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Performers of the Night: Examining the Mental Health of Electronic Music Artists

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Abstract

Despite growing popular interest for the mental health of electronic music artists, scientific research addressing this topic has remained largely absent. As such, the aim of the current study was to examine the mental health of electronic music artists, as well as a number of determinants. Using a cross-sectional quantitative design, a total of 163 electronic music artists participated in this study. In line with the two-continua model of mental health (Keyes, 2002), both symptoms of depression/anxiety *and* well-being were adopted as indicators for mental health. Furthermore, standardized measures were used to assess potential determinants of mental health, including sleep disturbance, music performance anxiety, alcohol abuse, drug abuse, occupational stress, resilience, and social support. Results highlighted that around 30% of participants experienced symptoms of depression/anxiety. Nevertheless, the majority of these participants still demonstrated at least moderate levels of functioning and well-being. Sleep disturbance formed a significant predictor for both symptoms of depression/anxiety and well-being. Furthermore, resilience and social support were significant predictors for well-being. The results provide a first glimpse into the mental health challenges experienced by electronic music artists and support the need for increased research as well as applied initiatives directed at safeguarding their mental health.

Keywords: Anxiety, Depression, Musicians, Stress, Well-being

Performers of the Night: Examining the Mental Health of Electronic Music Artists

Over the past few years, there have been a growing number of popular electronic music artists (e.g., DJs, producers, live artists) publicly struggling with mental health issues and even committing suicide (Millington, 2018; Zlatopolsky, 2016). Following these high-profile, albeit possibly extreme cases, a need to increase attention for electronic music artists' mental health has been emphasized by both the media (e.g., Kale, 2019; Lynch, 2018) and the electronic music industry itself (e.g., The Association For Electronic Music, 2017). Nevertheless, to the best of our knowledge, scientific research on mental health in electronic music artists has remained absent.

In contrast, the prevalence of mental health issues in artists from other musical genres, including classical and mainstream music, has been well documented (Barbar, De Souza Crippa, & De Lima Osório, 2014; Kegelaers, Schuijer, & Oudejans, 2020; Kenny, Driscoll, & Ackermann, 2014; Vaag, Bjørngaard, & Bjerkeset, 2016a; Wristen, 2013). Research suggests that, compared to the general population, musicians tend to be at increased risk for common mental disorders (Vaag, Bjørngaard, et al., 2016a; van Fenema & van Geel, 2014) and associated mortality (e.g., drug overdose, suicide; Bellis, Hughes, Sharples, Hennell, & Hardcastle, 2012). In line with data found in the general population (World Health Organization, 2017), affective disorders, such as depression and anxiety, seem to be the most common mental disorders in musicians, with some studies finding prevalence rates as high as 51% (Kegelaers et al., 2020).

Mental health, however, does not simply reflect the presence (or absence) of mental disorders or ill-health. For example, the World Health Organization (2014) defines mental health as:

> A state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.

In other words, mental health equally reflects a state of optimal emotional, psychological, and social functioning and well-being. In line with such a conceptualization, Keyes (2002) proposed a two-continua model of mental health; integrating both mental ill-health and positive indicators of mental health and well-being. According to Keyes, both continua reflect potentially related, but essentially distinct dimensions (see also Westerhof & Keyes, 2010). To illustrate, although music students are known to experience high levels of depression (Kegelaers et al., 2020; Wristen, 2013), research suggests they might also be relatively high in psychological (i.e., eudaemonic) well-being (Araújo et al., 2017). With regards to well-being and functioning, Keyes (2002) distinguished individuals who are *flourishing* in life (i.e., who experience a state of optimal well-being and functioning), those who are *languishing* in life (i.e., who experience a distinct absence of well-being and functioning), and those who are moderately mentally healthy (i.e., neither flourishing nor languishing). Adopting such a two-continua approach, research concerning the mental health of electronic music artists should, thus, consider both symptoms of mental ill-health *and* mental well-being and functioning as indicators of mental health.

A number of potential factors have been proposed to explain why musicians might be at an increased risk for mental health issues. For example, research has pointed in the direction of the stressors and demands musicians typically experience as part of their occupation (Aalberg, Saksvik-Lehouillier, & Vaag, 2019). Musicianship is a highly volatile profession, with irregular working hours, job instability, limited long-term prospects, and financial insecurities (Parker, Jimmieson, & Amiot, 2019; Vaag, Giæver, & Bjerkeset, 2014). Furthermore, performing artists might experience hardships due to public expectations (i.e.,

fandom), long travels, social isolation, or limited time for social life (King, Berg, Koenig, Adair, & Tirado, 2019). Such stressors might all act as barriers for musicians' mental health (Aalberg et al., 2019; Parker et al., 2019; Vaag et al., 2014).

