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Childhood socio-economic position and affective symptoms in adulthood: the role of neglect

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Abstract

Background: Childhood neglect is more common within low-income families and can have long-term effects on mental health. Despite this, the extent to which it can mediate the well documented longitudinal inverse relationship between childhood socio-economic position (SEP) and adult affective symptoms is yet to be investigated.

Method: Data (9595 males and 8959 females) from participants of the National Child Development Study (NCDS) were used to investigate the extent to which prospectively measured neglect mediates the relationship between SEP (age 11) and affective symptoms (ages 23 and 50).

Results: Neglect partially mediated the relationship between childhood SEP and affective symptoms at ages 23 ($b = -0.02$, $[-0.02, -0.02]$) and 50 ($b = -0.02$, $[-0.02, -0.01]$), after controlling for other family-related adversities. In addition, gender moderated the direct effect of SEP on affective symptoms at both ages 23 ($b = -0.06$, $t = -4.87$, $[-0.08, -0.03]$) and 50 ($b = -0.05$, $t = -3.86$, $[-0.07, -0.02]$), with the relationship being stronger for females; but did not moderate the indirect effect of neglect at either age 23 ($b = 0.01$, $t = 1.09$ $[-0.01, 0.02]$) or 50 ($b = 0.00$, $t = -0.60$ $[-0.02, 0.01]$).

Conclusions: Neglect in childhood should be viewed as having serious implications for the mental health of both men and women. Greater investments into social support interventions that reduce incidences of neglect are also warranted.

Over 25% of people experience a mental health problem each year (Jenkins et al., 2009) and this figure may be rising (McManus et al., 2016). However, the prevalence of mental illness is not equally distributed. It is fiercely overrepresented in people from poverty-stricken backgrounds (Reiss, 2013). Within social science literature, a frequently replicated finding has been a strong inverse relationship between socio-economic position (SEP) and mental health problems (Gilman et al., 2002; Hudson, 2005; McLaughlin et al., 2012; Miech and Shanahan, 2000; Muntaner et al., 2004; Reiss, 2013). Particularly prevalent is an association between affective disorders (i.e. depression and anxiety) and low SEP (Demir et al., 2011; Lorant et al., 2003; Wight et al., 2006). For example, one meta-analysis of research in 2003 found that lower SEP groups had an overall Odds Ratio (OR) for being depressed of 1.81 and were also more likely to have enduring depression (OR = 2.06) in comparison to higher SEP groups (Lorant et al., 2003).

The link between SEP and affective disorders is so strong that the SEP of a person when they are a child is associated with a higher risk of these disorders throughout life (Gilman et al., 2002; Sadowski et al., 1999). This effect remains, even after controlling for SEP in adulthood (Gilman et al., 2002; Ochi et al., 2014). Evidently, SEP in childhood specifically is a strong and independent predictor of affective disorders, even into adulthood, indicating that the higher rates of these disorders within populations who come from less affluent backgrounds manifest during childhood (Gilman et al., 2002; Sadowski et al., 1999).

This research instigates a desire amongst researchers in this area to understand the processes underlying the association between low childhood SEP and adult affective disorders (Gilman et al., 2002). What is it about growing up in poverty that causes this association? Research thus far has found that maltreatment by parents (i.e. physical/sexual abuse and neglect) is disproportionately common in low-income families (Drake and Pandey, 1996; Putnam-Hornstein et al., 2013). It is postulated that this is because the conditions associated with poverty (unemployment/overcrowded housing/insufficient money/insufficient food) make parents more likely to maltreat their children (Gil, 1970). Critically, research has also found that maltreatment itself is strongly associated with affective disorders throughout life (Brown et al., 1999; Gibb et al., 2001; Li et al., 2016; Putnam, 2003; Simon et al., 2009).

However, although this research has looked at childhood maltreatment in general using composite measures (Chapman et al., 2004; Herrenkohl et al., 2012; Norman et al., 2012) and the specific effects of physical and sexual abuse (Hildyard and Wolfe, 2002; Spataro et al., 2004) in relation to mental health symptomology, the specific effects of neglect on mental illness are rare (Infurna et al., 2016). An examination of previous literature reveals that neglect is often not extricated from physical and sexual abuse (Azar et al., 1998) making it unclear what the direct relationship between childhood neglect and affective-well-being is (Crouch and Milner, 1993). Further, due to the difficulty in identifying child neglect, research that has thus far reported on its effects for adult mental well-being has often relied on retrospective reporting (Maughan and Rutter, 1997), the limitations of which are well studied (Herrenkohl et al., 2012).

