The roles of socioeconomic status, occupational health and job rank on the epidemiology of different psychiatric symptoms in a sample of UK workers

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Abstract

There is a considerable gap in epidemiological literature about community mental health showing how psychiatric symptoms are associated with job rank, socioeconomic status, and occupational health. We examine data from 4,596 employees collected in the United Kingdom's Psychiatric Morbidity among Adults Living in Private Households Survey. There were 939 workers in managerial jobs, 739 in supervisory jobs and 2,918 employees in lower ranking jobs. Of the 4,596 workers, 2,463 had depressive symptoms and 2,133 no depressive symptoms. Job rank, household gross income, social class, personal gross income and socio-economic group were significantly associated with general health, occupational health and depressive and avoidant symptoms. Job rank, occupational and physical health also explained the variance in paranoid and avoidant symptoms among the employees. This study shows that severe psychopathology is related to workers' job rank.

Key words: Occupational health; Epidemiology; Depression; Paranoia; Job Rank; Socioeconomic status;

Introduction

Socioeconomic status can have an important impact on health and mortality (Adler, Boyce, Chesney, Cohen, Folkmann, Kahn and Syme, 1994; Feinstein, 1993; Marmot & Smith, 1991; Winkleby, Jatulis, Frank and Fortmann, 1971). Socioeconomic status predicts a myriad of health problems, including the onset of autoimmune diseases (Calixto & Anaya, 2014), cardiorespiratory fitness (Schmueli *et al.,* 2014) and obesity (Costa-Font, Hernandez-Quevedo & Jimenez-Rubio, 2014). Both objective and subjective socioeconomic indicators have been implicated (Demakakos, Nazroo, Breeze and Marmot, 2008). This is because variables such as occupational prestige, job type and working conditions co-vary with income in predicting health (Adler *et al.*, 1994; Cottini, 2012; Fujishiro, Xu and Gong, 2010). High occupational status is associated with a better income, lifestyle and diet but also with less exposure to occupational hazards and job stress, which can have a long-term impact on mortality. The famous Whitehall I and II longitudinal prospective cohort study showed that mortality was higher among people who worked in low-ranking jobs (Marmot, Rose, Shipley & Hamilton, 1978; Marmot & Smith, 1991). The more senior an employee is within the job role hierarchy, the longer they can expect to live, whereas employees who work in low-ranking jobs present progressively deteriorating health (Marmot *et al.*, 1978; Marmot & Smith, 1991). There is evidence that occupational status (job rank) relates to mental and physical health, and also evidence that socioeconomic status relates to mental and physical health. Individuals of low economic status are more likely to suffer from mental health issues, such as depression (Lorant, Eaton, Philippot & Ansseau, 2003; Lorant, Crouz, Weich, Deliège, Mackenbach & Ansseau, 2007), as well as a variety of physical health problems (Conway *et al.*, 2008; Marmot, 2005). There is some research exploring the prevalence of

psychiatric symptoms in specific professions (*e.g.* Medisauskaite and Kamau, 2017a) but there remains a gap in evidence about workers in different ranks. As a step toward understanding the antecedents of high mortality among low-ranking employees, we explore the contribution of job rank and socioeconomic status to poor physical and mental health.

Occupational status and psychiatric symptoms

From a psychological point of view, occupational status (that is, a worker's job rank) brings with it some real or imagined social threat. Therefore it is useful to explore the connection between job rank and mental/physical health. The danger of being exploited, criticized or ostracized constitutes a 'threat' situation. This can instigate a psychological defense and style of thinking that can veer into psychopathology, namely the presence of depressive, paranoid and avoidant symptoms (Gilbert, 1993; 2001). Low-ranking workers can develop fears about poor job security or promotional chances, as well as fearing difficulties from higher-ranking colleagues. Tenure in an organization affects feelings of self-consciousness and susceptibility to paranoid cognitions, characterized by fears of malevolence from others and the belief that they will intentionally cause one harm (Freeman, Garety, Kuipers, Fowler & Bebbington, 2002). This could explain the prevalence of psychopathological symptoms such as paranoia in organizations (Kramer, 1994; Freeman Freeman, Garety, Bebbington, Smith, Rollinson & Fowler, 2005).

