuSy questionnaire, once again shows more precisely that a large proportion of the students did not feel psychologically stable and rather disgruntled during the corona pandemic, which of course can also have other reasons than the situation of the corona pandemic, and is therefore not only to be attributed to it. However, there is evidence that the longer the corona pandemic and the associated digital lectures last, the more negatively it affects students' mental health. The question about the mental health before and after the corona pandemic also provided concise figures, where 25.5% of the students said they had a very good mental health before the corona pandemic and during the pandemic it was only 3.2% which is a very strong decrease, also before it was 51.1% of the students who said their mental health was good, where during the pandemic it was only 21.3%. Thereby, the numbers of less good to poor mental health increased dramatically. Previously, 19.1% described their mental health as less than good, but during the pandemic, 50% did so, and 4.3% of students initially rated their mental health as poor, but during the pandemic, 25.5%

did so. This again gives the indication that the corona pandemic has a direct negative impact on the mental health of the students.

In addition, only a small number of students stated that they always felt calm and relaxed, while some students stated that they felt sad, with 33% sometimes feeling sad and 4.1% feeling sad most of the time. However, a direct connection in the form of a correlation to the corona pandemic, the health behavior or the mental health of the students could not be found.

Social contacts also play a major role in students' mental health, so the lack of social contacts can have a negative impact on anyone's mental health. Meeting other people was especially difficult during the lockdown. It has been proven that social contacts have a very positive influence on mental well-being. Isolation and loneliness can even make people ill in the long run, and the lack of social contacts can be compared to physical damage caused, for example, by smoking 15 cigarettes a day (Hannoversche, 2021). Many students miss not only the social contacts outside of their studies but also the exchange with professors and fellow students. For many students who move to another city for their studies, their fellow students are also their first point of contact, which is either eliminated by digital teaching or they do not even get to know them properly. But even outside of their studies, 76.5% of the students stated in the specially created questionnaire that they had fewer social contacts than before the pandemic. It was also found that the more social contacts students maintain, the less they smoke, which shows that social contacts have a positive effect on students' health behavior.

In conclusion, the results of the surveys provide evidence that the pandemic period influences the health behavior of students and this mainly in a negative way. Going further, there is also evidence that students' mental health is negatively impacted by the pandemic period and the associated digital teaching. However, these findings need to be further explored in additional research. Accordingly, an ongoing analysis of the health behavior and mental health of the students and a renewed survey of the students is inevitable.

14.Discussion of methods

The method of questioning in the form of a questionnaire used in this thesis is subject to possible distortions and bias in individual points, both in the case of the questionnaire developed in-house and in the case of the questionnaire developed for SuSy.

When comparing the chosen research method with other methods, it becomes apparent that a survey by means of a qualitative questionnaire in the form of an interview would also have been conceivable, but probably especially the corona situation would have led to difficulties. On the one hand, the accessibility of the students would have been increasingly problematic, since the lectures did not take place in the usual way and thus most students studied from home. This means that the students would not have been available at the university most of the time and that appointments could only have been made online and that the interviews would also have had to take place online for the most part. Subsequently, it should be mentioned that the interviews would have had to take place as already mentioned mostly online, since also the security aspect may not be left out. The contact to others, due to the corona situation should be kept as low as possible and would accordingly not result in a face-to-face interview. This would probably lead to a lower participation rate and was therefore not chosen as a method.

The standardization of responses in quantitative research also allows for the rapid processing of larger quantities and enables the translation of what is asked into numerical values. This is helpful to ensure comparability with future surveys. For this, however, the criteria of the survey must be presented transparently in order to be able to create the same conditions for a new survey as far as possible. One of the goals of the present work was to numerically map an assessment of the students on the current corona situation and the associated digital teaching on the basis of a larger sample, equally the health behavior and mental health of the students should be considered and it should be possible to map how the students deal with the situation and what effects it has on the health behavior and mental health, this should be done under standardized conditions and generate an insight into this research field.

Since the research question was based on concrete assumptions in the form of hypotheses, a mainly quantitative research approach was chosen with a questionnaire study, whereby a mixture of methods occurred, since open questions were specifically added. This mixture must also be viewed critically, as it may have resulted in answers that are adapted to social desirability, but this cannot be conclusively ruled out for both the closed and open questions. However, due to the form of the online survey, this can be minimized if necessary, since neither other students are present nor an interviewer is questioning. The answering of the questionnaire took place anonymously and no personal related questions were asked, so that it is impossible to draw conclusions about the person who filled out the questionnaire.

