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The impact of childhood and adulthood psychological health on labour force participation and exit in later life.

C Clark, M Smuk, D Lain, S.A. Stansfeld, E. Carr, J. Head, S. Vickerstaff

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ABSTRACT

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Background

Adulthood psychological health predicts labour force activity but few studies examine childhood psychological health. We hypothesised that childhood psychological ill-health would be associated with labour force exit at 55 years.

Method

Data were from the 55-year follow-up of the National Child Development Study (n=9137). Labour force participation and exit (unemployment, retired, permanent sickness, homemaking/other) were self-reported at 55 years. Internalizing and externalizing problems in childhood (7, 11 and 16 years) and malaise in adulthood (23, 33, 42, 50 years) were assessed. Education, social class, periods of unemployment, partnership separations, number of children, and homemaking activity were measured throughout adulthood.

Results

Childhood internalizing and externalizing problems were associated with unemployment, permanent sickness and homemaking/other at 55 years, after adjustment for adulthood psychological health and education: one or two reports of internalizing was associated with increased risk for unemployment (RR=1.59 95%CI 1.12, 2.25; RR=2.37 95%CI 1.48, 3.79) and permanent sickness (RR=1.32 95%CI 1.00, 1.74; RR=1.48 95%CI 1.00, 2.17); three reports of externalizing was associated with increased risk for unemployment (RR=2.26 95%CI 1.01, 5.04), permanent sickness (RR=2.63 95%CI 1.46, 4.73) and homemaking/other (RR=1.95 95%CI 1.00, 3.78).

Conclusions

Psychological ill-health across the lifecourse, including during childhood, reduces the likelihood of working in older age. Support for those with mental health problems at different life-stages and for those with limited connections to the labour market, including homemakers, is an essential dimension of attempts to extend working lives.

INTRODUCTION

The extending working lives agenda, encouraging labour force participation beyond traditional retirement ages, brings increasing focus on the types of economic activities individuals are engaged in from mid-life onwards and also on lifecourse predictors of different types of economic activity (Lundin and Hemmingsson, 2013). By their mid-fifties, many individuals have already left the workplace due to early retirement, long-term sickness or disability, unemployment or may remain homemakers, placing expectations on those who remain in the workplace to extend their working lives. Getting people into employment and keeping them in employment is key to the extending working lives agenda (van der Noordt *et al.*, 2014).

Labour force participation is characterized by activities encompassing employment covering full-time, part-time and self-employment versus those that characterise work place exit covering unemployment and long-term sickness or disability - often conceptualised as being 'non-voluntary' work exits, versus early retirement - often conceptualised as being a 'voluntary' work exit. The role of homemaking in later-life has been largely overlooked in previous studies (Alavinia and Burdorf, 2008), and whilst likely to include a group undertaking caring responsibilities, it may also include individuals who have undergone work place exit at some earlier point in the lifecourse for other reasons.

Health is a key predictor for employment (van Rijn *et al.*, 2014), and in turn, good employment is beneficial for health (van der Noordt *et al.*, 2014). The health selection hypothesis posits that individuals in good health are more likely to obtain and stay in employment, whilst individuals with poorer health are more likely to lose their jobs, be or remain unemployed, or receive disability pensions. In terms of lifecourse predictors of moving from labour force participation to exit, a recent systematic review concluded that poorer self-rated health prospectively increased the likelihood for transition to receipt of a disability pension, being unemployed, and early retirement, whilst psychological health problems increased the likelihood for transition to receipt of a disability pension and unemployment but not early retirement (van Rijn *et al.*, 2014).

Whilst psychological health has a strong influence on employment in older age, it is overlooked by a lot of research (Lain, 2016). The Black Report (Black, 2008) identified psychological health as one of the two most important health constraints on employment, the other being musculoskeletal disorders. However, a longitudinal lifecourse approach is important as there are different potential pathways to poorer levels of psychological health among economically inactive older people. On the one hand, older non-working adults may have poorer psychological health *because* they became inactive – the so-called 'causation' explanation (Montgomery *et al.*, 1996). Analyses of the US Health and Retirement Study found increased levels of depression among workers on below median incomes that had lost their jobs (Gallo *et al.*, 2006). An alternative perspective, 'direct health selection', posits that poorer psychological health *leads* to inactivity (Montgomery *et al.*, 1996). This is likely to include psychological disorders that reflect relatively stable personality traits (Lundin and Hemmingsson, 2013), or 'scarring' effects, whereby previous psychological problems have long-term negative employment consequences. As psychological ill-health begins early in the lifecourse for many individuals (Clark *et al.*, 2007, Insel and Fenton, 2005), research into the

long term effects of psychological problems from childhood/early adulthood into older age is needed in order to better understand the processes at play, something that is currently missing from the literature.

Previous evidence relating early-life psychological health to labour force participation and exit is largely limited to studies examining psychological health in late adolescence or early adulthood on unemployment or disability pensions and is often restricted to male populations (Lundin and Hemmingsson, 2013, Montgomery *et al.*, 1996). Gaps in knowledge remain in relation to the role of externalizing and internalizing problems in childhood; across a broader range of economic activities in later adulthood; and for women. Previous studies also differ in length of follow-up (van Rijn *et al.*, 2014) and which adulthood time-periods are examined. Few studies take a lifecourse approach.

