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Wellbeing and flow in sports and music students during the COVID-19 pandemic

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\textbf{ABSTRACT}

The aim of the study was to explore emotional and cognitive aspects of subjective wellbeing and flow in music and sports students during the lockdown imposed by the COVID-19 pandemic. Participants (314 higher education sports and music students) answered questions about measure of flow, satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact. The results revealed differences in eight flow dimensions and a global flow score in favor of sports students. Differences were also found in affect: sports students experienced more positive affect and less negative affect than musicians. However, there were no significant differences with regard to satisfaction with life or satisfaction with study, and music and sports students perceived the COVID-19 impact equally. Gender differences were found for three flow dimensions and the global flow score (female students experienced flow less frequently than males) and satisfaction with studying (higher scores for female students). However, no gender differences were detected for satisfaction with life, positive and negative affect, or COVID-19 impact. The results of regression analyses showed that satisfaction with life and studying, positive and negative affect, and COVID-19 impact could all be predicted on the basis of flow dimensions.

1. Introduction

On March 11, 2020, the World Health Organization (\textit{WHO, 2020}) declared COVID-19 a global pandemic. One day later, Slovenia formally declared the presence of a pandemic of COVID-19 disease, followed by measures to stop the spread of the virus (\textit{Government of the Republic of Slovenia, 2020}). In view of the coronavirus situation and in accordance with the proposal of the COVID-19 Coordination Team at the University of Ljubljana, the rector of that university adopted measures that included canceling all forms of direct instruction (classes) and limiting personal contact in all other activities. The measures were extended through the end of the 2019–2020 academic year, with all academic programs carried out online (\textit{UL & Corona Virus, 2020}).

According to UNESCO’s monitoring, more than 160 countries implemented nationwide closures, affecting over 87\% of the world’s student population. E-learning was the prevalent pedagogical practice during the COVID-19 pandemic and several studies have documented the negative effects of isolation on students’ psychological wellbeing (Antonini Philippe, Schiavio, & Biasutti, 2020; Arslan, Yıldırım, & Aytaç, 2020; Cao et al., 2020; de Oliveira Araújo, de Lima, Cidade, Nobre, & Neto, 2020; Hasan & Bao, 2020;)

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According to student reports, the negative aspects of online teaching were lower course quality, decreased usability of content, technological problems, and a lack of interaction with peer students (Al-arabi, Mahrin, & Yusoff, 2019; Dewaele, Magdalena, & Saito, 2019; Penna & Stara, 2007). Inadequate e-learning approaches can lead also to psychological problems (Alam, 2020; Bao, 2020).

E-learning is especially demanding for more practice-based studies like music and sports (Antonini Philippe et al., 2020; Biasutti & Concina, 2021; Biasutti, Frate, & Concina, 2019; Winkelman & Eberman, 2020). (Biasutti, Antonini Philippe, & Schiavo, 2021) and Simunović (2020) explored music teachers’ perceptions about their information and communication technology (ICT) competences, the challenges of distance learning for leading instrumental and voice practice, and the limitations and benefits of distance learning in conservatories of music and music schools during the first COVID-19 lockdown. There were several problems acknowledged by music teachers, such as deficits in live performance, ensemble music, posture, technical performance, intonation, interpretive performance, and the quality of sound production. This last point regarding the quality of sound production was identified as the most problematic and significant effect impairing the educational process due to electronic distortion and delays in sound transmission. The absence of physical proximity, which is indispensable for learning and maintaining a specific posture while playing an instrument, was also relevant. Although instrumental teachers reported improvements in their pedagogical practices and an increase in their level of digital competences, they found teaching instruments or voice with ICT more demanding, less effective, physically strenuous, and unhealthy (Simunović, 2020).

As to sports, Hasan and Bao (2020) reported that even though online teaching is a promising alternative to the physical classroom, students showed a negative perception of online learning behavior (Rohman, Marji, Sugandi, & Nurhadi, 2020), which might be a significant consequence that is responsible for psychological distress.