During their careers, many musicians are also confronted with music performance anxiety (Barbar et al., 2014; Kenny et al., 2014; Papageorgi, Creech, & Welch, 2013). Performance anxiety is a complex phenomenon, characterised by intensified cognitive and somatic anxiety prior to, during, or after musical performances, which some researchers have linked to social phobia (Kenny, 2011). Such performance anxiety is common in musicians across different genres (Papageorgi et al., 2013). For example, Barbar et al. (2014) found that around 24% of musicians in their study experienced considerable indicators of music performance anxiety, which in turn was associated with increased social anxiety and depression.

In addition to the aforementioned stressors, a number of other challenges might be especially salient for electronic music artists and could place them at an increased risk for mental health issues. For one, the potential for sleep disturbance in electronic music artists has been recognized (e.g., Zlatopolsky, 2016). Research already demonstrated that musicians, overall, report relatively high levels of sleep disturbance (Vaag, Saksvik-Lehouillier, Bjørngaard, & Bjerkeset, 2016). However, this might be especially pronounced in electronic music artists given the typically late-night nature of performances within the electronic music industry. Such sleep disturbances, in turn, have been reciprocally related to mental health issues (Alvaro, Roberts, & Harris, 2013).

Moreover, electronic music artists might also be at an increased risk for alcohol and drug abuse (e.g., Kale, 2019; Zlatopolsky, 2016). Substance use issues have been identified as both a key determinant for and outcome of mental health issues (Patel et al., 2018) and form the leading cause of mortality in popular musicians (Bellis et al., 2012). In their study,

Raeburn, Hipple, Delaney, and Chesky (2003) already found that around 10% of musicians reported substance use problems. However, this number might be considerably higher in electronic music artists, as the electronic music scene is associated with a culture of increased substance use (Mulder et al., 2009; Palamar, Acosta, & Cleland, 2019).

In addition to these proposed risk factors, certain protective factors might help safeguard electronic music artists against mental health issues (Vaag et al., 2014). Specifically, both psychological resilience (Hu, Zhang, & Wang, 2015; Ungar & Theron, 2019) and social support (Thoits, 2011) have gained considerable attention in psychological research as protective resources. Psychological resilience reflects an individual's ability to effectively withstand or recover from stressors and challenges that threaten its functioning, development, or well-being (Kegelaers, 2019; Masten, 2014). Rather than a static personality trait, resilience reflects a dynamic process, resulting from the interaction and effective use of both personal and environmental resources (Fletcher & Sarkar, 2013). Research has demonstrated that resilience is an important psychological resource for both classical (Kegelaers et al., 2020) and pop and rock musicians (Vaag et al., 2014). Likewise, social support has frequently been proposed as a protective resource. Social support entails the informational, emotional, or instrumental assistance provided by significant others. Research has consistently shown that social support can have an important buffering effect against the negative consequences of stress exposure, and, thus, improve mental health outcomes (Thoits, 2011). Indeed, social support has been associated with decreases in emotional exhaustion (Parker et al., 2019) and symptoms of depression (Aalberg et al., 2019) in musicians.

In sum, there currently exists limited information on the mental health of electronic music artists, as well as the potential risk factors and protective resources. As such, the aim of the current study was to examine their mental health. More specifically, in line with the two-

continua model of mental health (Keyes, 2002), we considered symptoms of mental ill-health as well as the presence of a state of optimal functioning and well-being, as indicators for mental health. Furthermore, we examined the role of a number of potential determinants, including occupational stress, performance anxiety, sleep disturbance, drugs and alcohol abuse, psychological resilience, and social support. In order to address these research questions, a cross-sectional quantitative research design was adopted.

Method

Participants

For this study, both professional and semi-professional electronic music artists were sampled. Electronic music artists were defined as those individuals who take up a creative function within any of the electronic music sub-genres. Such a creative function could relate to performing (e.g., DJs), composing (e.g., producers), or a combination of both. Detailed participant demographics are provided in the results section.

Procedure

Institutional ethical approval was obtained prior to the start of the project. The study was conducted online, using the survey software Survalyzer. To recruit participants directly, a two-pronged approach was used: (a) through the extended professional networks of the authors and (b) via international electronic music record labels who agreed to collaborate in this study and distributed the survey among their clients. Potential participants received an invitation for the survey via email, containing the background and aims of the study as well as a link to the online survey. Through these channels, a total of 376 electronic music artists were contacted directly. Additionally, links to the survey were also placed on the social media channels of three major electronic music organizations. As such, a true and accurate response rate could not be determined, as it is impossible to discern how many additional artists found the survey through these social media channels. Once participants followed the

link to the survey, they were again presented with the background of the study and required to provide digital informed consent.

Material

A combination of demographic questions and validated self-report questionnaires were used to assess the participants' mental health, as well as the potential determinants. The different measures used are outlined below.