A number of lifecourse factors beyond health also influence labour force participation and exit such as educational attainment or cognitive ability, partnership history, and past occupational history and labour demand (Haas *et al.*, 2011, Lundin and Hemmingsson, 2013, Macnicol, 2015). Interestingly childhood and/or adulthood psychological health have been shown to be prospectively associated with educational attainment, partnership status, and past occupational history (Copeland *et al.*, 2015, Gibb *et al.*, 2011, Mojtabai *et al.*, 2015, Veldman *et al.*, 2015), suggesting that these lifecourse factors may explain associations between psychological health and labour force participation and exit in later adulthood. Associations between psychological health and labour force participation and exit may also be confounded by lifecourse socioeconomic status, education (own and parent), and childhood adversity (Clark *et al.*, 2010, Henderson *et al.*, 2012, Lorant, 2003, Stansfeld *et al.*, 2011).

The existing literature has very little to say about lifecourse predictors of being a homemaker, perhaps because of the previous neglect of women in workforce research. Most studies do not include this type of economic activity in their analyses, despite high numbers of homemakers in the older adult population (DWP, 2014). The implicit assumption is that the inactivity of homemakers is related to male-breadwinner norms among the older population. What has not been examined is whether earlier psychological problems influence inactivity as a homemaker. Consequently it is harder to reflect upon policies that would positively support increased employment among this group.

It is also important to acknowledge gender as a potential moderator of associations between psychological health and labour force participation and exit: prevalence rates for different types of disorders across childhood and adulthood differ by gender (Green *et al.*, 2005, McManus *et al.*, 2009), and there are also gendered patterns of economic activities (Loretto and Vickerstaff, 2011).

This paper examines whether childhood and adulthood psychological ill-health are associated with labour force participation and exit at 55 years. We examine whether associations differ by gender; for internalizing versus externalizing problems in childhood; and for early adulthood versus later adulthood psychological distress. We also examine whether the associations observed for childhood psychological health, are influenced by adulthood covariates including psychological ill-health, education, number of partnership

separations, current partner's labour force activity, number of children, length of time homemaking, and unemployment history.

METHOD

Sample

Data were from the National Child Development Study, a cohort of 98% of births in England, Scotland and Wales during 1 week in March 1958 (n=18,558). Information was obtained from parents and teachers at 7, 11 and 16 years and by participant interviews at ages 7, 11, 16, 23, 33, 42, 45, 50 and 55 years. Analyses are based on 9137 participants who took part in the 55-year survey: response rate 82.5% of the invited sample (n=11,070), representing 49.2% of the original cohort population. Ethical approval for the 55y survey was granted by MREC London Central (12/LO/2010).

Measures

Labour force participation and exit at 55y

Labour force participation or exit was self-reported at 55y, with participants reporting their main activity as full-time employed (self-employed or employed), part-time employed (self-employed or employed), unemployed, retired, permanently sick (defined as being long-term sick or disabled), or homemaker/other (self-defined as either looking after home/family or something else (including n=31 temporary sick)). Cohabiting participants reported their partner's current labour force participation, using a similar question.

Lifecourse psychological health

Internalizing and externalizing problems were measured at ages 7, 11 and 16 years using the teacher-report Bristol Social Adjustment Guides and Rutter Scales (Elander and Rutter, 1996, Rutter, 1967, Rutter, 1970). Internalizing problems comprised symptoms including depression, worry, withdrawal; externalizing problems comprised symptoms including hostility, disobedience, aggressiveness, bullying. These scales have demonstrated reliability in this cohort (Clark *et al.*, 2007). Counts of the number of reports of internalizing and the number of reports of externalizing problems across the childhood period (7y, 11y & 16y, inclusive) were derived.

Psychological health at ages 23, 33, 42, and 50 years was assessed using the Malaise Inventory (Rodgers *et al.*, 1999), which assesses psychological and somatic symptoms. This paper uses the 9-item version, where a score of 4 or higher denotes a high level of distress (Brown *et al.*, 2010). Counts of the number of reports of malaise across the adulthood period (23, 33, 42 or 50y), in early adulthood (23 or 33y) or in later adulthood (42 or 50y) were derived.

Lifecourse covariates

Social position was assessed using the Registrar General's Social Class measure (I=Professional; II=managerial, and technical occupations; III_{nm}=skilled non-manual occupations; III_m=manual occupations; IV=partly skilled occupations; v=unskilled occupations) in childhood at age 7 (for the Father) and in adulthood (23y, 33y, 42y, 50y) (OPCS, 1980). Highest educational qualification was self-reported at 33y. The number of

children the participant had across adulthood was reported at 55y. A count of times the participant had been unemployed (having no employment and seeking paid work as opposed to undertaking other non-working activities such as homemaking) from 16y to 42y was derived from the activity histories available from 1974-2009 (Hancock *et al.*, 2011a). For further details see (Stansfeld *et al.*, 2016). The number of months of homemaking activity reported over this period was also calculated. A count of the number of separations from a cohabiting partnership from 16y to 42y was derived from the partnership histories for the period 1974-2008 available for the cohort (Hancock *et al.*, 2011b).

Missing data

With over five decades of data collection, missing data needs to be addressed in the datasets. Non-participation at 55y was significantly predicted by childhood and adulthood psychological health, being male, lower social class and educational qualifications. Within our cohort of participants in the 55y survey, missing data ranged up to 21.1% for individual variables (not derived count variables). Missing data patterns were explored and “Missing At Random” (MAR) (Rubin, 1987) was assumed. We imputed the data using multiple imputation by chained equations in Stata’s ICE package (StataCorp, 2015). Interaction terms between gender and the psychological health outcomes were passively imputed. The imputation model was chosen to be congenial (Meng, 1994) with the most saturated model of interest and hence included all the lifecourse psychological health and covariates described in the method, along with labour force participation and exit at 55y. Due to lack of data relating to the partner, partner labour force participation was not imputed reducing the sample size (n=137), leaving a sample of n=9010 for imputation. We created 25 imputed datasets, using 100 cycles and checked the convergence of the imputation algorithm.

