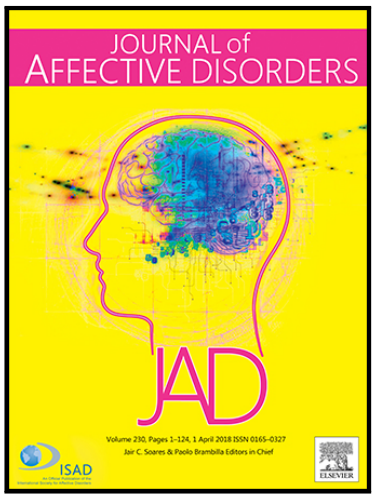

Childhood neglect and trajectories of affective symptoms throughout adulthood: a British birth cohort study

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Highlights

- We investigated the effect of childhood neglect (at ages 7 and 11) on longitudinal trajectories of affective symptoms from young adulthood through midlife.
- Childhood neglect was associated with three trajectories: 'high and increasing', 'high and decreasing' and 'persistent mild/moderate' affective symptoms.
- Neglect experienced at age 7 only, or at age 11 only, was predictive of 'high and decreasing symptoms' trajectory, whereas neglect experienced at both ages was predictive of 'persistent mild/moderate symptoms' trajectory.
- Childhood neglect has negative long-lasting effects on trajectories of adult affective symptoms, and is an important target for early preventive interventions.

Childhood neglect and trajectories of affective symptoms throughout adulthood: a British birth cohort study

Childhood neglect and trajectories of affective symptoms throughout adulthood: a British birth cohort study

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Abstract

Background: Childhood maltreatment, including neglect, can affect an individual's mental health. However, there is a gap in the literature investigating the long-term, dynamic effects of childhood neglect on adult affective symptoms (AS).

Method: Data were used from the National Child Development Study (a British 1958 birth cohort). Childhood neglect was prospectively measured at ages 7 and 11. Five distinct trajectories of AS have been derived previously, using data from the Malaise Inventory Scale (at ages 23, 33, 42 and 50): 'no symptoms', 'persistent mild/moderate symptoms', 'low and

increasing symptoms', 'high and increasing symptoms' and 'high and decreasing symptoms' (John et al., 2019). Multinomial logistic regressions were used to explore whether childhood neglect was associated with AS trajectory membership, while adjusting for a number of covariates.

Results: Results revealed that childhood neglect was significantly associated with 'high and decreasing', 'high and increasing' and 'persistent mild/moderate' AS trajectories from young adulthood through midlife. There was no association with the 'low and increasing' AS trajectory. When testing for at age specific effects, neglect experienced at age 7 only, or at age 11 only, was predictive of 'high and decreasing symptoms' trajectory, whereas neglect experienced at both ages was predictive of 'persistent mild/moderate symptoms' trajectory.

Conclusions: Childhood neglect has negative long-lasting effects on trajectories of adult mental health. This finding has important implications for early interventions for individuals who have experienced childhood neglect.

Key words: childhood maltreatment, neglect, depression, anxiety

Childhood maltreatment is a global issue (Fang et al., 2015) which can have long-lasting effects. Approximately 5% of children under the age of 11 and 13.3% of children aged 11-17 report experiencing neglect at some point during their childhood (Radford et al., 2011), making neglect the most commonly reported form of childhood maltreatment for all age groups. Neglect occurs when the basic needs of a child are not met (Dubowitz et al., 1993), which can lead to severe risk of harm (Kuhlman et al., 2018). Previous literature has reported a link between childhood maltreatment and mental illness including psychiatric disorders such as depressive disorders (Geoffroy et al., 2016; Kuhlman et al., 2018), anxiety disorder (Gallo et al., 2018) and borderline personality disorder (Ibrahim et al., 2018) as well as non-suicidal self-injury (Serafini et al., 2017; Wan et al., 2019) and suicidal ideation and attempt (Miller et al., 2013; Wan et al., 2019). One half of global depression and anxiety cases could be attributed to childhood maltreatment (Li et al., 2016) and childhood maltreatment accounts for approximately 45% of psychiatric disorders in childhood (Teicher and Samson, 2016). However there is a lack of knowledge of long-term and dynamic effects of childhood neglect on mental health in current literature. Therefore obtaining a more in-depth understanding of long-term effects is important in order to guide intervention.