The present study focuses on the social and educational dimensions of the challenges in developing e-learning teaching for music and sports during the early phases of the COVID-19 pandemic in Slovenia. The aim of the study is to explore emotional and cognitive aspects of subjective wellbeing and flow in music and sports students during the lockdown. Participants answered questions about measure of flow, satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact. Below, we present previous studies exploring differences in subjective wellbeing and flow between musicians and athletes, starting with similarities and differences between music and sports activities.

2. Theoretical background

Previous studies have outlined several similarities between musicians and athletes, such as the need for prolonged training, endurance, perfectionism, high self-regulation, strategic decisions, emotional expressivity, and social skills (Habe, Biasutti, & Rajina, 2019). However, there are also several differences. When facing psychological challenges, athletes frequently have the access to professional sports psychologists. Conversely, musicians usually deal with their psychological problems on their own. Musicians are by their personality structure more anxious, more sensitive, and therefore more vulnerable to stress situations (Kemp, 2002). Conversely, athletes are reported to be lower on neuroticism and more extroverted (Eysenck, Nias, & Cox, 1982), which are security factors in dealing with stress.

As to psychological flow, music and sports are activities that facilitate flow most frequently (Altenmüller & Ioannou, 2016; Csikszentmihalyi, 1990, 1993; Martin, 2008). Flow refers to a state of mind that brings together cognitive, physiological, and affective aspects and corresponds to an optimal psychophysical state (Biasutti, 2017). In both music and sport, total immersion and absorption in the activity, high internal enjoyment, and intrinsic motivation are frequently observed. However, there are some differences regarding the nine-dimensional model of flow (Csikszentmihalyi, 1990; see below). (Habe et al., 2019) found differences between elite musicians and top athletes in four flow dimensions: transformation of time and autotelic experience were higher in musicians, while clear goals and unambiguous feedback were higher in athletes. However, differences in global flow were not confirmed. In addition, elite musicians and top athletes experienced flow more often in group than in individual performance settings and it was experienced more in male than in female top performers.

Few studies have explored the differences in perceived wellbeing and flow between musicians and athletes (Habe et al., 2019), especially during the COVID-19 pandemic and a qualitative study by (Antonini Philippe et al., 2020) has addressed this issue. They focused on investigating how the COVID-19 lockdown period affected interpersonal relationships between music teachers and students and sports coaches and athletes. Their findings showed that changes in interpersonal student–teacher relationships could be grouped into four dimensions: establishing a new relationship, working on a new form for the relationship, developing functional and positive adaptations, and developing non-adaptive, detached relationships. Furthermore, their qualitative data revealed that members of the dyad gave meaning to their interpersonal relationship in a dynamic way, even over such a short time. With regard to the professional settings of music and sport, there were some similarities between the experiences of musicians and athletes, which highlights the importance of a well-functioning dyad and good communication between the parties.

Our study involved a risk population from the following two perspectives: one is developmental, and the other is activity based. In terms of developmental risk proneness, university students are a particularly vulnerable population for mental health problems in light of the challenges associated with transitions to adulthood and the economic and material difficulties common to that stage of life (Auerbach et al., 2018; Husky et al., 2020; Rubley, 2017). During mandatory confinement caused by COVID-19, university students in France showed increased anxiety and moderate to severe stress (Husky et al., 2020). Furthermore, students who did not relocate were particularly affected by heightened stress. Raj and Fatima (2020) found that 34.6 % of students have felt stressed at some point during a week, 23.2 % felt stressed often during a week, and 15.1 % of students always felt stressed due to the threat of coronavirus. Overall, 51.6 % of students reported to be under stress in the COVID-19 threat condition; 69.8 % of students were stressed about their studies,
and 78.4% students were not comfortable with online classes.

As to activity-based risks, studying music or sports entails a significant number of experiential practices. Music study involves several performing activities (rehearsals, recitals, group performances, exams, auditions, music competitions), while competitions are an essential part of athletes’ professional lives. With the lockdown, the majority of music and sports activities were canceled, causing a sense of loss and stress for music and sports students. The lockdown situation significantly changed their educational process and thus affected their everyday functioning. Music academy students faced even more stressful situations such as online instrumental and voice practice, which was less effective and quite frustrating because of the low sound quality. Music students missed live performances and the opportunities to play in ensembles and orchestras (Schiavio, Biasutti, & Antonini Philippe, 2021). Several of the practice-based activities in both music and sports rely on social collaboration with others—co-performers, coaches or teachers, the audience—and the lack of a social dimension significantly impacted their wellbeing and flow (Antonini Philippe et al., 2020).

