Przegląd Badań Edukacyjnych
Educational Studies Review
ISSN 1895-4308
nr 40 (2/2022), s. 231–254

ORIGINAL RESEARCH PROJECTS
ORYGINALNE ARTYKUŁY BADAWCZE

Marcin Moroń
University of Silesia in Katowice, Poland
e-mail: marcin.moron@us.edu.pl
ORCID: https://orcid.org/0000-0002-7265-077X

Karina Atłas
University of Silesia in Katowice, Poland
e-mail: karina.atlas@us.edu.pl
ORCID: https://orcid.org/0000-0002-4363-3583

Pandemic Burnout, Depression, and Anxiety Among Adolescents: A Network Analysis

http://dx.doi.org/10.12775/PBE.2022.026

Abstract
The COVID-19 pandemic could be regarded as a chronic psychological burden that may lead to prolonged, unmanageable stress, e.g. burnout. Previous studies on COVID-19 have indicated that pandemic burnout was frequent in the general population and could be regarded as a risk factor for psychopathological symptomatology (e.g. depression, anxiety). This study used a network approach to investigate the associations between pandemic burnout symptoms and symptoms of depression and anxiety among Polish adolescents. A total of 389 adolescents participated in a survey in two stages: in June 2021 (shortly after students' return to schools after the COVID-19 lockdowns were lifted; n = 181) and in September 2021 (shortly after the beginning of the new school year; n = 208). Data were collected by means of a survey aimed at measurement of anxiety, depression, and symptoms of COVID-19 burnout. The network analysis indicated that (1) pandemic burnout is rather a separate syndrome of symptoms compared to depression and anxiety; (2) emotional and mental exhaustion symptoms such as feelings of hopelessness and worthlessness were central to pandemic burnout; (3) the stability of the pandemic burnout

symptoms was relatively low, indicating that this syndrome could be dynamic or internally heterogenic.

Keywords: pandemic burnout, depression, anxiety, network analysis.

Introduction

The COVID-19 pandemic has continued to severely impact the physical and mental health of millions across the world since its outbreak in March 2020 (Vindegaard & Benros, 2020; Nakamura et al., 2021; Wu et al., 2021). While initially it had the status of an immediate stressor, the pandemic and its consequences in various domains of life (e.g. job insecurity, social distancing, lockdowns) have become a chronic stressor, which may longitudinally affect the mental health of the general population (Queen & Harding, 2020). For example, pandemic stress severely impacted students' mental health and their educational process (Li et al., 2021; Mali & Lim, 2021; Przyborowska & Błajet, 2021; Wang et al., 2021). The chronicity of pandemic stress has recently drawn attention of researchers and stimulated research on pandemic burnout (Yıldırım & Solmaz, 2022) or pandemic fatigue (Harvey, 2020; Michie et al., 2020). COVID-19 burnout is a syndrome of symptoms caused by prolonged stressors generated by the pandemic, including physical exhaustion (e.g. feeling weak/sickly and having sleep problems), emotional exhaustion (e.g. feeling depressed and hopeless), and mental exhaustion (e.g. feeling worthless/like a failure and disappointed with people) (Maslach et al., 2001; Malach-Pines, 2005, pp. 79–80; Maslach & Leiter, 2016; Queen & Harding, 2020; Yıldırım & Solmaz, 2022). On the other hand, pandemic fatigue refers particularly to the tendency of individuals to become weary of rules and advice that should be followed to prevent the spread of the pandemic (Haktanir et al., 2022).

COVID-19 burnout was positively correlated with depression, anxiety, intolerance of uncertainty, and coronavirus stress (Asl et al., 2021; Moroń et al., 2021; Haktanir et al., 2022; Yıldırım & Çiçek, 2022; Yıldırım & Solmaz, 2022). It was caused by COVID-19 anxiety and job insecurity and prevented by better financial well-being (Üngüren et al., 2021). Meanwhile, pandemic

fatigue was related to COVID-19 worries and general worries and stress (Nitschke et al., 2020).

According to meta-analytical studies, the most prevalent mental health consequences of the pandemic included depression and anxiety (Wu et al., 2021). These two mental health conditions were also significantly correlated with COVID-19 burnout (Moroń et al., 2021; Yıldırım & Solmaz, 2022). In light of the long debate on the distinctions between depression and job burnout (Verkuilen et al., 2021) and between depression, anxiety, and job burnout (Koutsimani et al., 2019), studies seem to be lacking on the structure of the associations between depression, anxiety, and pandemic burnout. Particularly, studies demonstrating that depression and job burnout overlap may indicate that burnout could be regarded as a dimension of depression (Bianchi et al., 2015a, b) or a stage in the development of depression (Ahola et al., 2005). This could lead to the conclusion that the so-called pandemic burnout may be a result of prolonged depressive and anxious reactions to threats caused by the pandemic rather than constituting an individual cluster of symptoms (Miaskowski et al., 2017).

Recent research has shown that COVID-19 burnout could be a serious problem for not only groups at risk but also the general population. High percentages of burnout were observed among medical staff and nurses in medical centres and hospitals in South Korea (Hong et al., 2021) as well as among teleworkers in Ecuador (Barriga Medina et al., 2021). Burnout caused by the pandemic was also observed among academics (Gawin, 2021) and teachers (Gómez-Domínguez et al., 2022). In a study by Morgul et al. (2021), psychological fatigue was present among 64.1% of the participants drawn from the general population in Turkey. Some groups are in higher risk of severe mental consequences of the pandemic, e.g. women (Aldossari & Chaudhry, 2021) and elderly (Banerjee, 2020).

Children and adolescents were indicated as groups at a higher risk of mental health problems during the pandemic (Tang et al., 2020; Wu et al., 2021). Less is known about the pandemic burnout among adolescents. Psychological burnout syndrome was previously identified among students due to long-term exposure to school-related stress events and the pressure to achieve (Fiorilli

et al., 2017). Further, depression was one of the most severe consequences of school burnout among Finnish students, alongside lower school engagement and lower achievements (Salmela-Aro et al., 2009). The pandemic led to new types of school-related stress events (e.g. prolonged remote learning and social isolation), which could have contributed to higher psychopathological symptomatology among students by increasing their psychological burnout due to the inability to cope with modification of school duties and social interactions with peers (Preston & Rew, 2022).