Previous longitudinal research found that early-onset neglect (0-4 years) led to higher levels of depression and suicidal ideation than later onset (4-8 years) in children aged 8, 12 and 16 years (Bhawanie, 2017), suggesting that neglect affects mental health in the short-term, particularly if it occurred from a young age. Further research has also found childhood maltreatment to have long-term effects on depression (Kuhlman et al., 2018). However, childhood adversities were combined in this study and so specific effects of neglect could not be examined. A large-scale systematic review and meta-analysis (Norman et al., 2012), also found long-term associations between childhood neglect and depressive disorders, anxiety disorders, conduct disorders and eating disorders. However, these studies used a retrospective design, which is subject to recall bias, as adults might not remember events clearly, particularly those related to trauma (Tajima et al., 2004). Therefore, the existing evidence suggests a link between childhood maltreatment and poor mental health; however, however, there is lack of research exploring ongoing and dynamic effects, using prospective longitudinal data.

Previous research has suggested that risk of developing difficulties following childhood adversity depends on both the type and timing of maltreatment (Khan et al., 2015). There is also a lack of knowledge in current literature exploring timing effects of neglect on mental health. Literature has shown that during early childhood, the brain is particularly

vulnerable to stress (Lupien et al., 2009). Comparing childhood neglect experienced at different time points can help identify 'sensitive exposure periods' which can guide recommendations on early-intervention (Khan et al., 2015).

Therefore, the present study aims to explore whether childhood neglect is associated with affective symptom (AS) trajectories throughout adulthood, while adjusting for sex, childhood socioeconomic status (Barrett and Turner, 2005), mental wellbeing (Geoffroy et al., 2016) and cognition (Hatch et al., 2007). This study also aims to explore whether AS trajectories differ for individuals who experienced neglect only at age 7, only at age 11 and at both ages 7 and 11. In order to address these aims, the study utilizes longitudinal prospectively collected data from the National Child Development Study (NCDS), also known as a British 1958 birth cohort. Previous research using NCDS data has found an association between childhood maltreatment (including abuse and neglect) and mental health (Geoffroy et al., 2016). However, the effects on trajectories of AS throughout adulthood have not previously been considered.

Method

Sample

Data were used from the National Child Development Study (NCDS) which follows 17,638 individuals born in England, Scotland, and Wales during one week of March in 1958. Immigrants born in the same week, who have since moved to Britain are also included (N=920). Participants were followed up in regular sweeps from birth, throughout childhood (ages 7, 11 and 16) and adulthood (ages 23, 33, 45, 50 and 55), and the study is ongoing (Power and Elliott, 2006). The ethnicity of the cohort is primarily white British (98%), but the full range of social classes in Britain is covered. More detailed information about NCDS data collection methods is described by Power and Elliott (2006).

Participants gave written consent to participate in NCDS and ethical approval for data collection, in 2008, was provided by London MREC (REC reference: 08/H0718/29). The current study received ethical approval from Sussex University's Departmental Ethics Board (Reference number: ER/SR555/1).

Measures

Neglect in childhood. Measures of neglect were taken at ages 7 and 11, as rated by parents and teachers. Parents were interviewed in their homes by local authority health visitors and

teachers completed a structured questionnaire. For the analyses, neglect was examined as a continuous variable at ages 7 (as a score out of six; e.g. 'child looks undernourished, scruffy or dirty') and 11 (as a score out of five; e.g. 'mother never or hardly ever takes child out'). Additionally, all eleven items were used to create a cumulative total neglect score (Archer et al., 2017). The Cronbach's alpha for the cumulative neglect score was acceptable ($\alpha = 0.77$) and the individual items used to derive this score are presented in Supplementary Table 1. Moreover, in order to make better comparisons with previous research, a binary measure of total neglect was derived according to previously published research (Archer et al., 2017). Specifically, a score of three or more (out of 11) indicated 'high neglect' and a score of two or less indicated 'low neglect'.

