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ASSOCIATIONS BETWEEN WELL-BEING AND ADHD/AUTISTIC TRAITS IN UNIVERSITY STUDENTS

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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. **Methods**: Three hundred and thirty-five students completed an online survey, which included the Short-Form Well-being Process Questionnaire, the Short-Form Strengths and Difficulties Scale, and the Autism Spectrum Quotient (AQ10) and the ADHD Self-Report Scale (ASRS). **Results**: Many associations were observed in univariate analyses; however, these often became non-significant when the established well-being predictors were covariied. In the multivariate analyses, there was little evidence of associations between the AQ10 and ASRS scores and the well-being outcomes. In contrast, significant associations remained between the AQ10 and ASRS scores and the SDQ outcomes (conduct problems, emotional problems and hyperactivity). **Conclusion**: The study found no significant relationships between ADHD/autistic traits and well-being when established predictors were controlled for, confirming previous findings. However, the ADHD/autistic trait scores were good predictors of the SDQ outcomes, confirming predictions based on previous research. A longitudinal methodology should now be employed to determine the underlying mechanisms.

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

INTRODUCTION

Adolescents with ADHD and autism traits are more dissatisfied with their quality of life.[1, 2] The primary aim of this study was to examine the associations between these variables in multivariate analyses. It utilised the Well-being Process Questionnaire (WPQ) to investigate the relationships between ADHD and autistic traits and well-being. The outcomes that represent essential features of ADHD and autistic traits were measured by the Strengths and Difficulties Questionnaire (SDQ). The present study was cross-sectional and collected data from students at Cardiff University. In order to create a multivariate model, the study considered the predictors of well-being as confounding variables (student stressors, social support, positive coping, negative coping, psychological capital, work–life balance, workload, rumination, and flow). The model used two more variables to examine the impact of ADHD and autistic traits (total score of ADHD and total score of autistic traits). The outcomes were positive well-being, negative well-being, physical health, and flourishing. One of the most essential features of the well-being process model is that it could add predictors or outcomes related to the study question. Thus, additional outcome variables have been added that are essential when examining ADHD and autistic traits, namely, SDQ outcomes (conduct problems, hyperactive behaviour, emotional problems, peer problems, and prosocial behaviour). The present study utilised the psychology experimental management system (EMS) at Cardiff University to recruit participants, who were compensated with credits for completing the survey. The data were extracted as an SPSS file from Qualtrics, and IBM SPSS 29 was used for analyses.

A univariate analysis was conducted to examine the following hypothesis about the relationships between ADHD/autism traits and well-being outcomes:

- There will be significant correlations between ADHD traits, autism traits, and well-being and SDQ outcomes.

As previously discussed, multivariate analyses are crucial in this type of study. The following general hypothesis was tested:

- ADHD traits and autism traits will be significant predictors of well-being and SDQ outcomes after controlling for well-being predictors.

METHODS

Ethical Approval

This study was approved by Cardiff University's School of Psychology Ethics Committee (ethical number: EC1610114608GRA).

Participants

The sample analysed was 335 students with complete data. The participants were psychology students, with 53.2% of the sample being first-year students and 46.8% being second-year students. Most participants were female (male = 13.2%, female = 85.9%, others = 0.9%).

MATERIALS

Short-Form WPQ (SFWPQ)

The Student Well-being Process Questionnaire (SWPQ) is a comprehensive instrument designed to evaluate the well-being of university students.[3] The Well-being Process Questionnaire was initially developed for use in occupational environments[4-22] and has been subsequently modified for use with students.[23-40] The short-form WPQ (SFWPQ) was developed using the same procedures as the original measuring instrument. Two significant changes were made to the WPQ. First, new predictors (flow, rumination, workload, work-life balance) and outcomes (flourishing) were added to the questionnaire. Secondly, single-item versions were used instead of the multi-item versions of the original questionnaire. This applied to all the predictors (stressors, social support, psychological capital, positive and negative coping) and the outcomes (positive and negative well-being). The short questions showed significant correlation with the original and extended versions (Smith, in preparation).

