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Corresponding authors:
Laura Havers;
Email: l.havers@qmul.ac.uk;
Sania Shakoor;
Email: sania.shakoor@qmul.ac.uk

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Youth adversity and trajectories of depression/anxiety symptoms in adolescence in the context of intersectionality in the United Kingdom

Laura Havers[1], Ruichong Shuai[1], Peter Fonagy[2,3], Mina Fazel[4], Craig Morgan[5,6], Daisy Fancourt[7], Paul McCrone[8], Melanie Smuk[9], Kamaldeep Bhui[10,11,12], Sania Shakoor[1,*] and Georgina M. Hosang[1,*]

[1]Centre for Psychiatry and Mental Health, Wolfson Institute of Population Health, Queen Mary, University of London, London, UK; [2]Anna Freud National Centre for Children and Families, London, UK; [3]Research Department of Clinical, Educational and Health Psychology, University College London, London, UK; [4]Department of Psychiatry, University of Oxford, Oxford, UK; [5]Health Service and Population Research, Institute of Psychology, Psychiatry & Neuroscience, King's College London, London, UK; [6]ESRC Centre for Society and Mental Health, King's College London, London, UK; [7]Department of Behavioural Science and Health, University College London, London, UK; [8]Institute for Lifecourse Development, University of Greenwich, London, UK; [9]Centre for Genomics and Child Health, Blizard Institute, Queen Mary, University of London, London, UK; [10]Department of Psychiatry, Nuffield Department of Primary Care Health Sciences, and Wadham College, University of Oxford, Oxford, UK; [11]Oxford Health, Oxford and East London NHS Foundation Trusts, London, UK and [12]World Psychiatric Association Collaborating Centre, Oxford, UK

Abstract

Background. Youth adversity is associated with persistence of depression and anxiety symptoms. This association may be greater for disadvantaged societal groups (such as females) compared with advantaged groups (e.g. males). Given that persistent symptoms are observed across a range of disadvantaged, minoritized, and neurodivergent groups (e.g. low compared with high socio-economic status [SES]), the intersection of individual characteristics may be an important moderator of inequality.

Methods. Data from HeadStart Cornwall ($N = 4441$) was used to assess the effect of youth adversity on combined symptoms of depression and anxiety (Strengths and Difficulties Questionnaire emotional problems subscale) measured at three time-points in 11–14-year-olds. Latent trajectories and regressions were estimated for eight intersectionality profiles (based on gender, SES, and hyperactivity/inattention), and moderating effects of the individual characteristics and their intersections were estimated.

Results. Youth adversity was associated with higher average depression/anxiety symptoms at baseline (11–12-years) across all intersectionality profiles. The magnitude of effects differed across profiles, with suggestive evidence for a moderating effect of youth adversity on change over time in depression/anxiety symptoms attributable to the intersection between (i) gender and SES; and (ii) gender, SES, and hyperactivity/inattention.

Conclusions. The detrimental effects of youth adversity pervade across intersectionality profiles. The extent to which these effects are moderated by intersectionality is discussed in terms of operational factors. The current results provide a platform for further research, which is needed to determine the importance of intersectionality as a moderator of youth adversity on the development of depression and anxiety symptoms in adolescence.

Introduction

Symptoms of depression (e.g. low mood and loss of enjoyment) and anxiety (e.g. nervousness and worry) are among the most common mental health problems in adolescence (Michaud & Fombonne, 2005). A global prevalence rate of ~35% has been estimated for elevated depressive symptoms (Shorey, Ng, & Wong, 2022) and ~10% for elevated anxiety symptoms (Biswas et al., 2020). Experiencing persistently high or increasing symptoms of depression and/or anxiety across adolescence is associated with a range of negative correlates and outcomes, such as substance use and school dropout (Morin et al., 2011; Schubert, Clark, Van, Collinson, & Baune, 2017). Importantly, some groups in society are more likely to experience a trajectory of elevated (i.e. high, or increasing) depression and/or anxiety symptoms (Musliner, Munk-Olsen, Eaton, & Zandi, 2016). These include individuals with neurodivergent conditions (e.g. attention deficit hyperactivity disorder [ADHD]) compared with neurotypical individuals, those from low compared with high socio-economic status [SES] backgrounds, and females compared with males (Leban, 2021; Schubert et al., 2017). The underlying *mechanisms* linking

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these characteristics with trajectories of elevated depression and/or anxiety are likely to be both complex, and diverse (e.g. Blakemore, Burnett, & Dahl, 2010; Udry, 2000). Importantly, however, in the context of the current study – these findings collectively suggest that minoritized, disadvantaged, and neurodivergent groups, are at heightened risk of experiencing trajectories of elevated depression and anxiety symptoms compared to their counterparts.

Youth adversity and adolescent depression/anxiety symptoms

In addition to risk conferred by individual-level and demographic characteristics, research consistently shows an association between *youth adversity* and trajectories of elevated depression and/or anxiety symptoms (Bevilacqua, Kelly, Heilmann, Priest, & Lacey, 2021; Desch, Mansuri, Tran, Schwartz, & Bakour, 2023; Leban, 2021). Youth adversity encompasses stressful and potentially traumatic experiences that occur in the home (e.g. abuse and parental separation), often referred to as adverse childhood experiences [ACEs] (Felitti et al., 1998; Kalmakis & Chandler, 2014), as well as outside the home (e.g. bullying-victimization). Youth adversity is more prevalent in disadvantaged, minoritized, and neurodivergent groups – which may contribute to why trajectories of elevated depression/anxiety symptoms are more common in these groups (Assini-Meytin, Fix, Green, Nair, & Letourneau, 2022; Craig, Bondi, O'Donnell, Pepler, & Weiss, 2020; Walsh, McCartney, Smith, & Armour, 2019).