Demographics. Participants were asked a number of demographic questions at the start of the survey. These included gender, age, nationality, professional status (i.e., professional/semi-professional), years active, number of gigs during the last year, main musical genre, and role within the electronic music industry. Three additional demographic questions were asked to gauge the participants' mental health. These included: "*Have you ever been diagnosed with a mental health condition?*", "*Have you ever received professional help in relation to your mental health (e.g., psychologist, psychiatrist)?*" and "*Have you used alcohol or drugs to cope with negative feelings and emotions?*" For these latter three questions, participants were provided with dichotomous (*YES/NO*) response options. For all demographic questions, participants also had the option to indicate "*prefer not to say*".

Depression/anxiety. In order to assess symptoms of depression/anxiety, the 12-item General Health Questionnaire (GHQ-12) was used (Goldberg et al., 1997; Lundin, Hallgren, Theobald, Hellgren, & Torgén, 2016). The GHQ-12 was chosen specifically as depression and anxiety form the most prevalent symptoms of mental ill-health, with high levels of comorbidity (World Health Organization, 2017). The GHQ-12 contains 12 items (6 worded positively, 6 worded negatively), scored on a 4-point scale ranging from 0 (*better than usual/not at all*) to 3 (*much worse than usual/more than usual*). For the present study, we adhered to the traditional scoring method (0-0-1-1), resulting in a total score ranging from 0

to 12 (Goldberg et al., 1997). A cut-off score of 2 was used as indicator for the presence of symptoms of depression/anxiety (Lundin et al., 2016).

Well-being. Well-being and functioning was measured using the Mental Health Continuum Short Form (MHC-SF; Keyes, 2002; Lamers, Westerhof, Bohlmeijer, Ten Klooster, & Keyes, 2011). This 14-item questionnaire measures feelings of emotional well-being (EWB; 3 items), social well-being and functioning (SWB; 5 items), and psychological well-being and functioning (PWB; 6 items). Responses are scored on a 6-point Likert scale, ranging from 1 (*never*) to 6 (*every day*). A total score is obtained to assess general well-being and functioning. Furthermore, the MHC-SF allows for a categorical assessment of mental health, divided in flourishing, languishing and moderate mental health (Keyes, 2002; Westerhof & Keyes, 2010). A diagnosis of *Flourishing* is made if someone answered at least 1 of the 3 EWB symptoms (items 1-3) and at least 6 of the 11 positive functioning symptoms (SWB & PWB; items 4-14) "*every day*" or "*almost every day*". A diagnosis of *Languishing* is made when someone answered at least 1 of the 3 EWB symptoms and 6 of the 11 positive functioning symptoms "*never*" or "*once or twice*". Participants who are neither languishing nor flourishing are categorized as having a moderate mental health.

Sleep disturbance. Indications of sleep disturbance were measured using the Patient-Reported Outcomes Measurement Information System (PROMIS) 4-item short form (Buysse et al., 2010; Yu et al., 2011). The items are rated on a 5-point Likert scale, ranging from 1 (*not at all*) to 5 (*very much*) (5). A total score ranging from 4 to 20 is obtained by summing up the answers to the 4 questions, with a cut-off point of 13 used to indicate the prevalence of sleep disturbance symptoms (Buysse et al., 2010).

Music performance anxiety. Participants' music performance anxiety before and during performances was measured using a subscale of the Kenny Music Performance Anxiety Inventory (K-MPAI; Kenny, 2009, 2011). Music performance anxiety is recognized

as a complex multidimensional phenomenon, including biological (e.g., vulnerability), temperamental (e.g., hopelessness), and experiential (e.g., parental empathy) factors (Kenny, 2011). However, within the present study, we were specifically interested in the cognitive and somatic anxiety experienced in relation to performances as a potential predictor for mental health. As such, the choice was made to only include the 'Proximal somatic anxiety and worry about performance' subscale (hereinafter referred to as K-MPAI-p). The K-MPA-p subscale includes 11 items, rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency of the K-MPAI-p was high in the present study ($\alpha = .88$).

Alcohol abuse. Indications of alcohol abuse were measured using the Alcohol Use Disorders Identification Test (AUDIT-C; Dawson, Grant, Stinson, & Zhou, 2005). The AUDIT-C contains three question, each scored on a distinct 4-point scale. A total score ranging from 0 to 12 is obtained by summing up the answers on the 3 items, with a score of 5 or more indicating the presence of potential alcohol abuse (Dawson et al., 2005).

Drug abuse. Symptoms of drug abuse were measured using the 10-item version of the Drug Abuse Screening Test (DAST-10; Yudko, Lozhkina, & Fouts, 2007). The items on the DAST-10 are scored dichotomously (*NO* = 0*; YES* = 1), with a total scored obtained by summing up all items. A cut-off score of 4 was used as an indicator of drug abuse (Yudko et al., 2007).

