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Do local unemployment rates modify the effect of individual labour market status on psychological distress?

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ABSTRACT

This study investigates whether the unemployment rate of the area in which an individual lives affects their level of psychological distress, and the extent to which this is dependent on their own labour market status. Data were taken from the British Household Panel Survey (1991–2008) and longitudinal multiple membership multilevel modelling was carried out in order to account for the complex hierarchical structure of the data. The results suggest that living in an area with a high unemployment rate, defined by the claimant count, confers a degree of protection against the negative psychological effects of unemployment. However, psychological distress levels among unemployed people were still significantly and substantially higher than among their securely employed counterparts.

1. Background

Against a backdrop of high unemployment rates and increasing casualisation of labour in the UK and globally, it is of vital importance that we gain a greater understanding of how joblessness and insecure employment affect the psychological wellbeing of populations. This study is concerned with investigating the extent to which the unemployment rate of the area in which an individual lives affects their level of psychological distress, and the extent to which this is dependent on their own labour market status.

Ecological and cross-sectional studies have predominantly found a strong association between joblessness and psychological distress (Jackson and Warr, 1984; Warr and Jackson, 1987; Bartley et al., 2005; Novo et al., 2000; Theodossiou, 1998). Longitudinal studies have generally found that transitions from employment to unemployment are associated with an increase in psychological distress, whereas transitions from unemployment to employment predict improvement (Thomas et al., 2005; Montgomery et al., 1999; Wadsworth et al., 1999; Weich and Lewis, 1998). However, an overemphasis on officially registered unemployment as opposed to other forms of worklessness and insecure labour market engagement is typical of the literature overall (Benach et al., 2000). In the UK, declining unemployment rates and rising male inactivity rates characterised the 1990s and 2000s. Increasing female participation in the formal labour market has also been a defining socioeconomic trend during this period, but many studies on unemployment and health have excluded women on the basis that their experiences in the labour market are complex and difficult to categorise. Recent decades have also seen an increase in casual and fixed-term contractual working arrangements, building ever higher levels of insecurity into the labour market (Burchell et al., 2002). Previous studies have suggested a causal association between job insecurity and psychological distress (Ferrie et al., 1995; Ferrie, 2001; Ferrie et al., 2002). The present study will include both men and women; distinguishing between unemployment, permanent sickness and other economic inactivity, and considering insecure employment as an important labour market status category in its own right.

Despite the development of a rich theoretical framework to explain the ways in which the social and physical environment affects levels of psychological distress (outlined in detail by Curtis, (2010)); research to date has generally concluded that there is little or no variation in the prevalence of psychological distress between small and mid-sized areas, and that apparent associations between individual adversity and area deprivation are generally accounted for by individual characteristics (McCulloch, 2001; Weich et al., 2003; Wainwright and Surtees, 2004a, 2004b; Reijneveld and Schene, 1998; Pickett and Pearl, 2001; Ross, 2000). A study by Henderson et al. (2005) suggests that this also applies to the United States. However, Lewis and Booth (1992) found a

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greater concentration of psychiatric morbidity in the north of England than the south. Blaxter (1990) also found area variation in psychological distress, suggesting that conditions at smaller scales (the so-called 'neighbourhood' level) have a greater influence than regional conditions, corroborating earlier work by Birtchnell et al. (1988). In the face of this mixed evidence, Weich (2005) bemoaned the failure of geographers and epidemiologists to adequately establish whether or not contextual factors influence mental health outcomes. He questioned whether previous studies have used the correct geographical scales, commenting on the difficulty of defining 'neighbourhood' and the limitations of defining culturally and economically meaningful areas using arbitrary administrative boundaries. Perhaps the biggest criticism Weich (2005) levelled at existing attempts to uncover the geographical variations in mental health outcomes is the over-reliance on cross-sectional studies. It seems unlikely that any effects of place on mental health are instantaneous. Riva and Curtis (2012) have shown that long-term trends in area employment rates predict mortality and self-rated health more effectively than if this exposure is measured at a single time point. We need to know both where people live now, and where they have lived in the past; and how these areas might have changed over time. This combination of geographical and longitudinal approaches may be necessary to finally understand whether place independently affects levels of psychological distress.