The contemporary approach to studying symptomatology in clinical psychology and psychiatry indicates that mental disorder could be theorised to be the result of the causal interplay among symptoms in a network structure (Borsboom, 2017). The traditional conceptualisations of psychopathology presumed that symptoms of mental disorders were reflective of underlying diseases ('latent' common causes; Cramer et al., 2010). In the network approach, symptoms are conceptualised as elements of a complex dynamical system in which they interact (Borsboom & Cramer, 2013). Here, symptoms can be activated by other symptoms in the network (e.g. worthlessness could activate fatigue, which in turn can trigger anhedonia). This approach also refers to the common knowledge among clinicians that symptoms can reinforce one another, leading to symptom cycles (Cramer et al., 2010). Specifically, a network structure of symptoms consists of 'nodes' referring to the selected variables that indicate symptoms and 'edges' representing the associations that connect the nodes (e.g. regularised partial correlation coefficients). Previous studies have indicated that the symptoms of anxiety and depression were more related to other symptoms of the respective disorder than to the symptoms of the other disorder (Beard et al., 2016). Similarly, fatigue among cancer patients was related to depression and anxiety symptomatology, but constituted an independent syndrome (Schellekens et al., 2020).

In the present study, we used a cross-sectional design based on the quantitative measurement of symptoms of pandemic burnout, depression, and anxiety and their co-occurrence. The dimensional approach to conceptualising psychopathology was used as a research paradigm (Krueger & Piasecki, 2002). This approach helps perform a reliable and valid assessment of the intensity

of symptoms of the examined psychopathological syndromes and postulates its comorbidity (Caspi et al., 2020). The intensity of each symptom of the examined psychopathological syndromes (pandemic burnout, depression, and anxiety) was treated as a separate variable. The study focused on characterising pandemic burnout symptoms in the context of the depression–anxiety symptom network among adolescents. Accordingly, two questions were investigated in the current study: (1) Do symptoms of pandemic burnout constitute a separate syndrome compared to the syndromes of symptoms of depression or anxiety? and (2) Is the structure of the associations of the symptoms of pandemic burnout, depression, and anxiety stable across two waves of measurement (June and September 2021)?

Given that the pandemic has its particular dynamic (Zhong, 2021), the structure of the pandemic burnout–depression–anxiety network may differ depending on the point during the pandemic in a particular country (Lindblad et al., 2021). Our study included adolescents from Polish high schools who were approached not long after the end of a prolonged lockdown (June 2021) and shortly after the start of the new school year (September 2021). The present study can, therefore, offer initial insights into the complex structure of the symptoms of depressed mood, anxiety, and burnout among adolescents in the latest waves of the pandemic in countries that implemented preventive policies against the spread of COVID-19, including long periods of lockdown.

Methods

Participants

A total of 389 adolescents (73.8% women) participated in the study. The age of the participants ranged from 14 to 18 years (M = 16.05; SD = 1.39). Further, 181 individuals (46.53%) participated in June, shortly after returning to schools after lockdowns were lifted in Poland, while 208 (53.47%) participated in September, shortly after returning from the summer holidays. In total, 143 girls and 38 boys participated in the first wave of the study, while 140 girls and

64 boys participated in the second wave. Overall, 126 participants (32.39%; wave 1: 60 individuals; wave 2: 66 individuals) reported having been infected with COVID-19, while 175 (44.73%; wave 1: 82 individuals; wave 2: 93 individuals) denied having been infected. Moreover, 88 participants (22.88%; wave 1: 49 individuals; wave 2: 39 individuals) were not sure whether they had or had not been infected with COVID-19. The participants did not differ between the waves of measurement in terms of having been infected with COVID-19 ($\chi^2(2) = 0.230$; $p = .891$) and differed only slightly in terms of age ($t(387) = 2.142$; $p = .033$), with the participants involved in the June wave being older ($M = 16.2$; $SD = 1.40$) than the participants involved in the September wave ($M = 15.89$; $SD = 1.45$). The participants were recruited from public high schools in southern Poland. The school management and parents were contacted via the school psychologist. Informed consent was obtained from the school management, the parents, as well as from the adolescents participating in the study. Analyses were conducted based on the database obtained during the diagnostic study conducted by the school psychologist. The process was previously approved by the school management and parents.

Measures

COVID-19 Burnout Scale (COVID-19-BS)

The COVID-19-BS consists of 10 items adapted from the Burnout Measure-Short Version (Malach-Pines, 2005). Yildirim & Solmaz (2020) modified the items by replacing references to 'your work' in the wording of the original items with 'COVID-19'. Each item is rated on a five-point Likert scale ranging from 1 (*never*) to 5 (*always*). The total score is calculated by summing all 10 items, and a higher score indicates a higher level of COVID-19 burnout. The Polish version of the scale has satisfactory psychometric properties (Moroń et al., 2021). The reliability of the scale in the present study was $\alpha = 0.893$; $\omega = 0.903$.

Hospital Anxiety and Depression Scale (HADS)

The Polish version of HADS (Zigmond & Snaith, 1983) consists of 14 statements measuring anxiety ('I feel tense or wound up'; 7 items) and depression ('I have lost interest in my appearance'; 7 items). The participants were presented with response options (e.g. 'most of the time', 'not at all') instead of numerical values (from 0 to 3) to avoid confusion. This version of HADS was proved to be a reliable and valid measurement of depression and anxiety (Nezlek et al., 2019). The reliability of the depression scale in the present study was $\alpha = 0.893$; $\omega = 0.903$, while the reliability of the anxiety scale was $\alpha = 0.743$; $\omega = 0.743$.

Statistical analysis

We estimated three network models: (1) one network with symptoms based on complete cases and (2) two networks based on cases from adolescents participating in the study in June 2021 and in September 2021. In the weighted networks estimated in the present study, 'nodes' represent the studied variables (see Online Supplementary Table 1) while 'edges' (links connecting two nodes) represent the regularised partial correlation coefficients (controlled for all other nodes). The regularised partial correlation coefficient networks were estimated using the network module implemented in JASP 0.14.1.0. We applied the least absolute shrinkage and selection operator (LASSO) with a tuning parameter selected by minimising the extended Bayesian information criteria (EBIC) using the default value of hyperparameter $\gamma = 0.5$ (Epskamp et al., 2018).