Statistical analysis

A series of unadjusted and adjusted multinomial regression analyses were conducted to examine associations between the counts of childhood and adulthood psychological ill-health measures and labour force participation and exit at 55y. These regression analyses compared the relative risks for being part-time employed, unemployed, retired, permanently sick, and homemaker/other with the full-time employed reference group. Models for childhood psychological ill-health were adjusted for Father’s social class at 7y, gender, and marital status at 55y. Models for adulthood psychological ill-health were adjusted for gender, number of times in manual social class in adulthood, and marital status at 55y. Interactions of childhood and adulthood psychological ill-health with gender were examined: analyses were stratified by gender if the interaction term was significant ($p \leq 0.05$) and adjusted for gender if not.

We were unable to run causal mediation estimates, as the data are multinomial categorical (Hicks and Tingley, 2011). To explore, whether the associations for childhood psychological health were influenced by adulthood factors, firstly, the association of each adulthood factor (number of children in the household; number of months of homemaking; partner’s labour force participation or exit; educational qualifications; number of times unemployed; and number of partnership separations) with labour force participation and exit were examined. Secondly, each adulthood factor was entered individually to examine whether associations of childhood psychological health on labour force participation and exit at 55y became non-significant ($p > 0.05$).

Data were analysed with Stata Version 14 (StataCorp, 2015).

RESULTS

At 55y, 81.2% reported labour force participation (61.5% full-time employed or self-employed and 19.7% part-time employed or self-employed), leaving 18.8% who were out of the work-force (2.8% unemployed, 5.2% permanently sick, 3.3% retired, and 7.5% homemaker/other (made up of 81.8% homemakers, 4.7% temporary sick and 13.5% other)) (see Table 1).

Table 2 shows that after adjustment for gender, father's social class at 7y, and marital status at 55y internalizing problems and externalizing problems in childhood both increased the risk for being unemployed, permanently sick, and homemaking/other. Risk for permanent sickness and homemaking/other increased with the count of internalizing problems; one or two reports of internalizing problems in childhood increased risk for unemployment. Risk for permanent sickness increased with the count of externalizing problems; one or three reports of externalizing increased risk of unemployment; and two or three reports of externalizing increased risk for homemaking/other. No gender interactions were observed between the childhood psychological health measures with labour force participation or exit at 55y.

Table 3 shows that after adjustment for gender, adulthood social class, and marital status at 55y, risk for being unemployed increased with the count of malaise in adulthood, as did risk for permanent sickness and homemaking/other. Risk for being retired was borderline significantly associated with one count of malaise in adulthood (RR=1.44 95%CI 1.01-2.05).

Comparing the risk for those with malaise in early adulthood (23/33y) with later adulthood (42/50y) similar associations were seen for an increase in risk for unemployment and homemaking/other but the risk was smaller, but still sizeable, for permanent sickness in early adulthood than in later adulthood.

Some gender differences in associations between the adulthood psychological health and labour force participation and exit at 55 years were observed (Table 3). Reporting malaise at both 23y and 33y increased risk for working part-time for men (RR=2.91 95%CI 1.16-7.30); reporting malaise at both 42y and 50y increased risk for working part-time for men (RR=2.13 95%CI 1.23-3.70). Table 3 also shows that men experiencing malaise at both times either in early adulthood or in later adulthood show greater risk of being permanently sick or homemaking/other at 55y, compared with women but the risks were sizeable for both genders.

Table 4 shows that many of the associations between childhood psychological ill-health and labour force participation and exit at 55y were statistically significant after additional adjustment for the count of malaise in adulthood. Internalizing problems in childhood were significantly associated with increased risk for unemployment and permanent sickness. Experiencing three reports of externalizing across childhood was associated with increased risk for being unemployed, being permanently sick and homemaking/other.

Table 5 shows that labour force participation and exit was associated with number of children in the household, current partner's labour force participation and exit, number of partnership separations, number of periods of unemployment, educational qualifications, and months of homemaking. These adulthood factors were individually added to the childhood psychological health models. Adjustment for these factors hardly changed the estimated coefficients (results not shown), with the exception of the model adjusting for educational qualifications (see Table 6), which influenced some but not all of the associations. One or two reports of internalizing in childhood was associated with increased risk for unemployment (RR=1.59 95%CI 1.12, 2.25; RR=2.37 95%CI 1.48, 3.79) and permanent sickness (RR=1.32 95%CI 1.00, 1.74; RR=1.48 95%CI 1.00, 2.17). Three reports of externalizing in childhood was associated with increased risk for unemployment (RR=2.26 95%CI 1.01, 5.04), permanent sickness (RR=2.63 95%CI 1.46, 4.73) and for homemaking/other (RR=1.95 95%CI 1.00, 3.78).

DISCUSSION

Summary of the evidence

Using prospective data over 55 years, this study found that childhood and adulthood psychological ill-health were both associated with work place exit at 55y in terms of unemployment, permanent sickness and homemaking/other. Childhood and adulthood psychological ill-health were not associated with early retirement at 55y.

Adulthood psychological health

This study found robust associations between malaise in adulthood and unemployment, permanent sickness and homemaking/other, confirming that adult mental health is a key predictor of labour force exit (van Rijn *et al.*, 2014). Just one count of malaise in adulthood increased risk for these outcomes, and there was a dose-response relationship between episodes of malaise and the increase in risk. Previous studies have found that poor psychological health predicts unemployment over several months (Kaspersen *et al.*, 2016a) but also over many years (Kaspersen *et al.*, 2016b). We found that malaise at any time in adulthood predicted unemployment many years later, with follow-up encompassing five to 32 years. Adulthood psychological health did not predict early retirement, supporting the conclusion of a recent systematic review (van Rijn *et al.*, 2014).

