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WELL-BEING OF UNIVERSITY STUDENTS WITH ADHD AND AUTISM DIAGNOSES AND TRAITS

Shikhah Almayobed and Andrew P. Smith*

Centre for Occupational and Health Psychology, School of Psychology, Cardiff University, 70 Park Place, Cardiff CF10 3AT, UK.

***Corresponding Author: Andrew P. Smith**

Centre for Occupational and Health Psychology, School of Psychology, Cardiff University, 70 Park Place, Cardiff CF10 3AT, UK.

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ABSTRACT

Background: There has been recent research on the associations between ADHD/autistic traits and well-being. The present study continued this line of inquiry using the Well-being Process approach with a sample of university students, some of whom had received a diagnosis of ADHD or Autism. **Methods:** Three hundred students completed an online survey, which included the Short-Form Well-being Process Questionnaire, the Short-Form Strengths and Difficulties Scale, the Autism Spectrum Quotient (AQ10) and the ADHD Self-Report Scale (ASRS). One hundred had received a diagnosis of ADHD, 100 had a diagnosis of Autism, and 100 had no diagnosis of either ADHD or Autism. Participants repeated the survey three months later. **Results:** Analyses compared the three groups while controlling for established predictors of well-being. No differences were found between the groups in terms of well-being outcomes. However, the ADHD and Autism groups had higher levels of hyperactivity than the no diagnosis group. Those with a diagnosis of Autism had more emotional problems than the no diagnosis group. Analyses based on trait scores showed that ADHD and Autistic traits were associated with greater hyperactivity at both time points. Autistic traits were also associated with increased peer problems and decreased prosocial behaviour. **Conclusion:** The results confirm earlier findings based on measurement of traits rather than diagnoses. Well-being outcomes were not associated with ADHD or Autism, whereas hyperactivity and social problems were. These results were observed with both diagnoses and traits.

KEYWORDS: Well-being; Strengths and Difficulties; ADHD; Autism; University Students.

INTRODUCTION

Recent research has examined well-being using the well-being process model. This was based on the Demands (D) – Resources (R) – Individual (IV) – Effects (E) model.[1,2] The Well-being Process model was initially used in occupational samples.[3-24] This was followed by research with student samples.[25-46] Recent research has used the model to assess associations between ADHD and Autistic traits and well-being.[47-52] These previous studies have examined ADHD and autistic traits rather than in diagnosed individuals.

The present study compared students with previous diagnoses of ADHD/autism with those without a diagnosis. AQ10 and ADHD questionnaires[53, 54] were still used in this study, as it is plausible that individuals may have high scores on these measures even though no formal diagnosis has been made. This allows for comparing analyses based on criteria with those using symptom scores. The WPQ outcomes and Strengths and Difficulties outcomes[55] were also measured. Previous studies have been cross-sectional, making it difficult to identify causal mechanisms. Here, a longitudinal study was used to examine the extent to which measures taken at Time 1 (T1) can predict outcomes at Time 2 (T2). This approach removes the possibility of reverse causality, as the T2 measurements are taken after the first. The initial aim of the analyses presented in this paper was to replicate the findings from the previous surveys at two time points. The specific hypotheses tested are as follows.

Hypothesis 1: The usual associations between the well-being predictors and outcomes will be replicated.

Hypothesis 2: The adjusted means of well-being and SDQ outcomes for the three groups of people (i.e., those with ADHD traits, autism traits, or no ADHD/autism traits) differ after accounting for health-related behaviours and well-being predictors as confounding factors at both time points.

Hypothesis 3: There will be fewer significant associations between the established predictors and the SDQ outcomes.

Hypothesis 4: Associations between the ADHD/autism traits, HRB scores, and well-being outcomes will essentially become non-significant when the established well-being predictors are included in the analyses.

Hypothesis 5: Associations between the ADHQ/AQ variables and the SDQ outcomes will be more robust and remain significant even when the established predictors are included in the analyses.

METHODS

Ethical Approval

Cardiff University's School of Psychology Ethics Committee approved this study (ethical number: EC2212136676R).

Participants

Data were collected from the Prolific recruitment panel for three groups. The first group was students without a prior diagnosis of ADHD or autism, and the second group was students with a previous diagnosis of autism. The final group was people with a prior diagnosis of ADHD. The Prolific pre-screen selection settings were used to implement the inclusion and exclusion criteria for recruiting the participants. The inclusion criteria for the three groups were students from the United Kingdom, the United States, Australia, New Zealand, and South Africa. To select people with ADHD, the pre-screen feature was participants with a prior diagnosis of ADHD. In addition, the participants with a previous autism diagnosis were used to select the autism group. The total sample size was 300 participants (100 for each group) at T1. However, there was a decrease in the response rate during T2, three months later, in July 2023, when just 248 participants answered the survey: 92 from the no ADHD/autism group, 83 from the ADHD group, and 73 from the autism group. Table 1 shows the characteristics of the students. At T1, females accounted for 49% (n = 147) of the sample, and males accounted for 50.7% (n = 152). In contrast, at T2, females accounted for 50% (n = 124) and males 48.4% (n = 120). Regarding age, the average of the total sample was 27.6 (SD = 9.13) at T1; this value was similar to that for T2, with 28.4 (SD = 9.57). BMI as more significant in people with autism (M = 28.6) compared to people with ADHD (M = 26.5). At the same time, people without ADHD or autism had the lowest BMI, with an average of 24.9 at T1. It was noted that the average BMI increased to M = 30.7 among participants in the autism group and M = 26.3 among those in the no ADHD/autism group at T2. The BMI of the individuals in the ADHD group was stable (M= 26.8) at T2; see Table 1.

Materials

As in previous chapters, the Student Well-being Process Questionnaire measured specific aspects of established predictors and well-being outcomes. The AQ10 was used to calculate the total scores for autistic traits, while the ADHD self-report scale, part A, was used to calculate the total scores for ADHD traits. It is worth noting that the same surveys were administered at both time points.

Table 1: Descriptive analysis of demographic variables.

Groups	N		Age Mean (SD)		BMI Mean (SD)		Gender N (%)			
							Male	Female	Male	Female
	T1	T2	T1	T2	T1	T2	T1		T2	
ADHD	100	83	28.29 (8.76)	28.17 (12.22)	26.57 (8.36)	26.82 (8.78)	47 (47%)	53 (53%)	43 (51.8%)	37 (44.6%)
Autism	100	73	27.67 (6.94)	28.75 (9.14)	28.69 (11.05)	30.78 (12.64)	49 (49%)	51 (51%)	32 (43.8%)	40 (54.8%)
No ADHD/autism	100	92	27.09 (11.25)	28.38 (7.02)	24.96 (6.08)	26.35 (8.19)	57 (57%)	42 (42%)	45 (48.9%)	47 (51.1%)
Total	300	248	27.68 (9.13)	28.42 (9.57)	26.75 (8.85)	27.83 (10.05)	152 (50.7%)	147 (49%)	120 (48.4%)	124 (50%)

Study Design and Procedure

All respondents completed the same questionnaire at both time points. The surveys were administered via the Prolific web-based data collection platform. Three advertisements were administered: the first was for the ADHD group, the second was for the autism group, and the third was for individuals without ADHD/autism. Those who expressed interest were directed to a Qualtrics online survey via a link. The survey was then analysed using IBM SPSS 29 to obtain accurate estimates for the hypothesis under investigation.

T2 collection was done by selecting the pre-screen option on the Prolific website (including participants who participated in the previous study only). Then, Prolific sent the study invitations to eligible participants who were taking part for the first time. The surveys took approximately 20 minutes to complete, and participants received £5 for completing the survey at T1 and another £5 for completing the survey at T2. Informed consent was obtained within the questionnaire, and participants could only continue beyond the consent page if they agreed. Participants were informed that they could withdraw from the study and were advised to skip any questions they did not wish to answer. An information sheet was provided prior to obtaining consent, and a debriefing sheet was provided after the questionnaire was completed.