To estimate network accuracy, we used three steps: (1) estimated the accuracy of edge weights using bootstrapped confidence intervals (CIs), (2) investigated the stability of (the order of) centrality indices, and (3) investigated the differences between edge weights and centrality indices using bootstrapping methods (Epskamp et al., 2018).

First, we examined each node using three indices of node centrality (Opsahl et al., 2010): node strength, betweenness, and closeness. Node strength refers

to the number and strength of the direct connections of a node. Betweenness is a measure of how often a node lies on the shortest path between every combination of two other nodes. Thus, betweenness indicates the extent to which the node facilitates the flow of information through the network. Lastly, closeness refers to the average distance from a node to all other nodes in the network, representing how fast a node can be reached from them.

We also examined edge-weight stability by estimating a CI. To estimate the stability of node centrality, we used the central stability coefficient (CS coefficient) representing the proportion of participants that can be dropped from the analysis, such that the correlation between the original centrality indices and the subset centrality indices is at least 0.7 with 95% probability (Beard et al., 2016; Epskamp et al., 2018).

We used the bootstrapped difference test to investigate the differences between the strength of nodes and the edge weights (Epskamp et al., 2018). To test for change in network structure between June and September, we used an approach described by Beard et al. (2016). Thus, we correlated the values for each centrality index (with Spearman rank-order correlations) between June and September 2021. We evaluated the stability of the network structure by examining the magnitude of the correlations rather than statistical significance.

Results

Relationship between pandemic burnout, depression, and anxiety symptoms

The labels of the studied variables are listed in Table 1 and in Online Supplementary Table 1. Descriptive statistics for the studied variables are presented in Table 2.

Table 1. List of labels of the variables

Label	Item
Depression	
HADS-D1	I still enjoy the things I used to enjoy.
HADS-D2	I can laugh and see the funny side of things.
HADS-D3	I feel cheerful.
HADS-D4	I feel as if I am slowed down.
HADS-D5	I have lost interest in my appearance.
HADS-D6	I look forward to things with enjoyment.
HADS-D7	I can enjoy a good book or TV program.
Anxiety	
HADS-A1	I feel tense or wound up.
HADS-A2	I get a sort of frightened feeling as if something awful is about to happen.
HADS-A3	Worrying thoughts go through my mind.
HADS-A4	I can sit at ease and feel relaxed.
HADS-A5	I get a sort of frightened feeling like 'butterflies' in the stomach.
HADS-A6	I feel restless as if I have to be on the move.
HADS-A7	I get sudden feelings of panic.
COVID-19 burnout	
CovBurn-1	When you think about COVID-19 overall, how often do you feel tired?
CovBurn-2	When you think about COVID-19 overall, how often do you feel disappointed with people?
CovBurn-3	When you think about COVID-19 overall, how often do you feel hopeless?
CovBurn-4	When you think about COVID-19 overall, how often do you feel trapped?
CovBurn-5	When you think about COVID-19 overall, how often do you feel helpless?
CovBurn-6	When you think about COVID-19 overall, how often do you feel depressed?
CovBurn-7	When you think about COVID-19 overall, how often do you feel physically weak/sickly?
CovBurn-8	When you think about COVID-19 overall, how often do you feel worthless/like a failure?
CovBurn-9	When you think about COVID-19 overall, how often do you feel difficulties sleeping?
CovBurn-10	When you think about COVID-19 overall, how often do you feel 'I've had it'?

Source: Authors' research.

Table 2. Descriptive statistics and correlations between the study variables

Variable	Full sample		
	M (*SD*)	1	2
1. Depression	5.398 (3.912)		
2. Anxiety	8.761 (4.735)	0.658	
3. COVID-19 burnout	24.607 (9.220)	0.280	0.425

Note. All correlations are significant at $p < 0.001$.
Source: Authors' research.

The regularised partial correlation network based on the complete cases is presented in Fig. 1.

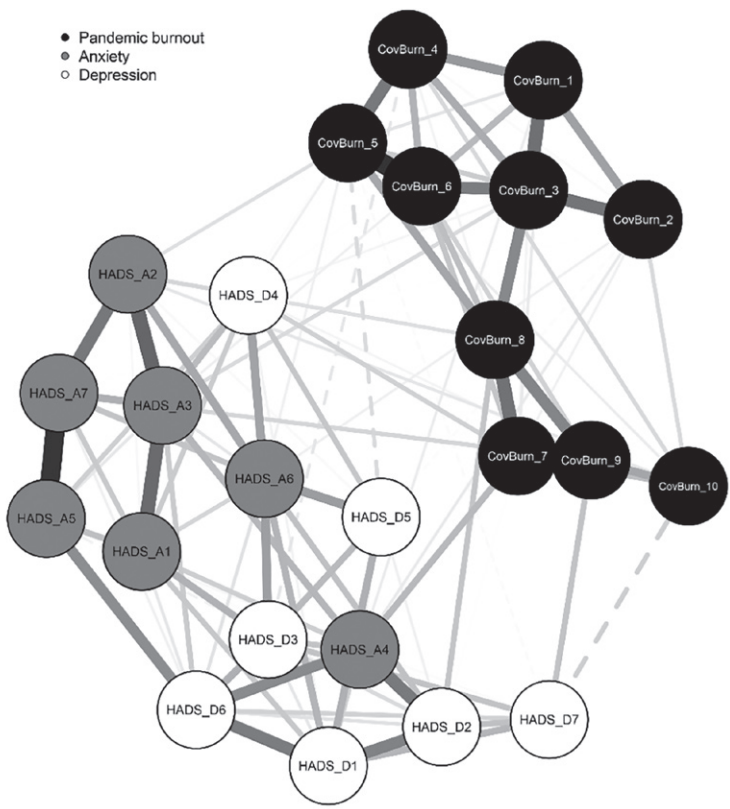

Figure 1. The network of pandemic burnout, depression, and anxiety
Source: Authors' research.