In the recruitment of participants in the survey, selection cannot be ruled out; this is due to the voluntary nature of participation and the motivation to take part. The students were informed that participation was voluntary, so the personal decision to participate could be made. This may have meant that the individuals participating may already have a certain preconception and motivation to participate in the survey. However, the effects of the possible selection can only be assumed and cannot be proven. Duplicate responses to the questionnaire also cannot be ruled out with all certainty, as multiple participation through different mobile devices also cannot be ruled out.

Another limitation in the methodology is the number of respondents. A number of 98 students leads to an accumulation of non-significant results. However, reaching more students was not possible within the scope of this work, as it was not possible to reach more students who wanted to participate in the online survey within the time frame. An extension of the survey period would have recruited more participants if necessary, but two calls for participation were made, and the number of participants did not increase much during the second call, so it can be assumed that a possible third call would not have generated a large number of new participants either.

15.Outlook and suggestions

The corona pandemic continues, most countries are still struggling with high incidence figures and in Germany, too, everything is being done to stop the next wave. The vaccination rate is steadily increasing, even if the vaccination numbers are flattening out. 66.5% of the German population has received at least one vaccination and measures are being taken to encourage more people to vaccinate.

Students continue to be affected by the restrictions of the corona pandemic and most lectures continue to be held online. It is still unclear when lectures will be able to be held in attendance as usual. The university's goal is to have all lectures take place in presence as far as possible, but they are still working on implementation possibilities. There is also a call for students to be vaccinated in order to protect themselves and others. The lectures would also be beneficial for the mental health of the students, many would like to have contact with fellow students and professors and it would lead to a more structured daily routine. Furthermore, it would help to create a better learning atmosphere, since it would give students the opportunity to

exchange ideas with others and form study groups, and it would also give them the opportunity to visit study rooms regardless of their living situation.

It would also be beneficial for the health behavior of the students if the online events were replaced by the usual face-to-face events.

However, as long as the online events are still offered, it would be advantageous if more offers were created for the students or if these were communicated more transparently, which on the one hand support the students in case of problems and on the other hand offers which connect students with each other. Many students who are just starting their studies have hardly any contact with their fellow students, because they only get to know each other online in the lectures, which means that these social contacts are missing and one feels more isolated from the whole group. In addition to the offers, work should continue on the implementation possibilities for face-to-face teaching, so that more and more lectures can take place again in the usual way, in order to positively influence the health behavior and the associated mental health of the students.

16.Conclusion

The present study, which addressed the following question: To what extent does the Corona pandemic and the associated distance teaching influence the health behavior of students at HAW-Hamburg, with a special focus on mental health? - Inclusion of the project SuSy, shows that the health behavior and the associated mental health of students are negatively influenced by the online lectures. Especially the consumption of cigarettes and alcohol increased during the time of the online lectures or the students even started to consume alcohol and cigarettes. In addition, many factors influence the mental health of students during distance learning. On the one hand, students feel isolated due to the lack of contact with other students and professors, and on the other hand, the results showed that, in general, significantly fewer social contacts were maintained than before the pandemic. In addition, the students themselves rated their mental health during the pandemic period significantly worse than before the corona pandemic and the associated distance teaching. This is also related to the fact that many students find the online lectures stressful and they are more stressed by this than during face-to-face lectures, this also has a negative effect on the mental health of the students. The results from SuSy are also consistent with this finding,

the stress level of the students is at a relatively high level and the high stress level is associated with a lower mental well-being.

In relation to the research question, it can be said that the extent to which the corona pandemic and the associated distance learning affect the health behavior and mental health of students cannot be concretely determined, but it can be said that the health behavior of students can be negatively affected to some extent by the online events and that the mental health of students can also suffer from the distance learning. However, it cannot be conclusively said whether all results are actually due to distance teaching or whether other factors also played a role in answering the questions.

Also to be noted is that not all results were significant and often only weak correlations could be found. Further research is needed here and a new survey would be useful to determine a long-term effect. In particular, long-term studies are needed to understand the correlations between different factors and to draw conclusions about the causes.