RESULTS

Descriptive Analysis

Descriptive Analysis for WPQ Variables

Well-being was assessed using the WPQ, which provides a score ranging from 1 to 10. The mean positive well-being score was 6.08 (SD = 2.22) at T1 and 6.4 (SD = 2.13) at T2. The mean negative well-being

score was 6.2 (SD = 2.38) at T1 and 5.6 (SD = 2.50) at T2, showing a slight increase in positive well-being and a decrease in negative well-being over the study period. Regarding established predictors of WPQ, the highest average appeared to be student stressors, low work-life balance, workload, and university stress at T1. Meanwhile, at T2, the highest averages were for workload, university stress, and positive coping (see Table 8.2). It was found that most of the WPQ factors remained relatively stable over the study period.

Descriptive Statistics for ADHD and Autism Questionnaire

The average score for the AQ-10 was 4.6 (SD = 2.48) at T1, and a similar average was found at T2 (M = 4.51, SD = 2.38). Furthermore, the ASRS average score (m = 3.4, SD = 1.75) was similar to that reported at T2 (M = 3.24, SD = 1.82; see Table 3). The average score for prosocial behaviour was the highest on the SDQ (m = 7.6, SD = 2.16), followed by emotional problems (m = 5.3, SD = 2.73) and hyperactivity (m = 5.0, SD = 2.73). Conduct problems had the lowest average (m = 2.3, SD = 1.66), followed by peer problems (m = 3.7, SD = 2.07). These results are similar to those reported at T2.

Table 2: Descriptive analysis of WPQ variables at T1 and T2.

WPQ Variables	Min. – Max.	Mean		SD		N	
		T1	T2	T1	T2	T1	T2
Positive well-being	1–10	6.08	6.43	2.22	2.13	299	248
Negative well-being	1–10	6.27	5.66	2.38	2.50	296	246
Student stressors	1–10	7.06	6.53	2.23	2.394	297	247
Social support	1–10	5.98	6.11	2.36	2.670	298	247
Positive coping	1–10	6.55	6.85	2.19	2.246	295	248
Negative coping	1–10	6.26	5.71	2.43	2.554	297	248
Psychological capital	1–10	5.95	6.52	2.18	2.213	298	248
Low work-life balance	1–10	7.03	6.63	2.35	2.487	296	246
Workload	1–10	7.08	6.80	2.20	2.323	298	246
Sleepiness	1–10	6.20	6.04	2.40	2.509	299	247
Physical health	1–10	6.11	6.01	1.97	1.972	300	245
Flow	1–10	6.02	6.13	2.02	2.035	299	246
Flourishing	1–10	5.23	5.37	2.13	2.015	299	246
Low rumination	1–10	5.20	4.98	2.26	2.261	300	246
Anxious	1–10	6.40	6.05	2.28	2.380	299	246
Life stress	1–10	6.44	6.16	2.05	2.186	296	246
University stress	1–10	6.86	6.84	2.12	2.066	296	246
Depression	1–10	5.31	4.97	2.38	2.467	299	247
Life satisfaction	1–10	5.53	5.53	2.28	2.287	297	246
University satisfaction	1–10	6.29	6.28	2.10	2.203	299	247

Table 3: Descriptive analysis of ADHD and autism questionnaires at T1 and T2.

ADHD/Autism Scores	Total Scores	T1				T2			
		Min.	Max.	Mean	SD	Min.	Max.	Mean	SD
Total score for ADHD	0–6	0	6	3.47	1.75	0	6	3.24	1.82
Total score for Autism	0–10	0	10	4.63	2.48	0	10	4.51	2.38

Table 4: Descriptive analysis of ADHD and autism questionnaires at T1 and T2 (cutoff points).

ADHD/Autism	Type	T1 N (%)	T2 N (%)
Autism	No autism traits (0–5)	195 (65%)	168 (67.7%)
	Autism traits (6–10)	98 (32.7%)	76 (30.6%)
ADHD	No ADHD traits (0–3)	140 (46.7%)	125 (50.4%)
	ADHD traits (4–6)	155 (51.7%)	119 (48%)

Table 5: Descriptive analysis of subscales of SDQ at T1 and T2.

SDQ Outcomes	Total scores	T1					T2				
		Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD	N
Conduct problems	0–10	0	9	2.39	1.66	300	0	8	2.31	1.62	245
Hyperactive behaviour	0–10	0	10	5.06	2.73	299	0	10	4.70	2.79	243
Emotional problems	0–10	0	10	5.33	2.73	298	0	10	5.00	2.70	239
Peer problems	0–10	0	9	3.70	2.07	300	1	10	4.89	1.70	246
Prosocial behaviour	0–10	0	10	7.67	2.16	299	1	10	7.86	2.06	246

Test-Retest Reliability

A test-retest reliability analysis used a correlation coefficient to assess the stability of the variables over time. The same survey was administered to participants on two separate occasions, with a 3-month interval between administrations. The results showed that the test-retest reliability coefficients for the outcome variables ranged from 0.804 to 0.441, indicating good to low reliability across the outcome variables (see Table 6). Meanwhile, the coefficients of ADHD and autism traits ranged from 0.754 to 0.684 (see Table 7). Moreover, the coefficients of controlled variables ranged from .681 to .257 (see Table 8). However, it is essential to note that the variables might not be stable over time. For this reason, one conducts longitudinal analyses to assess the impact of independent variables at T1 on the outcome variables at T2.

Table 6: Test-retest reliability coefficients and descriptive statistics for the outcome variables.

Variables	Test M (SD)	Retest M (SD)	r	p
Positive well-being	6.08 (2.22)	6.43 (2.13)	.441	<.001
Negative well-being	6.27 (2.38)	5.66 (2.50)	.454	<.001
Flourishing	5.23 (2.13)	5.37 (1.97)	.559	<.001
Physical health	6.11 (1.97)	6.01 (2.38)	.673	<.001
Anxiety	6.27 (2.28)	6.05 (2.01)	.700	<.001
Depression	2.38 (2.38)	4.97 (2.46)	.643	<.001
Conduct problems	2.39 (1.66)	2.31 (1.62)	.599	<.001
Hyperactive behaviour	5.06 (2.73)	4.70 (2.79)	.777	<.001
Emotional problems	5.33 (2.73)	5.00 (2.70)	.804	<.001
Peer problems	3.70 (2.07)	4.89 (1.70)	.664	<.001
Prosocial behaviour	7.67 (2.16)	7.86 (2.06)	.748	<.001

Table 7: Test-retest reliability coefficients and descriptive statistics for the ADHD and autism trait variables.

Variables	Test M (SD)	Retest M (SD)	r	p
Total ADHD	4.63 (2.48)	4.51 (2.38)	.684	<.001
Total autism	3.47 (1.75)	3.24 (1.82)	.754	<.001

Table 8: Test–retest reliability coefficients and descriptive statistics for control variables.