Trajectories of adult affective symptoms. Affective symptoms (AS) were measured at ages 23, 33, 42 and 50 using the Malaise Inventory Scale. The Malaise Inventory Scale includes 24 items at ages 23, 33 and 42 (Rodgers et al., 1999; Rutter et al., 1970). At age 50, a shortened version of the Malaise Inventory Scale was administered, including nine items (Rutter et al., 1970).

Five distinct trajectories of adult AS across these four time-points have been previously derived, using the same nine items of the Malaise Inventory Scale available at each age (for the detailed information see John et al. (2019)): 1) no affective symptoms; 2) persistent mild/moderate affective symptoms; 3) initially low and increasing to high affective symptoms; 4) initially high and persistently increasing affective symptoms; and 5) initially high and decreasing to low affective symptoms.

Covariates. Covariates were selected based on known associations with neglect and mental health. These were: childhood mental health, childhood socioeconomic status, childhood cognition (all measured at age 11) and sex. Mental health was rated by cohort members' teachers, measured using the British Social Adjustment Guides (BSAG) (Shepherd, 2013). BSAG assesses maladjustments and emotional disturbance. Household socio-economic position (SEP) measure was derived according to Centre for Longitudinal Studies guidelines (Elliott and Lawrence, 2014). This was based on measures of mother's occupation, father's occupation and household tenure and categorised as 'working', 'intermediate' or 'middle'. Cognition was assessed via a general ability test administered at school.

Analytical procedure

A series of multinomial logistic regressions were used to test for associations between childhood neglect (as a predictor) and adult AS trajectories (as an outcome). The following regression models were fitted for individual measures of neglect: Model 1: with neglect at age 7; Model 2: with neglect at age 11; Model 3: with a combined measure of neglect at ages 7 and 11 that distinguishes those with no experience of neglect (77%), experience of neglect at age 7 only (8%), experience of neglect at age 11 only (9%), or experience of neglect at both ages (6%); and Model 4: Model 3 + all the covariates. Two additional models were run with the measure of total neglect: with total neglect score (Modal 5a); and with the binary measure of total neglect (high versus low; Modal 5b). These models were adjusted for covariates. Analyses were conducted in SPSS version 25.

The main analyses were conducted using a sample with complete data on all predictors and covariates. Analysis of missing data indicated missingness across the variables of 12.8% for neglect at age 7, 22.3% for neglect at age 11, and 16.3% for total neglect. To account for these missing data, multiple imputation was conducted in SPSS, using the predictive mean matching approach. Five imputation models were run including both key variables and covariates and an imputed data set comprising 14,745 participants with complete data was created. In order to determine whether the imputation of data had an effect on the results, all main analyses were re-run using the imputed dataset.

Results

Missing data and demographic information

Participants who had missing data for the measure of AS class/trajectory membership (n = 3,813) were removed from the analysis. AS trajectory membership was available for 14,745 participants, while neglect measure at age 7 – for 12,857, and neglect measure at age 11 – for 11,458. In total, 9,716 participants had complete information and 5,029 had missing data on at least one of the variables used in the analyses. Comparing these two datasets (complete and with missing data), significant differences were found for gender (p = .21), with a higher percentage of male participants in the group with missing data. Further, participants with missing data had significantly higher levels of childhood psychological adjustment (p < .001), lower childhood cognitive scores (p = .30), lower socio-economic position in childhood (p = .001), and higher levels of neglect at age 7 (p < .001), age 11 (p < .001) and

for total neglect (p = .006). Descriptive information for the key measures in the sample is presented in Supplementary Table 2.

Childhood neglect and trajectories of adult affective symptoms

Table 1 presents the means and standard deviations of neglect for each AS trajectory. Means for neglect at both ages were lowest for the 'low/no symptoms' trajectory or 'low and increasing symptoms' trajectory suggesting that most people who fell into these trajectories had lower neglect scores. Means for neglect at both ages are highest for the 'high and decreasing symptoms' trajectory, suggesting that most people who fell into this trajectory had higher neglect scores.