Hierarchical relationships are important and prevalent within organizations, suggesting that low job rank has the potential to increase the risk of psychiatric and physical symptoms. Among the hallmarks of workplace relationships are significant asymmetries in

power, status, access to information, and evaluative scrutiny (Kramer, 1994). From the standpoint of workers with low job ranks, trust in those above them is critical to well-being because of their vulnerability and dependence for access to organizational resources such as promotion, pay increases, attractive assignments, desirable office space, staff support, and other resources needed to get work done. Workers with a low job rank may also depend on those above them for less tangible but no less important psychological resources, such as positive reinforcement, mentoring, social support, and empathy. Workers with lower job ranks can feel uncertainty about how they are regarded and where they stand (Kramer, 1994, 1999) as a result of which they could develop paranoid ideation because feeling scrutinized by their superiors increases self-referential biases, in turn leading to feelings of vulnerability and mistrust (Kramer, 1999).

Other research supports the idea that paranoia, anxiety and depressive symptoms are common among low-ranking employees (Gilbert, 1992; Lerner *et al.*, 2004). They also appear to be at risk of avoidant traits because being submissive towards seniors with the power to do harm (*e.g.* making their working life difficult or having the power to get them fired) can make disengagement and avoidant thinking quite adaptive in the face of social threats (Gilbert, 2001). Behaviorally, low-ranking workers might cope by avoiding applying for promotions, competing with co-workers or promoting his/her self-advancement but research is needed to establish whether avoidant thinking is indeed more prevalent in this population. Moreover, because low job rank can mean less power to challenge others' wrongdoing within the workplace, this perceived inability to control one's occupational fate could lead low-rankers to a state of arrested flight (Gilbert, Boxall, Cheung & Irons, 2005). Existing work suggests that this psychological state is associated with feelings of panic,

paranoia and depression (Gilbert *et al.*, 2005). There is also a high prevalence of anxious and depressive symptoms among people who feel entrapped and powerless to change their current status (Gilbert, Gilbert & Irons, 2004). Such feelings of negative mood, sadness, hopelessness, worthlessness, guilt and worry form part of the diagnostic criteria for mood disorders (Rhode, Lewinsohn & Seewley, 1991). We therefore explored whether there is a higher prevalence of depression (*e.g.,* low mood and worry), avoidance (*e.g.,* feelings of inadequacy, fear and avoidance of social and work activities and a preoccupation with rejection or criticism from others), paranoia (*e.g.* persecutory beliefs about being exploited, harmed or deceived; constant suspicions and a preoccupation with doubts about the loyalty or trustworthiness of others) and poorer occupational health among workers with low job ranks compared to managers and supervisors.

*Socioeconomic status, occupational status and psychiatric symptom*s

In the UK, socioeconomic status is understood using standard classification systems such as the National Statistics Socio-Economic Classification (NS-SEC; Goldthorpe 2007). The NS-SEC consists of employment categories ranging from higher managerial positions to long-term unemployment. We therefore explored the connection between a worker's socioeconomic classification and the prevalence of psychiatric symptoms. In addition, because socio-economic status co-varies with income (Winkleby *et al.*, 1992), we explored the connection between workers' income and psychiatric symptoms.

There is considerable evidence that low socioeconomic status and income are associated with a higher prevalence of psychiatric symptoms but less is known about the prevalence of psychiatric symptoms among people in work. For example, depression is

associated with low socioeconomic status and job loss or poor workplace productivity (Lorant *et al.*, 2003; Simon *et al.*, 2000; Zhang *et al.*, 1999). A meta-analysis of 51 prevalence studies showed that low socioeconomic status slightly increases the risk of episode onset and moderately increases the risk of chronic depression (Lorant *et al.*, 2003). Lorant *et al.* (2003) suggested that this is because a low socioeconomic status offers fewer personal resources with which to buffer the impact of stress on depression. A longitudinal study by Lorant *et al.* (2007) found that 1-year increases in material hardship (*e.g.,* financial strain, deprivation and poverty) led to increased depression risk. We therefore explored the prevalence of depression and other psychiatric symptoms among workers, while also taking into consideration socioeconomic factors.