Variables	Test M (SD)	Retest M (SD)	r	p
BMI	26.75 (8.85)	27.83 (10.05)	.681	<.001
Student stressors	7.06 (2.23)	6.53 (2.39)	.494	<.001
Social support	5.98 (2.36)	6.11 (2.67)	.524	<.001
Positive coping	6.55 (2.19)	6.85 (2.24)	.541	<.001
Negative coping	6.26 (2.43)	5.71 (2.55)	.482	<.001
Psychological capital	5.95 (2.18)	6.52 (2.21)	.652	<.001
Low work-life balance	7.03 (2.35)	6.63 (2.48)	.437	<.001
Sleepiness	6.20 (2.40)	6.04 (2.50)	.448	<.001
Workload	7.08 (2.20)	6.80 (2.32)	.386	<.001
Flow	6.2 (2.02)	6.13 (2.03)	.588	<.001
Low rumination	5.20 (2.26)	4.98 (2.26)	.257	<.001

Univariate Analysis

Associations between Control Variables and Outcomes

To examine the relationship between the outcomes and control variables using univariate analysis, Pearson's correlation was performed for continuous variables and between-subjects t-tests for categorising variables for T1 and T2 (see Table 9). The results were as expected: there were positive correlations between the covariates of low work-life balance, workload, negative coping, and student stressors and the outcomes of negative well-being, anxiety, and depression at T1 and T2; and negative correlations between social support, flow, and psychological capital and the outcomes negative well-being, anxiety, and depression at both time points. Moreover, social support, flow, positive coping, and psychological capital showed significant positive correlations with positive well-being, flourishing, and physical health at T1 and T2. Workload, negative coping, and student stressors negatively correlated with positive well-being and flourishing at both times. There was a negative correlation between low rumination and negative well-being, anxiety, and depression at T2 only. Positive correlations were found between BMI and negative well-being, anxiety, and depression at T2 only. Age was only correlated with anxiety at T1.

In addition, flow, positive coping, psychological cap, and social support were negatively correlated with hyperactive behaviour and emotional problems at both time points. In contrast, positive correlations were observed between life stress and hyperactivity, conduct problems, and emotional and peer problems at both T1

and T2. Moreover, psychological capital, life satisfaction, social support, and positive coping were positively correlated with prosocial behaviour at both time points. On the other hand, there was a negative correlation between negative coping and prosocial behaviour at T1 and T2 (see Table 10).

Table 9: Relationships between control variables and well-being outcomes at T1 and T2. Note: Correlations and differences are two-tailed.

Control variables		Positive well-being		Flourishing		Physical health		Negative well-being		Anxiety		Depression	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Student stressors	r	-.441	-.456	-.332	-.360	-.137	-.268	.675	.649	.585	.529	.539	.554
	p	<.001	<.001	<.001	<.001	.018	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Social support	r	.374	.459	.458	.469	.256	.279	-.284	-.254	-.351	-.226	-.371	-.404
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Negative coping	r	-.335	-.305	-.359	-.317	-.193	-.317	.448	.417	.460	.497	.437	.514
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Positive coping	r	.280	.343	.392	.326	.261	.258	-.239	-.115	-.234	-.136	-.256	-.299
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.072	<.001	.034	<.001	<.001
Psychological capital	r	.574	.496	.644	.545	.365	.431	-.460	-.444	-.482	-.417	-.524	-.464
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Work–life balance	r	-.105	-.083	-.165	-.177	-.037	-.169	.278	.225	.265	.343	.209	.300
	p	.073	.196	.004	.005	.524	.008	<.001	<.001	<.001	<.001	<.001	<.001
Workload	r	-.210	-.246	-.149	-.256	-.047	-.157	.318	.348	.320	.395	.256	.318
	p	<.001	<.001	.010	<.001	.419	.014	<.001	<.001	<.001	<.001	<.001	<.001
Sleepiness	r	-.269	-.192	-.274	-.397	-.206	-.329	.329	.427	.418	.416	.390	.439
	p	<.001	.002	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Flow	r	.302	.311	.539	.462	.306	.305	-.224	-.322	-.134	-.261	-.190	-.213
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.020	<.001	<.001	<.001
Low rumination	r	.236	.204	.320	.238	.089	.239	-.108	-.142	-.025	-.169	-.075	-.129
	p	<.001	.001	<.001	<.001	.123	<.001	.063	.027	.665	.008	.195	.044
Life stress	r	-.328	-.237	-.205	-.238	-.102	-.284	.442	.423	.498	.553	.523	.512
	p	<.001	<.001	<.001	<.001	.081	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Life satisfaction	r	.577	.439	.690	.656	.345	.394	-.443	-.494	-.417	-.412	-.547	-.521
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Age	r	-.036	-.063	-.026	-.049	-.055	-.031	-.082	.040	-.177	-.078	-.073	-.086
	p	.536	.327	.648	.442	.344	.629	.158	.536	.002	.226	.206	.180
BMI	r	-.093	-.011	-.116	-.111	-.211	-.253	.075	.132	.079	.154	.077	.142
	p	.110	.862	.047	.086	<.001	<.001	.199	.040	.177	.016	.189	.026
Differences													
Gender	t	.096	-.336	.381	**-.122**	**.804**	**2.019**	-1.84	-2.28	-2.88	-3.49	-1.06	-1.36
	p	.923	.737	.704	**.903**	**.422**	**.045**	.066	.023	.004	.001	.289	.175

Table 10: Relationships between control variables and well-being and SDQ outcomes at T1 and T2. ***Note: Correlations are two-tailed.***

Control variables		Conduct problems		Hyperactive behaviour		Emotional problems		Peer problems		Prosocial behaviour	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Student stressors	r	.106	.110	.291	.371	.476	.544	.323	.277	-.053	-.036
	p	.069	.088	<.001	<.001	<.001	<.001	<.001	<.001	.360	.570
Social support	r	-.100	-.219	-.269	-.223	-.333	-.300	-.469	-.411	.214	.204
	p	.083	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.001
Positive coping	r	-.170	-.199	-.232	-.234	-.283	-.231	-.342	-.274	.210	.288
	p	.003	.002	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Negative coping	r	.099	.180	.374	.376	.512	.558	.400	.313	-.119	-.232
	p	.090	.005	<.001	<.001	<.001	<.001	<.001	<.001	.040	<.001
Psychological capital	r	-.072	-.122	-.409	-.439	-.504	-.543	-.404	-.347	.228	.305
	p	.214	.057	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Work–life balance	r	.042	.077	.248	.296	.248	.317	.068	.096	.049	.050
	p	.473	.229	<.001	<.001	<.001	<.001	.244	.136	.401	.436

Workload	**r**	.169	.110	.268	.276	.298	.324	.096	.069	-.024	-.015
	p	.003	.086	<.001	<.001	<.001	<.001	.098	.279	.682	.811
Sleepiness	**r**	.058	.086	.323	.344	.408	.417	.143	.223	-.064	-.039
	p	.321	.182	<.001	<.001	<.001	<.001	.013	<.001	.271	.544
Flow	**r**	-.149	-.176	-.380	-.432	-.187	-.263	-.116	-.085	.187	.071
	p	.010	.006	<.001	<.001	.001	<.001	.045	.187	.001	.271
Low rumination	**r**	-.008	-.073	-.207	-.121	-.112	-.164	-.128	-.092	.077	.096
	p	.890	.258	<.001	.061	.054	.011	.027	.152	.185	.135
Life stress	**r**	.213	.224	.274	.370	.449	.439	.186	.137	-.091	-.015
	p	<.001	<.001	<.001	<.001	<.001	<.001	.001	.032	.123	.819
Life satisfaction	**r**	-.068	-.188	-.415	-.370	-.407	-.444	-.378	-.413	.188	.179
	p	.245	.003	<.001	<.001	<.001	<.001	<.001	<.001	.001	.005
Age	**r**	-.025	-.093	-.041	-.071	-.087	-.090	.113	.047	.002	-.023
	p	.660	.149	.479	.274	.134	.165	.051	.460	.968	.721
BMI	**r**	-.033	.120	.048	.089	.119	.131	.092	.100	.069	.041
	p	.570	.063	.415	.169	.042	.044	.115	.120	.240	.520
Differences											
Gender	**t**	-.243	-1.597	.864	-.005	-4.529	-5.542	-1.942	-1.139	-.053	-.795
	p	.808	0.112	.388	.996	.001	0.001	.053	.256	0.958	0.427

Associations between ADHD and Autism, and Outcomes

Pearson correlation analysis was used to investigate the relationship between total ADHD and autism scores and the outcome variables. The findings revealed that the values of the total scores for ADHD, autism, and most outcome variables were statistically significant, demonstrating the efficacy of the ADHD and autism traits tests in addressing various outcome variables in this study.