Table 1 here

Model 1, including neglect at age 7 as a predictor, revealed a significant main effect of neglect on AS trajectory group membership (χ^2 (4) = 143.712, p < .001; Table 2). The effect of neglect was significant for all AS trajectories, except for the 'low and increasing symptoms' trajectory (OR = 1.04, 95% CI: 0.95, 1.14, p = .40). Individuals who experienced neglect at age 7 were more likely to fall into the 'high and decreasing symptoms' (OR = 1.41, 95% CI: 1.32, 1.50, p < .01), 'high and increasing symptoms' (OR = 1.27, 95% CI: 1.19, 1.36, p < .01), and 'persistent mild/moderate symptoms' (OR = 1.18, 95% CI: 1.13, 1.24, p < .01) trajectories, relative to the reference group ('low/no symptoms') than those who were not neglected.

Model 2, including neglect at age 11 as a predictor, revealed a significant main effect of neglect on AS trajectory group membership (χ^2 (4) = 146.012, p < .001; Table 2) Similarly to effects of neglect at age 7, neglect at age 11 was significantly associated with 'high and decreasing symptoms' (OR = 1.44, 95% CI: 1.35, 1.55, p < .01), 'high and increasing symptoms' (OR = 1.33, 95% CI: 1.23, 1.43, p < .01), 'persistent mild/moderate symptoms' (OR = 1.19, 95% CI: 1.13, 1.24, p < .01), but not with 'low and increasing symptoms' (OR = 1.00, 95% CI: 0.90, 1.10, p = .93).

Table 2 here

Model 3 included a combined measure of neglect that distinguishes those with no neglect, neglect at age 7 only, neglect at age 11 only, and neglect at both ages as a predictor. The model showed a significant main effects of neglect on group membership of mental health trajectories (χ^2 (12) = 151.55, $p < 0.001$; Table 3). Effects of neglect at age 7, at age 11, and age 7 and 11 were significant for all AS trajectories except for neglect at age 7 and 11 for 'persistent mild/moderate symptoms' and neglect at both ages for 'low and increasing symptoms', as compared to the trajectory 'low/ no symptoms'.

Table 3 here

Model 4, included a combined measure of neglect as in Model 3, plus all the covariates. The main effects remained significant (χ^2 (24) = 345.95, $p < .001$; Table 4). For the 'high and decreasing symptoms' trajectory, the effects were significant for those neglected at age 7 only (OR = 1.74, 95% CI: 1.34, 2.26, $p = .01$), and at age 11 only (OR = 1.35, 95% CI: 1.04, 1.75, $p = .02$), and borderline significant for those neglected at both ages (OR = 1.34, 95% CI: 0.98, 1.90, $p = .07$). For the 'high and increasing symptoms' trajectory, the effect of neglect at age 11 only was significant (OR = 1.41, 95% CI: 1.09, 1.82, $p = .01$), but the effect of neglect at age 7 only was not (OR = 1.17, 95% CI: 0.87, 1.58, $p = .30$). The effect of neglect at both ages was also only borderline significant (OR = 1.36, 95% CI: 0.97, 1.91, $p = .08$). For the 'persistent mild and moderate symptoms' trajectory, effects were not significant for neglect at age 7 only (OR = 1.15, 95% CI: 0.96, 1.38, $p = 0.13$), or at age 11 only (OR = 0.91, 95% CI: 0.76, 1.08, $p = .29$). However, effects were significant for neglect reported at both ages (OR = 1.31, 95% CI: 1.05, 1.63, $p = 0.02$). For the 'low and increasing symptoms' trajectory, the effects of neglect at age 7 only (OR = 0.85, 95% CI: 0.59, 1.24, $p = .39$), at age 11 only (OR = 0.83, 95% CI: 0.59, 1.17, $p = .28$), or at both ages (OR = 0.88, 95% CI: 0.55, 1.40, $p = 0.58$) were not significant (Table 4).

The pattern of results remained similar when the analysis was rerun with the imputed data sets (Supplementary Table 4), with the exception that borderline significant effects of neglect at both ages on 'high and decreasing' and 'high and increasing symptoms' became statistically significant.