It may be expected that areas with high unemployment benefit claimant count rates (CCR) have low demand for labour, resulting in greater competition for each job among local unemployed people and therefore engendering greater stress and anxiety levels within this group. However, this is generally not borne out by the evidence. Economists have suggested the alternative hypothesis that if one conceptualises unemployment as a 'social norm', the utility impact of an individual's own unemployment will be reduced by a higher level of contextual unemployment (Clark and Oswald, 1994; Clark, 2003; Powdthavee, 2006). In early work on the subject, Clark and Oswald noted a relationship between the regional rate of joblessness and the average unemployment related increase in GHQ-12 score. From calculation of utility gap figures, the authors suggested that unemployment is "*relatively more unpleasant the less there is of it*", which in their research, was broadly the case in the South and East of England (Clark and Oswald, 1994 p.562). In later work using multivariate analysis of the British Household Panel Survey (BHPS), Clark (2003) showed that high International Labour Organisation (ILO) unemployment rates at the government office region level were associated with lower psychological distress levels among unemployed residents concluding, in a similar fashion to his earlier work, that "*unemployment hurts less the more there is of it around*" (Clark, 2003 p.326). In an extension to this work, Powdthavee concluded from multivariate analysis of South African data that "*it may be psychologically easier to be unemployed in a region with a high level of joblessness*" (Powdthavee, 2006 p.649). Similar findings have also been reported in the epidemiological literature. In an ecological study of England and Wales, Jackson and Warr (1987) found that GHQ-12 scores among unemployed people were significantly lower in areas of high unemployment and that this association withstood adjustment for a limited range of individual-level confounders. Platt and Kreitman (1990) found lower suicide and parasuicide rates among the unemployed in Edinburgh's areas of high unemployment, compared to the city's areas of low unemployment. These findings were corroborated by results from a similar study in Italy (Platt et al., 1992).

Much of the evidence upon which the current consensus rests is ecological. Where multivariate analysis of individual level data has been used, there has been little attempt to introduce the methodological advantages of multilevel modelling to these research questions. The investigation undertaken for this study will make an original contribution to our understanding of the complex interrelationships between the characteristics of local labour markets, individuals' own labour market status, and other factors which may affect psychological distress levels through time. Previous research uses the concepts of 'unemployment' and 'joblessness' interchangeably, when it has been established that a more precise definition of labour market status is crucial (Dooley (2003)).

The aim of the present study is to uncover the extent to which area level unemployment, defined in terms of the claimant count rate, affects levels of psychological distress, independently of individual-level exposure to joblessness and insecure employment. Three research questions are asked: (i) Is there independent variation in psychological distress at the area level, after accounting for variation within and between individuals? Does 'place' matter?; (ii) Is area level unemployment associated with individual-level psychological distress independently of individual-level factors?; (iii) Is it more psychologically distressing to be non-employed or insecurely employed in an area with a high claimant count rate, compared to an area with a low claimant count rate?

2. Methods

2.1. Sample

This study uses 18 consecutive waves of data from the British Household Panel Survey (BHPS), from 1991 to 2008. The BHPS began in 1991 with a nationally representative sample of 10,264 adults drawn from 5511 households recruited using a clustered, stratified random sampling method. Children of sample members are added to the main sample on reaching 16 years old. Adults joining the households of sample members are included in the survey on a temporary basis, as long as they reside with original sample members. These original and temporary sample members are resurveyed annually. A detailed overview of the BHPS's methodology is given elsewhere (Taylor et al., 2010). The sample used in this study was firstly restricted to broadly working age (16–65 years) original sample members residing in England and Wales (125,740 person-years of data). Cases with no possible value for 1-year-lagged GHQ-12 score (i.e. all observations from wave 1) were then excluded, yielding 116,247 possible person-years of data. The analytic sample was then derived by selecting only person-years with complete data for all analytic variables. This yielded a final analytic sample of 84,565 observations on 10,702 unique individuals across 347 local authority districts, spanning 17 years. This sample was found to be representative of the original England and Wales sample on key sociodemographic variables.

2.2. Area definition and area-level exposure

Arguably, the most theoretically appropriate geographical units for exploring the effects of characteristics of local labour markets on individual-level psychological distress are Travel-to-Work Areas (TTWA). These units are designed to encapsulate local labour markets. During the BHPS study period though, TTWAs have been redefined (Bond and Coombes, 2007), rendering annual figures for indicators such as claimant count rate incomparable over time. In any case, it has been argued that TTWAs misrepresent local labour markets for the unemployed and lead to underestimation of unemployment in urban areas (Thomas, 1998; Webster and Turok, 1997). It was therefore decided that the pre-2009 version of Local Authority Districts (LADs) would be used instead of travel-to-work-areas, as a compromise between theoretical and practical concerns. Pre-2009 LADs are harmonised across the study period and annual population data are supported. Being a widely-used

geographical indicator, more data are available at this level than at other geographical levels. Whilst it cannot be argued that LADs represent isolated labour markets or neighbourhoods, it is felt that LADs are the only geographical unit at which the desired comparable data are available annually, over areas whose definitions do not change over time.

LAD claimant count rate was downloaded from the from the National Online Manpower Information System (NOMIS) at Durham University (https://www.nomisweb.co.uk) for each LAD at each time point, and used as a mean-centred continuous exposure variable in the analysis. Claimant count rate is calculated by expressing the number of Jobseeker's Allowance claimants as a percentage of the working-age population.