3. The present study

Based on the theoretical background, we investigated subjective wellbeing and flow among music and sports students in the early phases of the COVID-19 pandemic. These two populations of students in “normal” circumstances are more prone to experiencing flow due to their professional and practice-based activity. We expected differences in favor of sports students because classical musicians have been found to be more sensitive (higher neuroticism and higher degree of depression) with regard to their personality traits (Kemp, 2002; Vaag, Sund, & Bjerkeset, 2018; Yondem, Yondem, & Per, 2017) and are exposed to objectively more stressful studying conditions than athletes (Simunović, 2020). In addition, we expected that emotionality and flow would be more frequent in females because women tend to experience positive emotional states more intensively and vividly than men (Deng, Chang, Yang, Huo, & Zhou, 2016; Fujita, Diener, & Sandvik, 1991; Gard & Kring, 2007; Kret & De Gelder, 2012). In line with previous studies, we also expected that female students would report greater satisfaction with the study (de Jager & Gbadamosi, 2013; González-Gómez, Guardiola, Martín Rodríguez, & Montero Alonso, 2012). The following research questions guided the current study:

1. Do music and sports students differ in experiencing flow, satisfaction with life, satisfaction with study, positive and negative affect, and COVID-19 impact?
2. Are there gender differences in experiencing flow, satisfaction with life, satisfaction with study, positive and negative affect, and COVID-19 impact?
3. Could flow dimensions predict satisfaction with life, satisfaction with study, positive and negative affect, and COVID-19 impact?

4. Materials and methods

4.1. Participants

Participants were 314 students with a mean age of 21.40 years (SD = 2.05) and a range of 19–30 years. Of the total, 198 were students at the Academy of Music (Mage = 21.98, SDage = 2.97 years) and 116 in the Faculty of Sport (Mage = 21.36, SDage = 2.00 years). Students at the academy were significantly older (t = -2.05, sig = 0.04). Regarding gender, all the participants choose the male or female options and 107 participants reported being male (Mage = 21.90, SDage = 2.56 years), and 207 reported being female (Mage = 21.67, SDage = 2.71 years), and the age difference was not significant (t = 0.74, sig = 0.46).

4.2. Instruments

4.2.1. Dispositional Flow Scale-2 (DFS-2; Jackson & Eklund, 2002)

The DFS-2 is a self-descriptive instrument based on the following nine dimensions of flow theory (Csikszentmihalyi, 1990): challenge-skill balance, merging of action and awareness, clear goals, unambiguous feedback, total concentration, sense of control, loss of self-consciousness, transformation of time, and autotelic experience. With 4 items per dimension, it contains 36 items that refer to athletic and physical dimensions during which people experience intense positive emotions. Each item is evaluated on a five-point Likert scale, where 1 means “never” and 5 “always.” The respondents were asked to evaluate how often they experience the sensations described for each item. The global flow score was the sum of all items. The reliability of the scale was high, with Cronbach’s alpha coefficients ranging between 0.78 to 0.86 (Phillips, 2005).

4.2.2. Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985)

The SWLS is a scale of five items that measure the overall self-estimation of quality of life. Participants evaluate their level of agreement with each item on a seven-point Likert scale, where 1 means “completely disagree” and 7 “completely agree.” The score was obtained by summing the five items, with 35 the maximum score. The questionnaire has shown high internal consistency and stability over time and the initial study had a Cronbach’s alpha of 0.87 and test–retest reliability of 0.82 (Diener et al., 1985).

4.2.3. Satisfaction with Studying Scale (SWSS; adapted from SWLS by Diener et al., 1985)

The SWSS is a scale composed of five items that measure the overall self-estimation of satisfaction with studying – the original statements referring to the quality of life were rewritten such that “life” was replaced with “studying.” Participants evaluated their level of agreement with each item on a seven-point Likert scale, where 1 means “completely disagree” and 7 “completely agree.” The
score was obtained by summing the five items, with 35 the maximum score.