Based on the 95% bootstrapped CI, the edge weights appeared rather stable (Online Supplementary Fig. 1). The centrality coefficients are given in Fig. 2.

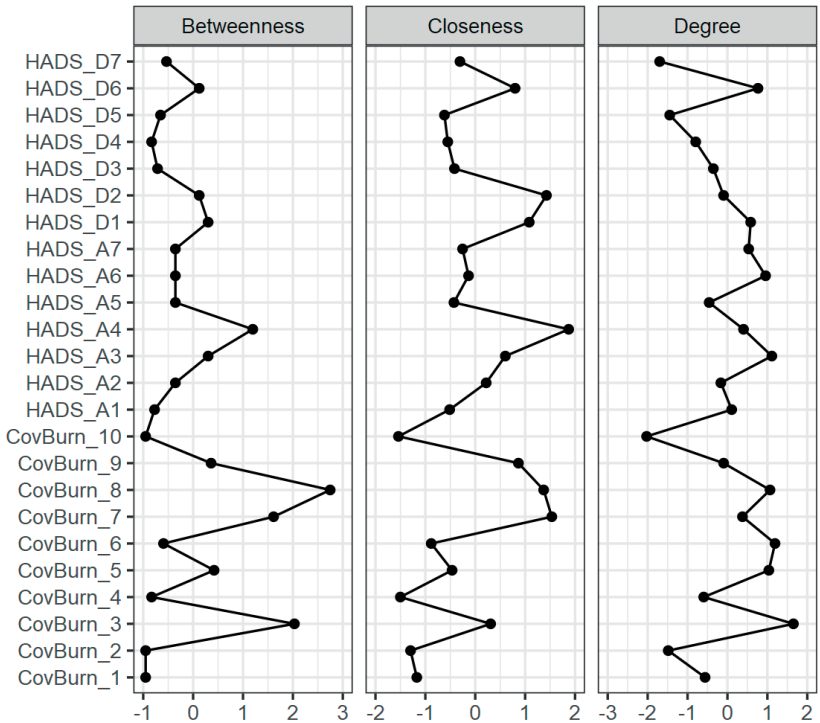

Figure 2. Centrality coefficients of pandemic burnout, depression, and anxiety symptoms. Presented scores are standardised. Degree = Strength
Source: Authors' research.

According to the centrality measures, the most central symptoms of the pandemic burnout were 'feeling hopeless' (strength = 1.652), 'feeling worthless/like a failure' (strength = 1.066), 'feeling helpless' (strength = 1.037), and 'feeling depressed' (strength = 1.191). However, the estimation of the CS coefficient indicated that node strengths were not stable under the subset cases (*CS* (cor = 0.7) =.129) and did not reach the cut-off of 0.5 in our simulation study, which was required to consider the metric stable (Epskamp et al., 2018).

The edges between anxiety symptoms indicated by the items 'I get a sort of frightened feeling like "butterflies" in the stomach' and 'I get sudden feelings of panic' and between the pandemic burnout symptoms 'feeling helpless' and 'feeling depressed' were significantly stronger than the majority of other edges (see Supplementary Material Fig. 3). The average partial weight between the pandemic burnout symptoms and anxiety symptoms was low (average weight = 0.006); their associations with depression symptoms were also similarly low (average weight = 0.003). Further, the pandemic burnout symptoms were relatively strongly related to each other (average weight = 0.082). A test of differences in strength demonstrated only three significant differences in node strength in the network (see Supplementary Material Fig. 4).

Networks in June and September 2021

The descriptive statistics for the June and September waves of the study are given in Table 3.

Table 3. Descriptive statistics and correlations between the variables studied in June and September 2021

Variable	June			September				
	M (*SD*)	1	2	*M* (*SD*)	1	2	*t*	*d*
1. Depression	5.116 (3.942)			5.644 (3.880)			1.329	0.135
2. Anxiety	8.315 (4.594)	0.669		9.149 (4.833)	0.646		1.737	0.177
3. COVID-19 burnout	24.724 (8.614)	0.303	0.485	24.505 (9.737)	0.266	0.387	−0.233	−0.024

Note. All correlations are significant at $p < 0.001$.

Source: Authors' research.

The regularised partial correlation networks based on the cases from June and September 2021 are presented in Figs. 3 and 4.

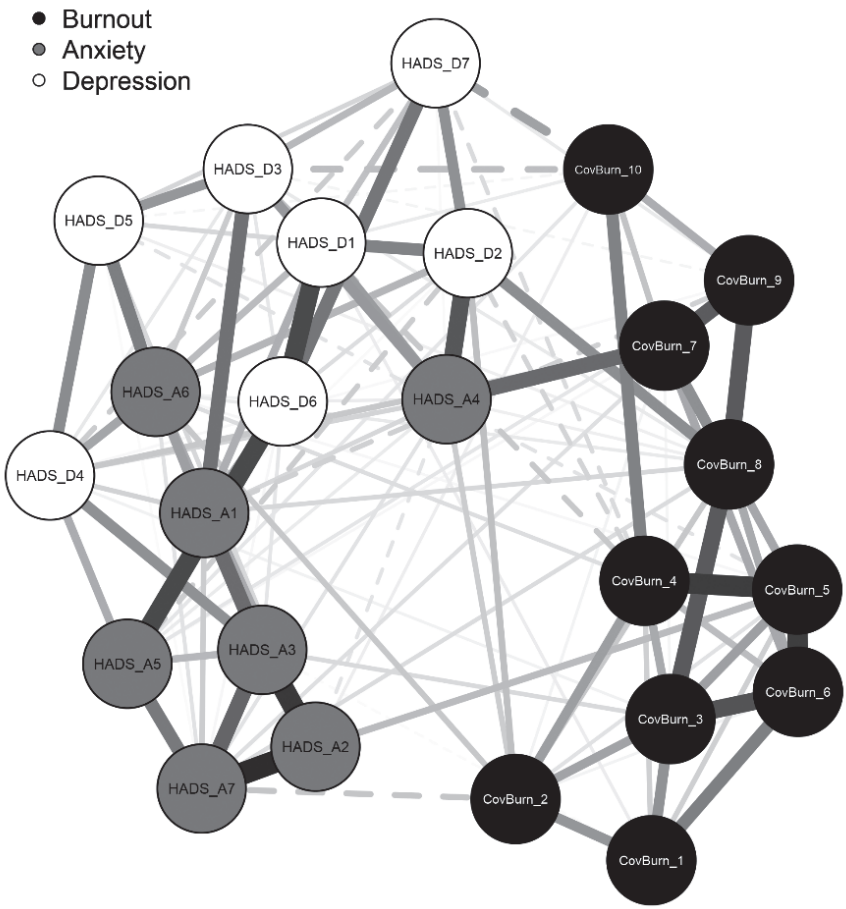

Figure 3. The network of pandemic burnout, depression, and anxiety in June 2021
Source: Authors' research.