Previous studies of disability pension receipt, an outcome similar to our measure of permanent sickness, show robust associations with mental health in both the short (Overland *et al.*, 2008) and the long-term (Knudsen *et al.*, 2010, Mykletun *et al.*, 2006). A Norwegian study found that individuals in receipt of disability benefit for mental ill-health were awarded this at a significantly younger age (46y) than those in receipt of disability pension for musculoskeletal disorder (55y) (Knudsen *et al.*, 2012). We found larger associations between malaise in later adulthood and permanent sickness, probably reflecting the closer timeframe between ill-health and transition to permanent sickness status: this may also reflect stress associated with the period leading up to the transition to permanent sickness status (Overland *et al.*, 2008). Previous studies suggest that recipients of disability benefits have poorer perceived health compared to both the employed and unemployed (Overland *et al.*, 2006); our findings may indicate that poorer perceptions of

health may be present much further back in the lifecourse and that return to work schemes should consider additionally focusing on patients' perceptions of their health, as suggested by Overland *et al.*, (2006).

Few studies examine lifecourse predictors of being a homemaker in later adulthood. In this study, participants describing themselves as 'homemakers/other' self-defined their main activity as looking after the home/family, being temporarily sick or disabled, or something else. However, the majority of this group were looking after the home/family (>80%). As participants selected which category described their main activity, those describing themselves as homemakers are not able to say they are in full-time or part-time employment, or that they are unemployed. The European Survey on Health and Aging in Europe (SHARE) found that being a homemaker at age 50-64 was predicted by poorer health, lower education and depression (Alavinia and Burdorf, 2008). Our findings support the hypothesis that poorer mental health at any stage of adulthood predicts homemaking in later adulthood. Homemaking is predicted by factors that also predict other 'non-voluntary' work exits such as permanent sickness and unemployment. It is likely that the roles and activities of individuals who describe themselves as homemakers vary and may include some individuals who are not working for health related reasons. Psychological ill-health in homemakers may reflect stress associated with caring duties for offspring or older relatives (Stansfeld *et al.*, 2014); conversely, homemaking may be a less-stigmatizing label used by some who are vulnerable to psychological distress. Kaspersen *et al.* highlighted the need for policy to focus on the health of out of work individuals, including the provision of support, preparing individuals for re-employment. Our findings suggest that the group of out of work individuals could be widened to include some homemakers, who may also qualify for re-employment schemes (Kaspersen *et al.*, 2016b).

Our findings suggest that men may be more likely to undertake part-time employment at 55y if they have malaise at both time-points in either earlier or later adulthood, although this finding needs replicating in other cohorts. This may reflect an agreement for more flexible working conditions for those who know they experience poor psychological health. Few studies to date examine part-time work in male populations.

Childhood psychological health

Psychological influences on labour force exit have their origin further back in the lifecourse. Childhood psychological health did not show associations with part-time employment or early retirement but was a significant distal factor for unemployment, permanent sickness and homemaking/other in later adulthood.

Few studies track childhood psychological health onto a range of labour force activities beyond early adulthood (Henderson *et al.*, 2009). Analyses of the Great Smoky Mountains cohort found that childhood psychiatric disorders predicted inability to keep a job, quitting multiple jobs and being dismissed up to 25y (Copeland *et al.*, 2014, Copeland *et al.*, 2015). Our findings suggest that the effects of childhood psychological problems extend further into the lifecourse. We have not examined further childhood factors, such as childhood adversity, trauma and neglect which might plausibly account for or precede the effect of childhood psychological health on mid-life labour force participation and exit. Copeland *et al.*, (2015) found that childhood psychiatric disorder was associated with poorer outcomes in

early adulthood, including educational outcomes, and this resulted in a disrupted transition to adulthood likely impacting on achieving good working conditions and higher status occupations. Due to the categorical multinomial nature of our data, we cannot assess whether education mediates the association between childhood psychological health and labour force activity. Previous studies demonstrate the importance of education and cognitive ability for labour force exit in early and later adulthood (Henderson *et al.*, 2012, Sörberg *et al.*, 2014). Targeting both childhood psychological health and educational outcomes might be beneficial for the extending working lives agenda. This proactive approach focusing on primary prevention of psychological ill-health and education as a means of reducing risk for labour force exit, contrasts with the popular reactive model focusing on better detection and treatment of adult mental health problems in occupational settings (Black, 2008, Health and Safety Executive, 2007).

One or two counts of internalizing problems increased risk for unemployment and permanent sickness at 55y. Previous studies have found that multiple episodes of internalizing disorders in childhood are associated with greater risk of long-term psychopathology across the lifecourse (Clark *et al.*, 2007, Colman *et al.*, 2007), indicating one pathway for the effects observed on labour force exit. Reporting externalizing at all three time-points in childhood was a significant risk factor for unemployment and permanent sickness at 55y, confirming previous reports of associations between childhood externalizing problems and poorer health in early adulthood (Odgers *et al.*, 2007). Three reports of externalizing reflects lifecourse persistent externalizing problems (Odgers *et al.*, 2008) and is indicative of clinically-relevant, more severe symptomatology and vulnerability: these findings identify a population that could be the focus on interventions in relation to labour force participation. One or two reports of externalizing problems are hypothesized not to increase risk as this is normative behavior in adolescence (Moffitt, 1993). Childhood psychological health may have a direct influence on labour force exit, but factors such as childhood parenting experiences, personality and coping styles, and inequalities in access to treatment may explain these relationships.