Occupational stress. Participants' occupational stress was measured using the 53-item Musician Occupational Stress Scale (MOSS; King et al., 2019). Responses on the MOSS are scored on a 5-point Likert scale, ranging from 1 (*no pressure at all*) to 5 (*a great deal of pressure*). When participants did not experience a specific stressor, they were instructed to indicate "*not applicable*". The MOSS is a novel scale adapted from the original musician occupational stress survey (Wills & Cooper, 1987). Preliminary testing of the

MOSS showed good consistency and reliability for a single summary score of occupational stress (King et al., 2019). However, further psychometric testing and examination of the underlying factor structure of the MOSS has yet to be conducted. As such, some caution is warranted when interpreting the MOSS scores. Nevertheless, it was considered a suitable measure for the present study. Internal consistency of the MOSS was excellent (α = .93).

Resilience. Participants' capacity for resilience through the use of protective resources, was measured using the unidimensional 10-item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007). Items on the CD-RISC-10 are rated on a 5-point Likert scale, ranging from 1 (*not true at all*) to 5 (*true nearly all the time*). The internal consistency of the CD-RISC-10 was high (α = .85).

Social support. To measure the participants' social support, the Multidimensional Scale of Perceived Social Support was used (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS contains 12 items, scored on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The MSPSS provides an assessment of the perceived support by family, friends, and significant others. For the present study, only the overall score of the MSPSS was used. The internal consistency of the MSPSS was excellent (α = .92).

Data analysis

IBM SPSS Statistics software 26 was used for all statistical analyses. First, descriptive statistics (mean, standard deviation, frequency, range) were computed for all variables. Independent sample *t*-tests were conducted to assess demographic differences based on professional status. Where appropriate, standardised cut-off scores were used to assess the prevalence of mental health indicators (i.e., for the GHQ-12, MHC-SF, PROMIS, AUDIT-C, and DAST). 95% Confidence intervals (95% CI) were calculated for the resulting categorical variables. However, in line with the suggestion by Streiner (2002), the continuous

– rather than categorical – data were used for all further analysis. Pearson correlation coefficients were used to assess the direction and strength of any potential relationships between the continuous variables of interest. Finally, two multiple regression analyses were performed, with symptoms of depression/anxiety and well-being as dependent variables. A priori power analysis, using G*Power 3.1, was performed to determine the minimum sample size for the regression analyses. Results revealed that, for seven predictor variables, a minimum sample of $N = 104$ was required to detect at least medium sized effects ($f^2 = .15$) with a power of .80. All effect sizes were interpreted in accordance with Cohen's (1988) conventions.

Results

In total, 163 electronic music artists (80.4% male) completed the survey, exceeding the targeted minimum sample of 104 participants. Participants represented 27 different nationalities and a wide range of different musical sub-genres within electronic music (e.g., EDM, house, techno, electro, trance, disco, jungle, ambient, minimal). 89% of participants were DJs (not exclusively), with other roles including music producers, live electronic music artists/members of a live electronic music band, and label managers. Further demographics are presented in Table 1. Participants ranged in age between 17 and 58 years old ($M = 32.85$; $SD = 7.76$). In total, 57 participants (35.0%) indicated they were active as full-time professional electronic music artists, whereas 106 (65.0%) indicated they were semi-professional. Independent sample *t*-tests demonstrated that professional artists were significantly older ($t(161) = 4.07$, $p < .001$), had more experience ($t(161) = 4.15$, $p < .001$), and played more gigs per year compared to the semi-professional artists ($t(161) = 6.94$, $p < .001$).

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Mental Health

Using single descriptive questions, 30.1% of participants indicated to have been previously diagnosed with a mental health condition, whereas 55.2% of participants indicated to have previously received professional mental health support (e.g., psychologists or psychiatrists) (see Table 1).

Turning to the validated measures, symptoms of depression/anxiety (GHQ-12) and well-being (MHC-SF) were moderately negatively correlated with each other (r = -.34, p < .001). Prevalence rates and cross-classifications of mental health status are presented in Table 2. GHQ-12 data indicated that 30.1% of participants scored over the threshold to indicate symptoms of depression/anxiety, 95% CI [23.1, 37.7]. MHC-SF data indicated that 31.3% of participants were flourishing in life, 95% CI [27.1, 42.2], 4.3% of participants were languishing, 95% CI [3.4, 11.8], and 64.4% were moderately mentally healthy, 95% CI [56.6, 71.7].

Looking at the cross-classifications, only 2.5% of the participants were both languishing and experiencing symptoms of depression/anxiety, 95% CI [0.7, 6.2]. Of the participants who scored over the threshold for symptoms of depression/anxiety, 23.3% showed moderate well-being, 95% CI [17.1, 30.6], and 4.3% were flourishing, 95% CI [1.7, 8.6]. Of the participants who did not experience symptoms of depression/anxiety, 27.0% were flourishing, 95% CI [20.3, 34.5], and 41.1% were moderately mentally healthy, 95% CI [33.5, 49.1]. Only 1.8% of participants were languishing without symptoms of depression/anxiety, 95% CI [0.4, 5.4].