Table 4 here

Model 5a included total neglect score as a predictor, as well as all the covariates (fully adjusted). Total neglect score had a significant main effect on group membership of AS trajectories (χ^2 (24) = 1061.291, p<0.001, Table 5). Effects of total neglect score were significant for the three AS trajectories: 'high and decreasing symptoms' (OR = 1.14, 95% CI: 1.09, 1.21, $p < .01$), 'high and increasing symptoms' (OR = 1.11, 95% CI: 1.05, 1.17, $p < .01$), and 'persistent mild/moderate symptoms' (OR = 1.07, 95% CI: 1.03, 1.11, $p < .01$), relative to the reference group ('low/no symptoms') than those who were not neglected, suggesting that neglected individuals were more likely to experience adult AS, as compared to individuals who were not neglected. Similar results were shown when using a binary measure of total neglect (Model 5b, Supplementary Table 3). The pattern of results remained largely the same when re-running the analysis with the imputed data sets (Supplementary Tables 5 and 6).

Table 5 here

Discussion

Results of the present study indicate that childhood neglect can lead to poor mental health across the lifespan. Specifically, we found that total neglect was associated with 'high and decreasing symptoms', 'high and increasing symptoms' and 'persistent mild and moderate symptoms' trajectories during adulthood. When testing for at age specific effects, we found that neglect experienced at age 7 only or age 11 only was predictive of 'high and decreasing symptoms' trajectory, whereas neglect experienced at both ages was predictive of persistent AS. This supports and extends previous research which has reported associations between childhood maltreatment (including neglect) and poorer mental health in adolescence and early adulthood (Kuhlman et al., 2018; Norman et al., 2012).

Individuals who had been neglected during childhood at age 7 only or age 11 only were more likely to fall into the 'high and decreasing symptoms' trajectory. These individuals might experience the inevitable immediate consequences of childhood neglect, but have access to resources to improve their mental health. It has been suggested that individuals with higher resilience and protective factors are less likely to experience long-term negative consequences of childhood maltreatment (Meng et al., 2018). This could include the presence of strong social support networks and adaptive coping mechanisms, which have been found to maintain wellbeing throughout adulthood, after experiencing maltreatment in childhood (Miller et al., 2013). Future research could explore whether these factors are linked to this finding.

It was also found that individuals who had been neglected at age 11 only were significantly more likely to fall into the 'high and increasing symptoms' trajectory. This may suggest that neglect which occurs later into childhood has more detrimental long-term effects on mental health. As children approach adolescence, they are more likely to be exposed to risky behaviour which is associated with poor mental health, for example substance abuse (Kuhlman et al., 2018) or gambling (Meng et al., 2018). Individuals who are experiencing neglect may be more likely to partake in these risky behaviours, due to lower levels of supervision, at a crucial developmental age. These potential comorbidities, along with a lack of parental supervision, could cause mental health to deteriorate if not addressed in the years leading up to adolescence. Future research could explore how the presence of comorbidities affects group membership of mental health trajectories.

Moreover, individuals who were neglected at both ages during childhood were more likely to experience 'persistent mild/moderate' symptoms, in line with previous research (Kuhlman et al., 2018). Persistent exposure to stress hormones during childhood (for example as a result of neglect) can affect brain structures which have been linked to mental health and cognition. These effects are dependent on the timing and duration of the exposure of these stress hormones (Lupien et al., 2009).

Finally, there was no significant effect of childhood neglect on the 'low and increasing' AS trajectory. These findings suggests that if childhood neglect is going to affect an individual's mental health, then this will be immediate, with symptoms projecting at an early age. This is in line with previous research (Bhawanie, 2017), which found that childhood maltreatment has effects on mental health in the short-term. Maintaining healthy levels of mental wellbeing in the short-term could have long-term positive outcomes, suggesting that intervention should be provided immediately. This is supported by research

which has concluded that early identification and management of childhood maltreatment can lead to positive outcomes, known as posttraumatic growth (Greenberg et al., 2018). Future research could explore whether this has the potential to prevent long-term mental health concerns.