4.2.4. Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)

The PANAS scale is a self-report questionnaire with which participants measure their emotions on a five-point scale, where 1 means “applies very little or not at all to the participant” and 5 means “applies very much to the participant.” PANAS is composed of 20 items, 10 comprising the positive affect scale and 10 the negative affect scale.

4.2.5. COVID-19 impact questionnaire

Using a new five-item scale developed by the authors of the present study, the perceived impact of COVID-19 on perceived mood, physical wellbeing, quality of educational process, professional relationships (with professors or coaches), and personal relationships was investigated. Participants evaluated the impact on a five-point scale, where 1 means “very negative,” 2 “negative,” 3 “no impact,” 4 “positive,” and 5 “very positive.” The scale was tested to be monofactorial.

In addition, demographic factors such as gender, age, degree attended and educational institution were queried at the beginning of the tools.

4.3. Procedure

The instruments and demographic questions were uploaded to the web platform https://www.1ka.si/d/en and the study was conducted during COVID-19’s peak in Slovenia, when all containment measures were in force (social distancing, lockdown of municipalities, closure of kindergartens and schools, closure of public transportation, etc.). The majority of participants answered the survey in May 2020. Participants were contacted by e-mail and informed of the study’s purpose; those who were willing agreed to participate in the study. This research study was conducted in accordance with the Declaration of Helsinki (World medical association, 2013) and the Code of Ethics and Q4 Conduct of The British psychological society (2009). The University of Ljubljana’s Research Ethics Committee granted ethical approval for data collection, and all subjects gave informed consent before taking part in the study.

5. Results and discussion

In the current study, we intended to verify if there were differences between music and sports students in experiencing flow, satisfaction with life, satisfaction with study, positive and negative affect, and COVID-19 impact and if flow dimensions could predict these elements. A first step was to verify if the tools used were reliable calculating Cronbach’s alphas. Then, group (music and sports participants) and gender differences were computed using t-tests, a statistical test that is commonly used to compare the means of two groups. In addition, we verified the degree to which our measures were related, computing the correlations between flow dimensions, satisfaction with studying, satisfaction with life, positive affect, negative affect, and COVID-19 impact, which were calculated with Pearson’s r. Finally, we verified if it was possible to predict satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact on the bases of flow dimensions using the multiple linear regression statistical method (via the ENTER method). Data were processed with the statistical package IBM SPSS 21.0.

5.1. Reliability analyses

Firstly, we verified the reliabilities of the scales by computing the alpha coefficients, which are shown in Table 1.

Table 1 shows that the instruments are highly reliable, as alpha coefficients ranged from 0.74 to 0.94, with the exception of the “merging of action and awareness” dimension on the flow questionnaire, which was low (0.51) but still in the acceptable range.
5.2. Group differences

Regarding the first research question, music and sports students were compared using t-tests, with results reported in Table 2. Differences in eight dimensions and the global flow score were detected: students in the Faculty of Sports experienced flow more intensely or more frequently than students at the Academy of Music. They felt they had more skills to face the challenges that appeared in their path, they experience the merging of action and awareness more often, and they feel like they have clearer goals and unambiguous feedback. Sports students also more frequently experienced total concentration when performing, had more sense of control and more frequently lost themselves in the activity while experiencing more flow in general than students at the Academy of Music.

Differences were found also in affect: sports students experienced more positive affect and less negative affect when compared to music students. However, there were no significant differences with regard to cognitive components such as satisfaction with life, satisfaction with study, or COVID-19 impact, which were equally perceived by sports and music students.