2.3. Individual-level variables

The outcome of interest was psychological distress, measured using the 12-item version of the General Health Questionnaire (GHQ-12) (Goldberg, 1972, 1978). Likert-scoring was used, producing a near normally-distributed continuous outcome variable with a possible range of 0 to 36. Higher scores indicate higher levels of psychological distress.

To measure the exposure of interest a five-category labour market status variable was derived. These categories were: securely employed; insecurely employed; unemployed; permanently sick; other inactive. The 'other inactive' category was a heterogeneous category comprised of all those who were economically inactive but not permanently sick. The employed were split according to whether the respondent had reported feeling satisfaction with their level of job security or not.

A range of covariates were identified from the literature. The effects of labour market status on psychological distress have been found to vary by gender (McFadyen, 1995; Paul and Moser, 2009) therefore an interaction between gender and unemployment was tested for. The interaction term was found to be non-significant (b=0.21; 95% CI -0.57, 0.16) so analyses were not stratified by gender. However, gender was added to the models as a covariate. Further covariates identified were as follows: age (and its square term, both mean-centred) (Daniel, 1974; Eisenberg and Lazarsfeld, 1938; Hepworth, 1980); education (highest academic qualification attained: higher educational qualification; A-levels; GCSEs/O-levels; none of these) (Clark and Oswald, 1994); Physical health problems (one or more physical health problems: the respondent endorsed any health problems presented on a showcard. A binary variable was derived, to indicate whether the respondent had 'no physical health problem' or 'one or more physical health problems') (Winefield, 1995); Amount of joblessness (one or more spells of joblessness between waves) (Jackson and Warr, 1984; Eisenberg and Lazarsfeld, 1938; Winegardner et al., 1984; Booker and Sacker, 2012); Social housing tenure (Clark, 2003); Substance abuse (Bartley et. al. 2005) (binary variable extracted from the endorsements to the showcard of health problems described above); Spousal joblessness (categorised as: spouse employed; spouse not employed; no spouse) (Clark, 2003); Spousal GHQ-12 caseness (Meyler et al., 2007; Goodman and Shippy, 2002) categorised as: spouse a GHQ-12 case; spouse not a GHQ-12 case; no spouse (using a caseness cut-off of ≥3 on the 1-12 scored GHQ-12 variable (Goldberg et al., 1997)); and marital status categorised as: married or cohabiting; divorced, widowed or separated; never married or cohabiting (Atkinson et al., 1986; Bolton and Oatley, 1987; Gore, 1978). Self-reported monthly household income was included as a covariate in order to isolate the psychosocial impact of being in a more disadvantageous employment status (Finlay-Jones and Eckhardt, 1984; Kessler et al., 1987; Payne and Hartley, 1987; Jones, 1991–1992; Hobfoll et al., 1996). It was used as a log-transformed continuous variable and equivalised using the OECD modified scale (Hagenaars et al., 1994).

2.4. Statistical analysis

A slight upward trend in GHQ-12 scores can be observed throughout the study and a continuous 'BHPS wave' variable is positively associated with GHQ-12 score in the data (coefficient: 0.02, 95% CI: 0.01, 0.02). It is therefore possible that panel conditioning is present, in which participants become more comfortable with answering sensitive questions over time, and therefore give more accurate answers (Sturgis et al., 2009). However, based on comparison of the first seven waves of the study to cross-sectional data from the Health Survey for England, Pevalin found no evidence of retest effects and concluded that the GHQ-12 is consistent and reliable across repeated measures (Pevalin, 2000). LAD-level claimant count rate also exhibits a long run trend throughout the period. Between 1992 and 2008, claimant count rates decreased across England and Wales. In order to avoid artifactual correlation between these two variables in the models, the GHQ-12 outcome variable was standardised and then rescaled to the original metric using the overall grand mean and overall standard deviation for all person-years of data. Standardisation removes much of the differences in GHQ-12 scores over time which are independent of employment rates. This allows the models to show if there is a relationship between variability in claimant count rates over areas, and GHQ-12 scores.