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Means, standard deviations, and correlations of the continuous GHQ-12 scores, MHC-SF scores, and other variables of interest are provided in Table 3. Symptoms of sleep disturbance were measured by the PROMIS. Following the standardized cut-off scores of the PROMIS, 28.8% of electronic music artists in this study scored above the threshold to

indicate sleep disturbance, 95% CI [22.0, 36.4]. Furthermore, symptoms of sleep disturbance were moderately positively correlated with depression/anxiety (r = .35, p < .001) and moderately negatively correlated with well-being (r = -.30, p < .001). Small, yet significant, correlations were also found between music performance anxiety and depression/anxiety (r = .16, p = .046) and well-being (r = -.22, p = .004). Moreover, moderate to large correlations were found between well-being and social support (r = .42, p < .001) and well-being and resilience (r = .52, p < .001). However, neither social support nor resilience correlated significantly with depression/anxiety. Relationships between mental health and other variables of interest are presented in the following sections.

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Alcohol and Drug Abuse

Alcohol abuse was measured by the AUDIT-C. In total, 62.6% of participants, 95% CI [54.7, 70.0], scored above the threshold of the AUDIT-C, indicating potential signs of alcohol abuse. With regards to drug abuse, the DAST-10 was used as a screening tool. In total 36.8% of participants, 95% CI [29.4, 44.7], scored above the threshold to indicate potential drug abuse. Furthermore, using a single descriptive question, 55.2% of participants admitted having used drugs or alcohol as a coping mechanism (see Table 1). However, despite this finding, no direct relationships could be found between alcohol or drug abuse and well-being or symptoms of depression/anxiety (rs ≤ .08; ps ≥ .29) (see Table 3). As such, both alcohol and drug abuse were excluded from further analysis.

Occupational Stress

The MOSS was used to examine occupational stress in the electronic music artists. Summated mean scores indicated that, overall, participants perceived their occupational stress to be moderate to low (M = 2.60, SD = 0.61). At the item level, only five stressors were, on average, rated as moderately stressful. These included *Instruments or equipment not*

working properly (*M* = 3.68, *SD* = 1.02), *Feeling that you must reach or maintain the standards of musicianship that you set for yourself* (*M* = 3.50, *SD* = 1.34), *Feeling that you need to become better known and/or better paid* (*M* = 3.40, *SD* = 1.20), *Worrying because of a lack of gigs* (*M* = 3.05, *SD* = 1.26), and *Having to play music you don't like, in order to earn a living* (*M* = 3.04, *SD* = 1.50). Providing a full overview of all stressors included in the MOSS is beyond the scope of this article. However, to provide context to the reader, the top 15 most impactful stressors are illustrated in Table 4.

Total MOSS scores were significantly correlated with all other variables of interest, except for alcohol and drug abuse (see Table 3). Small but significant correlations were found between occupational stress and symptoms of depression/anxiety ($r = .20$, $p = .015$) and well-being ($r = -.34$, $p < .001$). Furthermore, small correlations were also found between occupational stress and sleep disturbance ($r = .23$, $p = .006$) and social support ($r = -.22$, $p = .007$). Moderate correlations were found between occupational stress and music performance anxiety ($r = .44$, $p < .001$) and psychological resilience ($r = -.49$, $p < .001$).

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Mental Health Determinants

Two multiple regression analyses were conducted with symptoms of depression/anxiety (GHQ-12) and well-being (MHC-SF) as dependent variables. Predictor variables were included on the basis of their expected relevance for mental health outcomes as identified in the literature and their significant correlations with the dependent variables. Both regression models are presented in Table 5. Multicollinearity was within acceptable limits, with variance inflation factor (VIF) values ranging between 1.08 and 1.54 and tolerance statistics ranging between .65 and .93. A significant regression equation was found for depression/anxiety, $F(5, 137) = 3.869$; $p = .003$, explaining 12.4% of the variance. Within this model, sleep disturbance was the sole significant predictor for depression/anxiety ($\beta =$

.282; p = .001). A significant predictive model was also found for well-being, $F(5, 137)$ = 15.011; $p < .001$, explaining 35.4% of the variance. Within this model, psychological resilience (β = .313; $p < .001$), social support (β = .299; $p < .001$), and sleep disturbance (β = -.146; p = .045) were all significant predictors for well-being. Notably, occupational stress did not turn up as a significant predictor in either model. However, as the MOSS consists of a large list of potential stressors without established factor structure (possibly statistically averaging out each other's impact), we conducted two additional regression analyses including only the top 5 most impactful stressors. Both models were significant, with occupational stress as a significant predictor for both symptoms of depression/anxiety (β = .179; p = .043) and well-being (β = -.214; p = .004).