Strengths and Difficulties Questionnaire (SDQ)

Goodman[41] developed the Strengths and Difficulties Questionnaire (SDQ) to measure children's social, emotional, and behavioural difficulties. It has been found to have good reliability and validity. However, the SDQ is suitable for use with adults and adolescents in various contexts. The development of the SDQ was driven by the need to address mental health and well-being concerns, particularly in people with ADHD and autism symptoms. Research suggests that the SDQ can help measure outcomes typical of autism and ADHD. Russell, Rodgers, and Ford[42] found that all SDQ subscales were strongly associated with autism and ADHD, indicating that the SDQ can be a predictor of these conditions. Similarly, Demopoulos, Hopkins, and Davis[43] also reported the similarities in social cognitive profiles between children with autism and ADHD, suggesting that the SDQ can be a valuable measure for both conditions.

The SDQ's five-factor structure includes conduct problems, emotional problems, hyperactivity/inattention behaviour, prosocial behaviour, and peer problems, each comprising five items: emotional symptoms, which measure emotional distress (e.g., anxiety, depression); conduct problems, which assess behavioural issues related to aggression, rule-breaking, or defiance; hyperactivity/inattention behaviours, which focuses on attention difficulties and hyperactive behaviour; peer relationship problems, which evaluates difficulties in social interactions with peers; and prosocial behaviour, which examines positive social behaviours (e.g., kindness, cooperation). It has been shown to discriminate between clinical and community samples effectively. The items are based on a three-point Likert scale ranging from untrue to undoubtedly true. The total score is calculated by summing the scores for each scale, which range from 0 to 10. It is common in research to only use the first four scales that measure difficulties (conduct problems, hyperactive behaviour, emotional problems, and peer problems). At the same time, this study considers the fifth scale of prosocial behaviour and its outcomes, following the concept of well-being, which encompasses both negative and positive aspects.

Autism Spectrum Quotient (AQ-10)

The Autism Spectrum Quotient test was developed by Baron-Cohen et al.[44] as a self-administered instrument to assess traits associated with autism spectrum disorder in adults and adolescents. The AQ-10 was developed as a brief version of the original AQ, comprising 50 items to provide a more time-efficient alternative while still capturing essential features indicative of ASD. The test has since been widely used in various studies to assess an individual's position on the autism–normality continuum and measure autistic traits in both clinical and nonclinical populations. Hence, it was used in this research as a tool to measure autistic traits.

The AQ-10 consists of 10 items, each addressing specific behaviours or characteristics associated with autistic traits. Respondents rate the extent to which they identify with each statement on a four-level Likert scale, ranging from 'definitely agree' to 'definitely disagree'. Scores on the AQ-10 are summed to provide a total score reflecting the level of autistic traits. Scores range from 0 to 10, with scores of 6 and above indicating a more pronounced presence of autistic traits.

ADHD Self-Report Scale (ASRS)

The World Health Organisation (WHO) developed the Adult ADHD Self-Report Scale (ASRS) in collaboration with researchers to create a reliable tool for assessing adult ADHD symptoms (Kessler et al., 2005).[45] It has been updated for DSM-IV criteria and is effective in distinguishing ADHD traits from non-ADHD traits in adults. However, it is a valid and reliable screening instrument for ADHD in adults and adolescents, reporting satisfactory internal consistency and good test-retest reliability. The ASRS is particularly useful in identifying adult ADHD, which can be challenging due to its co-occurrence with other psychiatric disorders. It is commonly used due to its effectiveness, ease of use, and short administration time in general and clinical populations, which suggests that the ASRS is a robust

tool for identifying adult ADHD traits.

The ASRS Symptom Checklist comprises 18 questions that capture various aspects of ADHD symptoms, including inattention and hyperactivity/impulsivity. Respondents on a five-point rating system indicate how frequently these symptoms have occurred within the last six months, ranging from 'never' to 'very often'. However, the first six questions of the ASRS screener can be used to screen for ADHD traits. Kessler et al.[45] found that the six-question ASRS screener outperformed the full 18-question ASRS in terms of sensitivity, specificity, and total classification accuracy. Accordingly, the six questions were used in this study to measure ADHD traits. Scores range from 0 to 6; a score of 4 or higher on these six questions suggests a more significant presence of ADHD traits.