Repeated observations on the same person over time are likely to be highly correlated and cannot be considered independent of one another. Similarly, the clustering of observations on individuals residing in the same area must be accounted for, as described by Duncan et al. (1996, 1998). This clustering is accounted for using multilevel modelling. Multilevel models are recommended as they allow one to model the variation in psychological distress as a function of the area, person and occasion. The data used in this study have an inherently hierarchical structure. Occasions of measurement (level 1) are nested within individuals (level 2). If all individuals had lived in the same LAD throughout their participation in the study, then individuals would be perfectly nested within the higher LAD level (level 3). However, in reality individuals moved between areas and were therefore exposed to varying area level characteristics at different times. Simple nested hierarchies presumed by multilevel models must be tailored to reflect the 'realistically complex' nature of the world (Best et al., 1996). It is also important to recognise that areas change over time, and cannot be conceptualised has having static characteristics which have the same effects on residents throughout a 17-year study period. In order to take account both of the longitudinal nature of the data, changing LAD unemployment rates over time, and of the fact that individuals moved between LADs during the study, three-level multiple membership models were built using MLwiN 2.11 (Rasbash et al., 2009). The methodology is outlined in detail by its developers, (Goldstein, 1986; Browne et al., 2001; Browne, 2009).

A lagged version of GHQ-12 score from the previous wave was generated and used as a covariate in the models in order to control for individuals' propensities towards psychological distress, and therefore to allow a focus on change in GHQ-12 score. The use of this autoregressive modelling allows tentative suggestions to be made about the direction of causality in the relationship being tested.

The following series of models were run: null model (M0); model for the association between individual labour market status and GHQ-12 score, adjusted for covariates (M1); as in M1 but with LAD claimant count rate added (M2); as in M2 but with the interaction between labour market status and LAD CCR added

(M3). The models were specified as shown in the following series of equations, with LAD Claimant Count Rate, age, age-squared and lagged GHQ-12 score centred on their grand means. The subscripts '*i*', '*j*' and '*k*' denote LAD (level 3), individual (level 2) and occasion of measurement (level 1), respectively.

$$(M0)\quad y_{ijk} = \beta_0 + v_i + u_{ij} + e_{ijk}$$

$$\begin{aligned}(M1)\quad y_{ijk} = {} & \beta_0 + \beta_1 \mathrm{Insecure}_{ijk} + \beta_2 \mathrm{Unemployed}_{ijk} \\ & + \beta_3 \mathrm{PermSick}_{ijk} + \beta_4 \mathrm{OtherInactive}_{ijk} + \beta_5 \mathrm{Age}_{ijk} \\ & + \beta_6 \mathrm{Age}^2_{ijk} + \beta_7 \mathrm{LaggedGHQ}_{ijk} + \beta_8 1 + \mathrm{UnempSpells}_{ijk} \\ & + \beta_9 A - \mathrm{Levels}_{ijk} + \beta_{10} \mathrm{GCSEs}_{ijk} + \beta_{11} \mathrm{NoQuals}_{ijk} \\ & + \beta_{12} \mathrm{PhysHealthProblem}_{ijk} + \beta_{13} \mathrm{SocialHousing}_{ijk} \\ & + \beta_{14} \mathrm{SpouseNoJob}_{ijk} + \beta_{15} \mathrm{SpouseGHQcase}_{ijk} \\ & + \beta_{16} \mathrm{NoSpouse}_{ijk} + \beta_{17} \mathrm{Married/Cohabiting}_{ijk} \\ & + \beta_{18} \mathrm{Divorced/Widowed/Separated}_{ijk} \\ & + \beta_{19} \mathrm{Never\ Mar/Cohab}_{ijk} + \beta_{20} \mathrm{EquHouseholdIncome}_{ijk} \\ & + \beta_{21} \mathrm{SubstanceAbuse}_{ijk} + \beta_{22} \mathrm{Gender}_{ij} + v_i + u_{ij} + e_{ijk}\end{aligned}$$

$$\begin{aligned}(M2)\quad y_{ijk} = {} & \beta_0 + \beta_1 \mathrm{LADClaimantCountRate}_{ijk} \\ & + \beta_2 \mathrm{Insecure}_{ijk} + \beta_3 \mathrm{Unemployed}_{ijk} \\ & + \beta_4 \mathrm{PermSick}_{ijk} + \beta_5 \mathrm{OtherInactive}_{ijk} \\ & + \beta_6 \mathrm{Age}_{ijk} + \beta_7 \mathrm{Age}^2_{ijk} + \beta_8 \mathrm{LaggedGHQ}_{ijk} \\ & + \beta_9 1 + \mathrm{UnempSpells}_{ijk} + \beta_{10} A - \mathrm{Levels}_{ijk} \\ & + \beta_{11} \mathrm{GCSEs}_{ijk} + \beta_{12} \mathrm{NoQuals}_{ijk} \\ & + \beta_{13} \mathrm{PhysHealthProblem}_{ijk} + \beta_{14} \mathrm{SocialHousing}_{ijk} \\ & + \beta_{15} \mathrm{SpouseNoJob}_{ijk} + \beta_{16} \mathrm{SpouseGHQcase}_{ijk} \\ & + \beta_{17} \mathrm{NoSpouse}_{ijk} + \beta_{18} \mathrm{Married/Cohabiting}_{ijk} \\ & + \beta_{19} \mathrm{Divorced/Widowed/Separated}_{ijk} \\ & + \beta_{20} \mathrm{Never\ Mar/Cohab}_{ijk} + \beta_{21} \mathrm{EquHouseholdIncome} \\ & + \beta_{22} \mathrm{SubstanceAbuse}_{ijk} + \beta_{23} \mathrm{Gender}_{ij} + v_i + u_{ij} + e_{ijk}\end{aligned}$$