By exploring the prevalence of psychiatric symptoms among people in work, we hope to add to research showing the need for improved support for workers coping with psychiatric disorders (Kamau, 2016, 2017a). Indeed, there is research to suggest that employment outcomes improve after symptoms decrease (Lerner *et al.*, 2004; Schoenbaum *et al.*, 2001; Simon *et al.,* 2000) in samples of low-ranking workers in which there is a high prevalence of depression and other psychiatric symptoms. This research can also inform interventions that improve workers' access to treatment for psychiatric disorders because high-quality depression treatment improves employment outcomes (Kroenke *et al.*, 2001). By highlighting the prevalence of psychiatric symptoms among workers with different job ranks, we hope to add to existing knowledge by showing that – left untreated – psychiatric problems can increase unemployment risk (*e.g.* McGee and Thompson, 2015; Lerner *et al.* 2004). Lerner *et al.'s* (2004) longitudinal study of workers compared baseline and six-month follow-up data from depressed workers with data from a control group of healthy workers and a group with

non-psychiatric symptoms. Workers with depression had worse employment outcomes than both comparison groups. At the 6-month follow-up, depressed workers were more likely to be unemployed, change to a lower paid job, suffer limits in occupational ability, or be absent from work. Psychiatric symptoms impair job performance (Kamau, 2016, 2017a). Understanding their prevalence among different types of workers can inform supportive interventions.

Objectives

Evidence shows that low occupational and socioeconomic status are associated with poor mental health but there is a gap in evidence about the incidence of specific psychiatric symptoms. We assessed the associations among job rank, socioeconomic status and symptoms such as depression, avoidance and paranoia as well as physical health. Second, while there is evidence that shows that low socioeconomic status relates to poor mental and physical health, there is little research that measures both socioeconomic status (*e.g.* gross income and social class) and occupational status (job rank). In this article, we report the unique contributions of each type of status to variance in the incidence of psychiatric symptoms among workers.

Methods

We analyzed a dataset comprising 8,580 people who took part in extensive assessment interviews for the *Psychiatric Morbidity among Adults in Private Households Survey* by the

UK Office for National Statistics (ONS, 2003) between March and September 2000 in England, Wales and Scotland. The survey was sponsored by the Department of Health, the Scottish Executive's Health Department and the National Assembly for Wales. The purpose of the survey was to measure the prevalence of psychiatric symptoms and disorders in the general UK adult population (ages 16 to 74 years) in two stages. Participation in all interviews was voluntary and conducted under ethical guidelines stipulated by the regional health committees granting ethical approval (the London Multi-Centre Research Ethics Committee and 149 local research ethics committees).

Stage 1 interviews: The ONS conducted a stratified multi-stage random probability sample of postal addresses. The ONS then sent a letter to each selected address explaining that it had been chosen for a survey and that interviewers would be visiting to ask if they would like to take part in the survey. After this, interviewers visited the selected addresses to randomly select one person from each residential household aged 16-74 years. From the 12,792 residential addresses visited, 69.5% adults (8,886) agreed to participate; of these, 8,450 interviews (98.5%) were complete and 130 (1.5%) partially complete (totaling 8,580). Each consenting person took part in a computer-assisted questionnaire interview with an ONS researcher for an average of 115 minutes. All respondents were asked whether they were willing to take part in second-stage interviews. Stage 1 interviews assessed the following:

- *Psychotic disorders* were screened for by assessing whether respondents met one of the following criteria: a) current anti-psychotic medication use; b) a history of admission into a psychiatric ward or hospital; c) reporting a psychotic diagnosis such as schizophrenia when asked about long-standing illnesses or when asked about reasons for visiting a

doctor they gave reasons suggesting that they had experienced psychotic symptoms; and (d) having had auditory hallucinations within the past year, as assessed by an item within the Psychosis Screening Questionnaire (PSQ; Bebbington and Nayani, 1995).