An absence of research disentangling the effects of neglect is surprising, not only because neglect has a markedly higher incidence rate than both physical and sexual abuse (Sedlak et al., 2009; Stoltenborgh et al., 2015), accounting for 75.3% of reported maltreatment in 2015 (Child U.S. Department of Health & Human Services, 2017), but also because the limited research that has reported on neglect shows that its consequences for psychological functioning are more profound (Gauthier et al., 1996). Neglect is also more common in low-income families than abuse. For example, families who earn less than 15,000 dollars per year are seven times more likely to neglect their children, but three times more likely to abuse their children (Sedlak et al., 2009).

If one considers research that has already implicated other parenting behaviours, such as ‘unskilful’ parenting (Conger et al., 1992), as mediating factors within the relationship between childhood SEP and later emotional adjustment, one might assume that neglect too has a mediating role within this relationship. Although previous research has found that specifically within low-income cohorts, maltreatment is critical for affective well-being (Banyard, 1999), it is yet to investigate the extent to which maltreatment mediates the effects of SEP on affective well-being. Due to: 1) the profoundness of the consequences of child neglect for psychological functioning in comparison to abuse, 2) the higher prevalence of neglect within poorer families and 3) the general disregard of neglect within research, it was thought more important to clarify the extent to which neglect specifically mediates the relationship between childhood SEP and adult affective symptoms.

Interestingly, women are more likely to be diagnosed with affective disorders (Kessler et al., 1994). More critically, these gender differences seem to be more pronounced in people from low-income families in childhood (Gilman et al., 2002) and the relationship between childhood SEP and adult depression is stronger among females (Gore et al., 1992; Veijola et al., 1998). Likewise, women seem to be more sensitive to maltreatment in terms of their affective well-being, even in the long term (Gallo et al., 2018; Macmillan et al., 2001; Thompson et al., 2004). For example, Gallo et al. (2018) found that the OR between sexual abuse in childhood and Generalised Anxiety Disorder in adulthood was 1.70 for women, but only 1.18 for men. However, again, even recently, there has been insufficient data to meta-analyse gender differences in the effects of neglect separately from abuse (Gallo et al., 2018). The discovery of gender-specific risks of affective disorders improves our understanding of the epidemiology of psychiatric problems and helps us to develop better intervention strategies (Afifi, 2007). Thus, clarifying gender differences specifically in the effects of neglect on affective symptoms is important. Women are more sensitive to disturbed mother-child relationships than men in terms of depression (Veijola et al., 1998) and thus, women may be more sensitive to the independent effects of neglect, as well as the general effects of maltreatment, in causing affective problems.

Therefore, with the use of the National Child Development Study (NCDS), the present study explored the role of prospectively reported neglect as a possible mediator within the relationship between childhood SEP and affective symptoms and gender as a possible moderator of this relationship. The moderated-mediation relationship is illustrated in Figure 1.

Figure 1 here

Method

Sample

Longitudinal data was collected from the NCDS, a nationally representative sample of >17,000 people born in England, Scotland and Wales during one week in 1958. Since the beginning of the study several sweeps of information have been collected (at birth, age 7, 11, 16, 23, 33, 42, 46, 50 and 55). This study has been described thoroughly elsewhere (Power and Elliott, 2006). The current study used data collected at birth and ages 7, 11, 23 and 50. Data on the gender of participants at birth was used (Males = 9595, Females = 8959), data on affective symptoms at ages 23 and 50 was used ($N = 14745$), data on SEP at age 11 was used ($N = 13277$) and finally, data on neglect at age 7 and 11 was used ($N = 16502$). Numbers indicate the amount of data available after excluding participants with any missing data. Cohort members gave written informed consent to participate. Ethical approval for the present study was also provided by the University of Sussex (Reference number: ER/AM876/1).