While several studies have investigated the association between youth adversity and trajectories of emotional problems (encompassing depression/anxiety symptoms) in youth (Musliner et al., 2016), few have examined whether the association is *moderated* by (dependent on) individual characteristics, such as gender. In these studies, moderation attributable to gender was not found, suggesting that the impact of youth adversity on the development of emotional problems is similar for females and males (Bevilacqua et al., 2021; Leban, 2021). However, an individual can hold multiple forms of minority or disadvantaged status (e.g. being a neurodivergent female from a low SES background), which may lead to greater vulnerability to mental health problems in the face of adversity (Ghavami, Katsiaficas, & Rogers, 2016) – although this has yet to be empirically investigated.

Intersectionality

The broad analytic framework of intersectionality posits that the *intersection* (reflecting a multiplicative interaction) of an individual's characteristics (e.g. gender, ethnicity, and SES) has importance beyond their additive effects (Bowleg, 2012; Crenshaw, 1990). Intersectional identities are considered to reflect social positions within a complex system of societal and social hierarchies, in the context of power, oppression, and privilege (Crenshaw, 1990). Investigating the extent to which the effects of youth adversity on the development of depression/anxiety symptoms are dependent on *intersections* of individual characteristics, reflective of exclusion and marginalization, may offer a more comprehensive account of the conditions under which adversity is associated with the development of poor mental health.

Current study

To our knowledge, this is the first study to investigate the association between youth adversity and trajectories of depression/anxiety symptoms in adolescence in the context of intersectionality. This study will address two main research questions:

(1) Is youth adversity *associated* with baseline and change over time in depression/anxiety symptoms for all intersectionality profiles? It was hypothesized that youth adversity, compared to an absence of youth adversity, would be associated with higher baseline depression/anxiety symptoms that would remain higher, for all intersectionality profiles.
(2) (i) Does the association between youth adversity and depression/anxiety symptoms (at baseline, and their change over time) *differ* across intersectionality profiles; and if so, (ii) to what extent is the association *moderated* by gender, SES, and hyperactivity/inattention, and their intersections? It was hypothesized that: (i) the association between youth adversity and depression/anxiety symptoms (at baseline and their change over time) would differ across intersectionality profiles; and (ii) these associations would be moderated by gender, SES, and hyperactivity/inattention, and their intersections. No predictions were made regarding the direction of these moderating effects.

Methods

Participants

A total of 5336 individuals aged 11- to 14-years-old were included in the initial sample of the current investigation (online Supplementary Table S1), drawn from the HeadStart Cornwall study (Deighton et al., 2019; Hosang et al., 2023). In this study, pupils from all 31 state-maintained secondary schools in Cornwall, United Kingdom (UK), were invited to take part in 2017 when they were in school Year 7 (age 11–12-years, $N = 4575$) and were followed up annually in Year 8 (age 12–13-years, $N = 4600$) and Year 9 (13–14-years, $N = 3604$) (see Deighton et al., 2019 for a detailed description of HeadStart). School identification data and age data were not available for this sample (reported ages reflect UK averages). Parental consent was assumed unless parents opted their child out. Pupils assented prior to online participation at their school. Ethical approval for HeadStart was obtained from the University College London Ethics Committee (ref: 8097/003). The final sample for analysis was $N = 4441$ individuals with youth adversity and intersectionality profile data, detailed below.

Measures

Combined depression and anxiety symptoms were measured at each school year using the five-item emotional problems subscale of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). Items are worded to reflect usual experiences over the past six months (e.g. 'I am often unhappy') and are self-rated on a 3-point scale ('Not true', 'Somewhat true', and 'Certainly true'). A prorated total score of combined depression/anxiety symptoms (0–10) was calculated where at least three items had response data, which was true for all observations at each school year.

Youth adversity was measured in two ways. First, using the bullying-victimization item from the SDQ peer problems subscale: 'Other children or young people pick on me or bully me' (Goodman, 1997). Second, using data collected from the local government Supporting Families program records (https://www.gov.uk/government/publications/supporting-families-programme-guidance-2022-to-2025). In this program, families were identified as 'On Family List' if they experienced any of the adversities listed in Supplementary Materials 1 (examples include homelessness and household domestic violence). Because data regarding the number (and type) of adversity was not available for this sample,

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a binary variable was created to indicate presence/absence of either bullying-victimization (in any school year) and/or local government recorded adversity (Supplementary Materials 1a). It was not possible to elucidate the timing of the local government-reported youth adversities because this information is updated yearly (overwriting any previous records), and only the most recent records are available.

Gender and *SES* data were drawn from School Census records. Gender was recorded as 'female' or 'male', and receipt/non-receipt of free school meals was used to index 'lower SES' and 'higher SES', respectively. *Hyperactivity/inattention* was measured at baseline using the five items of the self-rated SDQ hyperactivity/inattention subscale (Goodman, 1997). Individuals were classified as 'low' with scores of 0–6, and 'high' with scores above 6, in line with scoring recommendations (Goodman, 1997). *Intersectionality profiles* were created based on the combination of gender, SES, and hyperactivity/inattention. Individuals were assigned to one of eight intersectionality profiles (e.g. male from lower SES background and high hyperactivity/inattention).

Statistical analyses

To address research question one, trajectories of depression/anxiety symptoms were estimated by specifying a latent growth model within a structural equation modeling framework (Supplementary Materials 2). Depression/anxiety symptoms at each school year were modeled as observed variables, specified as indicators of a latent intercept factor and a latent slope factor. The latent intercept was positioned at school Year 7 (age 11–12-years), reflecting estimated initial/baseline levels. The latent slope reflects the annual rate of change in symptoms across school Years 7–9 (herein interchangeably referred to as *change over time*). School year-specific (residual) variances were freely estimated.