It was not possible to examine the role of potential mediators of the association between psychological health and labour force exit. Possible mediators include educational attainment, partnership history and occupational history (Copeland *et al.*, 2015, Gibb *et al.*, 2011, Haas *et al.*, 2011, Lundin and Hemmingsson, 2013). Valid statistical methods for examining mediation using multinomial categorical data are not yet available (Richiardi *et al.*, 2013). We have therefore been limited to treating these adulthood factors as covariates, rather than mediators, which may bias our results and conclusions (Richiardi *et al.*, 2013).

Limitations & strengths

This study had several limitations. Labour force participation and exit at 55y was self-reported with participants categorising their main economic activity: such a question may not reflect increasingly diverse multi-occupational patterns in later adulthood. Descriptors of different out-of-work statuses are subjective and may plausibly be influenced by psychological health. The capacity restrictions on current multiple imputation software meant that we had to collapse the categories for homemakers and other together for analyses purposes. Further, imputation was restricted to individuals who participated in the

55-year study, meaning that the findings are based on analyses of 50% of the original birth cohort population. This may limit generalizability of the findings and may result in overly conservative findings as those with poorer health and greater social disadvantage may be missing from the dataset. We lacked power to explore participants on temporary sick leave. Adulthood psychological health was self-reported using a symptom scale not a clinical diagnostic measure. We have not accounted for temporal and reciprocal relationships that may exist between psychological health and permanent sickness.

Strengths include: the use of multi-informant data over 55 years; multiple imputation to address missing data; examination of a broad range of labour force participation and exit outcomes not restricted to a working or all male population; taking a range of adulthood lifecourse factors into account which might influence associations between psychological health and labour force participation at 55y.

Conclusions

Success of the extending working lives agenda depends on getting people into, and keeping them in, employment (van der Noordt *et al.*, 2014). It is notable that psychological problems across the lifecourse, including during childhood, significantly reduce the likelihood of working in older age. It was previously known that psychological problems *in older age* were associated with an increased likelihood of not working (Black, 2008). However, until now the long-term impact of childhood mental health on employment in older age was not empirically established. The provision of support for those with mental health problems at different life-stages could therefore be a dimension of attempts to extend working lives (on the development of policy interest in mental health and employment see (Irvine, 2013)). The UK Government's *Fuller Working Lives Framework for Action* (DWP, 2014), which is aimed at increasing employment among older people, indicates that the government will pilot the provision of increased psychological support for benefit claimants. More generally, the UK government has committed to having a 'parity of esteem' between mental and physical health. A key innovation has been the 'Improving Access to Psychosocial Therapies' (IAPT) programme, which has increased provision of therapies for those with depressive and anxiety disorders. Evaluations of IAPT suggest that 'Nationally, of [adult] people that finished a course of treatment in IAPT, 45% recover... and a further 16% show reliable improvement' (Fonagy and Clark, 2015). These results are encouraging, and hopefully modest employment increases among participants found in early evaluations (Clark *et al.*, 2009) could signal sustained improvements in labour market outcomes more generally. However, our study highlights the importance of childhood mental health on employment in older age. The Children and Young People's IAPT has found less obvious success, and there is a need to continue examining how improvements in childhood mental health can be made (Fonagy and Clark, 2015). Mental health interventions in schools is mooted as an area where more could be done (Fazel *et al.*, 2014).

As noted above, a particular focus has thus far been on the benefits of providing therapies for inactive people on benefits (DWP, 2014). However, population ageing means that governments will want to maximise employment among 'the working age population' more generally, in order to off-set the costs associated with an increased population of older people. This will most likely mean increasing employment among 'homemakers' (Altmann, 2015). Historically, there has been little examination of why large numbers of older women

are in this category. Our analysis suggests that mental health problems earlier in the lifecourse are significantly associated with being an economically inactive 'homemaker' for people in their mid-fifties. If policy is to increase employment among this group, it has to do more to provide and promote mental health services for those with limited connections to the labour market, including homemakers.

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Table 1 Descriptives and missing data for people who took part in the age 55 survey (n=9010*).

Measure		N	% Missing
		Unimputed	
OUTCOME AND MENTAL HEALTH MEASURES			
Employment at 55	Full Time (employed or self-employed)	5466	1.32%
	Part Time (employed or self-employed)	1755	
	Unemployed	251	
	Retired	291	
	Permanently Sick	462	
	Homemaker or other	666	
Count of internalizing across ages 7y, 11y & 16y	0	4083	36.96%*
	1	1229	
	2	308	
	3	60	
Count of externalizing across ages 7y, 11y & 16y	0	4369	37.33%*
	1	930	
	2	273	
	3	75	
Count of Malaise 23y/33y	0	6095	24.05%*
	1	558	
	2	190	
Count of Malaise 42y/50y	0	6228	14.55%*
	1	1016	
	2	455	
Count of Malaise (23y,33y,42y,50y)	0	4685	32.61%*
	1	807	
	2	352	
	3	160	
	4	68	
SOCIO-DEMOGRAPHIC & HOUSEHOLD FACTORS			
Gender	Male	4373	0.00%
	Female	4637	
Father's Social Class 7y	I & II	1816	12.49%
	III non-manual	842	
	III manual	3387	
	IV, V no male head	1840	
Social Class 23y	I & II	1192	17.48%
	III non-manual	2984	
	III manual	1750	
	IV, V	1509	
Social Class 33y	I & II	2929	17.88%
	III non-manual	1840	
	III manual	1361	
	IV, V	1269	
Social Class 42y	I & II	3332	19.66%
	III non-manual	1574	
	III manual	1320	