$$\begin{aligned}(M3)\quad y_{ijk} = {} & \beta_0 + \beta_1 \mathrm{LADClaimantCountRate}_{ijk} \\ & + \beta_2 \mathrm{Insecure}_{ijk} + \beta_3 \mathrm{Unemployed}_{ijk} \\ & + \beta_4 \mathrm{PermSick}_{ijk} + \beta_5 \mathrm{OtherInactive}_{ijk} \\ & + \beta_6 \mathrm{LADClaimantCountRate}^* \mathrm{Insecure}_{ijk} \\ & + \beta_7 \mathrm{LADClaimantCountRate}^* \mathrm{Unemployed}_{ijk} \\ & + \beta_8 \mathrm{LADClaimantCountRate}^* \mathrm{PermSick}_{ijk} \\ & + \beta_9 \mathrm{LADClaimantCountRate}^* \mathrm{OtherInactive}_{ijk} \\ & + \beta_{10} \mathrm{Age}_{ijk} + \beta_{11} \mathrm{Age}^2_{ijk} + \beta_{12} \mathrm{LaggedGHQ}_{ijk} \\ & + \beta_{13} 1 + \mathrm{UnempSpells}_{ijk} + \beta_{14} A - \mathrm{Levels}_{ijk} \\ & + \beta_{15} \mathrm{GCSEs}_{ijk} + \beta_{16} \mathrm{NoQuals}_{ijk} \\ & + \beta_{17} \mathrm{PhysHealthProblem}_{ijk} + \beta_{18} \mathrm{SocialHousing}_{ijk} \\ & + \beta_{19} \mathrm{SpouseNoJob}_{ijk} + \beta_{20} \mathrm{SpouseGHQcase}_{ijk} \\ & + \beta_{21} \mathrm{NoSpouse}_{ijk} + \beta_{22} \mathrm{Married/Cohabiting}_{ijk} \\ & + \beta_{23} \mathrm{Divorced/Widowed/Separated}_{ijk} \\ & + \beta_{24} \mathrm{NeverMar/Cohab}_{ijk} + \beta_{25} \mathrm{EquHouseholdIncome} \\ & + \beta_{26} \mathrm{SubstanceAbuse}_{ijk} + \beta_{27} \mathrm{Gender}_{ij} + v_i + u_{ij} + e_{ijk}\end{aligned}$$

Where: $\mathbf{y_{ijk}}$, outcome (GHQ-12 score) for LAD i, individual j at occasion k.; $\boldsymbol{\beta_0}$, intercept; $\boldsymbol{\beta_1}$–$\boldsymbol{\beta_{27}}$, regression coefficients (i.e. fixed effects); $\mathbf{v_i}$, between-LAD residual (i.e. the level 3 random effect); $\mathbf{u_{ij}}$, between-individual residual (i.e. the level 2 random effect); $\mathbf{e_{ijk}}$, within-individual residual (i.e. the level 1 random effect).

3. Results

The characteristics of the sample are shown in Table 1. Of the 84,665 person-years of data, 67% of labour market status observations were for secure employment, with a further 10% for insecure employment. Unemployment accounted for 3.5% of observations, as did permanent sickness. Other forms of economic inactivity accounted for 16% of labour market status observations over the 17-year study period. Just over half of all observations for physical health status identified one or more physical health problems and 13% of observations showed individuals living in social housing. Across all observations, the mean GHQ-12 score was 11.1 (SD 5.41), and the mean LAD claimant count rate across all individuals through time was 3.82% (SD 2.61). However, LAD claimant count rates experienced by individuals ranged between 0.4% and 17.2%.

The results of the series of four multiple membership multilevel models are presented in Table 2. In the null model, the Intraclass Correlation Coefficient (ICC) for the proportion of variance in GHQ-12 scores attributable to differences between LADs was just 0.005 suggesting that even before the addition of covariates at any level, the LAD(s) in which the individual lived were very poor predictors of GHQ-12 score. The figure is so close to zero that it is almost as though individuals were randomly assorted among areas with regard to their GHQ-12 scores. While very small, the unexplained variance in GHQ-12 scores between LADs was statistically significant in the null model ($v0_k$ 0.15, 95% CI 0.05, 0.25). When area level claimant count rate and individual level covariates were added in models 1, 2 and 3 however, the unexplained variance between LADs became non-significant and the ICC even lower.