Our differences in favor of sports students could be explained by the fact that musicians are more sensitive in terms of personality traits on one hand (Kemp, 2002; Vaag et al., 2018; Yön dem et al., 2017); on the other, they were also exposed to more stressful studying conditions as athletes (Simunović, 2020). Another possible explanation for our results is that sports students reported in personal feedback to the authors that they generally continued practicing to the best of their abilities during the lockdown; they stayed in contact with their coaches or themselves worked as coaches online. Physical activity is known to have a positive effect on emotional states (Buecker, Simacek, Ingwersen, Terwiel, & Simonsmeier, 2020), and the students in the Faculty of Sport remained physically quite active despite the pandemic. A rise in online exercises and recordings appeared during the first wave of the pandemic, and students in the Faculty of Sport were frequently engaged in developing these resources. Obviously, the challenging situation of the COVID-19 pandemic affected musicians in more negatively and with greater intensity.

5.3. Gender differences

Regarding the second research question on gender differences, students were compared using t-tests, as reported in Table 3. Differences in eight dimensions and the global flow score were detected: students in the Faculty of Sports experienced flow more intensely or more frequently than students at the Academy of Music. They felt they had more skills to face the challenges that appeared in their path, they experience the merging of action and awareness more often, and they feel like they have clearer goals and unambiguous feedback. Sports students also more frequently experienced total concentration when performing, had more sense of control and more frequently lost themselves in the activity while experiencing more flow in general than students at the Academy of Music.

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### Table 2

Comparison of students from the Faculty of Sports and the Academy of Music in flow factors, satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact.

| Dimension                      | Faculty of Sports | Academy of Music | Cohen’s d | 95% CI for Cohen’s D |
|-------------------------------|-------------------|------------------|-----------|----------------------|
| Satisfaction with studying    | M (SD)            | M (SD)           | t         | P                    |
| M 22.26 (6.43)                | M 22.03 (6.29)    | 0.31 (0.76)      | 0.04      | 0.19-0.27            |
| Satisfaction with life        | 24.72 (5.40)      | 25.11 (6.09)     | 0.58      | 0.56                 | -0.07 | -0.30-0.16 |
| Challenge-skill balance       | 15.05 (2.40)      | 13.43 (2.78)     | 5.11      | 0.00                 | 0.59  | 0.36-0.82 |
| Merging of action and awareness | 13.65 (2.28)    | 12.49 (2.07)     | 4.48      | 0.00                 | 0.52  | 0.29-0.75 |
| Clear goals                   | 15.38 (2.42)      | 13.60 (2.62)     | 5.84      | 0.00                 | 0.66  | 0.44-0.89 |
| Unambiguous feedback          | 14.45 (2.58)      | 13.00 (2.74)     | 4.50      | 0.00                 | 0.52  | 0.29-0.75 |
| Total concentration           | 14.29 (2.80)      | 12.29 (3.02)     | 5.67      | 0.00                 | 0.65  | 0.42-0.87 |
| Sense of control              | 15.70 (2.56)      | 12.62 (2.71)     | 9.59      | 0.00                 | 1.01  | 0.81-1.22 |
| Loss of self-consciousness    | 14.79 (3.67)      | 12.73 (4.25)     | 4.22      | 0.00                 | 0.49  | 0.26-0.73 |
| Transformation of time        | 15.06 (2.88)      | 14.75 (3.16)     | 3.16      | 0.04                 | 0.10  | -0.13-0.34 |
| Autotelic experience          | 15.35 (3.05)      | 12.33 (3.50)     | 7.51      | 0.00                 | 0.83  | 0.61-1.05 |
| Global flow score             | 133.89 (16.30)    | 117.69 (18.14)   | 7.51      | 0.00                 | 0.85  | 0.63-1.07 |
| Positive affect               | 33.71 (5.67)      | 31.45 (5.57)     | 3.45      | 0.00                 | 0.40  | 0.17-0.62 |
| Negative affect               | 24.41 (6.85)      | 27.45 (7.98)     | 3.41      | 0.00                 | -0.39 | -0.62-0.17 |
| COVID-19 impact               | 14.02 (3.52)      | 13.32 (3.08)     | 1.80      | 0.07                 | 0.21  | -0.02-0.45 |

Note. M: mean; SD: standard deviation; statistically significant differences are shaded.