	IV, V	1013	
Social Class 50y	I & II	3506	21.15%
	III non-manual	1421	
	III manual	1263	
	IV, V	914	
Count of number of times in manual social class in adulthood (III manual, IV or V)	0	1906	48.12%*
	1	1023	
	2	565	
	3	475	
	4	705	
Marital Status 55y	Married, cohabiting or Remarried	6450	0.07%
	Single never married	897	
	Separated/Divorced/Widowed	1657	
ADULTHOOD FACTORS - POTENTIAL MEDIATORS			
Number of children	0	1328	0.00%
	1	1142	
	2	3659	
	3+	2881	
Partner labour force participation or exit	No partner	1924	0.00%
	Full Time employed	3256	
	Part time employed	1096	
	Full-time self-employed	787	
	Part time self-employed	325	
	Unemployed	142	
	Permanently Sick	283	
	Homemaker	435	
	Retired	614	
	Other	148	
Number of Partner separations	0	561	0.00%
	1	5427	
	2	2045	
	3+	977	
Number of times unemployed	0	5688	0.00%
	1	1956	
	2	737	
	3	313	
	4+	316	
Educational qualifications (33y)	A level or higher	3803	14.31%
	O level	3417	
	None	501	
Home making duration (months)	Never	6013	0.00%
	0<HM<=2	513	
	2<HM<=5	661	
	5<HM<=10	921	
	HM>10	902	

*% missing at least one of the measures used to derive this variable.

* excluding 137 people who were missing data on partners employment status.

Table 2 Associations between childhood psychological health and economic activity at 55y, adjusted for gender, social class at 7y and marital status at 55y (N=9010)

	Full Time	Part Time	Unemployed	Retired	Permanently Sick	Homemaker or other
		RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)
adjusted for gender, social class 7y, marital status 55y						
Count of internalizing across ages 7y, 11y & 16y						
1	1.00	1.16 (1.00 - 1.36)	1.74*** (1.25 - 2.44)	0.97 (0.71 - 1.33)	1.80*** (1.40 - 2.32)	1.29* (1.02 - 1.62)
2	1.00	1.00 (0.73 - 1.38)	2.73*** (1.73 - 4.31)	0.66 (0.33 - 1.34)	2.46*** (1.72 - 3.51)	1.75** (1.21 - 2.53)
3	1.00	1.08 (0.51 - 2.28)	2.19 (0.78 - 6.13)	n.e.	4.25*** (2.29 - 7.88)	2.80** (1.39 - 5.66)
Count of externalizing across ages 7y, 11y & 16y						
1	1.00	1.03 (0.86 - 1.23)	1.45* (1.02 - 2.05)	0.91 (0.64 - 1.30)	1.77*** (1.36 - 2.30)	1.24 (0.97 - 1.59)
2	1.00	0.87 (0.62 - 1.22)	1.30 (0.72 - 2.36)	1.01 (0.53 - 1.92)	2.47*** (1.70 - 3.59)	1.78** (1.17 - 2.72)
3	1.00	0.94 (0.47 - 1.87)	3.10** (1.44 - 6.66)	0.47 (0.07 - 3.22)	5.69*** (3.32 - 9.75)	2.81*** (1.49 - 5.29)

A gender interaction was explored in each model; none were significant at 5%. ***p<=0.01, **p=0.01, *p=0.05. n.e: not estimated due to low power.

Table 3 Associations between adult psychological health and economic activity at 55y, adjusted for gender, social class in adulthood and marital status at 55y (N=9010)

		Full Time	Part Time	Unemployed	Retired	Permanently Sick	Homemaker or other
			RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)
Adjusted for gender, social class in adulthood, marital status 55y							
Count of Malaise (23y,33y,42y,50y) ^a	1	1.00	1.15 (0.96 - 1.38)	1.51* (1.02 - 2.24)	1.44* (1.01 - 2.05)	4.54*** (3.44 - 6.01)	1.62*** (1.25 - 2.10)
	2		1.17 (0.89 - 1.54)	2.18** (1.28 - 3.72)	1.23 (0.66 - 2.28)	7.23*** (5.22 - 10.01)	1.88*** (1.34 - 2.65)
	3		1.34 (0.92 - 1.96)	2.62** (1.28 - 5.35)	1.38 (0.59 - 3.24)	7.01*** (4.40 - 11.17)	2.54*** (1.63 - 3.96)
	4		1.29 (0.75 - 2.23)	4.14** (1.56 - 10.95)	0.51 (0.07 - 3.77)	13.62*** (8.09 - 22.95)	3.56*** (2.03 - 6.22)
Count of Malaise 23y/33y ^a	1	1.00	1.15 (0.93 - 1.43) M: 1.53 (0.89 - 2.63) F: 1.04 (0.82 - 1.32)	1.73* (1.10 - 2.73) M: 1.83 (0.92 - 3.64) F: 1.66 (0.89 - 3.09)	1.13 (0.71 - 1.81) M: 1.23 (0.55 - 2.73) F: 1.05 (0.59 - 1.89)	2.45*** (1.81 - 3.32) M: 3.21*** (1.99 - 5.19) F: 2.04*** (1.37 - 3.04)	1.59*** (1.21 - 2.10) M: 2.33* (1.18 - 4.60) F: 1.43* (1.05 - 1.94)
	2	1.00	1.19 (0.84 - 1.69) M: 2.91* (1.16 - 7.30) F: 1.00 (0.69 - 1.46)	2.60** (1.29 - 5.25) M: 3.82* (1.19 - 12.28) F: 2.09 (0.88 - 4.99)	0.84 (0.31 - 2.29) M: 1.42 (0.21 - 9.48) F: 0.66 (0.21 - 2.11)	3.87*** (2.58 - 5.79) M: 4.43*** (1.91 - 10.26) F: 3.49*** (2.19 - 5.55)	2.32*** (1.55 - 3.47) M: n.e. F: 2.17*** (1.43 - 3.30)
Count of Malaise 42y/50y ^a	1	1.00	1.15 (0.96 - 1.38) M: 1.30 (0.87 - 1.94) F: 1.12 (0.91 - 1.38)	1.86*** (1.28 - 2.70) M: 1.46 (0.83 - 2.57) F: 2.37*** (1.44 - 3.91)	1.47* (1.03 - 2.11) M: 1.17 (0.63 - 2.16) F: 1.69* (1.08 - 2.64)	5.07*** (3.90 - 6.60) M: 5.93*** (4.06 - 8.67) F: 4.50*** (3.16 - 6.42)	1.90*** (1.49 - 2.42) M: 2.12* (1.16 - 3.89) F: 1.87*** (1.44 - 2.44)
	2	1.00	1.33* (1.02 - 1.74) M: 2.13** (1.23 - 3.70) F: 1.12 (0.83 - 1.52)	2.65*** (1.60 - 4.40) M: 3.31*** (1.70 - 6.48) F: 2.14* (1.02 - 4.47)	1.19 (0.62 - 2.27) M: 1.61 (0.64 - 4.05) F: 0.90 (0.37 - 2.19)	11.14*** (8.36 - 14.83) M: 11.63*** (7.52 - 17.98) F: 10.03*** (6.86 - 14.65)	2.52*** (1.85 - 3.45) M: 3.71*** (1.79 - 7.69) F: 2.16*** (1.53 - 3.05)