Measures

Affective symptoms in adulthood

Affective symptoms were measured at ages 23 and 50 using subscales of the Malaise Inventory (MHI-5), a validated self-completion scale for assessing psychiatric comorbidity (Rutter et al., 1970). The age 23 subscale was 24 items long and came from the Cornell Medical Index, designed to be used in research that lacks resources for detailed diagnostic interviewing (Gale et al., 2009). A shorter, 9 item sub-scale was used at age 50. The items in these subscales cover emotional (e.g., ‘Do you often feel miserable or depressed?’) as well as somatic (e.g., ‘Does your heart often race like mad?’) symptoms. Latent scores of affective symptoms were used, which have been previously generated using confirmatory factor analysis (John et al., 2019). These will be referred to as ‘malaise scores’ for the remainder of this report.

Neglect in childhood

Neglect was measured prospectively at ages 7 and 11 using parental interviews and teacher structured questionnaires. A neglect scale was derived (range 0-10) by

cumulatively summing ten items on the physical appearance of the child and parental interest in the child's education at ages 7 and 11, which correspond to commonly defined features of neglect (Gilbert et al., 2009) (Supplementary Tables 1 and 2). When the children were 7 and 11, parents were asked: 1) "Do the parents take the child out? (e.g. for walks/outings/picnics/visits/shopping)" separately for mother and father. Answers indicating 'never/hardly ever' were coded as neglect. At ages 7 and 11, teachers were asked about the child's appearance and the apparent care for the child's appearance. If the child was 'undernourished', 'very dirty' or 'slovenly' this was coded as indicating neglect. At the same ages teachers were also asked, "With regard to the child's educational progress, do the parents appear 'over concerned about the child's progress and/or expecting too high a standard', 'very interested', 'to show some interest', 'to show little or no interest' or 'can't say/inapplicable'?" If the parents showed 'little or no interest' this was coded as indicating neglect. The Cronbach's alpha for the items within the neglect scale was acceptable ($\alpha = 0.70$) as established by Kline (2013) and deleting items would not have increased this alpha.

Socio-economic position in childhood

Our measure of socio-economic position at age 11 was created using guidance from the Centre for Longitudinal Studies (Elliott & Lawrence, 2014). Children were categorised into 'working' or 'intermediate' or 'middle' class depending on both fathers' and mothers' occupations and household tenure (Supplementary table 3), in order to create a more robust measure of SEP than previous measures using only fathers' occupations (Elliot & Lawrence, 2014). At age 11, mothers were asked in interviews about the occupation of the child's father/male head of the household, as well as their own most recent and current occupation. Fathers' occupations were grouped using an adapted version of the Registrar General's Social Class (RGSC) scale and mothers' occupations were grouped with the 1966 General Register Office's Socioeconomic Group Classification. Information was also collected about mothers' occupations at conception using a specially designed questionnaire and these were coded into 18 main categories (e.g., Teachers/Bank Clerks/Machinists). Tenure of accommodation (i.e. owner occupied/council rented/private rented unfurnished/private rented furnished/tied/other) was also measured at age 11 using a structured interview.

Covariates

Other adverse childhood experiences (ACEs), such as domestic violence, parental alcohol/drug problems and divorce are more common in low-income families (Wade et al., 2014) and can lead to very negative psychological consequences in adulthood (Giovanelli et al., 2016; Meltzer et al., 2009). Therefore, a number of covariates were controlled for in this study, to account for confounds/covariates within the relationship between age 11 SEP and adult mental illness at ages 23 and 50. These included divorce, parental alcoholism and parental domestic tension which were all measured using parental questionnaires when the child was 7 years old. Parents had to indicate whether domestic tension, divorce and alcoholism were difficulties experienced in their family, by answering 'No' 'Yes', 'Don't Know' or 'Inapplicable'. For this analysis, 'No', 'Don't Know' and 'Inapplicable' were grouped under one category (No, this was not a difficulty for this family) and 'Yes' was grouped under another category (Yes, this was a difficulty for this family).

Data analysis

The research question was tested in four steps, controlling for the covariates at every stage. First, a simple mediation model for age 23 malaise scores was examined. Second, a simple mediation model for age 50 malaise scores was examined. Third, the moderator variable (gender, coded as 1 male, 2 female) was added to the model for age 23. Fourth, the same moderator variable was added to the model for age 50.

Tests of mediation: The mediational effect of neglect was examined using an application provided by Hayes (2017), applying Model 4 with 5000 bias-corrected bootstrap samples. This analyses the extent to which the relationships between age 11 SEP and age 23/50 malaise scores are mediated by neglect with the use of confidence intervals. Ordinary Least Squares regression is used to estimate the total, direct and indirect effects on malaise scores. By providing accelerated confidence intervals bootstrapping leads to more accurate and precise type 1 error rates and thus, is more reliable for testing indirect effects than the Sobel Test (Sobel, 1986), or the multistep approach (Baron and Kenny, 1986). Heteroscedasticity-consistent inference was used to adjust for standard errors so that they were robust against violations of homoscedasticity (Long and Ervin, 2000).