The results from Model 1 show that when adjusting for individual-level covariates, all groups had significantly higher

Table 1
Characteristics of working-age men and women from England and Wales (person-years of data) in a sample from the British Household Panel Survey, 1992–2008.

Variables	Mean	SD
GHQ-12 score (0–36)	11.11	5.41
Age (years)	39.23	13.01
Mean equivalised monthly household income (£)	1489.51	1089.03
	Frequency	**%**
Male	41,381	48.88
Female	43,284	51.12
Higher education	17,767	20.99
Highest academic qualification: A-levels	18,358	21.68
Highest academic qualification: O level/GCSE	30,729	36.29
No academic qualifications	17,811	21.04
No physical health problems	41,107	48.55
Suffers from ≥1 physical health problems	43,558	51.45
Married or cohabiting	58,252	68.80
Widowed, divorced or separated	7858	9.28
Never married or cohabited	18,555	21.92
Spouse jobless	12,233	14.45
Spouse employed	45,762	54.05
Spouse not a GHQ-12 case	43,449	51.32
Spouse is a GHQ-12 case	14,546	17.18
No spouse	26,670	31.50
No spells of unemployment in past year	78,656	92.90
≥1 spells of unemployment in past year	6009	7.10
Owned or privately rented housing	73,261	86.53
Social housing	11,404	13.47
No substance abuse reported	84,289	99.56
Substance abuse reported	376	0.44
LAD claimant count rate: 0 to 2.5%	34,748	41.04
LAD claimant count rate: 2.5 to 5%	27,313	32.26
LAD claimant count rate: 5 to 7.5%	14,112	16.67
LAD claimant count rate: 7.5 to 10%	6202	7.33
LAD claimant count rate: 10 to 12.5%	1582	1.87
LAD claimant count rate: 12.5 to 15%	631	0.75
LAD claimant count rate: > 15%	77	0.09
Securely employed	56,902	67.21
Insecurely employed	8467	10.00
Unemployed	2988	3.53
Permanently sick	2978	3.52
Other economically inactive	13,330	15.74

Table 2
Results from series of multiple membership multilevel models, investigating the relationship between individual level labour market status, Local Authority District (LAD) claimant count rate (CCR) and individual psychological wellbeing in a British Household Panel Survey sample (1992–2008).

	Null model b (95% C.I)	M1[a] b (95% C.I)	M2[a] b (95% C.I)	M3[a] b (95% C.I)
Securely employed		0	0	0
Insecurely employed		1.22 (1.11, 1.32)	1.23 (1.12, 1.33)	1.23 (1.13, 1.34)
Unemployed		2.11 (1.89, 2.32)	2.11(1.89, 2.32)	2.20 (1.98, 2.42)
Permanently sick		2.94 (2.71, 3.16)	2.93(2.71, 3.16)	2.95 (2.72, 3.17)
Other inactive		0.39 (0.27, 0.50)	0.39 (0.28, 0.49)	0.38 (0.27, 0.49)
LAD claimant count rate			−0.02 (−0.04, −0.01)	−0.02 (−0.03, 0.00)
Securely emp [a] LAD CCR				0
Insecurely Emp. [a] LAD CCR				−0.02 (−0.06, 0.02)
Unemployed [a] LAD CCR				−0.09 (−0.15, −0.04)
Perm. Sick [a] LAD CCR				−0.03 (−0.11, 0.04)
Other inactive [a] LAD CCR				0.03 (−0.01, 0.06)
Constant	11.07 (10.98, 11.15)	9.38 (9.24, 9.52)	9.38 (9.24, 9.51)	9.38 (9.24, 9.52)
Unexplained variance within individuals (e_{oijk})	18.60 (18.41, 18.79)	18.34 (18.14, 18.53)	18.34 (18.15, 18.53)	18.33 (18.15, 18.52)
Unexplained variance between individuals within LADs (u_{ojk})	11.37 (10.97, 11.78)	4.74 (4.49, 4.99)	4.74 (4.49, 4.99)	4.75 (4.49, 5.00)
Unexplained variance between LADs (v_{ok})	0.15 (0.05, 0.25)	0.02 (0.00, 0.04)	0.01 (0.00, 0.03)	0.02 (0.00, 0.05)
Deviance information criterion	495,653	492,777	492,775	492,759
L1 (occasion) *n*	84,665		84,665	84,665
L2 (individual) *n*	10,702		10,702	10,702
L3 (LAD) *n*	347		347	347

[a] M1-M3: Adjusted for age (mean centred), age-squared (mean centred), gender, educational attainment, physical health status, marital status, spousal employment status, spousal GHQ-12 caseness, 1+ unemployment spells in the past 12 months, social housing tenure, substance abuse, log-transformed equivalised household income.