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Discussion

The aim of the present paper was to examine the mental health of electronic music artists, using a descriptive cross-sectional survey study. A first key finding was that we found confirmation for the two-continua model of mental health, indicating that mental ill-health and well-being reflect two related, yet distinct dimensions (Keyes, 2002; Westerhof & Keyes, 2010). Around 30.1% of participants experienced symptoms of anxiety/depression. This prevalence rate is in line with previous research (e.g., Barbar et al., 2014; Vaag, Bjørngaard, et al., 2016), suggesting that electronic music artists are not necessarily at an increased risk for symptoms of mental disorders compared to musicians from other musical genres. However, the prevalence rate does seem higher compared to the general population (see also Vaag, Bjørngaard, et al., 2016; van Fenema & van Geel, 2014), which typically varies around 20%, as measured by the GHQ-12 (Hoeymans, Garssen, Westert, & Verhaak, 2004).

Despite these relatively high prevalence rates, results also showed that the majority of participants who experienced symptoms of depression/anxiety still demonstrated at least

368 moderate levels of functioning and well-being. Only around 2.5% of participants experienced
369 symptoms of depression/anxiety, coupled with severe impairments in functioning and well-
370 being (i.e., languishing). This study is the first to simultaneously measure both mental health
371 and ill-health within a musician population. As such, the data are difficult to compare to
372 previous studies and some caution is needed when interpreting the results. Although most
373 participants with symptoms of depression/anxiety demonstrated moderate levels of well-
374 being and functioning, we would argue against an overly positive interpretation of the results.
375 As highlighted by the findings, the presence of some positive feelings and good functioning
376 does not imply that the individual is not suffering from underlying psychopathology (Lamers
377 et al., 2011).

378 Another notable finding was that more than half of the participants indicated to have
379 used mental health support services in the past. This number is considerably higher than what
380 is typically found in the general population. For example, a large scale international survey
381 by the World Health Organization found that in high income (Western) countries the rates of
382 individuals seeking mental health services only ranged between 4.3% (Italy) and 17.9%
383 (USA) (Wang et al., 2007). This is also consistent with a study demonstrating that musicians
384 from different genres are almost three times as likely to use psychotherapy, compared to the
385 general population (Vaag, Bjørngaard, & Bjerkeset, 2016b). A number of explanations might
386 be found for this result. First, this finding might support the notion that electronic music
387 artists are at an increased risk for mental health issues compared to the general population, as
388 the presence and severity of mental disorders are associated with increased help-seeking
389 (Wang et al., 2007). However, it could also point in the direction of high mental health
390 literacy, relatively low mental health stigma and the willingness to engage in help-seeking
391 behaviours in electronic music artists (Clement et al., 2015). Given these findings, future
392 research is clearly needed to examine the help-seeking behaviours of electronic music artists.

A number of determinants for mental health were also identified. It has previously been suggested that electronic music artists might be at an increased risk for sleep disturbance given the late-night nature of performances within the industry (Zlatopolsky, 2016). Indeed, around 29% of participants showed indications of sleep disturbance. This prevalence rate does not seem particularly higher compared to other musicians (Vaag, Saksvik-Lehouillier, et al., 2016), although direct comparisons are difficult due to the different screening instruments used. Nevertheless, symptoms of sleep disturbance were directly associated with an increase in symptoms of depression/anxiety. This finding is consistent with previous research demonstrating the reciprocal relationship between sleep disturbance and mental health disorders (Alvaro et al., 2013).

The present study also found support for the importance of psychological resilience and social support as protective resources. In contrast to previous research, both resilience (cf. Kegelaers et al., 2020) and social support (cf. Aalberg et al., 2019) were not associated with a decrease in symptoms of depression/anxiety. However, both resources were significant predictors for higher levels of functioning and well-being. As such, it seems that, for electronic music artists, resilience and social support do not necessarily protect against mental ill-health but might be important resources to maintain a least a moderate level of functioning and well-being. Furthermore, the impact of occupational stress was also examined. Although stress demonstrated significant correlations with most other variables of interest, it did not show up as a significant predictor within the regression analyses (cf. Aalberg et al., 2019; Parker et al., 2019). However, it should be noted that occupational stress was considered as a single factor, based on the MOSS (King et al., 2019). Arguably, several different types of occupational stress exist (e.g., job security, performances, interpersonal relationships). In the present study, the most impactful stressors seemed to relate to practical issues (e.g., material failure) or financial pressure (e.g., needing to be better paid, lack of

gigs). When only these most impactful stressors were added in the regression analyses, results indicated that occupational stress did impact both symptoms of depression/anxiety and well-being. As such, future research should further validate and determine the underlying factor structure of the MOSS; and examine the relationship of different stressor types and mental health outcomes in more detail.

Participants also reported high levels of substance abuse issues, with 36.8% indicating drug abuse and 62.6% indicating alcohol abuse. These rates are considerably higher than prevalence rates of around 10% reported in previous research with popular musicians (Raeburn et al., 2003). Such substance abuse issues have frequently been reciprocally related to mental health outcomes (Patel et al., 2018). However, despite over half of the participants indicating that they have used drugs or alcohol as a coping mechanism, no such link with mental health was found in the present study. Potentially, the high prevalence of substance abuse in the present sample is more indicative of a culture of substance use in the electronic music scene (Mulder et al., 2009; Palamar et al., 2019), than a marker of mental health. Nevertheless, the results still highlight a significant issue which warrants concern. Not in the least because substance use complications (e.g., overdose) form the leading cause of mortality among popular musicians (Bellis et al., 2012).