Tests of moderated mediation: The same application was used to examine the moderating effect of gender on the effects of age 11 SEP on malaise scores at ages 23 and 50 and the

strength of the mediated relationship between SEP and malaise scores via neglect, applying model 15 with 5000 bias-corrected bootstrap samples. As well as using heteroscedasticity-consistent inference, the predictor and moderator were mean centred so that coefficients indicate the effect of a predictor on the outcome at the mean value of the other variables in the model.

All statistics were conducted using the macro PROCESS in SPSS (Hayes, 2017). The main analyses were conducted on the complete dataset. The analysis of the missing data demonstrated that missingness across the variables was between 11.1% (for neglect) and 28.5% (for SEP), with 41.7% of participants having at least one missing value. To account for missing data, multiple imputation analysis was conducted in SPSS using the multiple imputation procedure. Five imputation models were run including both key variables and covariates, which maximises the plausibility of the missing at random assumption, and limits possibility of missing not at random data. The imputed data-set was created for the sample of 14745 participants. All analyses described above were re-run using imputed variables for the key predictors and covariates.

Results

Descriptive statistics are shown in Table 1 for the full sample and then differentiated by gender, along with the levels of significance for the gender differences. Females had significantly higher malaise scores than males at both ages and males scored significantly higher than females on neglect scores.

Table 1 here

Mediation by neglect

The proposed mediation model was then tested for ages 23 and 50 separately, with the covariates included and controlled for in the model. As shown in Table 2, the results show a positive main direct effect of SEP at age 11 on malaise scores at both ages, after controlling for neglect. The results also show a negative main effect of age 11 SEP on neglect. There was

a significant negative indirect effect of SEP at age 11 (coded as 1 working, 2 intermediate and 3 middle class) on malaise scores at age 23 and age 50 via neglect. Also, after controlling for SEP, there was a significant main effect of neglect on malaise scores at both ages. There was a significant negative total effect of SEP on malaise scores at age 23 and age 50, but as there was also a significant negative direct effect of SEP on malaise scores at age 23 and 50, this suggests that partial mediation occurred in the sample.

Table 2 here

Moderated mediation by gender

The proposed moderated mediation model was then tested for ages 23 and 50 separately, and gender was added to the model. As shown in table 3, there was a significant interaction between SEP and gender in predicting malaise scores at age 23 and age 50, with the direct effect of SEP on malaise scores at age 23 being significant for both males and females, but being stronger for females than for males. For age 50, the direct effect of SEP on malaise scores was not significant for males but was significant for females. These interactions are depicted in Supplementary Figures 1a and 1b. **Supplementary tables 6 and 7 also display the mediation results separated by gender.** Although there was a main effect of gender at both ages, the interaction between neglect and gender in predicting malaise scores was not significant at either age. Accordingly, the analysis of conditional indirect effects of SEP on malaise scores via neglect showed that gender did not significantly moderate this relationship, indicating that the overall strength of the indirect effect did not significantly differ between males and females at either age. Revised models showing these results are shown in Figures 2a and 2b.

We created a new 9-item malaise subscale for age 23 (comparable to the scale used to measure affective symptoms at age 50) and found that this was strongly correlated with the original 24-item malaise scale (.934, $p = .001$). Despite this, we re-ran the analysis with the new 9-item subscale. The results were similar, but the interaction between neglect and gender in predicting malaise scores was now significant; gender now moderated the indirect effect of neglect on malaise scores. The effect was significant for both males and females, but was stronger for females (-0.09) than for males (-0.06). Detailed results are available upon request

from the first author. Results of the analyses using imputed data (N = 14745) were similar to the results in the complete dataset. The only difference was found at age 23: the indirect effect of the neglect was moderated by gender ($p = .04$; Supplementary Table 8).

Table 3 here

Detailed results are shown in supplementary material. This includes descriptive statistics by SEP, along with levels of significance for SEP differences (Supplementary table 4) and intercorrelations between all the main variables (Supplementary table 5).