^a Reference group is 0. Social class is a count of the number of times in manual work for multiple age measures. Gender stratified estimates presented where the gender interaction $p < 0.05$. *** $p < 0.01$, ** $p = 0.01$, * $p = 0.05$

Table 4 Associations between childhood psychological health and economic activity at 55y, with additional adjustment for malaise in adulthood (N=9010)

	Full Time	Part Time	Unemployed	Retired	Permanently Sick	Homemaker or other
		RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)
Adjusted for gender, social class 7y, marital status 55y, adulthood social class, count of reports of malaise in adulthood						
Count of internalizing across ages 7y, 11y & 16y						
1	1.00	1.14 (0.97 - 1.33)	1.66** (1.18 - 2.33)	1.05 (0.76 - 1.44)	1.40* (1.07 - 1.82)	1.17 (0.92 - 1.48)
2	1.00	0.96 (0.69 - 1.32)	2.51*** (1.57 - 4.00)	0.77 (0.38 - 1.56)	1.58* (1.07 - 2.33)	1.43 (0.97 - 2.10)
3	1.00	0.99 (0.47 - 2.10)	1.89 (0.66 - 5.42)	n.e.	2.18* (1.10 - 4.29)	2.13* (1.04 - 4.35)
Count of externalizing across ages 7y, 11y & 16y						
1	1.00	0.99 (0.83 - 1.19)	1.36 (0.95 - 1.94)	1.01 (0.70 - 1.45)	1.29 (0.98 - 1.71)	1.09 (0.85 - 1.41)
2	1.00	0.81 (0.58 - 1.13)	1.11 (0.61 - 2.04)	1.23 (0.65 - 2.35)	1.37 (0.91 - 2.05)	1.40 (0.90 - 2.17)
3	1.00	0.86 (0.43 - 1.75)	2.68* (1.23 - 5.83)	0.64 (0.09 - 4.54)	3.11*** (1.74 - 5.55)	2.14* (1.12 - 4.09)

***p<=0.01, **p=0.01, *p=0.05. n.e: not estimated due to low power.

SUPPLEMENTAL TABLE: Table 5 Unadjusted associations between potential adulthood moderators of the associations between lifecourse psychological health and economic activity at 55y (n=9010).

		Part Time	Unemployed	Retired	Permanently Sick	Homemaker or other
		RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)
Number of children in household	1	1.25 (1.00 - 1.56)	0.48** (0.30 - 0.76)	0.67* (0.46 - 0.98)	0.85 (0.61 - 1.18)	1.00 (0.72 - 1.39)
	2	1.61*** (1.35 - 1.92)	0.45*** (0.32 - 0.63)	0.52*** (0.39 - 0.71)	0.59*** (0.45 - 0.78)	1.07 (0.83 - 1.38)
	3+	1.37*** (1.14 - 1.65)	0.56*** (0.40 - 0.79)	0.36*** (0.26 - 0.51)	0.80 (0.61 - 1.06)	1.35* (1.04 - 1.75)
Partner labour force participation or exit (reported at 55y)	No partner	0.75*** (0.65 - 0.88)	3.64*** (2.66 - 4.98)	1.46* (1.01 - 2.11)	5.34*** (4.07 - 7.00)	0.93 (0.74 - 1.18)
	Part time employed	0.43*** (0.35 - 0.52)	0.68 (0.40 - 1.15)	0.98 (0.63 - 1.53)	0.92 (0.59 - 1.41)	0.27*** (0.18 - 0.40)
	Full-time self-employed	1.56*** (1.30 - 1.87)	0.47 (0.20 - 1.09)	1.24 (0.72 - 2.13)	1.50 (0.93 - 2.42)	1.83*** (1.39 - 2.39)
	Part time self-employed	0.99 (0.75 - 1.31)	0.65 (0.23 - 1.80)	1.79 (0.95 - 3.37)	1.00 (0.46 - 2.16)	0.93 (0.58 - 1.48)
	Unemployed	0.71 (0.45 - 1.13)	3.52*** (1.75 - 7.08)	n.e.	2.07 (0.93 - 4.62)	0.77 (0.37 - 1.61)
	Permanently Sick	0.70 (0.47 - 1.04)	2.60** (1.30 - 5.20)	1.39 (0.59 - 3.29)	6.65*** (4.24 - 10.43)	4.56*** (3.30 - 6.31)
	Homemaker	0.31*** (0.22 - 0.44)	0.38 (0.14 - 1.04)	0.70 (0.33 - 1.48)	2.45*** (1.59 - 3.78)	0.26*** (0.14 - 0.49)
	Retired	1.50*** (1.20 - 1.87)	1.32 (0.67 - 2.61)	11.33*** (8.07 - 15.91)	3.47*** (2.25 - 5.35)	2.95*** (2.22 - 3.93)