ADHD scores and outcomes: The total ADHD scores were positively correlated with negative well-being, anxiety, depression, hyperactive behaviour, peer problems, conduct problems, and emotional problems at T1 and T2 (see Table 11). Conversely, a negative association was observed between ADHD scores and positive well-being, flourishing, physical health, and prosocial behaviour at both time points. Similar results were found in the dichotomised cutoff point scores.

Autism scores and outcomes: The total autism scores were positively correlated with negative well-being, anxiety, depression, emotional problems, peer problems, hyperactive behaviours, and conduct problems, anxiety, and depression at T1 and T2 (see Table 11). Moreover, negative correlations were observed between autism and positive well-being, flourishing, physical health, and prosocial behaviour at both time points.

Table 11: Correlations between the total score for ADHD, autism, and outcomes at T1 and T2.

Outcomes	T1				T2			
	ADHD score		Autism score		ADHD score		Autism score	
	r	p	r	p	r	p	r	p
Positive well-being	-.221	<.001	-.245	<.001	-.219	<.001	-.202	.002
Flourishing	-.374	<.001	-.284	<.001	-.248	<.001	-.256	<.001
Physical health	-.257	<.001	-.299	<.001	-.206	.001	-.294	<.001
Negative well-being	.299	<.001	.190	<.001	.367	<.001	.372	<.001
Anxiety	.318	<.001	.292	<.001	.393	<.001	.377	<.001
Depression	.281	<.001	.258	<.001	.301	<.001	.293	<.001
Conduct problems	.129	.027	.132	.024	.179	.005	.165	.010
Hyperactive behaviour	.667	<.001	.480	<.001	.695	<.001	.535	<.001
Emotional problems	.348	<.001	.346	<.001	.442	<.001	.454	<.001
Peer problems	.189	.001	.398	<.001	.060	.349	.293	<.001
Prosocial behaviour	-.146	.012	-.356	<.001	-.207	.001	-.289	<.001

Note: *All correlations are Pearson's (two-tailed).*

Table 12 illustrates the significance values and the differences between individuals who scored above and below the cutoff point, which is 5.

Table 12: Scores for ADHD, autism, and the outcomes (cutoff points) at T1 and T2.

Outcomes	T1				T2			
	ADHD traits		Autism traits		ADHD traits		Autism traits	
	t	p	t	p	t	p	t	p
Positive well-being	-3.468	<.001	-3.42	<.001	-2.904	.004	-2.363	.019
Flourishing	-6.743	<.001	-3.21	<.001	-3.951	<.001	-3.201	.002
Physical health	-3.095	.002	-3.92	<.001	-2.936	.004	-3.561	<.001
Negative well-being	4.22	<.001	1.92	.056	5.77	<.001	5.93	<.001
Anxiety	4.57	<.001	3.39	<.001	4.86	<.001	5.82	<.001
Depression	4.40	<.001	3.12	<.001	3.63	<.001	3.85	<.001
Conduct problems	1.268	.206	2.14	.033	3.369	<.001	1.654	.099
Hyperactive behaviour	11.75	<.001	6.48	<.001	11.26	<.001	7.850	<.001
Emotional problems	4.968	<.001	4.12	<.001	5.562	<.001	6.364	<.001
Peer problems	2.410	.017	6.00	<.001	.130	.897	3.580	<.001
Prosocial behaviour	-2.37	0.018	-6.08	<.001	-2.47	0.014	-2.95	0.003

Differences between Autism, ADHD, and No Diagnosis Groups

A multivariate analysis of covariance (MANCOVA) was conducted to examine the effects of groups (i.e., no ADHD/autism group, ADHD group, autism group) on well- being and SDQ outcomes separately as dependent variables while controlling for gender, BMI, and establish predictors of well- being (i.e., student stressors, social support, positive coping, negative coping, psychological capital, flow, and rumination) at T1 and T2. To perform the MANCOVA, equality of covariance matrices was tested using Box's test. The results showed that the p-values were greater than 0.05 at T1 and less than 0.05 at T2, indicating that the assumption was met at T1 but not at T2. However, the results should be interpreted with caution. Thus, to resolve this violation, the alpha value was reduced to 0.01, and Pillai's trace was used at T2 only. This is preferred for analyses with unequal sample sizes rather than Wilks' Lambda, as it is more resilient to violations of the homogeneity of variance. Moreover, ηp^2 was used as the estimated effect size for F.

The results of the well-being outcomes revealed that the multivariate test showed no significant differences among the groups in terms of the dependent variables at T1 and T2 (Wilks' Lambda = 0.943, FF (12, 472) = 1.174, pp = 0.299, $\eta\eta pp^2$ = 0.029 at T1; Pillai's Trace = 0.066, F (12, 406) = 1.149, p = 0.318, ηp^2 = 0.033 at T2).

Conversely, the MANCOVA test results for the SDQ outcomes (see Tables 13 and 14) showed that there were significant differences among groups in terms of the combined dependent variables at T1 and T2 (Wilks' Lambda = 0.819, FF (10, 474) = 4.98, pp = 0.001, $\eta\eta pp2$ = 0.095 at T1; Pillai's Trace = 0.235, F (10, 394) = 5.255, p = 0.001, ηp2= 0.0118 at T2). The between-subjects effects illustrated that there were significant differences between the groups in terms of hyperactive behaviour at both time points (F (2, 241) = 18.65, p < 0.001, partial $\eta\eta pp2$ = 0.134 at T1; F (2,200) = 19.15, p < 0.001, partial $\eta\eta pp2$ = 0.161 at T2). Emotional problems also exhibited significant differences among groups at T1 and T2, indicating the reliability of these results (F (2, 241) = 4.27, p < 0.015, partial $\eta\eta pp2$ = 0.034 at T1; F (2, 200) = 7.46, p < 0.001, partial $\eta\eta pp2$ = 0.069, respectively). In addition, pairwise comparisons were conducted to further explore the significant effects of hyperactive behaviour and emotional problems. The results revealed that hyperactive behaviour was significantly higher for individuals with ADHD traits compared to those without ADHD/autism traits, with a mean difference of 2.00 (SE = 0.335, p = 0.001, 95% CI [1.19, 2.81]) at T1 and 1.643 (SE = 0.348, p = 0.001, 95% CI [0.610, 2.67]) at T2. Similar results were found in individuals with autism traits: hyperactive behaviour was significantly higher for individuals with autism traits compared to those without autism/ADHD traits, with a mean difference of 1.433 (SE = 0.345, p = 0.001, 95% CI [0.602, 2 26]) at T1, and 1.993 (SE = 0.344, p = 0.001, 95%CI [0.969, 3.01]) at T2. However, there were no differences between the ADHD group and the autism group. The emotional problems variable was significantly higher for individuals with autism traits compared to those without ADHD/autism traits at both time points, with a mean difference of 0.910 (SE = 0.327, p = 0.018, 95% CI [0.121, 1.69]) at T1, and 1.231 (SE = 0.319, p = 0.001, 95% CI [0.283, 2.17]) at T2. However, there were no differences between the ADHD/autism traits group and the ADHD group; in addition, no differences were found between people with ADHD traits and people with autism traits in terms of emotional and peer problems.

Table 13: MANCOVA of SDQ outcomes at T1. Descriptive statistics and F-tests comparing ADHD, autism, and no ADHD/autism groups.

