Changes to student mental health during the Covid-19 pandemic

Short title: student mental health during pandemic

Eszter Toth[1], Thomas Faherty[1], Ali Mazaheri[1] and Jane E. Raymond[1]

School of Psychology, University of Birmingham, Birmingham, B15 2TT, UK.

Corresponding author:

Eszter Toth, School of Psychology, University of Birmingham, Birmingham, B15 2TT, UK. (email: EXT586@student.bham.ac.uk)

Abstract:

Background: Although many anecdotal reports and a handful of studies on Asian and European students suggest pandemic-related degradation in student mental health, research on UK undergraduates is lacking. *Aim:* Our aim was to redress this short fall by assessing how university student mental health in the UK in Autumn 2020 (during the pandemic) compared to previous years. *Sample*: 762 UK undergraduate students participated in the study. *Methods*: A well-validated, self-report, 21-item scale, the Depression, Anxiety, and Stress Scale (DASS-21) was used to assess mental health. Results were compared to data obtained using the same scale on similar, albeit smaller cohorts in each of the previous three years. *Results*: Autumn 2020 students reported greater levels of depression and anxiety than their peers from previous years. Stress was high but remained unchanged compared to previous years. *Conclusion*: Compared to previous years, UK students show elevated symptoms of mental health problems, underscoring the importance of mental health-oriented support for students.

Key words: University students, mental health, pandemic, depression, anxiety, stress

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Due to high rates of Severe Acute Respiratory Syndrome Coronavirus 2, commonly known as Covid-19, England entered a national lockdown in March 2020 (https://www.gov.uk/government/speeches/pm-address-to-the-nation-on-coronavirus-23-march-2020). In the remaining months of 2020, studies of university students were seriously disrupted. Although universities partially reopened in the autumn of 2020 and students were permitted to return to campus (https://www.bbc.co.uk/news/uk-54040421), student life did not resume as in previous years. In 2020, most lectures and seminars were delivered online and many students were required to self-isolate in student or shared rental accommodation. Furthermore, harsher restrictions were repeatedly introduced, often at short notice, throughout this period, further limiting student life.

News outlets have frequently highlighted that student mental health is at risk as a consequence of lockdown safety measures (https://www.bbc.co.uk/news/uk-scotland-54706305; https://www.bbc.co.uk/news/av/education-55220801) and that university students appear to be experiencing high stress, anxiety, and depression levels (https://www.bbc.co.uk/news/education-55105044). Although such claims are often based on anecdotal evidence, some empirical data to support them can be found in very recent studies showing downward trends in mental health for university students in Poland, Spain, Iran, Saudi Arabia and Bangladesh (Debowska, Horeczy, Boduszek, & Dolinski, 2020; Hakami et al., 2020; Islam et al., 2020; Odriozola-González, Planchuelo-Gómez, Irurtia, & de Luis-García, 2020; Vahedian-Azimi et al., 2020). Supporting these findings, the Prince's Trust (https://www.princes-trust.org.uk/about-the-trust/news-views/tesco-youth-index-2021) recently reported greater self-reported levels of unhappiness and anxiety than in previous years based on their annual survey of over 2000 UK youth (16-25 year[11]), although this sample comprised a broad spectrum of young people, many not in education or employment. Nevertheless, firm empirical evidence supporting the contention that mental health of university students in the UK has degraded is lacking. To redress this shortfall, we assessed mental health status of undergraduate students

enrolled at the University of Birmingham for academic year 2020/2021 and compared results with similar cohorts assessed using the same test scale during the three previous years.

Student mental health is commonly assessed using the well-validated 21-item Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995a). When completing the DASS-21, students report the extent to which statements regarding depressive, anxiety and stress symptoms applied to them during the past week. Anxiety items concern feelings and physical symptoms of panic; stress items concern relaxation and feeling oversensitive; and depression items concern worthlessness, lack of positive feelings and motivation. Although widely used for many studies in psychology, published data obtained prior to the pandemic specifically from university students are limited to students from South and East Asia (Bayram & Bilgel, 2008; Asif, Mudassar, Shahzad, Raouf, & Pervaiz, 2020; Cheung, Tam, Tsang, Zhang, & Lit, 2020; Hanawi et al., 2020) and data obtained thus far during the pandemic are from students enrolled in Asian and European universities. One study from Hong Kong (Cheung et al., 2020) assessed university students using DASS-21 every year for 4 years and reported a modest trend to improved mental health over the years from 2014 – 2017, contributing to knowledge of pre-pandemic baselines.