5.2. Group differences

Regarding the first research question, music and sports students were compared using t-tests, with results reported in Table 2. Differences in eight dimensions and the global flow score were detected: students in the Faculty of Sports experienced flow more intensely or more frequently than students at the Academy of Music. They felt they had more skills to face the challenges that appeared in their path, they experience the merging of action and awareness more often, and they feel like they have clearer goals and unambiguous feedback. Sports students also more frequently experienced total concentration when performing, had more sense of control and more frequently lost themselves in the activity while experiencing more flow in general than students at the Academy of Music.

Differences were found also in affect: sports students experienced more positive affect and less negative affect when compared to music students. However, there were no significant differences with regard to cognitive components such as satisfaction with life, satisfaction with study, or COVID-19 impact, which were equally perceived by sports and music students.

Our differences in favor of sports students could be explained by the fact that musicians are more sensitive in terms of personality traits on one hand (Kemp, 2002; Vaag et al., 2018; Yön dem et al., 2017); on the other, they were also exposed to more stressful studying conditions as athletes (Simunović, 2020). Another possible explanation for our results is that sports students reported in personal feedback to the authors that they generally continued practicing to the best of their abilities during the lockdown; they stayed in contact with their coaches or themselves worked as coaches online. Physical activity is known to have a positive effect on emotional states (Buecker, Simacek, Ingwersen, Terwiel, & Simonsmeier, 2020), and the students in the Faculty of Sport remained physically quite active despite the pandemic. A rise in online exercises and recordings appeared during the first wave of the pandemic, and students in the Faculty of Sport were frequently engaged in developing these resources. Obviously, the challenging situation of the COVID-19 pandemic affected musicians in more negatively and with greater intensity.

5.3. Gender differences

Regarding the second research question on gender differences, students were compared using t-tests, as reported in Table 3. A gender comparison showed that female students reported being more satisfied with studying. Our results are in line with previous research that report higher satisfaction with study for females (González-Gómez et al., 2012; de Jager & Gbadamosi, 2013), in both the classroom setting (de Jager & Gbadamosi, 2013) and in e-learning context (González-Gómez et al., 2012).

There were gender differences in three flow dimensions and the global flow score: female students experienced flow less frequently when performing or engaging in athletic activity than male students. Findings of the challenge-skill balance and sense of control dimensions revealed that female students found it more difficult to balance their skills with the challenges they experienced, had less of a sense of control over what was happening while they performed than male students. In addition, female students did not lose themselves in the activity as frequently as the male participants did. The global flow score was lower in females, which might suggest that they were potentially more likely to struggle with their performance, as they experienced less flow.

However, no gender differences were detected for satisfaction with life, positive and negative affect, or COVID-19 impact, in contrast to previous research that reported that women tended to experience positive affect states more intensively and vividly than
Correlations between flow dimensions and satisfaction with studying and life show that students who had clearer goals were more satisfied with their studying (see Table 4).

Correlations between positive and negative affect and flow factors show a higher number of significant correlations: positive affect correlates with a higher perception of being skilled enough to face the challenge, with having clearer goals, with being able to establish total concentration, and with having a good sense of control. Positive affect also correlates with autotelic experience. Conversely, negative affect is negatively correlated with all these flow dimensions, and with less loss of self-consciousness. Experiencing COVID-19

### Table 3
Comparison of males and females in flow dimensions, satisfaction with life, satisfaction with studying, positive and negative affect, and the COVID-19 impact.

| Dimension                        | Males       | Females     | Cohen’s $d$ | 95% CI for Cohen’s $d$ |
|----------------------------------|-------------|-------------|-------------|------------------------|
| Satisfaction with studying       | 20.73       | 6.65        | 2.82        | -0.33 -0.56 -0.10      |
| Satisfaction with life           | 24.53       | 6.30        | 0.94        | 0.35 -0.11 -0.35 0.12  |
| Challenge-skill balance          | 14.70       | 2.88        | 2.64        | 0.00 0.36 0.12 0.60    |
| Merging of action and awareness  | 13.16       | 2.32        | 1.81        | 0.20 0.16 -0.08 0.40   |
| Clear goals                      | 14.53       | 2.77        | 1.64        | 0.24 0.14 -0.10 0.39   |
| Unambiguous feedback             | 13.98       | 2.69        | 1.79        | 0.16 0.23 -0.01 0.48   |
| Total concentration              | 13.45       | 3.25        | 1.98        | 0.10 0.20 -0.04 0.44   |
| Sense of control                 | 14.28       | 2.95        | 1.96        | 0.04 0.26 0.01 0.50    |
| Loss of self-consciousness       | 14.49       | 3.76        | 2.37        | 0.00 0.36 0.12 0.60    |
| Transformation of time           | 15.03       | 3.44        | 1.62        | 0.04 0.52 0.08 0.32    |
| Autotelic experience             | 13.77       | 3.63        | 1.36        | 0.30 0.13 -0.12 0.37   |
| Global flow score                | 127.89      | 19.47       | 121.65      | 18.69 2.59 0.01 0.33 0.08 0.57 |