An unconditional model was first run, followed by a conditional model, with the latent growth factors regressed on youth adversity. A multiple group conditional model was then run, where parameters were freely estimated for each intersectionality profile (Supplementary Materials 3: *Mplus* script; online Supplementary Fig. S1: path diagram). A schematic diagram of the final model is shown in Fig. 1. Incremental better fit of these models would figuratively indicate that trajectories of depression/anxiety symptoms vary with the presence/absence of youth adversity, and that at an omnibus level, the relations between youth adversity and the latent growth factors vary across intersectionality profiles.

Model fit was assessed using the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). CFI >0.95, RMSEA <0.08, and SRMR <0.06 were broadly considered indicative of acceptable fit (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). Bayesian information criterion (BIC) was also used, with lower values indicative of better relative fit. Depression/anxiety symptoms were treated as continuous data. Full information maximum likelihood estimation was used to accommodate missing data across school years under the assumption that data was missing at random. Robust estimation was used to accommodate multivariate nonnormality of residuals, with adjustment to S.E. and test statistics. As a sensitivity analysis, the final analysis model was rerun with multiply imputed youth adversity data from 10 datasets.

To address research question two, compound parameters of the maximum likelihood regression estimates from the final analysis model (above) were estimated; specified to approximate the extent to which the effect of youth adversity on the latent growth factors is moderated by the individual characteristics (gender, SES, and hyperactivity/inattention), and by interactions between these characteristics (reflecting intersectional effects, e.g. gender by SES). Using this approach, the derived compound parameters reflect the extent to which the regression estimates from the final analysis model are moderated by the individual characteristics and their intersections. Standard errors and confidence intervals of the compound parameters were estimated from 1000 bootstrapped draws.

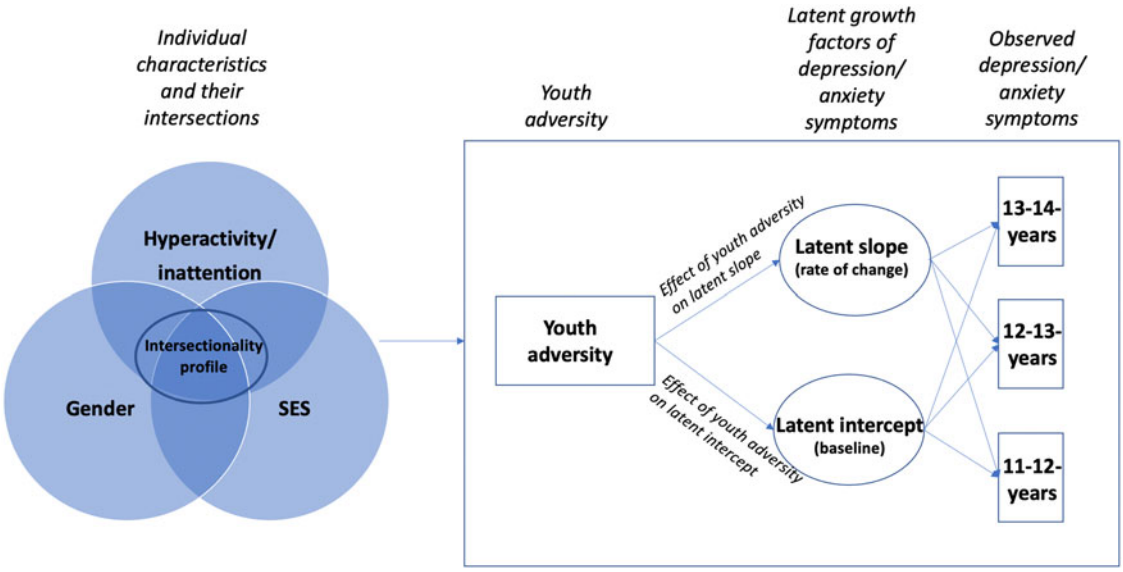

Figure 1. Schematic diagram of the multiple group conditional latent growth model.
Note. SES: socio-economic status. Intersectional profile (depicted at the center of the Venn diagram, above left) is used as the grouping variable in a multiple group model, where everything inside of the box (above right) is estimated for each intersectionality profile group. Compound parameters are further estimated, reflecting the extent to which the individual characteristics, as well as the intersections between them (i.e. the shaded areas of the Venn diagram), moderate the paths from youth adversity to the latent growth factors. The observed depression/anxiety symptoms scores are indicators of the latent growth factors. A non-schematic, labeled path diagram is shown in online Supplementary Fig. 1.

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Prior to the main analyses detailed above, the five depression/anxiety items were specified as indicators of a common latent factor in a confirmatory factor analysis, and measurement properties of the model were assessed. This provides model-based information regarding the extent to which modeling depression and anxiety as a unitary construct provides an adequate representation of the sample data, although testing models with more than one factor was beyond the scope of the current study. Measurement invariance of depression/anxiety across school years, and across intersectionality profile groups at each time-point, was assessed to provide model-based information regarding the extent to which the measurement of depression/anxiety is sufficiently equivalent across time, and across groups, respectively (van de Schoot, Lugtig, & Hox, 2012) (Supplementary Materials 4). Model specifications recommended for ordered categorical data were used (Liu et al., 2017; Wu et al., 2020). For the models described in this paragraph, diagonally weighted least squares estimation was used, using pairwise present data.