Design and Procedure

The study was cross-sectional; potential participants responded to an internal advertisement in the Experimental Management System (EMS), and those who expressed interest received a link to a Qualtrics online survey. The survey was then analysed using IBM SPSS 29 to obtain accurate estimates for the hypothesis under investigation. The survey took approximately 20 minutes to complete. Additionally, participants received course credit as a reward for their involvement. Informed consent was obtained within the questionnaire, and participants could only continue beyond the consent page if they agreed. The participants were advised to skip any questions they did not wish to answer. An information sheet was provided to participants before consent was obtained, and a debriefing sheet was provided after the questionnaire was completed.

The study aimed to examine the associations between ADHD/autistic traits and well-being. The total scores for ADHD traits and autism were taken from the ASRS questionnaire. The total scores for autistic traits were taken from the AQ questionnaire. The well-being predictors included student stressors, social support, negative coping, positive coping, psychological capital, low work-life balance, flow, and low rumination, all of which were measured using the WPQ and used as covariates. It is worth noting that not all established predictors were included as covariates in each regression model. Essentially, each covariate that was significantly or marginally associated (i.e., $p < 0.1$) with the outcome in the hypotheses was entered as a covariate. The outcome variables from the WPQ were positive well-being, negative well-being, flourishing, and physical health. The other outcome variables were taken from the SDQ: conduct problems, hyperactive behaviour, emotional problems, peer problems, and prosocial behaviour.

RESULTS

Descriptive analyses

The descriptive statistics for the demographic variables, well-being process variables and SDQ variables are shown in a previous paper.[46]

ADHD and AQ-10 Scales

Table 1 presents the total scores for the ASRS, which assesses ADHD traits, and the AQ-10 scale, used to measure autistic traits. In Table 2, a score of 4 or higher on the ADHD scale indicates that the person is at risk for ADHD. One hundred thirty-two students (39.4% of the sample) fell into this category. People with a score of six and above on the AQ-10 are at risk of autism. Fifty students (14.9%) fell into this category. The following analyses used the total ADHD/autistic trait scores and did not categorise the participants based on the cut-off scores.

Table 1: Descriptive analysis of ADHD and autism questionnaires (total scores).

ADHD/Autism	Total scores	Min.	Max.	Mean	SD	N
Total score: Autism	0-10	0	10	3.31	1.94	330
Total score: ADHD	0-6	0	6	2.98	1.61	333

Table 2: Descriptive analysis of ADHD and autism questionnaires (cut-off score).

ADHD/Autism	Type of scores	N (%)	Total N (%)
	No autism (0-5)	280 (83.6%)	
Autism			330 (98.5%)
	Autism traits (6-10)	50 (14.9%)	
	No ADHD (0-3)	201 (60.0%)	
ADHD			333 (99.4%)
	ADHD traits (4–6)	132 (39.4%)	

Univariate Analyses

Correlations between ADHD/Autistic Traits and Outcomes

A Pearson correlation analysis was conducted to investigate the relationship between the ADHD and autistic scores and the outcome variables. These results are shown in Table 3.

Positive and negative well-being, physical health, and flourishing were significantly correlated with ADHD scores. The results showed a positive correlation between negative well-being and ADHD scores and a negative correlation between positive well-being and flourishing. In addition, there were negative relationships between physical health and ADHD/autism scores.

There were positive associations between ADHD and autism traits and peer problems, conduct problems, hyperactive behaviour, and emotional problems. Prosocial behaviour was negatively correlated with ADHD and autism scores.

Table 3: Correlations between ADHD and autistic trait scores and outcome variables.