Figure 4. The network of pandemic burnout, depression, and anxiety in September 2021
Source: Authors' research.

Centrality indices for both networks are presented in Online Supplementary Fig. 5. Spearman rank-order correlations among centrality measures were relatively low (betweenness, r_s =-0.010; closeness, r_s = 0.116; strength, r_s = 0.489). This indicates that the structure of the network may undergo some development and should be examined in a longitudinal design. It is possible that the removal of pandemic-related stressors does not lead to a withdrawal of pandemic burnout symptoms: the network could be self-sustaining and could remain stuck in its active state (Borsboom, 2017).

Average edge weights between the pandemic burnout symptoms and anxiety were higher in June (0.009) than in September (0.005), while average edge weights between pandemic burnout and depression were lower in June (-0.002) than in September (0.006). The edge weights between the depression symptom 'inability to laugh and see the funny side of things' and the pandemic burnout symptom 'feeling worthless/like a failure' and that between the anxiety symptom 'inability to feel relaxed' and the pandemic burnout symptom 'feeling physically weak/sickly' were the strongest in June, indicating that these depression and anxiety symptoms may be the 'bridge symptoms' (Borsboom, 2017) between anxiety, depression, and pandemic burnout. These associations were, however, least significant in September. The CS coefficient indicated that node strengths in June and September were not stable under the subset cases (CS_{June} (cor = 0.7) = 0.072; $CS_{September}$ (cor = 0.7) = 0.087) and did not reach the cut-off of 0.5 required to consider the metric stable (Epskamp et al., 2018) in our simulation study. Thus, the obtained results should be interpreted with care. Additional results concerning edge-weight differences and differences in node strength in June and September are provided in the supplementary materials.

Discussion

The present study is one of the first to characterise pandemic burnout symptoms in the context of the depression–anxiety symptom network. The central tenet of the network approach is that mental disorders arise from the causal interaction among different symptoms in a network (Borsboom,

2017). Understanding how symptoms group together helps in interventions based on the assumption that a change in the state of one symptom could change the strength of other symptoms that are interacting with the one that has changed (Woodward, 2003). Thus, the findings concerning the central symptoms of pandemic burnout could help in inventing interventions that improve the mental state of adolescents affected by pandemic burnout. Below, we interpret the central symptoms of pandemic burnout. Then, we discuss the associations between pandemic burnout and symptoms of depression and anxiety.

Overall, the findings from the network analysis suggest that pandemic burnout seems to be a separate syndrome of psychopathological symptoms. The central symptoms of pandemic burnout among adolescents were 'feeling hopeless due to the pandemic' and 'feeling worthless due to the pandemic' (Queen & Harding, 2020). These symptoms indicate mental and emotional exhaustion (Malach-Pines, 2005).

Across the two stages of the study, 'feeling hopeless' could be described as probably the most central symptom of pandemic burnout. This result shows that difficulties connected with the pandemic restrictions in schools and limitations in social relations could predominantly affect the self-esteem and self-efficacy of teenagers, resulting in mental exhaustion (Malach-Pines, 2005).

These findings are consistent with the results indicating that self-esteem and self-efficacy are protective factors against social isolation among adolescents (Preston & Rew, 2022). One of the possible ways in which the pandemic may affect the self-esteem of adolescents is by leading to the higher frequency of the usage of social networking sites, thereby resulting in lower self-esteem and higher body dissatisfaction (Vall-Roqué et al., 2021). Thus, supporting adolescents' self-worth and preventing hopelessness after their return to schools and other public institutions seem to be an important social practice goal.

Further, the positive associations between pandemic burnout symptoms and depression symptoms were only partially verified. Previous studies have indicated that emotional exhaustion – as the core symptom of burnout – was

strongly associated with depression (Bianchi et al., 2015a; 2015b; Verkuilen et al., 2021). In this regard, the present study presents only some significant associations between pandemic burnout and depression symptoms, i.e. 'inability to see the funny sides of life' with 'feeling worthless due to the COVID-19', 'feeling slowed down' with 'feeling physically weak due to the pandemic', and 'inability to enjoy a good film' with 'troubles sleeping due to the pandemic'. Thus, the associations between depression and pandemic burnout were based on depressive anhedonia and psychomotor retardation (Mihalca & Pilecka, 2015), which co-occur with symptoms of mental and physical exhaustion due to the pandemic (Malach-Pines, 2005).

Furthermore, the association between anxiety and pandemic burnout symptoms were also limited. Previous studies have indicated positive associations between burnout and anxiety (Koutsimani et al., 2019). However, in the present study, among anxiety symptoms, primarily 'inability to feel relaxed' was associated with 'feeling physically weak due to the pandemic'. These associations appeared in the first stage of the study (June 2021) and were less significant in the second stage (September 2021). This finding shows that individuals who have difficulty relaxing could develop both anxiety and pandemic burnout symptoms (Ernst et al., 2021). To address this bridge symptom, training in relaxing techniques could be included in school psychological practice.