Some practical implications can be derived from the current findings. First, it is clear that electronic music organizations (e.g., record labels, booking agencies, etc.) should be cognisant of the fact that artists might be suffering from underlying mental ill-health, even when they demonstrate seemingly normal levels of functioning and well-being. As such, organizations should strive to support the mental health of their musicians by decreasing mental health stigma and support-seeking barriers, monitor early signs of potential clinical or sub-clinical mental health issues, and provide low-threshold access to quality mental health support. Specific attention should also be directed towards improving electronic music

443 artists' sleep hygiene. Furthermore, preventive interventions might be designed to strengthen
444 artists' social support networks and built their resilience. Although resilience-building
445 research has remained absent within music psychology, key lessons might be derived from
446 research within occupational psychology (see Joyce et al., 2018; Robertson, Cooper, Sarkar,
447 & Curran, 2015). For example, within their systematic review, Joyce et al. (2018) found
448 support for the effectiveness of CBT and mindfulness-based interventions to develop
449 resilience. As such, similar interventions might provide a fruitful avenue to develop resilience
450 in electronic music artists as well.
451 A number of strengths and limitations should be addressed when discussing the
452 results of this study. A specific strength is that, to the best of our knowledge, this study forms
453 the first structural mental health study in a population which has been suggested to be at an
454 increased risk for mental health issues (Kale, 2019; Lynch, 2018). Furthermore, the relative
455 heterogenous nature of the sample, in terms of age, country of origin, and different types of
456 electronic music artists, can be considered a strength and might improve the
457 representativeness of the data for a broader population. Another strength is that the present
458 study advances existing research by adopting a two-continua approach (Keyes, 2002), as this
459 paper was the first to simultaneously study both symptoms of mental ill-health and positive
460 indicators of mental health within a musician population. Nevertheless, within the mental ill-
461 health continuum, only symptoms of depression/anxiety were considered. Although these
462 form the most prevalent common mental disorders (World Health Organization, 2017), other
463 clinical or sub-clinical disorders might also be prevalent in electronic music artists, including
464 burn-out, bipolar disorder, post-traumatic stress disorder, social phobia, or eating disorders.
465 Additional limitations of the current study include the inability to determine the true response
466 rate as well as a lack of a control group. The inclusion of one or more control groups would
467 allow for a more direct comparison of the mental health of electronic music artists with, for

example, other musicians or the general population. Furthermore, we also acknowledge the potential for a self-selection bias; a common limitation within online survey research. Given the voluntary nature of the research project, the possibility exists that individuals who have a higher affinity for the topic of mental health were more willing to participate in the survey. In light of these points, some caution is warranted when generalizing the findings to the population of electronic music artists as a whole.

Another specific limitation of the current study is that the survey was online during the early stages of the COVID-19 pandemic. We attempted to account for this event by adding an explicit statement at the beginning of the survey, asking participants to answer the questions as they pertain to them prior to the start of the crisis. Nevertheless, the potential impact of COVID-19 on mental health has been globally recognized (Holmes et al., 2020; World Health Organization, 2020). The pandemic also has a considerable impact on the music industry, with the large-scale cancellation of shows and tours (Brown, 2020). These work and financial uncertainties might further have increased musicians' stress and anxiety. As such, future research is needed to directly examine the impact of the COVID-19 crisis on (electronic) music artists' mental health.

Conclusion

The present study was to first to examine both symptoms mental ill-health and positive indicators of mental health in electronic music artists. Results suggested that around 30% of artists experienced symptoms of depression/anxiety. At the same time, the majority of these artists still experienced at least moderate levels of functioning and well-being. Moreover, sleep disturbance, resilience, and social support were found to be significant predictors for mental health outcomes within the present study. From an applied perspective, the current study highlights the need for organizations within the electronic music industry to be cognisant of and support the mental health of their artists.