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Appendix

Syntax Questionnaire

```
DATASET ACTIVATE DataSet1.
EXAMINE VARIABLES=Geschlecht Alter Rauchverhalten OnlineVorlesungenStress RuhigEntspannt
    MentaleGesundheitVorher MentaleGesundheitOnline
  /PLOT BOXPLOT NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

CORRELATIONS
  /VARIABLES=Rauchverhalten Alkoholkonsum PsychischStabil AntriebslosUnmotiviert
AustauschLehrende
    WenigSchaffen ZukunftOptimistisch MentaleGesundheitOnline Chats
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
NONPAR CORR
  /VARIABLES=Rauchverhalten Alkoholkonsum PsychischStabil AntriebslosUnmotiviert
AustauschLehrende
    WenigSchaffen ZukunftOptimistisch MentaleGesundheitOnline Chats
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.

CROSSTABS
  /TABLES=Rauchverhalten Alkoholkonsum PsychischStabil Chats WenigSchaffen ZukunftOptimistisch
BY
    MentaleGesundheitOnline
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ CORR
  /CELLS=COUNT
```

```
  /COUNT ROUND CELL.

NONPAR CORR
  /VARIABLES=MentaleGesundheitOnline OnlineVorlesungenBelastung WohnsituationDigital
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.

NONPAR CORR
  /VARIABLES=OnlineVorlesungenBelastung Rauchverhalten Alkoholkonsum PsychischStabil
    AntriebslosUnmotiviert AustauschLehrende ZukunftOptimistisch WenigSchaffen Chats
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.

DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=Geschlecht Alter
  /ORDER=ANALYSIS.

FREQUENCIES VARIABLES=Geschlecht Alter Familienstand Bildungsabschluss Studiengang Semester
    Migrationshintergrund Wohnsituation BeruflicherStatus Rauchen Rauchverhalten Alkohol
Alkoholkonsum
    OnlineVorlesungenTeilnahme Präsenzstudium OnlineVorlesungenBelastung
OnlineVorlesungenStress
    PsychischeVerstimmung PsychischStabil AntriebslosUnmotiviert WohnsituationDigital
AustauschLehrende
    AustauschStudierende SozialeKontakteFehlen WenigSchaffen ZukunftOptimistisch RuhigEntspannt
Stress
    Traurig SozialeKontakteBeeinträchtigt MentaleGesundheitVorher MentaleGesundheitOnline
    PhysischerKontakt Telefonate Chats SozialeKontakteVeränderung
  /NTILES=4
  /STATISTICS=STDDEV VARIANCE MINIMUM MAXIMUM MEAN MEDIAN MODE
  /ORDER=ANALYSIS.
```