The present study showed that although scores of the pandemic burnout, anxiety, and depression scales are strongly correlated, the symptom-to-symptom associations were less evident. Symptoms of each construct were correlated more strongly among each other than with symptoms of other mental health conditions. These findings have two consequences. First, pandemic burnout should be treated as a separate mental health difficulty. Consequently, it requires additional attention of mental health researchers and practitioners. Second, the possible existence of bridge symptoms between depression (anhedonia), pandemic burnout, and anxiety (restlessness) may indicate the risk factors responsible for the development of pandemic burnout or the ways in which the rather short-lived state of pandemic burnout may have affected anxiety or depressive symptomatology among adolescents.

However, the obtained results must be interpreted as preliminary due to the low stability of centrality measures (Epskamp et al., 2018). This low stability of the pandemic burnout structure was also demonstrated by the differences between the pandemic burnout network among adolescents during June 2021 and September 2021. Due to this dynamic, more precise and longitudinal observation of various forms of causal relations among the studied symptoms is needed (Borsboom, 2017).

The present study has some limitations as well. First, the sample of adolescents was relatively small, which may result in an underestimation of the associations among the studied symptoms and in the low stability of centrality measures (Epskamp et al., 2018). Second, the present study shows that the pandemic burnout symptom network is a dynamic one. Future studies should recruit larger and more diverse samples of adolescents and should use longitudinal designs to follow the causal associations between symptoms of COVID-19 burnout and other risk or protective factors (Schellekens et al., 2020).

Undoubtedly, the pandemic has had a severe impact on the social and emotional development of adolescents. The long periods of lockdown and remote learning experienced by adolescents, e.g. in Poland (Lindblad et al., 2021), places this age group at risk of severe consequences of pandemic-related stressors such as social isolation (Preston & Rew, 2022). The present study showed that pandemic burnout was present among Polish adolescents as a syndrome of symptoms separate from that of depression and anxiety. The central symptoms of pandemic burnout were emotional and mental exhaustion, including symptoms such as feeling worthless and hopeless. Thus, psychological support for adolescents at risk of pandemic burnout should focus on helping them to restore their self-worth and self-efficacy, e.g. by supporting colleagues through regular peer consultation, mentorship, and collegial support (Queen & Harding, 2020; Preston & Rew, 2022). Moreover, longitudinal monitoring of the pandemic burnout symptoms should be conducted to detect adolescents at risk of worsening their mental health.

Supplementary materials:

https://osf.io/zea8s/?view_only=72db22fc1fea46ae934a4a7649c9aa6e.

References

Ahola, K., Honkonen, T., Isometsä, E., Kalimo, R., Nykyri, E., Aromaa, A., & Lönnqvist, J. (2005). The Relationship Between Job-Related Burnout and Depressive Disorders – Results from the Finnish Health 2000 Study. *Journal of Affective Disorders*, 88(1), 55–62, doi: 10.1016/j.jad.2005.06.004.

Aldossari, M., & Chaudhry, S. (2021). Women and Burnout in the Context of a Pandemic. *Gender, Work,* & *Organization*, 28(2), 826–834. doi: 10.1111/gwao.12567.

Asl, E.M., Boostani, H., Behrouzian, F., & Rostami, H. (2021). The Mediating Role of Compassion in the Relationship Between COVID-19 Anxiety Syndrome and COVID-19 Burnout. *Journal of Education and Health Promotion*, 10, Article 413, doi: 10.4103/jehp.jehp_1580_20.

Banerjee, D. (2020). The Impact of COVID-19 Pandemic on Elderly Mental Health. *International Journal of Geriatric Psychiatry*, 35(12), 1466–1467, doi: 10.1002/gps.5320.

Barriga Medina, H.R., Campoverde Aguirre, R., Coello-Montecel, D., Ochoa Pacheco, P., & Paredes-Aguirre, M.I. (2021). The Influence of Work-Family Conflict on Burnout During the COVID-19 Pandemic: The Effect of Teleworking Overload. *International Journal of Environmental Research and Public Health*, 18(19), Article 10302, doi: 10.3390/ijerph181910302.

Beard, C., Millner, A.J., Forgeard, M.J., Fried, E.I., Hsu, K.J., Treadway, M.T., Leonard, C.V., Kertz, S.J., & Björgvinsson, T. (2016). Network Analysis of Depression and Anxiety Symptom Relationships in a Psychiatric Sample. *Psychological Medicine*, 46(16), 3359–3369, doi: 10.1017/S0033291716002300.

Bianchi, R., Schonfeld, I.S., & Laurent, E. (2015a). Is Burnout Separable from Depression in Cluster Analysis? A Longitudinal Study. *Social Psychiatry and Psychiatric Epidemiology*, 50(6), 1005–1011, doi: 10.1007/s00127-014-0996-8.

Bianchi, R., Schonfeld, I.S., & Laurent, E. (2015b). Burnout-Depression Overlap: A Review. *Clinical Psychology Review*, 36, 28–41, doi: 10.1016/j.cpr.2015.01.004.

Borsboom D. (2017). A Network Theory of Mental Disorders. *World Psychiatry*, 16(1), 5–13, doi: 10.1002/wps.20375.

Borsboom, D., & Cramer, A.O.J. (2013). Network Analysis: An Integrative Approach

to the Structure of Psychopathology. *Annual Review of Clinical Psychology*, 9, 91–121, doi: 10.1146/annurev-clinpsy-050212-185608.

Caspi, A., Houts, R.M., Ambler, A., Danese, A., Elliott, M.L., Hariri, A., & Moffitt, T.E. (2020). Longitudinal Assessment of Mental Health Disorders and Comorbidities Across 4 Decades Among Participants in the Dunedin Birth Cohort Study. *JAMA Network Open*, 3(4), Article e203221, doi: 10.1001/jamanetworkopen.2020.3221.

Cramer, A.O.J., Waldorp, L.J., van der Maas, H.L.J., & Borsboom, D. (2010). Comorbidity: A Network Perspective. *Behavioral and Brain Sciences*, 33(2–3), 137–150, doi:10.1017/s0140525x09991567.

Derya, S. (2021). The Relationship of COVID-19 Burnout Level in 112 Emergency Service Personnel with Work Stress and Work-Family Conflict Level. *Medical Records*, 3(2), 146–150, doi: 10.37990/medr.908384.