Descriptive statistics were calculated using *R* (version 4.2). Structural equation modeling was conducted using M*plus* (version 8.8).

Results

A description of the sample is presented in Table 1. Mean depression/anxiety symptoms were 3.82 (s.d. 2.54) at age 11–12-years, 3.89 (s.d. 2.64) at age 12–13-years, and 4.32 (s.d. 2.75) at age 13–14-years. A total of 52.94% of individuals experienced youth adversity across the study period (also see Supplementary Materials 1a). Descriptive results for youth adversity and depression/anxiety symptoms for each intersectionality profile are reported in Table 2. At each age, proportions experiencing youth adversity and mean levels of depression/anxiety symptoms were *highest* for the intersectionality profile of female, lower SES, and high hyperactivity/inattention. Depression/anxiety symptoms were *lowest* for the intersectionality profile of male, higher SES, and low hyperactivity/inattention. The rate of youth adversity was *lowest* for the intersectionality profile of female, higher SES, and low hyperactivity/inattention.

The depression and anxiety items were adequately represented by a common factor model at each school year. Model fit statistics and reliability estimates ($\omega = 0.80–0.85$) derived from the models are reported in online Supplementary Table S2. Evidence in support of measurement invariance at the scalar level (a model with constrained thresholds and loadings) was observed longitudinally, and across groups at each time-point (online Supplementary Tables S3 and S3a, respectively).

Is youth adversity associated *with baseline and change over time in depression/anxiety symptoms for all intersectionality profiles?*

The fit of the conditional multiple group model was acceptable (online Supplementary Table S4). For all intersectionality profiles, the presence of youth adversity compared to an absence of such,

Table 1. Sample description

Variable	Year 7 (11–12-years) *N* = 4575	Year 8 (12–13-years) *N* = 4600	Year 9 (13–14-years) *N* = 3604
Gender			
Female	2270 (49.62%)	2335 (49.24%)	1785 (49.53%)
Male	2303 (50.34%)	2265 (51.76%)	1819 (50.47%)
No data	2 (<1%)	0 (0%)	0 (0%)
SES			
Lower	674 (14.73%)	668 (14.52%)	555 (15.40%)
Higher	3901 (85.27%)	3932 (85.48%)	3048 (84.57%)
No data	0 (0%)	0 (0%)	1 (<1%)
Hyperactivity/inattention			
High	1170 (25.57%)	1199 (26.07%)	1002 (27.80%)
Low	3280 (71.69%)	3291 (71.54%)	2529 (70.17%)
No data	125 (2.73%)	110 (2.39%)	73 (2.03%)
Youth adversity			
Yes	2444 (53.42%)	2435 (52.93%)	1958 (54.33%)
No	2108 (46.08%)	2151 (46.76%)	1637 (45.42%)
No data	23 (<1%)	14 (<1%)	9 (<1%)
Depression/anxiety symptoms (0–10)			
N with total score data	4462	4500	3537
Mean (s.d.)	3.82 (2.54)	3.89 (2.63)	4.32 (2.75)
Range	0–10	0–10	0–10
Median (IQR)	4 (4)	4 (4)	4 (4)

N, number of individuals; SES, socio-economic status; IQR, interquartile range.

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Table 2. Youth adversity and depression/anxiety symptoms by intersectionality profiles

Intersectionality profile	*N* (%) in intersectionality profile[a]	*N* (%) of intersectionality profile reporting youth adversity[b]	Depression/anxiety symptoms by school year Mean (s.d.)[c]		
			Year 7 (age 11–12-years)	Year 8 (age 12–13-years)	Year 9 (age 13–14-years)
Males, higher SES, low hyperactivity/ inattention	1327 (29.84%)	623 (47.02%)	2.86 (2.21), *N* = 1327	2.77 (2.24), *N* = 1185	2.92 (2.39), *N* = 883
Females, higher SES, low hyperactivity/ inattention	1519 (34.18%)	692 (45.59%)	4.01 (2.45), *N* = 1519	4.43 (2.59), *N* = 1364	5.06 (2.56), *N* = 1024
Males, lower SES, low hyperactivity/ inattention	188 (4.23%)	143 (76.06%)	3.42 (2.49), *N* = 188	3.26 (2.38), *N* = 144	3.20 (2.55), *N* = 128
Females, lower SES, low hyperactivity/ inattention	245 (5.47%)	167 (68.72%)	4.39 (2.53), *N* = 245	4.88 (2.55), *N* = 203	5.84 (2.51), *N* = 162
Males, higher SES, high hyperactivity/ inattention	591 (13.29%)	356 (60.34%)	3.93 (2.47), *N* = 591	3.69 (2.58), *N* = 507	3.63 (2.55), *N* = 383
Females, higher SES, high hyperactivity/ inattention	362 (8.15%)	226 (62.43%)	5.34 (2.59), *N* = 362	5.14 (2.68), *N* = 296	5.88 (2.59), *N* = 235
Males, lower SES, high hyperactivity/ inattention	121 (2.70%)	98 (81.67%)	4.52 (2.51), *N* = 121	3.60 (2.59), *N* = 99	3.50 (2.56), *N* = 68
Females, lower SES, high hyperactivity/ inattention	95 (2.14%)	82 (86.32%)	6.11 (2.50), *N* = 95	6.24 (2.71), *N* = 69	6.31 (2.31), *N* = 54

N, number of individuals; SES, socio-economic status.
[a]*N* = 4448 with intersectionality profile data.
[b]Percentage of individuals in intersectionality profile with youth adversity data across the study period (*N* = 4441).
[c]Individuals in intersectionality profile with depression/anxiety symptoms data at each time-point.