Dependent Variables	Groups	Mean	SD	Mean Adj	SE	F	P	Partial Eta squared η
Conduct problems	No ADHD	2.22	1.657	2.317	.182	.071	.931	.001
	ADHD	2.44	1.559	2.327	.175			
	Autism	2.38	1.639	2.407	.181			
Hyperactive behaviour	No ADHD	3.44	2.432	3.909	.238	18.652	<.001	.134
	ADHD	6.24	2.084	5.913	.228			
	Autism	5.48	2.815	5.342	.236			
Emotional problems	No ADHD	4.25	2.554	4.749	.226	4.279	.015	.034
	ADHD	5.52	2.676	5.457	.217			
	Autism	6.09	2.738	5.659	.224			
Peer problems	No ADHD	3.29	1.889	3.476	.196	2.393	.094	.019
	ADHD	3.56	2.056	3.617	.188			
	Autism	4.30	2.234	4.066	.194			
Prosocial behaviour	No ADHD	8.24	2.147	8.096	.239	2.648	.073	.022
	ADHD	7.63	2.197	7.676	.229			
	Autism	7.21	2.213	7.298	.237			

Table 14: MANCOVA of SDQ outcomes for T2. Descriptive statistics and F-tests comparing ADHD, autism, and no ADHD/autism groups.

Dependent Variables	Groups	Mean	SD	Mean Adj	SE	F	P	Partial Eta squared η
Conduct problems	No ADHD	1.88	1.263	1.933	.181	2.363	.097	.023
	ADHD	2.40	1.715	2.374	.198			
	Autism	2.54	1.812	2.500	.195			
Hyperactive behaviour	No ADHD	2.89	2.295	3.509	.227	19.152	<.001	.161
	ADHD	5.60	2.303	5.152	.249			
	Autism	5.81	2.642	5.501	.245			
Emotional problems	No ADHD	3.71	2.397	4.361	.210	7.468	<.001	.069
	ADHD	5.04	2.489	4.899	.230			
	Autism	6.23	2.734	5.591	.227			
Peer problems	No ADHD	4.63	1.386	4.875	.173	1.891	.154	.019
	ADHD	4.57	1.819	4.543	.190			
	Autism	5.33	1.763	5.057	.187			
Prosocial behaviour	No ADHD	8.40	1.981	8.246	.227	2.542	.081	.025
	ADHD	7.90	1.819	7.911	.249			
	Autism	7.30	2.277	7.472	.245			

Table 15: Bonferroni post hoc comparisons of hyperactive behaviour and emotional problem scores for ADHD, autism, and no ADHD/autism groups.

Outcomes	Group type		T1			T2		
			Mean diff	SE	Sig	Mean diff	SE	Sig
Hyperactive behaviour	ADHD	No ADHD/autism	**2.004**	**.335**	**<.001**	**1.643**	**.348**	**<.001**
	Autism	No ADHD/autism	**1.433**	**.345**	**<.001**	**1.993**	**.344**	**<.001**
	ADHD	Autism	.571	.333	.262	-.349	.352	.964
Emotional problems	ADHD	No ADHD/autism	.708	.318	.081	.539	.322	.288
	Autism	No ADHD/autism	**.910**	**.327**	**.018**	**1.231**	**.319**	**<.001**
	Autism	ADHD	.202	.316	1.00	.692	.325	.104

Multivariate Regression Analyses

For the multivariate analyses, a multiple linear regression model (Enter method) was run for each outcome at T1 and T2. The following control variables were included in all multivariate analyses conducted in the current study (BMI, gender, student stressors, social support, positive coping, negative coping, psychological capital, low work–life balance, sleepiness, flow, and rumination).

ADHD scores and autism scores were also added. The assumptions were assessed to ensure that the linear regression models were reliable and valid. To avoid overfitting the models, it has been suggested to use the formula N > 50 + 8(m) (m is the number of independent variables). Therefore, 300 was a good sample size for the predictors analysed. The multicollinearity assumption was tested by calculating variance inflation factor (VIF) and tolerance values for each predictor in the model. The VIF values ranged from 1.023 to 2.151, which is less than 5, the accepted threshold. However, the tolerance values ranged from 0.465 to 0.978, indicating no evidence of problematic multicollinearity among the predictors. Moreover, the homoscedasticity and normality of residuals were assessed visually using a P-P plot for normality and a scatterplot of the standardised residuals for homoscedasticity; the results suggest that the assumptions of homoscedasticity and normality of residuals were met.

Positive Well-being, Flourishing, and Physical Health Regression Models

The first linear regression analysis was conducted to determine the significant predictors of positive well-being. Gender, BMI, student stressors, social support, positive coping, negative coping, psychological capital, low work–life balance, and flow were the covariate predictors entered in the regression model. The positive well-being models were statistically significant at T1 and T2, with F [18, 281] = 12.08, p = 0.001, and R^{adj} = 0.400; F [18, 229] = 10.40, p = 0.001, and R^{adj} = 0.407, respectively. The model accounted for 40% of the variance in positive well-being at T1 and T2. This suggests a positive association between psychological capital and positive well-being at both time points. Additionally, high student stressors were correlated with decreased positive well-being at both T1 and T2. The flow and social support were associated with positive well-being at T2 only. The ADHD and autism scores were not significant predictors in the model.

Table 16: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and positive well-being outcome at T1 and T2. ***Note: Beta (□) values arestandardised.***

Positive Well-being						
T1				**T2**		
R^2	.436			**R^2**		.450
R adjusted	.400			**R adjusted**		.407
F	12.08			**F**		10.40
F Sig	.001			**F Sig**		0.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	-.046	-.971	.332	.007	.137	.891
Gender	.075	1.590	.113	.076	1.367	.173
Student stressors	-.211	-3.765	<.001	-.314	-4.861	<.001
Social support	.105	1.911	.057	.183	2.739	.007
Positive coping	-.060	-1.038	.300	.024	.368	.713
Negative coping	-.017	-.279	.780	.001	.018	.986
Psychological capital	.371	6.129	<.001	.337	4.957	<.001
Low work–life balance	.051	.969	.333	.143	2.296	.023
Workload	-.106	-1.859	.064	-.113	-1.716	.088
Flow	.101	1.924	.055	.142	2.454	.015
Low rumination	.056	1.118	.264	.011	.208	.836
Sleepiness	-.013	-.234	.815	.076	1.276	.203
Total ADHD	.041	.715	.475	-.005	-.085	.932
Total autism	-.008	-.146	.884	.087	1.386	.167

The flourishing multiple linear regression models of T1 and T2 were statistically significant (F [18, 281] = 22.561, p = 0.001, R^{adj} = 0.565 T1, and F [18, 229] = 13.56, p = 0.001, R^{adj} = 0.478) at T2. The models explained 56.5% of flourishing at T1 and 47.8% at T2. High social support, psychological capital, and flow were linked to a greater likelihood of flourishing. These findings were observed at both time points. High weekly caffeine intake and ADHD traits correlated with lower flourishing at T1; these findings were not observed at T2. In addition, there was a negative correlation between sleepiness and flourishing at T2 only (see Table 17).

Table 17: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and flourishing outcome at T1 and T2. ***Note: Beta (□) values are standardised.***

Flourishing						
T1				T2		
R^2	.591			R^2		.519
R adjusted	.565			R adjusted		.478
F	22.561			F		13.56
F Sig	.001			F Sig		.001
Predictors	β	t	Sig	β	t	Sig
BMI	-.050	-1.22	.222	-.061	-1.252	.212
Gender	.005	.133	.894	.083	1.592	.113
Student stressors	-.039	-.810	.419	-.076	-1.259	.209
Social support	.123	2.620	.009	.246	3.926	<.001
Positive coping	.037	.748	.455	-.080	-1.292	.198
Negative coping	-.040	-.774	.440	.042	.713	.477
Psychological capital	.374	7.25	<.001	.370	5.797	<.001
Low work–life balance	-.036	-.801	.424	.014	.234	.815
Workload	-.010	-.200	.842	-.114	-1.858	.065
Flow	.320	7.13	<.001	.272	5.029	<.001
Low rumination	.045	1.07	.283	-.013	-.254	.800
Sleepiness	.022	.475	.635	-.188	-3.387	<.001
Total ADHD	-.122	-2.50	.013	.065	1.086	.279
Total autism	.025	.535	.593	.080	1.353	.177

Moreover, the results of the multiple linear regression to predict physical health were also statistically significant at T1 and T2 (F [18, 281] = 9.42, $p < 0.001$, R^{adj} = 0.336; F [18, 229] = 9.224, $p < 0.001$, R^{adj} = 0.375, respectively). The model explained about 33% of the variance at T1 and 37.5% at T2. The covariate predictors' psychological capital was associated with a higher likelihood of physical health at both time points. High BMI was linked to lower physical health at T1 and T2. Flow was related to physical health only at T1. ADHD and autism scores showed no significant associations (see Table 18).