Figures 2a and 2b here

Discussion

Using data collected from the NCDS, the current study tested a moderated mediation model and demonstrated that neglect partially mediated the relationship between childhood SEP and adult affective symptoms. It was also demonstrated that gender significantly moderated the direct relationship between SEP and affective symptoms such that the effect of SEP was stronger for women than for men. However, gender did not moderate the indirect effect of neglect on affective symptoms.

The finding that neglect was significantly negatively associated with SEP at age 11 confirms previous research finding that neglect is more common within low-income families (Sedlak et al., 2009). Childhood SEP was negatively related to affective symptoms at ages 23 and 50, irrespective of neglect, as well as of the covariates (domestic tension/alcoholism/divorce). This is in line with past research finding an inverse relationship between childhood SEP and experiences of affective disorders (Gilman et al.,

2002; Sadowski et al., 1999), even irrespective of other ACEs (Gilman et al., 2002), and indicates just how enduring the effects of growing up in poverty are on mental well-being.

Neglect did partially mediate the negative relationship between SEP at age 11 and self-reported affective symptoms at age 23 and 50, which is a novel finding. While novel, this finding is obviously not wholly unanticipated, as neglect is more common in low-income families (Sedlak et al., 2009) and other research has implicated childhood maltreatment as an important indicator of affective disorders well into adulthood (Brown et al., 1999; Gibb et al., 2001; Li et al., 2016; Putnam, 2003; Simon et al., 2009). Our findings demonstrate that the relationship between childhood SEP and adult affective symptoms is operating, at least in part, through the neglect that children in these circumstances can experience. Therefore, when attempting to reduce affective problems within this cohort, although the amelioration of poverty continues to be critical, greater investments into interventions that reduce incidences of maltreatment are also warranted (Schilling et al., 2007). In line with research by McLoyd (1990) and Gil (1970), these interventions may need to target social support for low-income parents. If it is the conditions and adverse experiences associated with poverty and the concomitant despair experienced by parents that are causing this child neglect (McLoyd, 1990), then increasing parents' employment rates, housing quality and benefits may reduce it and thus, psychiatric problems in adulthood will be minimised. Research has indeed discovered that improved social support systems can increase parents' abilities to cope with adverse events before they become too stressful, ergo reducing child maltreatment (Howze and Kotch, 1984); this is particularly beneficial for low-income families (Hashima and Amato, 1994).

Moreover, in contrast to numerous studies using composite measures of childhood maltreatment (Chapman et al., 2004; Herrenkohl et al., 2012; Norman et al., 2012) the specific mediational effect of neglect in the development of affective symptoms was discerned. Neglect itself had independent effects on self-reported affective symptoms, irrespective of other confounds and childhood SEP. This mirrors limited existing literature showing neglect to have adverse effects on affective well-being (Bifulco and Moran, 2002), but extends and strengthens this research by finding that neglect continues to be related to affective problems, even when prospectively reported and even after controlling for other adverse experiences in childhood. Furthermore, maternal neglect can alter brain reward and oxytocin systems in children, which may lead to diminished parental care

giving in future generations (Strathearn, 2011). This combined evidence illustrates how critical and enduring neglect is within the causation of affective symptoms. Neglect should be focused on as much as abuse/other adverse childhood experiences as a potential root of long-term psychiatric problems.

Additionally, the association between childhood SEP and adult affective symptoms was stronger for women than for men. This finding is in accordance with the existing evidence that sex differences in affective disorders are even more prevalent among individuals from lower socioeconomic backgrounds in childhood (Gilman et al., 2002) and that growing up in a low-income family is more likely to predispose women to affective disorders than men (Gore et al., 1992; Veijola et al., 1998). However, the present study extends these findings by discovering that the effects of SEP on affective symptoms in men are not only weaker, but also less enduring. At age 23 the relationship between SEP and self-reported affective symptoms, although weaker than for females, was still significant for males. In contrast, at age 50, this relationship was not significant for males, but was for females. The stronger moderation effect at age 50 may be because men were less consistent than women in their reports of affective symptoms between age 23 ($M = -0.06$) and age 50 ($M = -0.03$); the prevalence of their affective symptoms seemed to decrease by half between both ages. In contrast, female reports were more consistent ($M = 0.18$ and $M = 0.17$ respectively). Thus, as well as men being less sensitive to the effects of SEP, perhaps when SEP does affect mental well-being in male individuals, these effects are less enduring than in women. Future research is needed to assess this hypothesis, examining gender differences in the relationship between childhood SEP and affective problems at multiple ages from early to late adulthood.