was associated with higher mean depression/anxiety symptoms at baseline (age 11–12-years) (online Supplementary Table S5). Youth adversity was only negligibly associated with a different rate of change over time in these symptoms, except for in two profiles. Specifically in these profiles (detailed below), there was weak evidence to suggest that youth adversity, compared to an absence of youth adversity, was associated with a *decrease* in change over time for the male, lower SES, high hyperactivity/inattention profile, and with an *increase* in change over time for the female, lower SES, and high hyperactivity/inattention profile. Figure 2 shows the estimated average latent trajectories for each intersectionality profile in the presence of youth adversity, compared to an absence of youth adversity. To aid interpretation, visually – the effect of youth adversity on baseline symptoms can be considered as the distance between the dashed and solid lines at school Year 7, within each panel. The effect of youth adversity on the rate of change over time can be considered as the degree to which the dashed and solid lines are non-parallel, within each panel.

Does the association between youth adversity and depression/anxiety symptoms (at baseline and their change over time) differ *across intersectionality profiles?*

The conditional multiple group model showed an improvement in terms of BIC compared to the single group models (online Supplementary Table S4). This provides model-based information to suggest that the association between youth adversity and the latent growth factors differs across intersectionality profiles at an omnibus level.

Parameter estimates of the conditional multiple group model are reported in online Supplementary Tables S5 and S6. The effect of youth adversity on baseline symptoms was highest for the male, lower SES, high hyperactivity/inattention intersectionality profile ($b = 2.318$, s.e. = 0.521), and was lowest for the female, low SES, low hyperactivity/inattention intersectionality profile ($b = 1.106$, s.e. = 0.329). As noted for research question one, although the evidence is weak, the results suggest that the effect of youth adversity on the rate of change over time may differ across intersectionality profiles and is not uniformly associated with an increase in the rate of change over time.

To what extent is the association between youth adversity and depression/anxiety symptoms (at baseline and their change over time) moderated *by gender, SES, and hyperactivity/inattention, and their intersections?*

Compound parameter estimates for assessing the moderating effects of the individual characteristics (weighted main effects) and their intersections (weighted interaction effects) are shown in Table 3. There was some, albeit notably weak, evidence for moderation effects in the association between youth adversity and change over time in depression/anxiety symptoms (discussed

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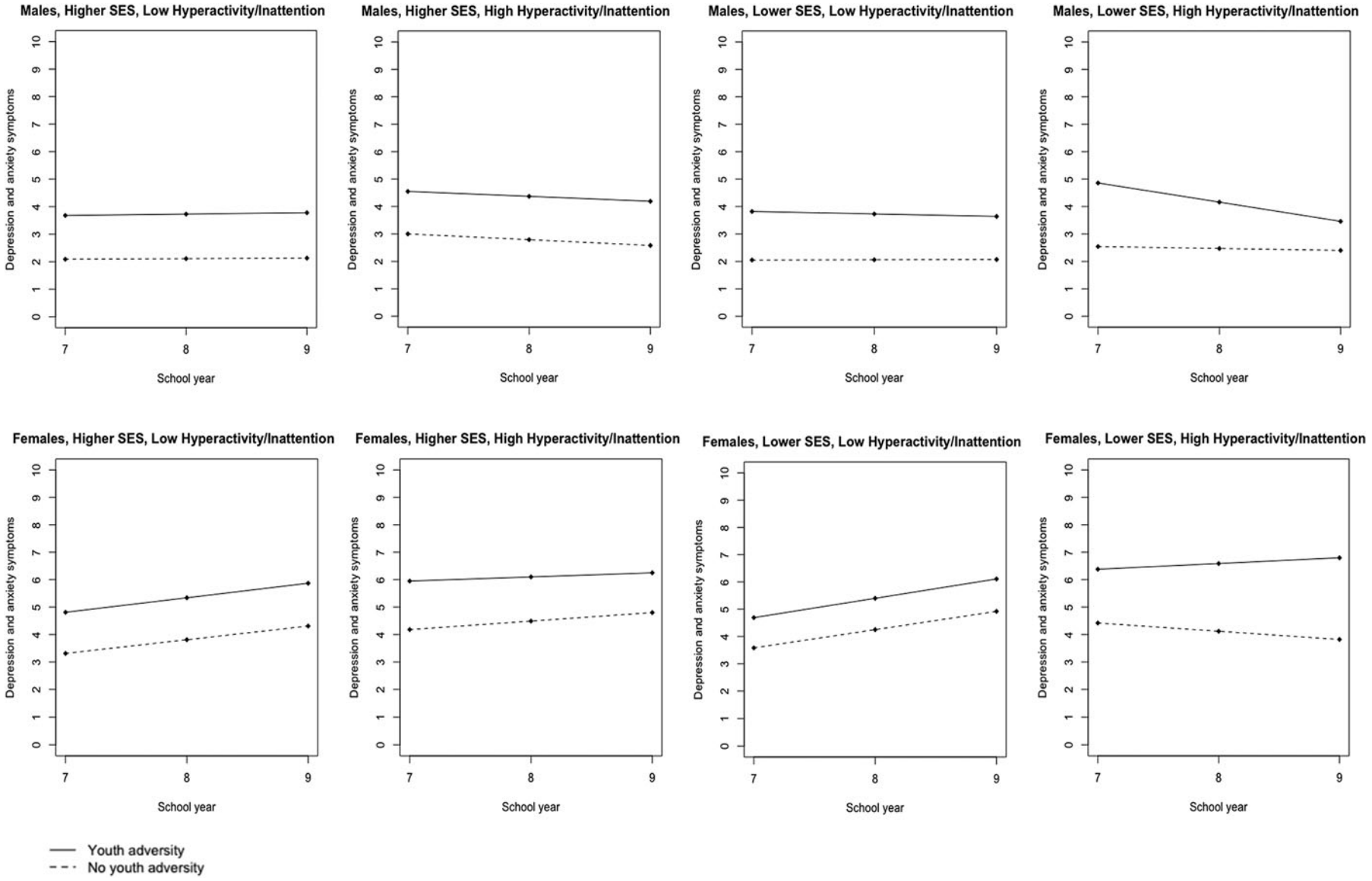

Figure 2. Effect of youth adversity on average depression/anxiety symptoms trajectories by intersectionality profiles.
Note. SES: socio-economic status. Y axis: depression/anxiety symptoms total observed score. School year corresponds to the following average ages: 11–12-years (Year 7), 12–13-years (Year 8), 13–14-years (Year 9).