In the present study, 501 undergraduate psychology students completed the DASS-21 in the autumn of 2020. Computer aggregate scores for depression, anxiety, and stress as well as responses to individual scale items were compared with responses obtained using the same scale from different cohorts of predominantly psychology undergraduates in 2017, 2018 and 2019. Not only do these data provide a snapshot of mental health for the UK undergraduate students currently enrolled, they also provide a baseline against which change can be identified. To foreshadow our findings, levels of depression and anxiety but not stress in UK undergraduates are presently higher than in previous years. Moreover, the level of mental health symptoms is elevated compared to available norms and the percentage of students with scores greater than "normal" has increased. Another key result of the study is that students assessed in the autumn of 2020 were more likely to feel that they have "nothing to look forward to" than their peers from previous years.

Methods

Participants

762 undergraduate students completed the questionnaire in one of four years (2017, 2018, 2019, 2020). All were fluent English speakers and reported no history of neuropsychological or psychiatric disorders. More than 90% of students in the sample were first- or second-year students who participated in exchange for course credit. Participant numbers and characteristics are shown in Table 1 separately for each year. Informed consent was obtained prior to participation and procedures were approved by the appropriate institutional ethics review board.

Year	Participants	Gender			Mean age (years)
		Male	Female	Unknown	
2020	501	69	430	2	19 (s.d. = 1.5)
2019	81	18	63	0	19.4 (s.d = 1)
2018	33	6	27	0	19.1 (s.d. = 1.2)
2017	147	6	52	89	19.1 (s.d. = 0.9)
Total	762	99	572	91	19.1 (s.d = 1.8)

Table 1. Number of participants, gender and mean age of participants who completed the questionnaire in each year. Total is shown at the bottom. s.d. = standard deviation.

Materials

Mental health was assessed using the 21-item Depression, Anxiety, Stress Scale (DASS-21, Lovibond & Lovibond, 1995a). See *Appendix* A. Participants rate the extent to which each of 21 statements applied to them during the past week on a 4-point Likert scale (0 = did not apply to me at all; 1 = applied to me to some degree, or some of the time; 2 = applied to me to a considerable degree or a good part of the time; and 3 = applied to me very much or most of the time).

Procedure

DASS-21 was completed as part of participation in other studies and experiments conducted in the autumn term of 2017, 2018, 2019 or 2020 within the School of Psychology at the University of Birmingham. DASS-21 was completed either at the beginning or end of the participant's session.

Data analysis

Scores on depression, anxiety, and stress subscales (7 items each) were summed separately to produce three scores. Scores on each subscale were doubled as is sometimes reported to ease comparison with DASS-42 data. Differences in self-report data for the 2020, 2019, 2018 cohorts for aggregate depression, anxiety, and stress scores were examined using Kruskal-Wallis tests. Follow-up comparisons used Mann-Whitney U test (2-tailed). For both cases, Bonferroni corrections were applied to correct for multiple comparisons; alpha levels were set at .016. A similar approach was used to test for statistically significant differences across cohorts for individual items (alpha = .007).

Results

Depression and anxiety levels are elevated in 2020

Aggregate depression, anxiety, and stress scores for each year of data collection are shown in *Figure* 1. Statistical analysis (Kruskal-Wallis tests) showed that depression ($\chi^2(3) = 23.383$, $p < .001$) and anxiety ($\chi^2(3) = 20.933$, $p < .001$) varied significantly across cohorts tested in successive years. Stress, however, did not vary across the years ($\chi^2(3) = 5.572$, p = .134). This was confirmed by Bayesian analysis, showing support for the null hypothesis that stress did not vary across cohort (BFexcl = 13.665).