levels of psychological distress than the securely employed. The coefficient for LAD claimant count rate in M2 was small, negative and significant (b −0.02, 95% CI −0.04, −0.01). Compared to those with secure jobs: insecurely employed individuals had GHQ-12 scores 1.2 units higher on average (b 1.2; 95% CI: 1.1, 1.3); unemployed individuals had GHQ-12 scores 2.1 units higher on average (b 2.1; 95% CI: 1.9, 2.3); those in the permanently sick category had GHQ-12 scores 2.9 units higher on average (b 2.9; 95% CI: 2.7, 3.2); and the other inactive group had GHQ-12 scores 0.4 units higher on average (b 0.4; 95% CI: 0.3, 0.5).

In Model 3, only the interaction between individual unemployment and LAD claimant count rate was found to be significantly different from that of the securely employed group (b −0.09, 95% CI −0.15, −0.04). However, with the addition of the interaction between LAD claimant count rate and individual employment status, the coefficient for LAD claimant count rate became of borderline significance (b −0.02, 95% CI −0.02, 0.00). This is interpreted with reference to the baseline category for individual employment status. That is, LAD claimant count rate does not much influence the psychological distress of those in secure employment. Predicted GHQ-12 scores by LAD claimant count rates for each labour market status category are presented in Fig. 1. The results suggest that living in an area of low unemployment is associated with higher levels of psychological distress among unemployed people than living in an area of high unemployment. However, it should be emphasised that even in very low unemployment areas, unemployed individuals still had higher GHQ-12 scores on average than their securely employed neighbours.

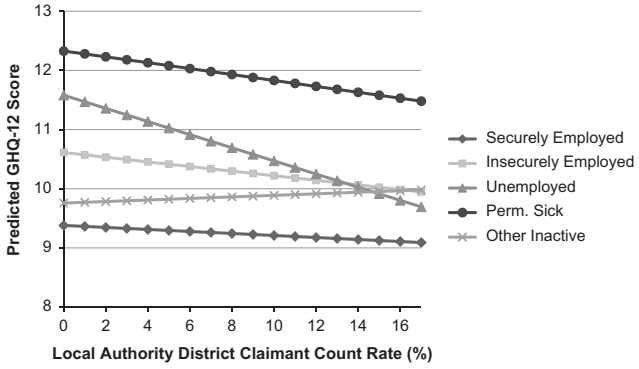

Fig. 1. Predicted GHQ-12 score by LAD Claimant Count Rate, for each individual labour market status category, adjusted for covariates. (Derived from Model 3 results).

4. Discussion

The first objective this study set out to address was the extent to which independent variation in GHQ-12 scores exists at the area level, and the results presented here suggest that there is very little. This failure to isolate any substantial 'place' effect is consistent with the literature. The second and third objectives of this study were to investigate the extent to which the claimant count rate of an area was related to the GHQ-12 scores of individuals living in the area, and whether this varied by individual labour market status. The results presented here show that a very small, negative, statistically significant association existed between area-level claimant count rate and individual-level GHQ-12 score, when controlling for individual labour market status and a range of individual level covariates. Further investigation revealed a significant cross-level interaction between area-level claimant count rate and individual-level labour market status. Living in an area of low overall unemployment was associated with higher levels of psychological distress among unemployed people than living in an area of high overall unemployment.

As outlined by Cummins et al. (2007), the overemphasis on merely quantifying 'place' effects on health without unpacking the causal mechanisms has been a major limitation of research in the field. Understanding the ways in which precise characteristics of environments affect certain health outcomes is not only important in terms of establishing causality, but is necessary if research is to lead to effective policy intervention. As described above, Clark and colleagues in the field of economics suggest that unemployment is less distressing in areas where, by token of its prevalence, it has become a normalised social role and therefore the unemployed in such areas are not subject to the distressing effects of social disapproval and loss of status. Akerlof (1980) suggested that social comparison effects are important and that the primary mechanism may be a reduction in the stigma and disapproval surrounding unemployment in areas where it is more prevalent. In critiquing these hypotheses, it is useful to refer to Warr's definition of eight

pathways through which joblessness can lead to psychological distress (Warr, 1985). Of these, only two appear to map directly on to the 'social norming' hypothesis: a general feeling of being a 'scrounger', and decline in social position and status. The other suggested pathways in Warr's schema pertain mainly to the unemployed individual in isolation, who is conceptualised has having lost time structure, traction, scope for decision making, and the hope of acquiring life-affirming new skills (Warr, 1985). Jackson and Warr (1987) suggested a causal mechanism whereby areas experiencing high rates of unemployment develop higher levels of community-level social support, providing psychological protection for unemployed men and ameliorating the potential effects of unemployment on GHQ-12 scores to a greater degree than would be the case in areas of low unemployment.