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Table 3. Compound parameter estimates of youth adversity as a predictor of the latent growth factors of depression/anxiety symptoms

	Latent intercept factor regressed on youth adversity[a]				Latent slope factor regressed on youth adversity[b]			
Description	Unstandardized estimate (s.e.)	95% CI	Standardized estimate (s.e.)	95% CI	Unstandardized estimate (s.e.)	95% CI	Standardized estimate (s.e.)	95% CI
Weighted averages								
Males	1.635 (0.093)	1.445–1.816	0.928 (0.065)	0.794–1.054	−0.018 (0.063)	−0.144 to 0.111	−0.020 (0.073)	−0.165 to 0.130
Females	1.518 (0.105)	1.298–1.716	0.746 (0.060)	0.630–0.860	0.019 (0.066)	−0.115 to 0.142	0.019 (0.069)	−0.119 to 0.146
Higher SES	1.564 (0.072)	1.424–1.718	0.823 (0.044)	0.742–0.915	0.010 (0.048)	−0.095 to 0.104	0.011 (0.051)	−0.099 to 0.110
Lower SES	1.647 (0.211)	1.185–2.075	0.858 (0.141)	0.574–1.107	−0.058 (0.135)	−0.329 to 0.227	−0.066 (0.200)	−0.427 to 0.273
Low hyperactivity/inattention	1.521 (0.077)	1.372–1.676	0.825 (0.050)	0.737–0.925	0.022 (0.051)	−0.081 to 0.124	0.024 (0.056)	−0.088 to 0.133
High hyperactivity/inattention	1.730 (0.151)	1.426–2.022	0.840 (0.085)	0.674–1.006	−0.059 (0.099)	−0.259 to 0.138	−0.057 (0.101)	−0.247 to 0.144
Weighted main effects								
Gender (male – female)	0.117 (0.145)	−0.165 to 0.396	0.061 (0.067)	−0.084 to 0.208	−0.037 (0.091)	−0.208 to 0.155	−0.039 (0.100)	−0.223 to 0.166
SES (higher – lower)	−0.083 (0.230)	−0.517 to 0.389	−0.044 (0.122)	−0.269 to 0.199	0.068 (0.143)	−0.232 to 0.349	0.072 (0.159)	−0.248 to 0.380
Hyperactivity/inattention (low – high)	−0.209 (0.170)	−0.564 to 0.126	−0.110 (0.090)	−0.296 to 0.068	0.081 (0.111)	−0.122 to 0.297	0.086 (0.119)	−0.137 to 0.314
Weighted interaction effects								
Gender × SES	−0.606 (0.461)	−1.523 to 0.261	−0.319 (0.243)	−0.820 to 0.121	0.512 (0.291)	−0.038 to 1.068	**0.543** (0.311)	−0.042 to 1.153
Gender × hyperactivity/inattention	0.298 (0.352)	−0.358 to 0.997	0.157 (0.186)	−0.187 to 0.533	0.041 (0.232)	−0.422 to 0.492	0.043 (0.248)	−0.449 to 0.532
SES × hyperactivity/inattention	0.670 (0.524)	−0.367 to 1.731	0.352 (0.277)	−0.190 to 0.920	−0.025 (0.350)	−0.711 to 0.627	−0.027 (0.374)	−0.772 to 0.659
Gender × SES × hyperactivity/inattention	0.015 (1.052)	−1.902 to 2.155	0.008 (0.556)	−1.026 to 1.115	−1.183 (0.687)	−2.655 to 0.127	**−1.254** (0.737)	−2.819 to 0.134

N, number of individuals; SES, socio-economic status.
Values in bold typeset reflect effect sizes greater than half a standard deviation, referred to in the main text.
Note: $N = 4441$ (with intersectionality profile and youth adversity data).
Compound parameter estimates specified using the maximum likelihood estimates derived from the multiple group model of youth adversity as a predictor of the latent growth factors of depression/anxiety symptoms (online Supplementary Table S5), weighted by intersectionality profile sample size. s.e. and bias-corrected bootstrapped CI from 1000 draws. Weighted pooled standard deviations used for calculation of standardized estimates. Results were substantively unchanged where missing youth adversity data was imputed (10 datasets, $N = 4448$).
[a]Average effect of youth adversity on depression/anxiety symptoms at baseline (age 11–12-years).
[b]Average effect of youth adversity on change over time in depression/anxiety symptoms.

here for effect sizes greater than half a standard deviation, indicated in bold typeset in Table 3): The first was for a gender by SES interaction. The difference between the estimates for lower SES females ($b = 0.169$, S.E. = 0.196) and males ($b = -0.307$, S.E. = 0.200), was 0.543 S.D. greater (S.E. = 0.311, 95% CI −0.042, 1.153) compared to the difference between the estimates for higher SES females ($b = -0.008$, S.E. = 0.069) and males ($b = 0.209$, S.E. = 0.067). This reflects a greater moderating effect of gender at a lower level of SES than at a higher level of SES.