The average aggregate depression score of 11.1 (s.d. = 4.8) for 2020 is significantly higher than the average score of 7.6 (s.d. = 3.8) for 2019 (Z = -3.196, *p* = .001), 6.5 (s.d. = 4.3) for 2018 (Z = -3.337, *p* = .001) and 8.6 (s.d. = 4) for 2017 (Z = -2.675, *p* = .007).

Similarly, the average aggregate anxiety score of 8.7 (s.d. = 3.8) for 2020 is significantly higher than the average score of 5.9 (s.d. = 3.1) for 2019 (Z = -3.290, *p* = .001), 5.6 (s.d. = 3.9) for 2018 (Z = -3.046, *p* = .002), and marginally significantly higher than 7.6 (s.d = 4.1) for 2017 (Z = -2.358, *p* = .018).

To benchmark these finding against suitable normative data, we considered two large studies, one conducted in the UK prior to 2005 (Henry & Crawford, 2005) and one in Hong Kong in 2017 (Cheung et al., 2020). Although the former is culturally matched to the groups studied here, their sample of >1700 adults was older (mean age = 40 years) and all were employed. The latter study was conducted on >7000 undergraduate students with a similar mean age but living in a different cultural environment. Nevertheless, these two studies (summarised data shown in *Figure* 1) are consistent with other normative studies (Lovibond & Lovibond, 1995a; Sinclair et al. 2012). Together they indicate that the student sample studied here show elevated symptoms of mental health problems on all three subscales, at least in 2020. Specifically, comparisons with previous normative data show that stress symptoms for UK students are higher than expected, even though stress remains unchanged by the pandemic. Depression symptoms are also more pervasive than expected, an effect that is exacerbated in 2020. Anxiety levels up until 2020, however, were generally consistent with those measured in Hong Kong students; thereafter, anxiety levels for UK students are clearly elevated above typical values.
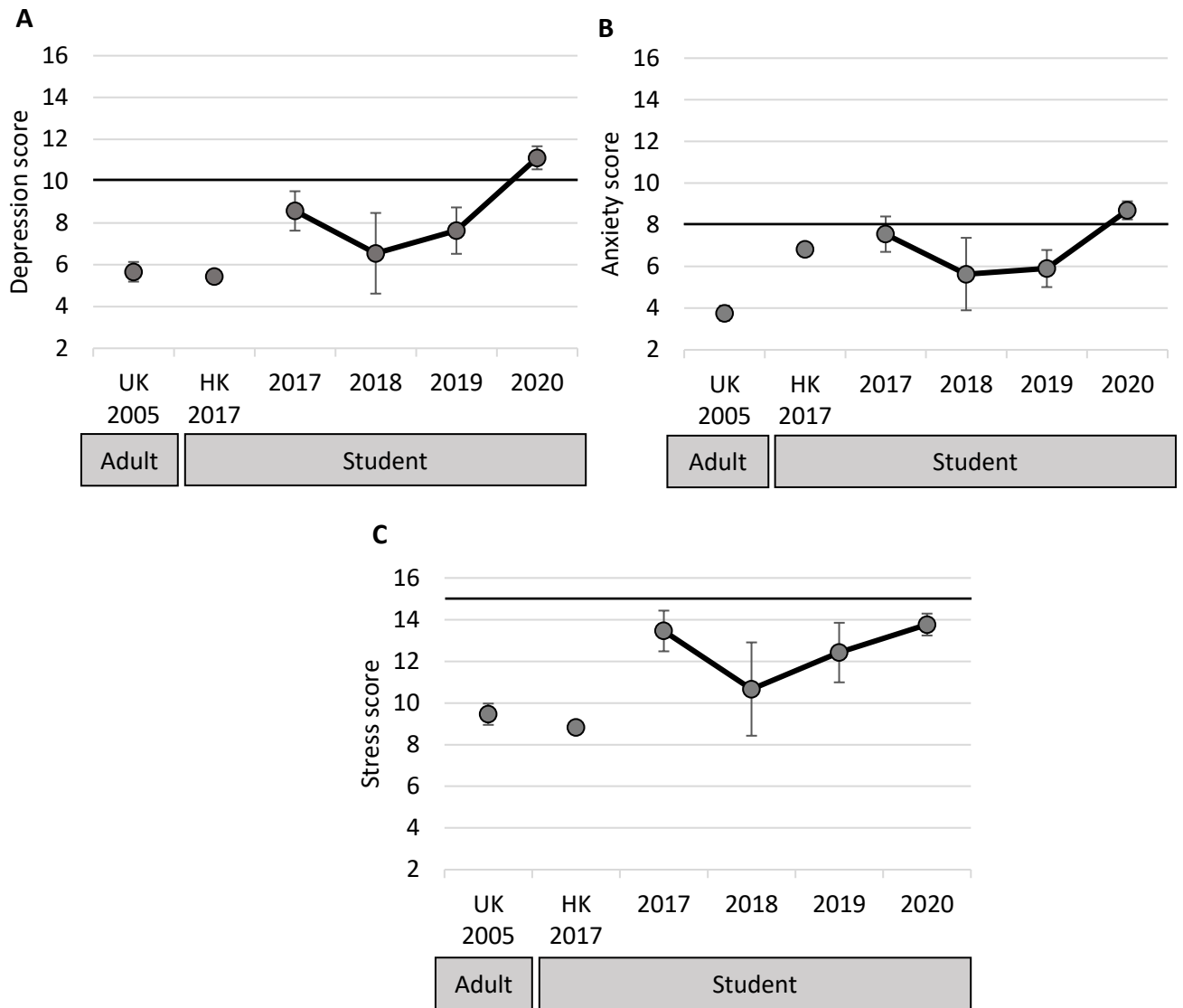
Figure 1. Data on the left of each graph shows group mean scores for DASS-21 subscales (A) depression, B) anxiety, and C) stress) obtained from UK students 2017, 2018, 2019 and 2020. Data to the right on each graph shows baseline average scores obtained from two large scale normative studies. Black line on each graph represent the cut-off between "normal" and "mild" symptoms on the respective subscale (Lovibond & Lovibond, 1995b). Error bars are 99% confidence limits. UK 2005 was obtained from> 1500 employed adults in 2005, mean age 40 years (Henry & Crawford, 2005). HK 2017 was obtained from> 7000 undergraduate students in 2017 at Hong Kong University, mean age 19 years (Cheung et al., 2020).