Strengths & limitations

There are several advantages to using longitudinal birth cohort data, which strengthen conclusions made from the findings of the current study. This type of research allowed for data to be collected from a large and representative sample. Long and ongoing follow-up periods also allow for the exploration of data relating to changes across the life course (Plewis, 2007), which addressed a previous gap in the literature. The same measure of AS was administered to the sample over three decades, which allowed for trajectories to be explored, making the current study novel. Using longitudinal data from a large British Birth cohort study rectifies methodological flaws of systematic review, including small sample sizes due to few studies meeting eligibility criteria (Ibrahim et al., 2018), difficulties carrying out statistical comparison due to studies using different measures (Serafini et al., 2017) or studies with differing research designs (Miller et al., 2013).

The current study also has strengths in the measures of childhood neglect that were used. There have been limitations in previous studies in the use of measures of childhood adversities, (Geoffroy et al., 2016; Kuhlman et al., 2018) as these have utilized retrospective measures, however literature supports the use of prospective measures of childhood maltreatment in psychological research. Prospective measures have been found to identify up to 15% more cases of childhood maltreatment than retrospective measures of the same cases (Tajima et al., 2004). This has been supported by earlier literature, which found that approximately 14% of neglected individuals (as reported by official records) did not self-report neglect retrospectively in adulthood, suggesting that retrospective reports might be less accurate (Widom and Shepard, 1996). Memories of past events taken retrospectively might be limited, due to time or trauma. Therefore, the use of prospective measures in the current study is advantageous and rectified previous flaws in literature.

Consideration of several limitations should be taken into account when drawing conclusions from the current study. Despite the advantages of the measure of neglect used, there are also limitations with this. Neglect was only measured at the ages of 7 and 11, whereas childhood maltreatment can occur at any point up to the age of eighteen. Children who experienced neglect at any other timepoint during their childhood have not been

accounted for in the current study. It has been suggested that a larger proportion of cases of neglect are reported between the ages of eleven and seventeen than before the age of eleven (Radford et al., 2011). Therefore, effects of neglect at different time points during childhood and adolescence require further in-depth exploration due to varying findings for different trajectories

Furthermore, although some aspects of traditional definitions of neglect were explored (for example 'failure to meet a child's physical, emotional or educational needs'), not all aspects were covered (for example 'failure to ensure a child's safety'), suggesting that this measure of neglect could be limited. Measures of neglect were rated by parents (who might be more likely to underestimate levels of neglect) and teachers. Neglectful parents might have been less likely to take part in the study, which could have led to more missing data for individuals who experienced childhood neglect. However, measures of neglect were obtained from multiple sources (teachers as well as parents) which could reduce some potential bias of this measure.

Other forms of childhood adversity (including abuse) were not accounted for in the current study. Individuals who have experienced forms of childhood abuse, as well as neglect, are more likely to develop mental health difficulties in adulthood. Dube et al. (2001) has described this as 'cumulative stress' in which the more types of childhood maltreatment experienced, the higher the risk of developing AS. Therefore, a limitation of the current study is in its inability to adjust for childhood abuse (as prospective measures of childhood abuse are unavailable).

A key and inevitable issue with longitudinal research is attrition rates. Sample attrition has occurred across the years within NCDS. From the original sample, of 18,558 participants, 14,745 were included in the current study due to missing or incomplete data. However, it has been suggested that respondents in mid-adulthood were generally representative of the surviving cohort (Archer et al., 2017), which is when AS (which derived mental health trajectories) were explored. On the other hand, it is likely that disadvantaged groups (including those who have experienced childhood maltreatment) are less likely to respond over time. Therefore, neglected individuals could be underrepresented in later sweeps. This has been dealt with by imputing missing data using a multiple imputation approach. Notably, the results from imputed data were substantially identical to the ones obtained using a complete dataset.

Conclusions

It is important to understand the long-term impact of childhood neglect in order to offer appropriate support. It has been suggested that interventions should take into account co-occurring conditions, including mental illness (Miller et al., 2013). A large systematic review (Leenarts et al., 2013) concluded that trauma-focused CBT was the most effective intervention for childhood maltreatment. If trauma is addressed appropriately, it could lead to an increased ability to take the perspective of and understand the mental and emotional state of others, due to higher levels of sensitivity to suffering (Greenberg et al., 2018). It has been suggested that effective intervention could lead to positive outcomes in maltreated children, including increased levels of compassion, prosocial behaviour, empathy and resilience (Greenberg et al., 2018) which could also reduce associated AS.