The second was for a gender by SES by hyperactivity/inattention interaction. The difference between the estimates for lower SES females ($b = 0.507$, S.E. = 0.437) and males ($b = -0.626$, S.E. = 0.372) compared to higher SES females ($b = -0.163$, S.E. = 0.171) and males ($b = 0.028$, S.E. = 0.028) was 1.254 S.D. greater (S.E. = 0.737, 95% CI −2.189, 0.134) for high hyperactivity/inattention, than it was for the difference between the estimates for lower SES females ($b = 0.036$, S.E. = 0.198) and males ($b = -0.104$, S.E. = 0.029), compared to higher SES females ($b = 0.029$, S.E. = 0.077) and males ($b = 0.029$, S.E. = 0.077) for low hyperactivity/inattention. This reflects a greater moderating effect of gender and SES at a high compared to a low level of hyperactivity/inattention.

No other potentially notable moderating effects were observed for the effect of youth adversity on baseline depression/anxiety symptoms, or change over time in these symptoms, either for the individual characteristics as main effects or for their interactions (reflecting intersectional effects).

Discussion

To the best of our knowledge, this is the first study to investigate, (a) the effect of youth adversity on the trajectories of depression/anxiety symptoms in adolescence separately for different intersectionality profiles (based on gender, SES, and hyperactivity/inattention), and (b) the role of intersectionality in differentiating the effect of youth adversity on these trajectories. The findings from this investigation provide evidence to suggest that the detrimental effects of youth adversity on depression/anxiety symptoms at age 11–12-years transcend the intersections of society that were indexed in this study. The findings further provide evidence to suggest that the impact of youth adversity varies across intersectional groups, with preliminary evidence to suggest that this variation may be attributable to the intersections of (i) gender and SES, and (ii) gender, SES, and hyperactivity/inattention, albeit with notably wide confidence intervals around these effects. Collectively, this investigation provides a preliminary foundation to spur further research in this emerging area.

The results supported the hypothesis that youth adversity would be associated with trajectories of elevated depression/anxiety symptoms across intersectionality profiles. These findings are broadly in line with previous research that reported that youth adversity was associated with an increased risk of being in a high/increasing latent trajectory group for adolescent depression/anxiety symptoms compared to a low scoring latent trajectory group (Leban, 2021). The current results extend these findings by demonstrating that the detrimental effects of youth adversity are evident across intersections of society indexed by gender, SES, and hyperactivity/inattention. In the current study, youth adversity did not alter the rate of change over time in depression/anxiety symptoms with any certainty. However, importantly – average depression/anxiety symptoms started higher and remained higher over the study period in the presence of youth adversity, compared to an absence of youth adversity, for all intersectionality profiles.

Findings related to the second hypothesis that gender, SES, and hyperactivity/inattention, and the intersections of these characteristics, would moderate the relation between youth adversity and the latent growth factors were less certain. Notably, however, effect sizes for two intersectional effects were above half a standard deviation and were therefore considered to warrant discussion. At a *broad* level, moderation attributable to between group differences in intersectionality profiles could be inferred through model comparison. More specifically, moderation attributable to the characteristics that were used to classify individuals into intersectionality profiles was suggested for the intersectional effects of (i) gender by SES, suggesting a greater moderating effect of gender at a lower compared to a higher level of SES; and (ii) gender by SES by hyperactivity/inattention interaction, suggesting a greater moderating effect of gender and SES at a high compared to a low level of hyperactivity/inattention. It is possible that the broad, group-level differences (inferred by model comparison) may be reflective of some unmodeled characteristics in the data between the groups. As a hypothetical example, differences between the intersectionality profile groups could reflect characteristics at the school level that correlate with the characteristics of the groups. For instance, neurotypical individuals from higher SES backgrounds are more likely to attend grammar schools compared to nonselective schools than neurodivergent individuals from lower SES backgrounds (Burgess, Crawford, & Macmillan, 2018). While speculative, since school information was not available for this sample, this example serves to illustrate why there could be moderation at the group-level that is not explicitly due to the variables that were modeled.

In terms of moderation attributable to intersectionality, while the statistical uncertainty in the estimates prompts caution in over-interpretation, the non-negligible effect sizes are notable. The interaction (intersectional) effects in the current study were specified as compound parameters. These estimates cannot be used in the same way that maximum likelihood estimates could be utilized, for example, in *a priori* power analysis to estimate sample size requirements in future studies (Hancock & French, 2013). It was nonetheless of interest to investigate the effects of increasing the current sample size. The results of post-hoc analyses suggested that doubling the sample size would result in greater statistical certainty in the two specific interaction effects discussed above [i) $b = 0.512$, 95% CI 0.110, 0.916; ii) $b = -1.183$, 95% CI −2.251, −0.240]. These pseudo power analyses give a crude estimate of the extent to which sample sizes may need to be increased in future studies, in samples with similar characteristics, to detect the moderating effects of intersectionality as conceptualized in the current study. Further consideration related to this point is noted in the methodological considerations section.

Despite the lack of statistical certainty regarding *moderation* attributable to intersectionality, the results allude to an intersectional profile characterized by male gender, low SES, and high hyperactivity/inattention as being most vulnerable to experiencing heightened depression/anxiety symptoms at age 11–12-years in the face of youth adversity, compared to an absence of such. The results suggest that males with other vulnerability factors (low SES, high hyperactivity/inattention) may be more susceptible to depression/anxiety in the face of youth adversity compared to females. According to stress inoculation theory (Compton & Pfau, 2005), and through an intersectional analytic lens (Crenshaw, 1990), this could be due to females' development under specific conditions of structural oppression, leading to increased *resilience*. Clinically, this may be motivation to pay particular attention to adversity-exposed *males* with low SES and high hyperactivity/inattention.