Table 18: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and physical health outcome at T1 and T2. ***Note: Beta (□) values arestandardised.***

Physical health						
T1				T2		
R^2	.376			R^2		.420
R adjusted	.336			R adjusted		.375
F	9.42			F		9.224
F Sig	.001			F Sig		.001
Predictors	β	t	Sig	β	t	Sig
BMI	-.129	-2.56	.011	-.163	-3.044	.003
Sex	.011	.230	.818	-.018	-.309	.758
Student stressors	.032	.546	.585	-.080	-1.212	.227
Social support	.056	.973	.331	.010	.150	.881
Positive coping	.034	.569	.570	.025	.373	.709
Negative coping	.083	1.28	.199	.017	.259	.796
Psychological capital	.190	2.98	.003	.241	3.452	<.001
Low work–life balance	.036	.643	.521	.008	.129	.897
Workload	.002	.034	.973	-.004	-.054	.957
Flow	.137	2.47	.014	.089	1.510	.132
Low rumination	-.081	-1.54	.124	.052	.921	.358
Sleepiness	-.038	-.669	.504	-.084	-1.377	.170
Total ADHD	-.084	-1.39	.165	.073	1.113	.267
Total autism	-.068	-1.19	.233	-.020	-.307	.759

Negative Well-being, Anxiety, and Depression Regression Models

Linear regression analyses were carried out to identify the predictors of negative well-being at T1 and T2. The first model to predict negative well-being at T1 was significant (F [18, 281] = 18.26, p = 0.001, and R^{adj} = 0.510). The model to predict negative well- being at T2 was significant as well (F [18, 229] = 16.18, p = 0.001, and R^{adj} =.525), explaining 51% of the variance in the negative well-being at T1 and 52.5% of the variance at T2. Negative well-being was predicted by increased student stressors and decreased psychological capital at T1 and T2. In addition, high BMI was found to be associated with an increase in negative well-being at T2. However, this association was not found at T1. Negative coping was positively correlated with negative well-being at T1 only. No associations were found between ADHD, autism traits and negative well-being. See Table 19 for full details.

Table 19: Multiple linear regression between health-related behaviours, ADHD, and autism traits, and negative well-being outcome for T1 and T2. ***Note: Beta ( )values are standardised.***

Negative Well-being						
T1				**T2**		
R^2	.539			**R^2**		.560
R adjusted	.510			**R adjusted**		.525
F	18.26			**F**		16.18
F Sig	.001			**F Sig**		.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	.057	1.31	.188	.104	2.23	.027
Sex	.031	.726	.469	.012	.247	.805
Student stressors	.512	10.09	<.001	.519	8.97	<.001
Social support	.012	.247	.805	.036	.596	.552
Positive coping	-.002	-.034	.973	.103	1.74	.082
Negative coping	.127	2.30	.022	.090	1.58	.116
Psychological capital	-.216	-3.93	<.001	-.215	-3.53	<.001
Low work–life balance	.092	1.92	.055	-.084	-1.50	.133
Workload	.008	.164	.870	.029	.489	.625
Flow	-.092	-1.92	.055	-.141	-2.73	.007
Low rumination	.068	1.51	.130	-.010	-.203	.839
Sleepiness	-.017	-.346	.730	.084	1.57	.116
Total ADHD	.071	1.36	.173	.053	.921	.358
Total autism	-.062	-1.26	.206	.036	.636	.526

Moreover, the linear regression models of anxiety were statistically significant at T1 and T2 (F [18, 281] = 16.01, p = 0.001, and R^{adj} = 0.475 at T1 and F [18, 229] = 12.50, p = 0.001, and R^{adj} = 0.456 at T2). The model explained 47.5% of the variance in anxiety at T1 and 45.6% at T2. The model showed that anxiety was associated with psychological capital at both time points. There was a positive association between negative coping, student stressors, and anxiety at T1 and T2. Moreover, social support was associated with lower anxiety at T1. It was noticed that total weekly caffeine intake was linked to a reduced likelihood of anxiety at time 2, but not time 1, whereas there was no significant relationship between anxiety and ADHD and autism scores. For the beta values and p-values in the multiple linear analyses between the predictors, anxiety, and depression, see Table 20.

Additionally, linear regression models were employed to examine the predictors of depression. Model T1 was significant (F [18, 281] = 13.36, p = 0.001, and R^{adj} = 0.427) and the model explained 42.7% of the variance in depression at T1. The second model was also significant (F [18, 229] = 13.54, p = 0.001, and R^{adj} = 0.478); the model explained 47.8% of the variance in depression at T2. The results showed that at T1 and T2, there were positive relationships between negative coping, student stressors, and depression. It was found that the established predictor of psychological capital was associated with decreased depression at both time points. Moreover, depression was predicted by increasing sleepiness during the day. As in previous results, no relationship between ADHD, autism scores and depression was observed (see Table 21).

Table 20: Multiple linear regression between health-related behaviour, ADHD and autism trait scores, and anxiety outcome for T1 and T2. ***Note: Beta (□) values are standardised.***

Anxiety						
T1				**T2**		
R^2	.506			**R^2**		.496
R adjusted	.475			**R^2 adjusted**		.456
F	16.01			**F**		12.50
F Sig	.001			**F Sig**		**.001**
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	.016	.365	.716	.072	1.450	.148
Gender	.061	1.382	.168	.042	.788	.432
Student stressors	.337	6.421	<.001	.276	4.457	<.001
Social support	-.113	-2.19	.029	.023	.353	.724
Positive coping	.046	.859	.391	.082	1.301	.195
Negative coping	.114	1.991	.047	.200	3.299	.001
Psychological capital	-.259	-4.55	<.001	-.169	-2.589	.010
Low work–life balance	.082	1.657	.099	.030	.501	.617
Workload	.035	.656	.512	.077	1.230	.220
Flow	.030	.616	.538	-.053	-.956	.340
Rumination	.137	2.951	.003	-.024	-.452	.651
Sleepiness	.099	1.966	.050	.049	.864	.388
Total ADHD	.043	.796	.427	.082	1.344	.180
Total autism	.031	.611	.542	.069	1.140	.255

Table 21: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and depression outcomes for T1 and T2. Note: Beta (□)values are standardised.