Outcomes	Total scores: ADHD		Total scores: Autism	
	r	p	r	p
Positive well-being	**-.248**	**<.001**	-.068	.219
Negative well-being	**.238**	**<.001**	.027	.621
Flourishing	**-.361**	**<.001**	-.083	.133
Physical health	**-.147**	**.007**	**-.167**	**.002**
Conduct problems	**.219**	**<.001**	**.226**	**<.001**
Hyperactive behaviour	**.585**	**<.001**	**.303**	**<.001**
Emotional problems	**.339**	**<.001**	**.209**	**<.001**
Peer problems	**.214**	**<.001**	**.325**	**<.001**
Prosocial behaviour	**-.111**	**.044**	**-.257**	**<.001**

Note: *All correlations are Pearson's (two-tailed). p< 0.05 are displayed in bold.*

Multivariate Analysis

The multiple linear regression (Enter) method was used to predict the outcomes of the multivariate analysis. One practical advantage of regression analysis is that the outcome models include the control variables.

Association between ADHD/Autistic Traits and Positive Well-being

ADHD and autism trait scores were not significantly associated with positive well-being.

Association between ADHD/Autistic Traits and Negative Well-being

ADHD and autism trait scores were not significantly associated with negative well-being.

Association between ADHD/Autistic Traits and Physical Health

ADHD and autism trait scores were not significantly associated with physical health.

Association between ADHD/Autistic Traits and Flourishing

ADHD and autism trait scores were not significantly associated with flourishing.

Association between ADHD/Autistic Traits and Conduct Problems

There were significant associations between conduct problems, autistic traits and ADHD traits, although ADHD was only marginally significant ($\beta = 0.147$, $p = 0.008$ and $\beta = 0.116$, $p = 0.057$, respectively).

Association between ADHD/Autistic Traits and Emotional Problems

ADHD traits ($\beta = 0.102$, $p = 0.036$) and autistic traits ($\beta = 0.097$, $p = 0.028$) were associated with a greater risk of emotional problems.

Association between HRBs, ADHD/Autistic Traits, and Hyperactive Behaviour

There were positive relationships between ADHD traits ($\beta = 0.373$, $p = 0.001$), autistic traits ($\beta = 0.159$, $p = 0.001$), and hyperactive behaviour.

Association between ADHD/Autistic Traits and Peer Problems

The results from the peer problems model suggest that autistic traits ($\beta = 0.232$, $p = 0.001$) were associated with an increased likelihood of peer problems.

Association between ADHD/Autistic Traits and Prosocial Behaviour

ADHD and autism trait scores were not significantly associated with prosocial behaviour.

DISCUSSION

This study aimed to conduct multivariate analyses to determine the impact of ADHD/autistic traits on the well-being of university students. Its specific aim was to determine whether ADHD traits and autistic traits were predictive of well-being and SDQ outcomes after controlling for established predictors of well-being, an approach also used with other factors, such as diet.[47] The univariate analysis revealed that ADHD/autism traits were statistically significant in models of positive well-being, flourishing, and negative well-being. ADHD and autistic traits showed several significant correlations in the univariate analysis; however, they were not significantly associated with well-being in the multivariate analysis, confirming results from a previous study involving university students.[48] The ADHD and autism scores showed significant associations with the SDQ outcomes. Those with high ADHD/autistic traits were more likely to have conduct problems, hyperactive behaviours, and emotional problems at the multivariate level. In addition, only those with high autistic traits were more likely to have peer problems. These results confirm that individuals with autistic traits experience difficulties in building friendships and in avoiding and managing anxiety in social situations. The associations between ADHD/autistic traits and the SDQ outcomes may reflect the SDQ measures being critical components of ADHD and autism. In addition, the well-being

predictors were not strong predictors of the SDQ scores, which meant that covarying them in the SDQ analysis had less effect than when the WPQ outcomes were analysed.

Limitations

One limitation of this study was that participants were recruited from a single department at a university, which may limit the generalizability of the findings to undergraduate students at other universities. Furthermore, the study's cross-sectional design prevents the establishment of causal relationships.

CONCLUSION

The study found no significant relationships between ADHD and autistic traits and well-being when established predictors were controlled for, confirming previous findings. However, the ADHD/autistic trait scores were good predictors of the SDQ outcomes, confirming predictions based on previous research. A longitudinal methodology should now be employed to determine the underlying mechanisms.

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