Therefore, research exploring longitudinal mental health trajectories can help to identify key time points to intervene to prevent the onset and/or deterioration of mental health difficulties throughout the lifespan. The current study addresses a gap in the current literature and suggests that mental health implications resulting from childhood neglect may present early on and therefore it is important to offer interventions for individuals at an early age.

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SRozanski_Statement

We can confirm that the materials included in this manuscript have not been previously published and are not currently submitted for publication elsewhere. All the authors contributed to the design and writing of the paper and approved the final version for submission.
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SRozanski_ConflictOfInterest

The authors of this paper – Sophie Rozanski, Alexandra Schmidt, Amber John, and Darya Gaysina, report no conflict of interest.

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Table 1. Means and standard deviations for measures of neglect by AS trajectories

AS trajectories	**Neglect (age 7)** (N=12,857)	**Neglect (age 11)** (N=11,458)	**Total neglect** (N=12,341)
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
High and decreasing symptoms (N = 763)	0.75 (1.13)	0.73 (1.04)	1.41 (1.74)
High and increasing symptoms (N = 754)	0.63 (1.06)	0.64 (1.04)	1.21 (1.71)
Persistent mild/moderate symptoms (N = 2,932)	0.56 (0.95)	0.53 (0.92)	1.03 (1.53)
Low and increasing symptoms (N = 593)	0.45 (0.89)	0.40 (0.80)	0.81 (1.40)
Low/no symptoms (N= 5,405)	0.43 (0.83)	0.40 (0.82)	0.78 (1.32)

Table 2. The effect of neglect at age 7 (*N*=12,857) and at age 11 (*N*=11,458) on AS trajectories (Models 1 and 2)

	Odds Ratio	**(95% CI)**	***p-value***
Model 1: Neglect (age 7)			
High and decreasing symptoms	1.41	(1.32, 1.50)	<.01
High and increasing symptoms	1.27	(1.19, 1.36)	<.01
Persistent mild/moderate symptoms	1.18	(1.13, 1.24)	<.01
Low and increasing symptoms	1.04	(0.95, 1.14)	.40
Model 2: Neglect (age 11)			
High and decreasing symptoms	1.44	(1.35, 1.55)	<.01
High and increasing symptoms	1.33	(1.23, 1.43)	<.01
Persistent mild/moderate symptoms	1.19	(1.13, 1.24)	<.01
Low and increasing symptoms	1.00	(0.90, 1.10)	.93

Table 3. The effects of a combined measure of neglect at two ages on AS trajectories (Model 3, *N=10.447)*

AS Trajectories	**Neglect**	**OR**	**(95% CI)**	***p-value***
High and decreasing symptoms	Age 7	2.24	(1.76, 2.86)	<.01
	Age 11	2.06	(1.63, 2.60)	<.01
	Age 7 & 11	2.86	((2.16, 3.78)	<.01
High and increasing symptoms	Age 7	1.47	(1.12, 1.94)	<.01
	Age 11	1.84	(1.46, 2.33)	<.01
	Age 7 & 11	2.18	(1.62, 2.95)	<.01
Persistent mild/moderate symptoms	Age 7	1.34	(1.13, 1.58)	<.01
	Age 11	1.16	(0.99, 1.37)	.07
	Age 7 & 11	1.82	(1.50, 2.22)	<.01
Low and increasing symptoms	Age 7	0.91	(0.65, 130)	.60
	Age 11	0.89	(0.65, 1.24)	.50
	Age 7 & 11	1.05	(0.69, 1.59)	.82

Table 4. The effects of a combined measure of neglect at two ages on AS trajectories, fully adjusted (Model 4, *N=9,716)*