Depression						
T1				**T2**		
R^2	.461			**R^2**	.516	
R adjusted	.427			**R adjusted**	.478	
F	13.36			**F**	13.54	
F Sig	.001			**F Sig**	.001	
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	.029	.623	.534	.078	1.598	.111
Gender	-.030	-.654	.514	-.082	-1.579	.116
Student stressors	.295	5.372	<.001	.346	5.707	<.001
Social support	-.114	-2.128	.034	-.075	-1.203	.230
Positive coping	.068	1.215	.225	-.039	-.636	.525
Negative coping	.123	2.055	.041	.209	3.512	<.001
Psychological capital	-.300	-5.067	<.001	-.207	-3.237	.001
Low work–life balance	.048	.928	.354	.107	1.825	.069
Workload	.023	.411	.681	-.057	-.919	.359
Flow	-.019	-.362	.718	.023	.434	.665
Low rumination	.088	1.818	.070	.053	1.030	.304
Sleepiness	.101	1.920	.056	.160	2.881	.004
Total ADHD	.008	.144	.886	.007	.118	.906
Total autism	.008	.153	.879	-.070	-1.196	.233

Conduct Problems and Hyperactive Behaviour Regression Models

Multiple linear regression models were used at both time points to determine the effects of the predictors on hyperactive behaviour. The results showed that the T1 model was statistically significant (F [18, 281] = 19.99, p = 0.001, and R^{adj} = 0.533), and the model accounted for approximately 53% of the hyperactive behaviour at T1. In addition, the T2 model was also significant (F [18, 229] = 20.08, p = 0.001, and R^{adj} = 0.582); this model accounted for 58.2% of the hyperactive behaviour. Flow appeared to be associated with a decrease in the likelihood of hyperactive behaviour at T1 and T2. A relationship was observed between student stressors and increased hyperactive behaviour at T2, but not at T1. ADHD traits and autism traits were found to be associated with an increased likelihood of hyperactive behaviour at both time points (see Table 22).

Although the multiple linear regression model for conduct problems at T1 was insignificant (F [18, 281] = 1.52 p < 0.081, R^{adj} = 0.031), the regression model at T2 was significant (F [18, 229] = 2.00 p < 0.001, R^{adj} = 0.010), only gender was substantial at T2 (see Table 23).

Table 22: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and hyperactive behaviour outcome at T1 and T2. ***Note: Beta (□) values arestandardised.***

Hyperactive Behaviour						
T1				**T2**		
R^2	.561			**R^2**		.612
R adjusted	.533			**R adjusted**		.582
F	19.94			**F**		20.08
F Sig	.001			**F Sig**		.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	-.032	-.757	.450	.005	.108	.914
Gender	-.079	-1.899	.059	-.049	-1.056	.292
Student stressors	-.008	-.163	.870	.147	2.703	.007
Social support	-.035	-.717	.474	.055	.981	.328
Positive coping	.077	1.513	.131	-.081	-1.461	.145
Negative coping	.061	1.135	.257	.023	.434	.665
Psychological capital	-.149	-2.781	.006	-.103	-1.811	.071
Low work–life balance	.053	1.137	.256	.044	.844	.399
Workload	.033	.648	.518	-.073	-1.322	.187
Flow	-.150	-3.228	.001	-.156	-3.220	.001
Low rumination	-.022	-.498	.619	.026	.563	.574
Sleepiness	.040	.842	.401	-.027	-.548	.584
Total ADHD	.441	8.761	<.001	.464	8.672	<.001
Total autism	.166	3.465	<.001	.169	3.201	.002

Table 23: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and conduct problems at T1 and T2. ***Note: Beta (□) values are standardised***

Conduct problems						
T1				**T2**		
R^2	.089			**R^2**		.136
R adjusted	.031			**R adjusted**		.068
F	1.52			**F**		2.00
Sig	.081			**F Sig**		.010
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	-.035	-.583	.560	.099	1.525	.129
Gender	.029	.476	.634	.158	2.275	.024
Student stressors	.018	.254	.800	.004	.048	.962
Social support	-.023	-.325	.745	-.125	-1.492	.137
Positive coping	-.110	-1.512	.132	-.133	-1.614	.108
Negative coping	-.019	-.250	.803	.046	.581	.562
Psychological capital	.044	.576	.565	.114	1.334	.184
Low work–life balance	-.084	-1.253	.211	-.049	-.621	.535
Workload	.172	2.376	.018	.033	.401	.689
Flow	-.136	-2.040	.042	-.116	-1.609	.109
Low rumination	.068	1.070	.286	.001	.020	.984
Sleepiness	-.032	-.464	.643	-.052	-.701	.484
Total ADHD	.036	.498	.619	.092	1.156	.249
Total autism	.071	1.032	.303	.084	1.068	.286

Emotional Problem and Peer Problem Regression Models

The model was statistically significant in terms of the linear regression results to predict emotional problems at both time points (F [18, 281] = 14.66, p = 0.001, and R^{adj} = 0.451; F [18, 229] = 17.17, p = 0.001, and R^{adj} = 0.541, respectively). Females reported significantly higher emotional problems than males at T1 and T2. The established predictors of psychological capital, student stressors, and negative coping were significant at both

time points. In addition, high ADHD traits correlated with an increased likelihood of emotional problems at T2, but not at time 1 (see Table 24).

The linear regression models of peer problems were significant at both time points ($F [18, 281] = 11.15$, $p < 0.001$, $R^{adj} = 0.379$; $F [18, 229] = 4.58$, $p < 0.001$, $R^{adj} = 0.223$, respectively). The models explained about 38% of the variance in peer problems at T1 and 22.3% at T2. Social support was associated with fewer peer problems at T1 and T2. Negative coping and student stressors were linked to a greater likelihood of peer problems at T1 only.

The findings revealed that autism traits positively correlated with peer problems at both time points. The full results are shown in Table 25.

Table 24: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and emotional problems for T1 and T2. ***Note: Beta (□) values are standardised***

Emotional Problems						
T1				**T2**		
R^2	.484			**R^2**		.574
R adjusted	.451			**R adjusted**		.541
F	14.66			**F**		17.17
F Sig	.001			**F Sig**		.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	.023	.506	.613	.037	.816	.415
Gender	.158	3.489	<.001	.193	3.974	<.001
Student stressors	.158	2.941	.004	.262	4.602	<.001
Social support	-.075	-1.435	.152	.023	.393	.695
Positive coping	.034	.624	.533	-.003	-.060	.952
Negative coping	.193	3.310	.001	.220	3.951	<.001
Psychological capital	-.242	-4.180	<.001	-.245	-4.099	<.001
Low work–life balance	.076	1.497	.135	.021	.382	.703
Workload	.030	.547	.585	-.035	-.602	.548
Flow	-.003	-.066	.947	-.032	-.630	.529
Low rumination	.064	1.341	.181	.032	.652	.515
Sleepiness	.076	1.481	.140	.022	.412	.681
Total ADHD	.056	1.022	.308	.134	2.392	.018
Total autism	.050	.960	.338	.081	1.461	.145

Table 25: Multiple linear regression between health-related behaviours, ADHD and autism trait scores, and peer problems at T1 and T2. ***Note: Beta (□) values are standardised.***

Peer Problems						
T1				**T2**		
R^2	.417			**R^2**		.286
R adjusted	.379			**R adjusted**		.223
F	11.15			**F**		4.581
F Sig	.001			**F Sig**		.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	-.011	-.228	.820	.053	.855	.394
Gender	.032	.667	.506	-.010	-.144	.885
Student stressors	.150	2.634	.009	.131	1.660	.098
Social support	-.323	-5.791	<.001	-.260	-3.197	.002
Positive coping	-.026	-.440	.660	-.016	-.201	.841
Negative coping	.194	3.126	.002	.144	1.903	.058
Psychological capital	-.074	-1.207	.229	-.078	-.954	.341
Low work–life balance	.014	.269	.788	.024	.310	.757
Workload	-.062	-1.073	.284	-.067	-.846	.398
Flow	.066	1.242	.215	.022	.315	.753
Low rumination	-.015	-.297	.767	.001	.011	.991
Sleepiness	-.124	-2.274	.024	.007	.097	.923
Total ADHD	-.075	-1.284	.200	-.111	-1.424	.156
Total autism	.264	4.784	<.001	.161	2.134	.034

Prosocial Behaviour Regression Model

The prosocial behaviour linear regression model for T1 was statistically significant (F [18, 281] = 4.27, p = 0.001, R^{adj} = 0.165). The model explained 16.5% of the prosocial behaviour. It was found that high BMI and social support increase the likelihood of prosocial behaviour at T1. The model of prosocial behaviour at T2 was also statistically significant (F [18, 229] = 3.43, p = 0.001, and R^{adj} = 0.151). The model explained approximately 15% of the prosocial behaviour at T2. It was found that positive coping was correlated with prosocial behaviour at T2, although these correlations were not observed at T1. Furthermore, it appeared that autism traits were negatively associated with prosocial behaviour at both time points. There were no relationships between health-related behaviour factors and prosocial behaviour in the multivariate analyses (see Table 26).