Epskamp, S., Borsboom, D. & Fried, E.I. (2018). Estimating Psychological Networks and Their Accuracy: A Tutorial Paper. *Behavioral Reseach Methods*, 50, 195–212, doi: 10.3758/s13428-017-0862-1.

Ernst, J., Jordan, K.D., Weilenmann, S., Sazpinar, O., Gehrke, S., Paolercio, F., Petry, H., Pfaltz, M.C., Méan, M., Aebischer, O., Gachoud, D., Morina, N., von Känel, R., & Spiller, T.R. (2021). Burnout, Depression and Anxiety Among Swiss Medical Students – A Network Analysis. *Journal of Psychiatric Research*, 143, 196–201, doi: 10.1016/j.jpsychires.2021.09.017.

Fiorilli, C., De Stasio, S., Di Chiacchio, C., Pepe, A., & Salmela-Aro, K. (2017). School Burnout, Depressive Symptoms and Engagement: Their Combined Effect on Student Achievement. *International Journal of Educational Research*, 84, 1–12, doi: 10.1016/j.ijer.2017.04.001.

Gewin, V. (2021). Pandemic Burnout is Rampant in Academia. *Nature*, 591(7850), 489–491. doi: 10.1038/d41586-021-00663-2.

Gómez-Domínguez, V., Navarro-Mateu, D., Prado-Gascó, V.J., & Gómez-Domínguez, T. (2022). How Much Do We Care About Teacher Burnout During the Pandemic: A Bibliometric Review. *International Journal of Environmental Research and Public Health*, 19(12), Article 7134. doi: 10.3390/ijerph19127134.

Haktanir, A., Can, N., Seki, T., Kurnaz, M.F., & Dilmaç, B. (2022). Do We Experience Pandemic Fatigue? Current State, Predictors, and Prevention. *Current Psychology*, 41(10), 7314–7325, doi: 10.1007/s12144-021-02397-w.

Harvey, N. (2020) Behavioral Fatigue: Real Phenomenon, Naïve Construct, or

Policy Contrivance? *Frontiers in Psychology*, 11, Article 589892, doi: 10.3389/fpsyg.2020.589892.

Hong, Y., Lee, J., Lee, H.J., Kim, K., Cho, I.K., Ahn, M.H., Shin, Y.W., Park, J., & Chung, S. (2021). Resilience and Work-Related Stress May Affect Depressive Symptoms in Nursing Professionals During the COVID-19 Pandemic Era. *Psychiatry Investigation*, 18(4), 357–363, doi: 10.30773/pi.2021.0019.

Koutsimani, P., Montgomery, A., & Georganta, K. (2019). The Relationship Between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis. *Frontiers in Psychology*, 10, Article 284, doi: 10.3389/fpsyg.2019.00284.

Krueger, R.F., & Piasecki, T.M. (2002). Toward a Dimensional and Psychometrically-Informed Approach to Conceptualizing Psychopathology. *Behaviour Research and Therapy*, 40(5), 485–499, doi: 10.1016/s0005-7967(02)00016-5.

Li, Y., Wang, A., Wu, Y., Han, N., & Huang, H. (2021). Impact of the COVID-19 Pandemic on the Mental Health of College Students: A Systematic Review and Meta-Analysis. *Frontiers in Psychology*, 12, Article 669119, doi: 10.3389/fpsyg.2021.669119.

Lindblad, S., Wärvik, G.-B., Berndtsson, I., Jodal, E.-B., Lindqvist, A., Messina Dahlberg, G., Papadopoulos, D., Runesdotter, C., Samuelsson, K., Udd, J., & Wyszynska Johansson, M. (2021). School Lockdown? Comparative Analyses of Responses to the COVID-19 Pandemic in European Countries. *European Educational Research Journal*, 20(5), 564–583, doi: 10.1177/14749041211041237.

Malach-Pines, A. (2005). The Burnout Measure, Short Version. *International Journal of Stress Management*, 12(1), 78–88, doi: 10.1037/1072-5245.12.1.78.

Mali, D., & Lim, H. (2021). How Do Students Perceive Face-To-Face/Blended Learning as a Result of the COVID-19 Pandemic? *The International Journal of Management Education*, 19(3), Article 100552, doi: 10.1016/j.ijme.2021.100552.

Maslach, C., & Leiter, M.P. (2016). Understanding the Burnout Experience: Recent Research and Its Implications for Psychiatry. *World Psychiatry*, 15, 103–111, doi: 10.1002/wps.20311.

Maslach, C., Schaufeli, W.B., & Leiter, M.P. (2001). Job Burnout. *Annual Review of Psychology*, 52, 397–422, doi: 10.1146/annurev.psych.52.1.397.

Miaskowski, C., Barsevick, A., Berger, A., Casagrande, R., Grady, P.A., Jacobsen, P., Kutner, J., Patrick, D., Zimmerman, L., Xiao, C., Matocha, M., & Marden, S. (2017). Advancing Symptom Science Through Symptom Cluster Research: Expert Panel Proceedings and Recommendations. *Journal of the National Cancer Institute*, 109(4), Article djw253, doi: 10.1093/jnci/djw253.

Michie, S., West, R., & Harvey, N. (2020). The Concept of "Fatigue" in Tackling COVID-19. *BMJ*, 371, Article m4171, doi: 10.1136/bmj.m4171.

Mihalca, A.M., & Pilecka, W. (2015). The Factorial Structure and Validity of the Hospital Anxiety and Depression Scale (HADS) in Polish Adolescents. *Psychiatria Polska*, 49(5), 1071–1088, doi: 10.12740/PP/38139.

Morgul, E., Bener, A., Atak, M., Akyel, S., Aktaş, S., Bhugra, D., Ventriglio, A., & Jordan, T.R. (2021). COVID-19 Pandemic and Psychological Fatigue in Turkey. *International Journal of Social Psychiatry*, 67(2), 128–135, doi: 10.1177/0020764020941889.

Moroń, M., Yildirim, M., Jach, Ł., Nowakowska, J., & Atlas, K. (2021). Exhausted Due to the Pandemic: Validation of Coronavirus Stress Measure and COVID-19 Burnout Scale in a Polish Sample. *Current Psychology*, 1–10, doi: 10.1007/s12144-021-02543-4.