AS Trajectories	**OR**	**(95% CI)**		***p-value***
High and decreasing symptoms:				
Neglect (age 7)	1.73	(1.33,	2.26)	<.01
Neglect (age 11)	1.35	(1.04,	1.74)	.03
Neglect (age 7 & 11)	1.36	(0.97,	1.89)	.07
Childhood mental health	1.02	(1.01,	1.03)	<.01
Childhood cognition	0.98	(0.97,	0.99)	<.01
Childhood social class[1]	0.73	(0.57,	0.94)	.02
Childhood social class[2]	0.81	(0.67,	0.98)	.03
High and increasing symptoms:				
Neglect (age 7)	1.17	(0.87,	1.57)	.31
Neglect (age 11)	1.41	(1.09,	1.81)	<.01
Neglect (age 7 & 11)	1.35	(0.96,	1.89)	.09
Childhood mental health	1.02	(1.01,	1.03)	<.01
Childhood cognition	0.98	(0.98	0.99)	<.01
Childhood social class[1]	0.90	(0.71,	1.14)	.39
Childhood social class[2]	0.88	(0.73,	1.06)	.17
Persistent mild/moderate symptoms:				
Neglect (age 7)	1.15	(0.96,	1.38)	.13
Neglect (age 11)	0.91	(0.76,	1.09)	.29
Neglect (age 7 & 11)	1.31	(1.06,	1.64)	.02
Childhood mental health	1.01	(1.00,	1.01)	.03
Childhood cognition	0.99	(0.98,	0.99)	<.01
Childhood social class[1]	0.86	(0.75,	0.99)	.04
Childhood social class[2]	0.94	(0.84,	1.05)	.28
Low and increasing symptoms:				
Neglect (age 7)	0.85	(0.59,	1.24)	.41
Neglect (age 11)	0.83	(0.59,	1.17)	.30
Neglect (age 7 & 11)	0.88	(0.56,	1.41)	.61

Childhood mental health	1.01	(1.00,	1.02)	.16
Childhood cognition	1.00	(0.99,	1.00)	.54
Childhood social class[1]	0.88	(0.69,	1.13)	.32
Childhood social class[2]	1.00	(0.82,	1.23)	.97

Note: [1]middle vs. intermediate class, [2]intermediate vs. working class

Table 5. The effects of total neglect score on AS trajectories, fully adjusted (Model 5)

Trajectories of AS	**OR**	**(95% CI)**		**p-value**
High and decreasing symptoms:				
Total neglect score	1.14	(1.09,	1.21)	<.01
Childhood mental health	1.03	(1.02,	1.04)	<.01
Childhood cognition	0.98	(0.97,	0.98)	<.01
Childhood social class[1]	0.78	(0.60,	1.00)	.05
Childhood social class[2]	0.86	(0.71,	1.03)	.10
Sex	0.20	(0.17,	0.24)	<.01
High and increasing symptoms:				
Total neglect score	1.11	(1.05,	1.17)	<.01
Childhood mental health	1.03	(1.02,	1.04)	<.01
Childhood cognition	0.98	(0.98,	0.99)	<.01
Childhood social class[1]	0.96	(0.76,	1.21)	.71
Childhood social class[2]	0.94	(0.78,	1.13)	.49
Sex	0.29	(0.24,	0.34)	<.01
Mild/moderate symptoms:				
Total neglect score	1.07	(1.03,	1.11)	<.01
Childhood mental health	1.02	(1.01,	1.02)	<.01
Childhood cognition	0.99	(0.98,	0.99)	<.01
Childhood social class[1]	0.92	(0.80,	1.05)	.22
Childhood social class[2]	0.99	(0.89,	1.10)	.81
Sex	0.39	(0.36,	0.43)	<.01
Low and increasing symptoms:				
Total neglect score	1.00	(0.93,	1.07)	.99
Childhood mental health	1.01	(1.00,	1.02)	.04
Childhood cognition	1.00	(0.99,	1.00)	.47
Childhood social class[1]	0.94	(0.73,	1.21)	.62
Childhood social class[2]	1.09	(0.89,	1.33)	.40
Sex	0.69	(0.58,	0.82)	<.01

Note: [1]middle vs. intermediate class, [2]intermediate vs. working class