Note. M: mean; SD: standard deviation; statistically significant differences are shaded.

### Table 4
Pearson correlations between flow dimensions, satisfaction with life, satisfaction with studying, positive and negative affect, and the COVID-19 impact.

| Flow dimensions                  | Satisfaction with studying | Satisfaction with life | Positive affect | Negative affect | COVID-19 impact |
|----------------------------------|----------------------------|------------------------|-----------------|-----------------|-----------------|
| Challenge-skill balance          | 0.17**                     | 0.18**                 | 0.55**          | -0.38**         | 0.37**          |
| Merging of action and awareness  | 0.13*                      | 0.18**                 | 0.27**          | -0.30**         | 0.19**          |
| Clear goals                      | 0.34**                     | 0.22**                 | 0.53**          | -0.35**         | 0.18**          |
| Unambiguous feedback             | 0.27**                     | 0.28**                 | 0.44**          | -0.43**         | 0.22**          |
| Total concentration              | 0.18**                     | 0.16**                 | 0.52**          | -0.43**         | 0.23**          |
| Sense of control                 | 0.22**                     | 0.12*                  | 0.49**          | -0.36**         | 0.29**          |
| Loss of self-consciousness       | 0.12*                      | 0.25**                 | 0.30**          | -0.52**         | 0.20**          |
| Transformation of time           |                            |                        |                 |                 |                 |
| Autotelic experience             | 0.18**                     | 0.18**                 | 0.50**          | -0.41**         | 0.40**          |
| Global flow score                | 0.28**                     | 0.28**                 | 0.58**          | -0.53**         | 0.33**          |

Note. *Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); statistically significant differences > 0.34 (0.01 level) are shaded.
impact as more positive also correlates with autotelic experience and challenge-skill balance. The correlations are quite high and significant to the point of 0.01. We wondered whether these factors had predictive possibilities for experiencing flow, a question with the regression analyses reported below.

5.5. Regression analyses

Regarding research question 3, stepwise multiple regression analyses via the ENTER method were computed. In the first step, we excluded the effects of gender and school.

The results of the regression analyses are reported in Table 5 and show that satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact could all be predicted on the basis of flow dimensions. Having clearly set goals, good feedback about one’s performance, being pulled into the activity and thus experiencing a loss of self-consciousness, and experiencing transformation of time increase satisfaction with life but having the need to control events will decrease satisfaction with life. Allowing oneself to go more with events and accept situations will evidently increase satisfaction with life, especially during the pandemic, when people are often unable to control the course of events. Satisfaction with studying appears to be based on having clearly set goals, which is understandable, as school was still in progress—if only online—and having clear goals supports being efficient in studying. However, experiencing total concentration decreased satisfaction with studying because studying online is more demanding, which is in line with the previous studies (Al-araibi et al., 2019; Antonini Philippe et al., 2020; Dewaele et al., 2019; Penna & Stara, 2007; Simunović, 2020; Winkelmann & Eberman, 2020). Students who believe that full concentration is an absolute prerequisite for successful studying might face more problems during a pandemic.

Students who feel that their skills frequently match the challenges of a situation and those who frequently have autotelic experiences were able to use the impact of COVID-19 to their advantage. Conversely, the impact of COVID-19 had a negative effect on students who need clear goals and total concentration. The effects of flow on positive affect were also evident: people who set clear goals, value challenge-skill balance, and frequently have autotelic experiences had more positive affect. Students who want to be able to control the course of events, rarely experience loss of self-consciousness, and do not obtain unambiguous feedback experienced more negative emotions.