Table 26: Multiple linear regression between health-related behaviour factors, ADHD and autism trait scores, and prosocial behaviour for T1 and T2. ***Note: Beta (□) values arestandardised.***

Prosocial Behaviour						
T1				**T2**		
R^2	.215			**R^2**		.212
R adjusted	.165			**R adjusted**		.151
F	4.27			**F**		3.43
F Sig	.001			**F Sig**		.001
Predictors	**β**	**t**	**Sig**	**β**	**t**	**Sig**
BMI	**.157**	**2.791**	**.006**	.088	1.409	.160
Gender	-.014	-.245	.807	.036	.549	.583
Student stressors	.070	1.057	.292	.062	.805	.422
Social support	**.136**	**2.092**	**.037**	.015	.192	.848
Positive coping	.044	.650	.516	**.176**	**2.235**	**.026**
Negative coping	.025	.341	.733	-.138	-1.822	.070
Psychological capital	.071	.995	.321	.113	1.393	.165
Low work–life balance	.107	1.709	.089	.111	1.495	.136
Workload	-.017	-.256	.798	.021	.272	.786
Flow	.090	1.452	.148	-.077	-1.115	.266
Low rumination	-.016	-.269	.788	.043	.654	.514
Sleepiness	.027	.427	.670	.107	1.508	.133
Total ADHD	.041	.612	.541	-.142	-1.858	.064
Total autism	**-.315**	**-4.924**	**<.001**	**-.194**	**-2.589**	**.010**

DISCUSSION

In this study, we investigated the associations between ADHD and autism scores, well-being, and SDQ outcomes in groups of students with and without a prior diagnosis of ADHD or autism. The first aim of this study was to examine the relationship between ADHD scores, autism scores, and outcomes, and then to determine the extent to which ADHD and autism scores predict outcomes when controlling for established predictors for students with a previous diagnosis of ADHD and autism. As in our previous studies, the well-being process model was used as the theoretical framework. A significant advantage of including established predictors as covariates is that substantial effects of established predictors represent the replication of previous findings and provide greater confidence in the important effects of ADHD/autism. ADHD scores, autism scores, and established variables were used as predictors. Meanwhile, the well-being and SDQ variables were the outcomes. The two significant differences from our previous studies were the comparison with individuals with a prior diagnosis and the use of a longitudinal design.

Diagnosed Groups

To explore the comparison between the three groups (i.e., no ADHD/autism group, ADHD group, and autism group) on well-being and SDQ outcomes, multivariate analysis of covariance (MANCOVA) analyses was conducted with groups as independent variables, well-being and SDQ outcomes as dependent variables, and gender, BMI, and established predictors as covariates for T1 and T2. No differences were found among the three groups in terms of well-being outcomes. In contrast, there were differences between the groups for the SDQ outcomes: hyperactivity and emotional problems. The no ADHD/autism group had lower hyperactivity scores than the ADHD and autism groups. However, the difference in hyperactivity between the ADHD group and the autism group was not significant. These results are consistent with the findings from the previous literature. Emotional problems were also significantly different between the groups: those with autism had more emotional problems than those in the no ADHD/no autism group. This finding was not observed among people with ADHD.

Associations between Established Predictors and Outcomes

Most of the established predictors were associated with the outcomes at the univariate level of analysis. As might be expected, the negative outcomes were associated with increased levels of student stressors and negative coping strategies, decreased levels of social support, and psychological capital. Conversely, positive outcomes were associated with increased levels of social support, positive personality traits, and positive coping strategies. All well-being and SDQ outcomes, except prosocial behaviour and conduct problems, were associated with student stressors, psychological capital, negative coping, positive coping, and social support at both time points. These results confirm those of the previous studies using the Well-being Process Questionnaire. In the univariate analysis, poor work–life balance, high workload, and life stress were positively related to negative well-being, anxiety, depression, emotional problems, and hyperactive behaviour and negatively associated with positive well-being and flourishing at both time points. Conversely, low rumination, life satisfaction, and flow were positively related to positive well-being and flourishing.

In the multivariate analysis, some of the established predictors remained significant. For example, increased psychological capital was associated with increased positive well-being and physical health at both time points. Similar findings were found for flow and social support with positive well-being at T2. In addition, increased psychological capital, flow, and social support were associated with increased flourishing at both time points. This confirms our earlier observations, which showed that psychological capital and flow might help increase university students' positive well-being and flourishing. In addition, in the multivariate analysis, there were significant associations between the established predictors of student stressors and negative well-being, anxiety, depression, and emotional problems at both time points. These results confirm those reported in our earlier studies, where stressors appeared to increase negative well-being and emotional problems among university and secondary students and were associated with increased anxiety and depression among secondary students. Moreover, the results showed that student stressors could contribute to a decrease in positive well-being at both time points and an increase in hyperactive behaviour at T2; this finding was not observed at T1. However, the results from previous studies supported the idea that student stressors are associated with low positive well-being and flourishing. Negative coping was related to increases in anxiety and depression at T1 and T2. There was a consistent relationship between negative coping and emotions at both time points and with peer problems and negative well-being at T1. This finding is consistent with the results of another university student survey, which also found a positive relationship between emotional problems and negative coping in multivariate analyses. The positive relationship between negative well-being and negative coping was consistent with the findings of previous studies on university students. Females were more likely than males to have emotional problems. A similar finding was found in previous studies of secondary school students.

Associations between ADHD/Autistic Traits and Outcomes

In the univariate analyses, ADHD and autism scores were consistently associated with well-being and SDQ outcomes at both time points. For example, these scores were associated with lower positive well-being, flourishing, physical health, and prosocial behaviour, as well as high negative well-being, anxiety, depression, conduct problems, hyperactive behaviour, peer problems, and emotional problems. In the multivariate analyses, after adjusting for established predictors and health-related behaviour, the results showed similar findings to those of previous chapters; ADHD/autism traits were not associated with well-being outcomes, except for ADHD traits related to reduced flourishing at T1; this finding was not observed at T2. While the ADHD and autism scores remained significantly associated with some SDQ outcomes. ADHD and autism traits were associated with increased hyperactivity at both times. The results also showed that autistic traits were associated with increased peer problems and decreased prosocial behaviour. These results were found at both time points. The results described in the previous chapters indicated similar associations between ADHD traits, autism traits, and hyperactivity among university and secondary students. In addition, autistic traits were associated with peer problems in the university and secondary student surveys, while decreased prosocial behaviour was associated with autism traits among university students, but not secondary students. In previous literature studies of an association between ADHD and autism traits and well-being, the SDQ outcomes showed the same results. For example, after controlling for established predictors, Garcha et al. (2023) found that ADHD/autistic traits were positively associated with hyperactive behaviour among university and secondary school students; at the same time, they reported that autistic traits were positively related to peer problems among university students and low prosocial behaviour among secondary students.[47, 50]

CONCLUSION

The results are consistent with previous chapters on university and secondary student populations. ADHD/autism traits were significantly associated with SDQ outcomes but not with well-being outcomes. The present analyses considered some of the hypotheses outlined in the Introduction section. The next paper will present the cross-lagged analyses examining whether the predictors at T1 are associated with the outcomes at T2.

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