On the contrary, the indirect effect of SEP via neglect did not differ between men and women, which suggests that both genders are equally vulnerable to the negative effects of neglect. This contradicts previous research finding that women were more sensitive to the effects of maltreatment in terms of affective problems (Gallo et al., 2018; Macmillan et al., 2001; Thompson et al., 2004). However, due to lack of data available on neglected children (Gallo et al., 2018), previous studies have focused on physical and sexual abuse when investigating gender differences in the effects of maltreatment. As this study focused specifically on gender differences in neglect, perhaps it is the case that although women are more sensitive to the effects of abuse than men, neglect may be equally as detrimental for both genders.

Secondly, few studies, even recent meta-analyses (Gallo et al., 2018), have detailed gender by maltreatment interactions (Gershon et al., 2008) within literature on childhood maltreatment and affective disorders and thus, one cannot be sure that the higher rates of affective disorders reported in women are simply attributable to a higher rate of maltreatment among the female population (Arnow et al., 2011). Indeed, significantly more women than men report experiences of both sexual and emotional abuse (Arnow et al., 2011). Thus, due to the focus on abuse in past research, the gender discrepancies in affective disorders observed may be entirely attributable to this increased exposure to abuse in females. In contrast, neglect was significantly more common in boys than girls in the current study. This combined with the fact that men are much less likely to report mental health problems than women (Fields and Cochran, 2011), may be the reason that no gender differences were observed.

The present study has a number of strengths and limitations. A key strength of the study is its huge nationally representative sample that followed people over three decades (John et al., 2019). However, this study is not without limitations. Firstly, the neglect indicators cover many (e.g., failure to ensure a child's basic physical, emotional and educational needs) but not all (e.g., failure to ensure a child's safety, failure to provide shelter, failure to meet a child's medical/dental needs) features of the typical definition of neglect (Gilbert et al., 2009). However, by creating a composite neglect scale with both parent and teacher reports of neglect, the effects of this misclassification may have been decreased (Kendall-Tackett and Becker-Blease, 2004).

Secondly, although certain adverse childhood experiences were controlled for when assessing the mediation and moderated mediation models, childhood abuse was not controlled for. As maltreatment types are often comorbid (Higgins and McCabe, 2001) and abuse, as well as neglect, is common within low-income families (Putnam-Hornstein et al., 2013), one cannot be sure that the effects of neglect on affective symptoms occurred independently of other adverse childhood experiences. Likewise, a multitude of changes are occurring in adolescence and can be explored in future studies.

Thirdly, psychological distress was assessed exclusively by a self-report, the Malaise Inventory. The limitations of self-report measures are widely known, especially in relation to mental illness (Atkinson et al., 1997). However, this scale is widely used, and is

highly effective at identifying psychiatric comorbidity (Rodgers et al., 1999), so one can be more certain of its accuracy.

The main weakness of this study is attrition, leading to a lot of missing data. Although those who took part in mid-adulthood were mostly representative of the surviving cohort, there was under-representation of disadvantaged groups (Atherton et al., 2008), which could have caused biased estimates. In this case, any differences observed in affective symptoms between the ages of 23 and 50, could have been due to an under-representation of people for lower SEPs at age 50 in comparison to age 23. Although research in the past has found that the effects of attrition bias in relation to child maltreatment in this cohort are relatively inconsequential for correlations with mental wellbeing at 50 years after doing sensitivity analyses (Geoffroy et al., 2016), one cannot completely rule out the possibility of this bias. We have dealt with this 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 data-set

In conclusion, this study suggests that neglect is partially responsible for the relationship between childhood SEP and adult affective problems. This indicates that social support is critical to reduce maltreatment and subsequent mental health problems. Therefore, neglect should be at the forefront of research into the effects of maltreatment.