Syntax Susy

```
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=Sex Age Study Liv_Sit Cov_Test Cov_Impf KörpW PsyW Stress Alc_Con
Cig_Con
  /STATISTICS=MINIMUM MAXIMUM MEAN MEDIAN MODE
  /ORDER=ANALYSIS.
EXAMINE VARIABLES=Sex Age Study Liv_Sit Cov_Test Cov_Impf KörpW PsyW Stress Alc_Con Cig_Con
  /PLOT BOXPLOT NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
NONPAR CORR
  /VARIABLES=Liv_Sit Cov_Test KörpW PsyW Stress Alc_Con Cig_Con
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

Fragebogen

1. **Geschlecht**

männlich ☐ weiblich☐ divers☐

2. **Alter**

_____

3. **Was ist Ihr Familienstand?**

☐ledig

☐verheiratet

☐geschieden

☐anderes

4. **Was ist Ihr höchster Bildungsabschluss?**

☐ohne Berufsabschluss

☐Lehre/Ausbildung/Fachschule

☐Abitur

☐abgeschlossenes Fach/Hochschulstudium

☐sonstiges

5. **Studiengang**

_____

6. **Semester**

_____

7. **Würden Sie sich selbst als Person mit Migrationshintergrund bezeichnen?**

☐ja ☐nein ☐keine Angabe

8. **Wie ist Ihre aktuelle Wohn-/Lebenssituation?**

☐Ich wohne alleine ☐Ich wohne in einer WG ☐Ich wohne meinem Partner/Partnerin zusammen ☐Ich wohne bei meinen Eltern, Verwandten o.Ä.

9. **Was ist Ihr beruflicher Status?**

☐nicht erwerbstätig

☐arbeitssuchend

☐voll berufstätig

☐Teilzeit oder Stundenweise berufstätig

10. **Rauchen Sie? (Zigaretten, E-Zigaretten, Zigarillos, Pfeife etc.)**

☐ja ☐nein

11. **Hat sich Ihr Rauchverhalten in der Pandemiezeit verändert?**

☐Ja, ich habe angefangen zu rauchen

☐Ja, ich rauche jetzt deutlich mehr

☐Ja, ich rauche etwas mehr

☐Ja, ich rauche deutlich weniger

☐Ja, ich rauche etwas weniger

☐Ja, ich habe aufgehört zu rauchen

☐Nein, es ist genauso geblieben

12. **Wie oft trinken Sie Alkohol?**

☐nie

☐etwa 1-mal im Monat

☐etwa 1- bis 4-mal im Monat

☐etwa 1- bis 3-mal in der Woche

☐4-mal oder öfter in der Woche

13. **Hat sich Ihr Alkoholkonsum in der Pandemiezeit verändert?**

☐Ja, ich habe angefangen Alkohol zu konsumieren

☐Ja, ich trinke jetzt deutlich mehr Alkohol

☐Ja, ich trinke etwas mehr Alkohol

☐Ja, ich trinke deutlich weniger Alkohol

☐Ja, ich trinke etwas weniger Alkohol

☐Ja, ich habe aufgehört Alkohol zu trinken

☐Nein, es ist genauso geblieben

14. **Haben Sie an online Vorlesungen teilgenommen?**

☐ja ☐nein

15. **Haben Sie auch schon mindestens ein Semester regulär in Präsenz studiert?**

☐ja ☐nein

16. **Wenn Sie bereits an online Vorlesungen teilgenommen haben, haben Sie dies als belastend empfunden?**

☐ja ☐nein ☐nicht mehr als sonst

17. **Haben Sie sich durch die online Veranstaltungen gestresster gefühlt?**

☐ja ☐nein ☐nicht mehr als sonst

18. **Haben Sie sich während der Pandemie-Zeit psychisch verstimmt gefühlt?**

☐ja ☐nein ☐keine Angabe

19. **Im Folgenden werden Gefühlslagen und Situationen dargestellt, bitte schätzen Sie auf einer Skala von 1-5 (1=gar nicht zutreffend bis 5= komplett zutreffend) ein, welche dieser Gefühlslagen während der Pandemiezeit auf Sie zutrifft**

Ich habe mich während der Pandemiezeit psychisch stabil gefühlt

☐1 ☐2 ☐3 ☐4 ☐5

Ich habe mich antriebslos und unmotiviert gefühlt

☐1 ☐2 ☐3 ☐4 ☐5

Meine Wohnsituation ist für die Formen der digitalen Lehre nicht geeignet

☐1 ☐2 ☐3 ☐4 ☐5

Mir fehlt der persönliche Austausch mit den Lehrenden

☐1 ☐2 ☐3 ☐4 ☐5

Mir fehlt der persönliche Austausch mit den Studierenden

☐1 ☐2 ☐3 ☐4 ☐5

Mir fehlen allgemeine soziale Kontakte

☐1 ☐2 ☐3 ☐4 ☐5

Ich habe weniger geschafft als ich mir vorgenommen habe

☐1 ☐2 ☐3 ☐4 ☐5

Ich habe mich in Bezug auf die Zukunft optimistisch gefühlt

☐1 ☐2 ☐3 ☐4 ☐5

20. **Wie oft waren Sie während der Zeit der Online-Veranstaltungen**

...ruhig und entspannt?

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

…gestresst?

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

…traurig

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

21. **Wurden durch Ihre körperliche oder seelische Verfassung während der Pandemie der Kontakt zu anderen Menschen beeinträchtigt?**

☐ja ☐nein

22. **Wie würden Sie Ihren mentalen Gesundheitszustand vor der Pandemie beschreiben?**

☐Sehr gut ☐Gut ☐Weniger gut ☐Schlecht

23. **Wie würden Sie Ihren mentalen Gesundheitszustand während des online-Semesters beschreiben?**

☐Sehr gut ☐Gut ☐Weniger gut ☐Schlecht

24. **Die folgenden Fragen beziehen sich auf den Zeitraum der Corona-Pandemie und des online-Semesters**

Wie häufig haben Sie soziale Kontakte aufrechterhalten? Durch…

…physischen Kontakt

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

…Telefonate oder Videotelefonate

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

…Emails oder Chats

☐Immer ☐Meistens ☐Manchmal ☐Selten ☐Nie

25. **Würden Sie sagen, dass sich die Häufigkeit Ihrer sozialen Kontakte seit der Pandemie verändert hat?**

☐Ja, es ist weniger geworden

☐Ja, es ist mehr geworden

☐Nein, es ist gleichgeblieben

26. **Welche Unterstützung wünschen Sie sich von der Universität im Hinblick auf das psychische Wohlbefinden während der Pandemie?**

_____
_____
_____
_____

27. **Was würde dazu beitragen Ihr psychisches Wohlbefinden zu verbessern?**

_____
_____
_____
_____

Declaration of academic honesty

Hereby, I declare that I have composed the presented master thesis independently on my own and without any other resource than the ones indicated. All thoughts taken directly or indirectly from external sources are properly denoted as such.

Hamburg, 29th September 2021

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