Nakamura, Z.M., Nash, R.P., Laughon, S.L., & Rosenstein, D.L. (2021). Neuropsychiatric Complications of COVID-19. *Current Psychiatry Reports*, 23, Article 25, doi: 10.1007/s11920-021-01237-9.

Nezlek, J.B., Rusanowska, M., Holas, P., & Krejtz, I (2021). The Factor Structure of a Polish Language Version of the Hospital Anxiety Depression Scale (HADS). *Current Psychology*, 40, 2318–2326, doi: 10.1007/s12144-019-0164-0.

Nitschke, J.P., Forbes, P.A.G., Ali, N., Cutler, J., Apps, M.A.J., Lockwood, P.L., & Lamm, C. (2020). Resilience During Uncertainty? Greater Social Connectedness During COVID- 19 Lockdown is Associated with Reduced Distress and Fatigue. *British Journal of Health Psychology*, 26(2), 553–569, doi: 10.1111/bjhp.12485.

Opsahl, T., Agneessens, F., & Skvoretz, J. (2010). Node Centrality In Weighted Networks: Generalizing Degree and Shortest Paths. *Social Networks*, 32(3), 245–251. doi: 10.1016/j.socnet.2010.03.006.

Preston, A.J., & Rew, L. (2022). Connectedness, Self-Esteem, and Prosocial Behaviors Protect Adolescent Mental Health Following Social Isolation: A Systematic Review. *Issues in Mental Health Nursing*, 43(1), 32–41, doi: 10.1080/01612840.2021.1948642.

Przyborowska, B. & Błajet, P. (2021). Changing the Health Behaviour of Students During the COVID-19 Pandemic in Poland. *Przegląd Badań Edukacyjnych* [Educational Studies Review], 35(2), 97–113, doi: 10.12775/PBE.2021.033.

Queen, D., & Harding, K. (2020). Societal Pandemic Burnout: A COVID Legacy. *International Wound Journal*, 17(4), 873–874, doi: 10.1111/iwj.13441.

Salmela-Aro, K., Savolainen, H., & Holopainen, L. (2009b). Depressive Symptoms and School Burnout During Adolescence: Evidence from Two Cross-Lagged Longitudinal Studies. *Journal of Youth and Adolescence*, 38(10), 1316–1327, doi: 10.1007/s10964-008-9334-3.

Schellekens, M.P.J., Wolvers, M.D.J., Schroevers, M.J., Bootma, T.I., Cramer, A.O.J., & van der Lee, M.L. (2020). Exploring the Interconnectedness of Fatigue, Depression, Anxiety and Potential Risk and Protective Factors in Cancer Patients: A Network Approach. *Journal of Behavioral Medicine*, 43, 553–563, doi: 10.1007/s10865-019-00084-7.

Tang, S., Xiang, M., Cheung, T., & Xiang, Y.-T. (2020). Mental Health and Its Correlates Among Children and Adolescents During COVID-19 School Closure: The Importance of Parent-Child Discussion. *Journal of Affective Disorders*, 279, 353–360, doi: 10.1016/j.jad.2020.10.016.

Üngüren, E., Tekin, Ö.A., Avsallı, H., & Kaçmaz, Y.Y. (2021). The Moderator Role of Financial Well-Being on the Effect of Job Insecurity and the COVID-19 Anxiety on Burnout: A Research on Hotel-Sector Employees in Crisis. *Sustainability*, 13, Article 9031, doi: 10.3390/su13169031.

Vall-Roqué, H., Andrés, A., & Saldaña, C. (2021). The Impact of COVID-19 Lockdown on Social Network Sites Use, Body Image Disturbances and Self-Esteem Among Adolescent and Young Women. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 110, Article 110293, doi: 10.1016/j.pnpbp.2021.110293.

Verkuilen, J., Bianchi, R., Schonfeld, I.S., & Laurent, E. (2021). Burnout–Depression Overlap: Exploratory Structural Equation Modeling, Bifactor Analysis and Network Analysis. *Assessment*, 28(6), 1583–1600, doi: 10.1177/1073191120911095.

Vindegaard, N., & Benros, M.E. (2020). COVID-19 Pandemic and Mental Health Consequences: Systematic Review of the Current Evidence. *Brain Behavior, and Immunity*, 89, 531–542, doi: 10.1016/j.bbi.2020.05.048.

Wang, C., Wen, W., Zhang, H., Ni, J., Jiang, J., Cheng, Y., Zhou, M., Ye, L., Feng, Z., Ge, Z., Luo, H., Wang, M., Zhang, X., & Liu, W. (2021). Anxiety, Depression, and Stress Prevalence Among College Students During the COVID-19 Pandemic: A Systematic Review and Meta-Analysis. *Journal of American College Health*, 1, 1–8, doi: 10.1080/07448481.2021.1960849.

Woodward, J. (2003). *Making Things Happen: a Theory of Causal Explanation*. Oxford: Oxford University Press.

Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2021). Prevalence of Mental Health Problems During the COVID-19 Pandemic: A Systematic Review

and Meta-Analysis. *Journal of Affective Disorders*, 281, 91–98, doi: 10.1016/j.jad.2020.11.117.

Yıldırım, M., & Çiçek, İ. (2022). Optimism and Pessimism Mediate the Association Between Parental Coronavirus Anxiety and Depression Among Healthcare Professionals in the Era of COVID-19. *Psychology, Health & Medicine*, 27(9), 1898–1906, doi: 10.1080/13548506.2021.1966702.

Yıldırım, M., & Solmaz, F. (2022). COVID-19 Burnout, COVID-19 Stress and Resilience: Initial Psychometric Properties of COVID-19 Burnout Scale. *Death Studies*, 46(3), 524–532, doi: 10.1080/07481 187.2020.1818885.

Zhong, L. (2021) A Dynamic Pandemic Model Evaluating Reopening Strategies Amid COVID-19. *PLoS One*, 16(3), Article e0248302, doi: 10.1371/journal.pone.024830.

Zigmond, A.S., & Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67(6), 361–370, doi:10.1111/j.1600-0447.1983.tb09716.x.