Table 1. Descriptive Statistics by Gender

	Total (<i>n</i> = 18554)		Men (<i>n</i> = 9595)		Women (<i>n</i> = 8959)		<i>t</i>
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	
Malaise 23	0.06	(0.47)	-0.06	(0.42)	0.19	(0.48)	-32.57*** [-0.26, -0.23]
Malaise 50	0.07	(0.50)	-0.03	(0.48)	0.18	(0.51)	-24.89*** [-0.22, -0.19]
Neglect	.77	(1.28)	.83	(1.34)	.71	(1.22)	5.83*** [0.08, 0.16]
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Working	5911	44.5	3004	44.2	2907	44.8	
IM	4807	36.2	2483	36.6	2324	35.8	
Middle	2559	19.3	1306	19.2	1253	19.3	

Note. IM = Intermediate and % = Valid Percent excluding missing responses. N was calculated excluding missing data. *** $p \leq .001$ (two-tailed).

Table 2

Mediation Model at ages 23 and 50.

	Estimate	<i>t</i>	<i>SE</i>	<i>p</i>	95% CIs [LL, UL]
Age 23					
Effect of IV on M (a)	-0.49	-34.04	.01	< .001	[-0.52, -0.46]
Direct Effect of M on DV (b)	0.04	10.34	.00	< .001	[0.03, 0.05]
Total Effect (c)	-0.07	-12.28	.01	< .001	[-0.08, -0.06]
Direct Effect (c')	-0.05	-8.59	.01	< .001	[-0.06, -0.04]
Indirect Effect	-0.02		.00		[-0.02, -0.02]
Model Summary IV on M	$R^2 = .11, F(4, 10806) = 334.84, p = <.001$				
Model Summary IV & M on DV	$R^2 = .03, F(5, 10805) = 68.54, p = <.001$				
Model Summary Total Effect	$R^2 = .02, F(4, 10806) = 59.81, p = <.001$				
Age 50					
Effect of IV on M (a)	-0.49	-34.04	.01	< .001	[-0.52, -0.46]
Direct Effect of M on DV (b)	0.03	7.95	.00	< .001	[0.02, 0.04]
Total Effect (c)	-0.05	-7.85	.01	< .001	[-0.06, -0.04]
Direct Effect (c')	-0.03	-5.11	.01	< .001	[-0.05, -0.02]
Indirect Effect	-0.02		.00		[-0.02, -0.01]
Model Summary IV on M	$R^2 = .11, F(4, 10806) = 334.84, p = <.001$				
Model Summary IV & M on DV	$R^2 = .02, F(5, 10805) = 38.02, p = <.001$				
Model Summary Total Effect	$R^2 = .01, F(4, 10806) = 32.29, p = <.001$				

Note. R^2 = The total amount of variance in mental health explained. IV = Independent Variable (age 11 SEP), M = Mediator (neglect), DV = Dependent Variable (Malaise score age 23), CI [LL, UL] = Confidence Interval [Lower Level, Upper Level] and a, b, c and c' are the paths shown in Figure 2.

Table 3. Moderated Mediation Model at ages 23 and 50.

	Estimate	<i>t</i>	<i>SE B</i>	<i>p</i>	95% CIs [UL, LL]
Age 23					
Model Summary	$R^2 = .11$ $F(8, 10802) = 157.77$, $p = <.001$				
Main effect of Gender	.25	29.40	.01	< .001	[0.23, 0.26]
SEP x Gender	-0.06	-4.87	.01	< .001	[-0.08, -0.03]
Men	-0.02	-2.61	.01	.01	[-0.03, -0.00]
Women	-0.08	-8.79	.01	<.001	[-0.09, -0.06]
Neglect x Gender	0.01	1.09	.01	.27	[-0.01, 0.02]
Overall Moderated Mediation	-0.00		.00		[-0.01, 0.00]
Men	-0.02		.00		[-0.02, -0.02]
Women	-0.02		.00		[-0.03, -0.02]
Age 50					
Model Summary	$R^2 = .06$ $F(8, 10802) = 86.69$, $p = <.001$				
Main Effect of Gender	0.21	21.82	.01	< .001	[0.19, 0.23]
SEP x Gender	-0.05	-3.86	.01	< .001	[-0.07, -0.02]
Men	-0.01	-0.68	.01	.49	[-0.02, 0.01]
Women	-0.06	-5.89	.01	<.001	[-0.07, -0.04]
Neglect x Gender	0.00	-0.60	.01	.55	[-0.02, 0.01]
Overall Moderated Mediation	-0.00		.00		[-0.01, 0.01]
Men	-0.02		.00		[-0.02, -0.01]
Women	-0.02		.00		[-0.02, -0.01]

Note. SEP = socio-economic position, N = Neglect, R^2 = The total amount of variance in mental health explained, 95%CI [LL, UL] = 95% Confidence Interval [Lower Level, Upper Level].