An important question for those providing pastoral support for students concerns the percentage of students who show symptoms considered to be great than "normal". Scores below 11, 7, and 9 are considered "normal" for the depression, anxiety, and stress subscales respectively

(Lovibond & Lovibond, 1995b). Percentage of students who show symptoms considered to be greater than "normal" for each year studied are shown in *Figure* 2. Most notable from this figure is that the percentage of students experiencing mild or worse symptoms of depression has doubled in the pandemic year (2020), reaching a level of 20%. Approximately a quarter of this student sample report experiencing mild or worse symptoms of anxiety and stress.
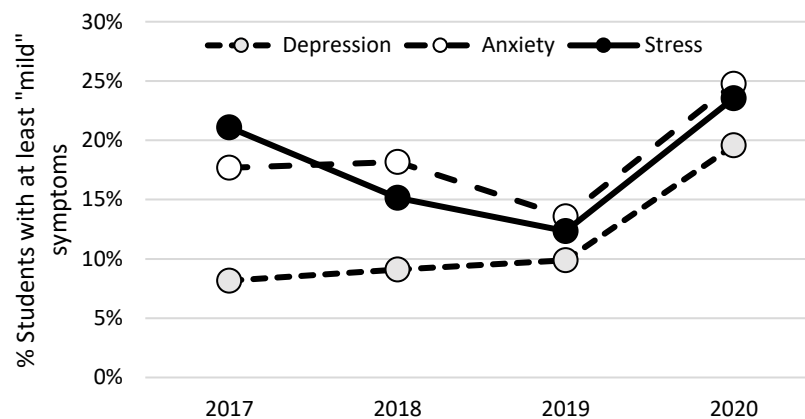

Figure 2. The percentage of student in each cohort that scored higher than "normal" on each subscale according to standard norms.