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Table 5
Prediction of satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact based on flow dimensions.

| Influenced by                  | B       | B         | T         | p (t) | R     | R² (adj) | F         | p(t) |
|-------------------------------|---------|-----------|-----------|-------|-------|----------|-----------|------|
| **Satisfaction with life**    |         |           |           |       |       |          |           |      |
| Clear goals                   | 0.41    | 0.19      | 2.05      | 0.04  | 0.44  | 0.19     | 0.16      | 5.91 | 0.00 |
| Unambiguous feedback          | 0.52    | 0.25      | 2.69      | 0.01  |       |          |           |      |
| Sense of control              | -0.40   | -0.21     | -2.01     | 0.05  | 0.26  | 0.19     | 2.92      | 0.00  |
| Loss of self-consciousness    | 0.34    | 0.17      | 2.97      | 0.00  |       |          |           |      |
| Transformation of time        |         |           |           |       |       |          |           |      |
| **Satisfaction with studying**|         |           |           |       |       |          |           |      |
| Clear goals                   | 1.08    | 0.46      | 5.04      | 0.00  | 0.46  | 0.21     | 0.18      | 6.50 | 0.00 |
| Total concentration           | -0.60   | -0.29     | -2.88     | 0.00  |       |          |           |      |
| **Positive affect**           |         |           |           |       |       |          |           |      |
| Challenge-skill balance       | 0.55    | 0.26      | 3.58      | 0.00  | 0.64  | 0.41     | 0.38      | 16.78 | 0.00 |
| Clear goals                   | 0.50    | 0.23      | 2.94      | 0.00  |       |          |           |      |
| Autotelic experience          | 0.28    | 0.18      | 2.61      | 0.01  |       |          |           |      |
| **Negative affect**           |         |           |           |       |       |          |           |      |
| Unambiguous feedback          | -0.55   | -0.20     | -2.36     | 0.02  | 0.61  | 0.37     | 0.34      | 14.06 | 0.00 |
| Sense of control              | 0.50    | 0.19      | 2.06      | 0.04  |       |          |           |      |
| Loss of self-consciousness    | -0.73   | -0.39     | -6.78     | 0.00  |       |          |           |      |
| **COVID-19 impact**           |         |           |           |       |       |          |           |      |
| Challenge-skill balance       | 0.33    | 0.28      | 3.43      | 0.00  | 0.49  | 0.24     | 0.21      | 7.41  | 0.00 |
| Clear goals                   | -0.23   | -0.19     | -2.08     | 0.04  |       |          |           |      |
| Total concentration           | -0.23   | -0.21     | -2.12     | 0.03  |       |          |           |      |
| Autotelic experience          | 0.35    | 0.39      | 5.06      | 0.00  |       |          |           |      |

*Note.* B: Unstandardized regression coefficient; β: standardized regression coefficient; effects of gender and studying course were controlled; statistically significant differences are shaded.
6. Conclusions and further developments

Our study has the strength of filling the gap in exploring flow, satisfaction with life, satisfaction with studying, positive and negative affect, and COVID-19 impact among music and sports students during early phases of the COVID-19 pandemic. However, the study does have certain limitations. Data were not analyzed considering if music and sport students practiced mainly individual or collective activities and the kind of music and sport performed. It would be interesting to analyze if musicians and athletes could be considered a cohesive behavioral black box or deterministic machines and how they react to COVID-19 pandemic. Our study is a snapshot oriented to coping with COVID-19 in the early phases, so it would be advisable to repeat the study during later stages of the pandemic and under normal circumstances. Finally, our study offers practical implications for the second wave of the COVID-19 pandemic and has transferable value for any similar situation that may arise.

Author contributions

KH and TK contributed conception and design of the study and organized the database. MB and TK performed the statistical analysis. KH wrote the first draft of the manuscript. KH, MB, and TK wrote sections of the manuscript, contributed to manuscript revision, and read and approved the submitted version.

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