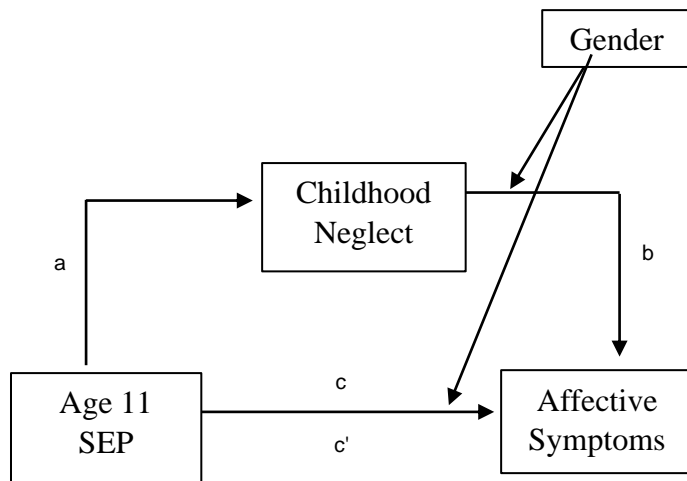


Figure 1. The moderated mediation relationship conceptually modelled. (SEP = socio-economic position)

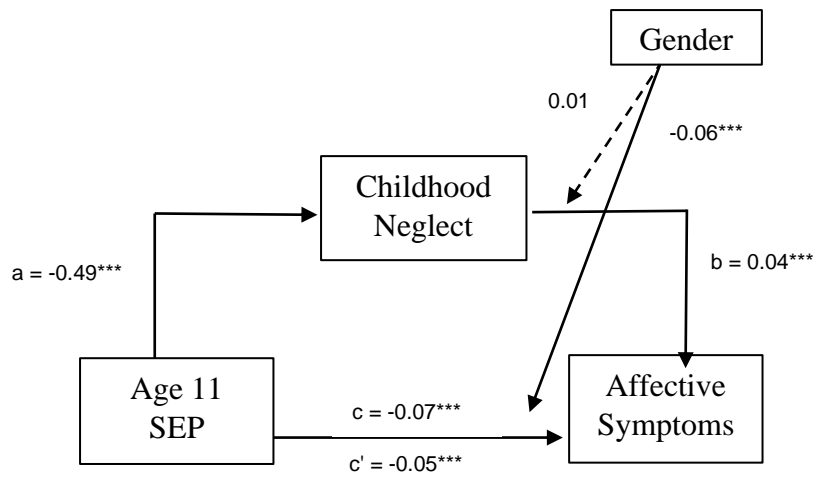


Figure 2a. Revised model for age 23 (Dashed lines show non-significant effects. SEP = socio-economic position. *** $p \leq .001$ (two tailed)).

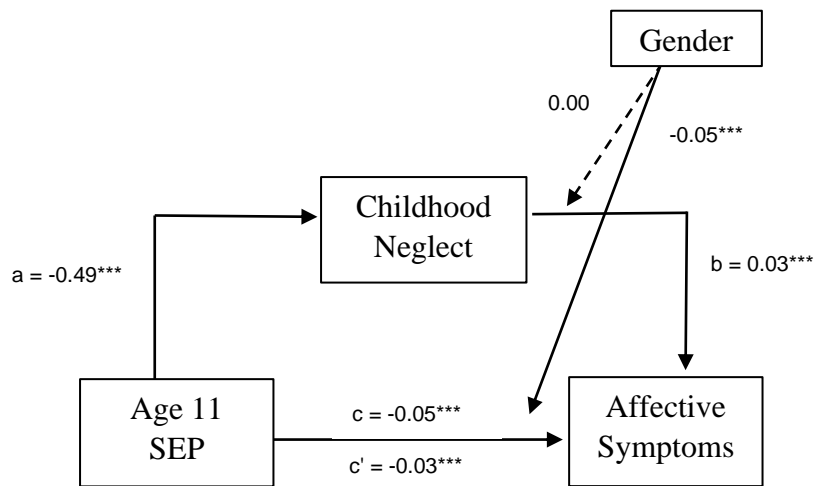


Figure 2b. Revised model for age 50 (Dashed lines show non-significant effects. SEP = socio-economic position. *** $p \leq .001$ (two tailed)).

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