"Nothing to look forward to in 2020"

Statistical analysis (Kruskal-Wallis tests) on individual items in the depression subscale comparing yearly cohorts revealed significant differences for item-2 (χ^2(3) = 18.911, *p* < .001), item-3 (χ^2(3) = 24.309, *p* < .001) and item-7 (χ^2(3) = 23.424, *p* < .001). Average scores for each cohort on depression items are shown in *Figure* 3. Follow-up comparisons showed that the average score of .87 (s.d = 1) on depression item-3 ("I feel like I have nothing to look forward to") in 2020 was significantly higher than the average score for each previous years (for 2019, mean = .53, s.d. = .8, Z = -2.790, *p* = .005; for 2018 mean = .36, s.d. = .7, Z = -3.055, *p* = .002; and for 2017, mean = .52, s.d. = .8, Z = -3.513, *p* <.001). These results suggest that students' optimism for future events was negatively impacted by the pandemic. Differences for responses to items 2 and 7 across the years were less systematic but in both cases scores for 2020 were higher than scores for 2019.

Similar analyses on items for the anxiety subscale revealed significant cohort effects for item-5 ("I felt I was close to panic"; $\chi^2(3) = 33.310$, $p < .001$). (See *Figure* 3.). Follow-up comparisons showed that the average score of .71 (s.d. = .9) on this item in 2020 was significantly higher than the average score of .23 (s.d = .5) for 2019 (Z = -4.893, $p < .001$) and .24 (s.d. = .7) for 2018 (Z = -3.467, $p = .001$). However, it was statistically similar with the average score of .67 (s.d. = .9) for 2017 ($p = .357$).
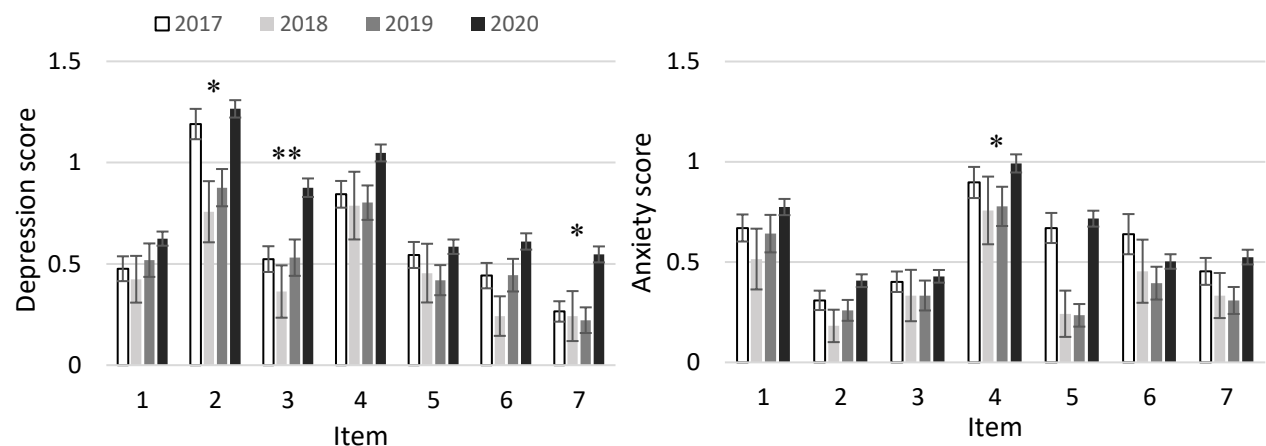

Figure 3. Average score for each item in the depression (left) and anxiety (right) subscales for 2017 (light blue), 2018 (medium blue), 2019 (dark blue) and 2020 (grey). Error bars show standard error. * indicates that average score in 2020 was higher than for some of the three previous years. ** indicates average that score in 2020 was higher than for all of the three previous years.

Discussion

To examine the effect of the Covid-19 pandemic on student mental health, we compared depression, anxiety and stress scores of undergraduates who completed the DASS-21 in the autumn of 2020, 2019, 2018 or 2017. For the first time, we show that students enrolled in the autumn of 2020 were feeling more depressed and anxious compared to their peers from previous years. However, evidence that students experienced higher levels of stress in 2020 compared to previous years was not found. Critically, the percentage of students who may need support for mental health problem has increased in 2020 to over a fifth of students showing at least mild symptoms of depression, anxiety, and stress. Furthermore, students enrolled in 2020 reported lower optimism for the future than in previous years.