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675

676 Table 1

677 *Participant demographics*

	Total		Professional		Semi-professional	
N	163		57		106	
Gender (%)						
Male	131	(80.4%)	43	(78.9%)	88	(83.0%)
Female	28	(17.2%)	13	(22.8%)	15	(14.2%)
Non-binary/prefer not to say	4	(2.5%)	1	(1.8%)	3	(2.8%)
Age (*SD*) *	32.85	(7.76)	36.07	(8.00)	31.12	(7.07)
Years experience (*SD*) *	11.02	(8.03)	14.75	(9.03)	9.06	(6.70)
Gigs / year (*SD*) *	31.64	(32.32)	55.32	(36.59)	18.91	(20.72)
MH condition diagnosis (%)						
Yes	49	(30.1%)	19	(33.3%)	30	(28.3%)
Treatment MH professional (%)						
Yes	90	(55.2%)	39	(68.4%)	51	(48.8%)
Used alcohol/drugs as coping (%)						
Yes	90	(55.2%)	31	(54.4%)	59	(55.7%)

* $p < .001$

678

679 Table 2

680 *Prevalence rates and cross classifications of mental health status*

	Well-being and functioning			
	Flourishing	Moderate mental health	Languishing	Total
WITHOUT symptoms of depression/anxiety	44 (27.0%) *Flourishing*	67 (41.1%) *Moderately mentally healthy*	3 (1.8%) *Pure languishing*	114 (69.9%)
WITH symptoms of depression/anxiety	7 (4.3%) *Pure symptoms of depression*	38 (23.3%) *Pure symptoms of depression*	4 (2.5%) *Symptoms of depression & languishing*	49 (30.1%)
Total	51 (31.3%)	105 (64.4%)	7 (4.3%)	163

681

682 Table 3

683 *Means, standard deviations, and correlation coefficients*

	M	*SD*	1	2	3	4	5	6	7	8
1. GHQ-12	2.23	3.01	-							
2. MHC-SF	4.01	0.87	-.34***	-						
3. PROMIS	10.48	4.19	.35***	-.30***	-					
4. K-MPAI-p	2.80	1.23	.16*	-.22**	.18*	-				
5. CD-RISC-10	3.64	0.59	-.16	.52***	-.25**	-.34***	-			
6. MSPSS	5.56	1.02	-.08	.42***	-.01	-.24**	.32***	-		
7. AUDIT-C	5.22	2.53	.02	.08	.04	.06	.04	.03	-	
8. DAST-10	3.12	1.83	.02	-.01	.08	.20**	-.13	.03	.27***	-
9. MOSS	2.60	0.61	.20*	-.34***	.23**	.44***	-.49***	-.22**	-.03	.13

GHQ-12 *depression/anxiety*; MHC-SF *well-being*; PROMIS *sleep disturbance*; K-MPAI-p *music performance anxiety*; CD-RISC-10 *resilience*; MSPSS *social support*; AUDIT-C *alcohol abuse*; DAST-10 *drug abuse*; MOSS *occupational stress.*

684

685 Table 4

686 *Means, standard deviations, and incidence rates of the top 15 most impactful occupational*

687 *stressors (MOSS)*

Stressors	Mean	SD	Incidence[a] (%)
1. Instruments or equipment not working properly	3.68	1.02	99.3%
2. Feeling that you must reach or maintain the standards of musicianship that you set for yourself	3.50	1.34	89.0%
3. Feeling that you need to become better known and/or better paid	3.40	1.20	95.9%
4. Worrying because of the lack of gigs	3.05	1.26	88.3%
5. Having to play music you don't like, in order to earn a living	3.04	1.50	53.8%
6. Waiting around for long periods at the gig before it's time to perform	2.95	1.27	90.1%
7. Worrying about the lack of pensions and benefits in the music profession	2.95	1.37	81.9%
8. Worrying about getting to the gig on time	2.92	1.37	87.9%
9. Coping with an instrument that is physically difficult to play	2.91	1.13	58.4%
10. Having to mingle socially with other musicians so that you will keep getting gigs	2.90	1.42	90.6%
11. Playing at a venue with bad conditions, e.g. poor dressing rooms, poor acoustics, small stage	2.86	1.22	94.0%
12. Effects of noise when the music is heavily amplified	2.84	1.20	95.3%
13. Playing where there is inadequate rehearsal or preparation	2.81	1.19	79.2%
14. Having to work when work is available, making it difficult to take vacation	2.79	1.23	84.0%
15. Feeling tense or nervous when playing a live gig	2.70	1.23	83.9%

[a] Incidence rates were determined by calculating the number of participants scoring an item "*not applicable*" subtracted from the total population

688

689 Table 5

690 *Multiple regression analyses for the mental health indicators*

	B	SE B	β	p	t	R^2	p
Depression/anxiety						**.124**	**.003**
Sleep disturbance	0.202	.060	**.282**	**.001**	3.369		
MPA	-0.003	.020	-.014	.879	-0.153		
Resilience	-0.002	.050	-.004	.986	-0.040		
Social support	-0.120	.254	-.041	.636	-0.474		
Occupational stress	0.743	.491	.150	.133	1.513		
Well-being						**.354**	**<.001**
Sleep disturbance	-0.030	.015	**-.146**	**.045**	-2.027		
MPA	0.000	.005	.005	.951	0.061		
Resilience	0.046	.012	**.313**	**<.001**	3.808		
Social support	0.251	.062	**.299**	**<.001**	4.051		
Occupational stress	-0.161	.120	-.114	.182	-1.342		

Values in **bold** = $p < .05$

691