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Importantly however, the results underscore the importance of a developmental approach, as they further suggest that youth adversity is associated with a *decrease in the rate of change over time* in depression/anxiety symptoms for this specific group, compared to an *increase*, for the counterpart female group (i.e. low SES, high hyperactivity/inattention). The current findings invite replication to probe the nuance of these findings further.

In addition to the effects of sample size, there are several other factors to consider when interpreting the findings of statistical uncertainty in terms of moderation due to intersectionality. The current results only pertain to *specific* societal/social identities reflected by the intersection of gender, SES, and hyperactivity/inattention, from many possible characteristics. Of note – trans, nonbinary, and gender-diverse identification was not measured in this sample but may be an important component of an individual's intersectional identity (e.g. Kidd et al., 2021). Other individual characteristics such as sexual orientation (Jonas et al., 2022), immigration status (Kern et al., 2020) and ethnicity (Mersky, Choi, Plummer Lee, & Janczewski, 2021) may further be important factors. These could not be considered in the current study due to an absence of, or insufficient data. Intersectionality theory originated in the context of the societal positioning of black women of color (Crenshaw, 1990). Thus ethnicity is important theoretically, and as well, preliminary empirical findings suggest that ethnicity may contribute to intersectional differences in the development of depression symptoms in young people (Chen & Tung, 2023). Future work planned in our group will build on the current findings by investigating the effects of youth adversity including ethnicity as an intersectional characteristic (Hosang et al., 2023).

Of note, other recent work in our group found evidence to suggest that the cross-sectional association between youth adversity and depression/anxiety at age 13–14-years in the current sample (pooled with two other Year 9 cohorts from the HeadStart Cornwall study) was moderated by gender, and SES, as individual (non-interacting) characteristics (Havers et al., 2024). This pattern of results was not observed at age 11–12-years (baseline) in the current study. Collectively, these results could suggest that age 13–14-years but not age 11–12-years (where the latent intercept factor was positioned in the current study) represents a specific developmental window of vulnerability for differentiating the effect of youth adversity on depression/anxiety symptoms in terms of gender and SES. However, in repositioning the latent intercept factor to 13–14-years in post-hoc analysis of the current data, moderating effects of gender and SES were not detected. Several factors could be contributing to this divergence in findings. For example, youth adversity in the current study included bullying-victimization across the study period, rather than solely at age 13–14-years as was the case in the cross-sectional study. More work in this area is required to facilitate an in-depth evaluation of and discussion around the source/s of these discrepant findings.

The current findings should spur future research in this area as a foundation for contributing towards a stratified approach to investigating mechanisms linking youth adversity and mental health problems. In turn, this can contribute to theory development, with the ultimate goal of informing clinical and/or community-level interventions that aim to reduce and mitigate the negative impacts of youth adversity.

Methodological considerations

The current study has a number of strengths, including the use of both self-report and objective (i.e. local government, and School Census) youth adversity data, from a large sample of adolescents. Utilizing repeated measures of depression/anxiety symptoms, this study was able to estimate trajectories of mental health in the face of youth adversity. However, several limitations need to be considered when interpreting the findings. First, despite the large overall sample size, some subgroup sample sizes were small. Oversampling the underrepresented intersectional groups in future data collection studies would aid greater precision in the point estimates. Second, the temporal impact of youth adversity could not be ascertained, since adversities were those reported across the study period, not prior to the reporting of symptoms at baseline. It is important for future studies to adopt prospective longitudinal data collection so that temporal relations can be delineated. Notwithstanding, our results show that individuals exposed to youth adversity experience higher levels of depression/anxiety symptoms that remain higher across ages 11–14-years, compared to those who have not experienced adversity.

Third, information about the number of adversities and the specific forms of adversity that were experienced was not available in this study. Instead, the presence or absence of a range of different adversities was provided. More granular detail, including timing-specificity of the experiences (Schalinski et al., 2016), would allow for investigation into specific adversities that may pose a greater risk for the progression of depression/anxiety symptoms, and for delineation of the cumulative effect of adversities on these symptoms (Petruccelli, Davis, & Berman, 2019). For example, neglect and emotional abuse have been found to be particularly strongly associated with mental health problems (Kisely et al., 2018; Mills et al., 2013). Future research should expand on previous findings to explore the impact of specific types of youth adversity on trajectories of depression/anxiety symptoms in young people in the context of intersectionality.

Conclusion

In summary, our results indicate that youth adversity has detrimental effects on the development of depression/anxiety symptoms across ages 11–14-years, and that these effects pervade across intersectionality profiles. Our findings add to a growing body of literature that point to the negative impact of youth adversity on adolescent mental health, and futher underscore the pervasiveness of these effects across societal intersections in the United Kingdom. Our findings provide tentative evidence to suggest that the intersectionality profile characterized by male gender, lower SES, and high hyperactivity/inattention may be at heightened risk of experiencing elevated levels of depression/anxiety symptoms at age 11–12-years in the face of youth adversity. Nonetheless, they also provide preliminary evidence to suggest that youth adversity is associated with an attenuation in the development of these symptoms over time for this group, in contrast to females, where youth adversity continues to exert a detrimental effect over time. An accumulation of research in this area is fundamental for drawing conclusions regarding whether and to what extent intersectional identity is an important contextual condition for differentiating the effects of youth adversity on trajectories of depression/anxiety symptoms in adolescence.

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Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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