	Other	0.99 (0.63 - 1.54)	2.16 (0.84 - 5.53)	2.91** (1.29 - 6.58)	3.98*** (2.03 - 7.79)	2.39*** (1.43 - 3.97)
Number of partnership separations	1	1.56*** (1.20 - 2.02)	0.31*** (0.21 - 0.44)	0.77 (0.48 - 1.22)	0.43*** (0.31 - 0.58)	1.10 (0.77 - 1.57)
	2	1.19 (0.90 - 1.58)	0.29*** (0.19 - 0.45)	0.75 (0.46 - 1.24)	0.40*** (0.28 - 0.57)	0.98 (0.67 - 1.43)
	3+	1.34 (0.98 - 1.81)	0.48** (0.30 - 0.77)	0.69 (0.39 - 1.22)	0.74 (0.51 - 1.07)	0.99 (0.65 - 1.51)
Number of times unemployed	1	1.08 (0.95 - 1.23)	1.47* (1.06 - 2.05)	0.88 (0.66 - 1.18)	1.40** (1.11 - 1.77)	0.80* (0.64 - 0.99)
	2	0.98 (0.80 - 1.21)	2.21*** (1.46 - 3.34)	0.52* (0.29 - 0.92)	1.75*** (1.28 - 2.40)	1.08 (0.81 - 1.44)
	3	1.21 (0.91 - 1.62)	2.68*** (1.53 - 4.70)	0.60 (0.26 - 1.40)	2.19*** (1.43 - 3.37)	0.77 (0.47 - 1.28)
	4+	0.80 (0.57 - 1.14)	8.00*** (5.39 - 11.86)	0.77 (0.36 - 1.65)	2.84*** (1.88 - 4.29)	1.69** (1.15 - 2.48)
Educational qualifications	O level	1.34*** (1.2 - 1.51)	1.47* (1.08 - 2.01)	0.74* (0.57 - 0.96)	2.32*** (1.80 - 2.98)	1.47*** (1.22 - 1.76)
	None	1.27 (0.98 - 1.65)	3.48*** (2.16 - 5.63)	0.60 (0.31 - 1.15)	8.58*** (6.21 - 11.86)	2.82*** (2.08 - 3.82)
Duration of home making (months)	0<HM<=2	3.99*** (3.24 - 4.91)	1.40 (0.80 - 2.44)	0.72 (0.37 - 1.43)	0.80 (0.47 - 1.36)	4.37*** (3.06 - 6.25)
	2<HM<=5	4.02*** (3.34 - 4.84)	1.14 (0.66 - 1.95)	1.17 (0.72 - 1.89)	0.91 (0.58 - 1.43)	3.81*** (2.72 - 5.34)
	5<HM<=10	4.56*** (3.86 - 5.38)	1.62* (1.06 - 2.47)	1.01 (0.63 - 1.62)	1.59** (1.15 - 2.20)	6.99*** (5.38 - 9.08)
	HM>10	7.00*** (5.76 - 8.50)	2.13** (1.30 - 3.48)	2.29*** (1.48 - 3.53)	3.53*** (2.58 - 4.83)	33.98*** (26.95 - 42.84)

Reference categories for each predictor variable: no children, partner in full-time employment, no partnership separations, no periods of unemployment, A-levels or higher, no periods of homemaking. n.e: not estimated due to low power
***p<=0.01, **p=0.01, *p=0.05. n.e: not estimated due to low power.

Table 6 Adjusted associations between childhood psychological health and economic activity at 55y: further adjusted for educational qualifications at 33y (N=9010)

	Full Time	Part Time	Unemployed	Retired	Permanently Sick	Homemaker or other
		RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)	RRR (95%CI)
Adjusted for gender, social class 7y, marital status 55y, adulthood social class, count of reports of malaise in adulthood, educational qualifications at 33y						
Count of internalizing across ages 7y, 11y & 16y						
1	1.00	1.14 (0.97 - 1.33)	1.59** (1.12 - 2.25)	1.06 (0.77 - 1.46)	1.32* (1.00 - 1.74)	1.15 (0.91 - 1.46)
2	1.00	0.96 (0.70 - 1.33)	2.37*** (1.48 - 3.79)	0.79 (0.39 - 1.60)	1.48* (1.00 - 2.17)	1.38 (0.94 - 2.04)
3	1.00	0.98 (0.46 - 2.09)	1.70 (0.59 - 4.92)	n.e.	1.92 (0.96 - 3.86)	2.04 (0.99 - 4.19)
Count of externalizing across ages 7y, 11y & 16y						
1	1.00	0.99 (0.82 - 1.19)	1.28 (0.90 - 1.83)	1.03 (0.71 - 1.48)	1.21 (0.91 - 1.61)	1.06 (0.82 - 1.37)
2	1.00	0.80 (0.57 - 1.12)	0.99 (0.53 - 1.84)	1.26 (0.66 - 2.41)	1.22 (0.81 - 1.83)	1.31 (0.84 - 2.04)
3	1.00	0.85 (0.42 - 1.72)	2.26* (1.01 - 5.04)	0.65 (0.09 - 4.62)	2.63*** (1.46 - 4.73)	1.95* (1.00 - 3.78)

***p<=0.01, **p=0.01, *p=0.05. n.e: not estimated due to low power.

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