Although uncovering the sources of changes in mental health in UK undergraduates was not the aim of this study, such changes are unlikely to reflect an arbitrary fluctuation as DASS scores have been shown to be highly stable over time (Lovibond, 1998). Instead, these changes are likely to have resulted directly or indirectly from the Covid-19 pandemic, as this was the single largest external event during the time of the data collection in 2020.

Comparing UK student data obtained in this study prior to 2020 with normative data obtained elsewhere (Henry & Crawford, 2005; Cheung et al., 2020) suggests that stress and depression levels for UK students has been relatively high over the past 4 years. Although higher than that found for working UK adults, student anxiety levels have been comparable to that found in other student samples. Importantly, both depression and anxiety symptoms increased in the pandemic. Despite stress levels appearing relatively unchanged in 2020 compared to previous years, it is possible that some factors caused stress to increase (e.g., dealing with on-line teaching), yet others, such as limited social contact, may have led to a decrease in perceived stress, leaving overall stress unchanged.

Although sub-scores on the DASS subscales are correlated (Crawford & Henry, 2003; Henry & Crawford, 2005; Norton, 2007), numerous experiments demonstrated that the subscales, especially depression and anxiety, adequately assess their intended domains (Lovibond & Lovibond, 1995a; Crawford & Henry, 2003; Henry & Crawford, 2005). This suggests that changes in one subscale are unlikely to explain effects observed for other subscales. In the data reported here, this supposition is supported by the lack of change in stress subscale scores in the presence of an increase in scores for the other two sub-scales, even though previous studies have shown that stress subscale scores correlate more strongly with depression and anxiety scores, than the latter do with each other (Brown, Chorpita, Korotitsch, Barlow, 1997; Clara, Cox, & Enns, 2001).

Although the DASS should not be used to clinically diagnose depression, anxiety, or stress, it is a useful tool for highlighting the presence of elevated levels of distress (Gomez, 2016). Clearly, the data reported here imply that a fifth of students are experiencing higher than average levels of

distress, and therefore highlight that university student mental health has been particularly poor during the pandemic. It should be noted however that such data do not imply that a fifth of students are likely to develop serious mental healthy problems. Even though our study focused on the mental health of students, it is likely that elevated levels of distress may also be present in the wider UK population, a point deserving of further research.

The information reported here may be important for educational institutions and mental health support groups as they examine their responses to the pandemic situation and seek to protect and enhance student well-being. Importantly, these data suggest that in addition to focus on reducing students stress, efforts to lower depression and anxiety symptoms are also required. For example, boosting student optimism for the future should be considered, perhaps by developing multiple positive events to which students can look forward to. Regardless of the measures taken, the data reported here suggest that a mental-health-centred approach to student services and support is needed.

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Appendix A

DASS-21

The 21 items that make up the DASS-21 and the subscale to which they contribute are shown here. When presented to participants, items from different subscales are intermixed.

Subscale	Item	Statement
Depression	1	I couldn't seem to experience any positive feeling at all
	2	I found it difficult to work up the initiative to do things
	3	I felt that I had nothing to look forward to
	4	I felt downhearted and blue
	5	I was unable to become enthusiastic about anything
	6	I felt I wasn't worth much as a person
	7	I felt that life was meaningless
Anxiety	1	I was aware of dryness of my mouth
	2	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion
	3	I experienced trembling (e.g. in the hands)
	4	I was worried about situations in which I might panic and make a fool of myself
	5	I felt close to panic
	6	I was aware of action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)
	7	I felt scared without any good reason
Stress	1	I found it hard to wind down
	2	I tended to overreact to situations
	3	I felt that I was using a lot of nervous energy
	4	I found myself getting agitated
	5	I found it difficult to relax
	6	I was intolerant of anything that kept me from getting on with what I was doing
	7	I felt that I was rather touchy