When seeking to explain results which show a protective effect of high area-level unemployment against psychological distress, for unemployed individuals, it is crucial to guard against employing a populist discourse in which the unemployed residents of high-unemployment areas are essentialised and stereotyped as being 'happy' with worklessness and its associated psychosocial, material and physical health disadvantages. While the weight of evidence suggests that unemployed, permanently sick and insecurely employed people may not suffer as high levels of psychological distress in areas of high claimant count rate compared to their counterparts in areas of low claimant count rate, it is crucial to emphasise that even in areas of very high unemployment, unemployed, permanently sick and insecurely employed people still had higher average GHQ-12 scores than securely employed individuals. The discussion here is about the extent to which jobless and insecurely employed people are psychologically worse off than those with secure jobs. In addition, Jackson and Warr emphasise that unemployment remains significantly associated with physical health problems and lower life expectancy in general (Jackson and Warr, 1987).

4.1. Strengths and limitations

The use of multilevel models to represent the realistically complex structure of the BHPS data and to take account of the nesting of occasions with individuals, and of individuals within (multiple) areas, and the use of lagged GHQ-12 scores, allow us to be confident that this methodology produces reliable estimates and that direction of causality can be inferred with reasonable confidence. However, a number of limitations must be acknowledged. While multilevel modelling estimates are unbiased if data are missing at random, we cannot rule out the possibility that they are missing not at random.

Measurement bias limitations must be considered with regards to the derived insecure employment category and it is important not to over-interpret the results pertaining to the permanently sick category. While physical health condition is controlled for, reverse causality cannot be ruled out in the case of permanently sick individuals, many of whom are out of work owing to mental health conditions. While no significant interaction between gender and unemployment was found, and the effects of gender were adjusted for in the models, stratification by this variable may have produced more nuanced results. The inclusion of factors such as household income, which can plausibly be conceptualised as a mediator of the relationship between labour market status and psychological distress rather than a confounder, means that there is likely to be an element of over-adjustment in the analyses presented. However, the focus of this study was on psychosocial pathways, and in order to distil these, it was necessary to control for income.

Perhaps the most serious limitation is the issue of using administrative geographical units to represent a theoretically meaningful notion of 'place'. Smith and Easterlow (2005) noted that an overreliance on traditional representations of space based on administrative boundaries limits the value of quantitative research in the field of health and place. Local Authority Districts are relatively large areas and mask huge variety in context. While it is therefore possible to conclude from this research that the LAD of residence cannot explain variations in GHQ-12, it would be wrong to conclude that 'area', 'neighbourhood' or 'place' cannot affect and predict psychological distress at the individual level. The difficulty in defining 'place', and in doing so adequately for all individuals in a study (who in reality will have complex, multi-nodal, overlapping and temporally shifting understandings of 'neighbourhood') is a great challenge in quantitative health geography and spatial epidemiology, and one which could not be adequately addressed within the data and methodological constraints of this study. The community level resilience to the ill effects of unemployment on mental health hypothesised by Jackson and Warr may operate at the level of a single housing estate, a few streets, or within locally meaningful boundaries defined physically, for example by railway cuttings or motorway flyovers; or more intangibly. However, in a comparison of health inequality outcomes using three area definition strategies in two London boroughs, Stafford et al. (2008) found no support for the hypothesis that health differences would be smallest across arbitrarily chosen administrative boundaries, and larger across boundaries defined using physical and social geographical features. Nevertheless, whilst outside the data availability and methodological scope of this study, the application of smaller geographical areas might have been more informative. However, the work undertaken by Clark and colleagues in the field of economics used larger administrative areas than the current study and found there to be significant differences in the geography of unemployment and psychological distress. The choice of geographical unit in this study was dictated by the need for a compromise between accessing 17 years of comparable area level data and choosing areas theoretically relevant to the research question. Overall, the combination of longitudinal and geographical perspectives achieved by this work makes an important contribution to the literature, despite questions over use of local authority districts as theoretically relevant geographical units.

A related limitation is the use of an arguably flawed variable to characterise the unemployment rate of local authority districts. Claimant count rate underestimates unemployment and the extent to which it adequately captures unmet need for employment varies geographically (Machin, 2004). Additionally, area-level unemployment, however measured, may not be the most relevant area-level characteristic for understanding the psychological impact of insecure employment. Other social norms may be of greater importance.

5. Conclusions

This study has shown support for the hypothesis that living in an area with high claimant count rate confers a degree of protection against the negative psychological effects of joblessness, although GHQ-12 scores among these groups are still significantly and substantially higher than among their securely employed counterparts. While there is only a small amount of variation in GHQ-12 scores at the local authority level, it appears that the wider economic context does affect an individual's experience of unemployment.

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