- *Mood Disorders* formerly known a*s Neurotic Disorders* were assessed using the Revised Clinical Interview Schedule (CIS-R; Lewis and Pelosi, 1990; Lewis, Perosi, Araya and Dunne, 1992) which has 14 sections assessing anxiety; compulsions; concentration/forgetfulness; depression; depressive ideas; fatigue; irritability; obsessions; panic; phobias; sleep problems; worry about physical health; worry; and somatic symptoms. To screen for a neurotic disorder, the ONS applied an algorithm to respondents' data based on 1CD-10 diagnostic criteria (World Health Organization, 1993). This determined the following diagnoses: depressive episodes, generalized anxiety disorder, mixed anxiety and depressive disorder, obsessive-compulsive disorder, panic and phobias,

- Alcohol misuse was assessed using the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 1992); and the Severity of Alcohol Dependence Questionnaire (SAD-Q; Stockwell, Murphy and Hogson, 1983).

- Drug misuse was assessed using questions about frequency of use, dependence and withdrawal symptoms from amphetamines, cannabis, cocaine, crack, ecstasy, tranquillizers and opiates.

- *Personality disorders* were assessed using a self-completed screening version of the Structured Clinical Interview for DSM-IV Axis II, Personality Disorders: avoidant; antisocial; borderline; dependent; depressive; histrionic; narcissistic; obsessive-

compulsive; paranoid; passive-aggressive; schizoid; and schizotypal personality disorders (SCID-II; First et al., 1997).

- *General and occupational health* using the SF-12 Health Survey (Ware, Kosinski, and Keller, 1996).

- Suicidal ideation and suicide attempts were assessed using CIS-R items (Lewis and Pelosi, 1990; Lewis, Perosi, Araya and Dunne, 1992).

- Other elements of the stage 1 interviews assessed:

- Demographics e.g. age, education

- Employment

- Socioeconomic variables e.g. income and social class

- Accommodation, social networks and support

- Stressful life events

- Intellectual functioning

The current study: For this article, we analyzed data from all 4,596 employed respondents who took part in stage 1 interviews, of which 939 (20.4%) employees were managers, 739 (16%) employees were supervisors, and 2,918 (63.5%) employees had lower job ranks. Table 1 presents a summary of respondents' demographics.

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We examined the workers' responses to assessments of the following variables during stage 1 interviews:

General and occupational health assessment: The respondents were asked about their general health, life event history and their use of health services. General and occupational health was assessed using the SF-12 Health Survey; previous literature shows that it has good reliability (e.g. Ware, Kosinski, and Keller, 1996). In this article, we analyzed the following individual items from the SF-12 measuring general and occupational health: SF1 (general health); SF4 (occupational impairments due to physical health in the past 4 weeks); SF5 (impairments in types of work/activities the respondent can do in the past 4 weeks); SF6 (low productivity at work/activities due to emotional problems); and SF8 (pain has interfered with work). Other SF-12 items were not analyzed for the current study because they lack direct relevance to employment in their wording e.g. items about difficulty climbing stairs, hobbies, and general mood. Factor analysis of all SF items showed that the selected items load onto one factor and analysis of the selected SF items alone confirmed that they represent one factor with only one component having an Eigenvalue greater than 1 (E=2.37).

Socioeconomic variable assessment: (i) Social class was assessed by the ONS using standard occupational classifications (OPCS, 1991). Each respondent's occupation led the ONS to classify them into one of 5 groups: I (professional); II (intermediate occupations); IIIM (skilled non-manual occupations); IIINM (skilled manual occupations); IV (partly skilled occupations); V (unskilled occupations), all excluding army occupations. (ii) Socioeconomic status was assessed by the ONS based on Standard Occupational Classification (OPCS, 1991) by allocating respondents to one of 14 socioeconomic groups based on their profession, ranging from higher managerial to unemployed. (iii) Household gross income group and (iv) personal gross income group were both assessed by the ONS using 32 income categories that

it created based on a respondent's income before taxes and national insurance. The categories ranged from 1 (an annual income <£520), 2 (an annual income of £520 to £1,039), and so on until 32 (an annual income of ≥36,400). Measures of socioeconomic factors presented good concurrent validity with each other (with significant inter-correlations, $p < .001$) and with job rank. At $p < .001$ job rank correlated significantly with personal gross income group, $r = .48$; household gross income group, $r = .25$; socioeconomic group, $r = -.65$; and social class, $r = -.51$. A linear regression model showed that the four socioeconomic indicators predicted 46.9% of the variance in job rank, $R = .69$, $F (4, 3004) = 663.84$, $p < .001$.

Assessment of depressive symptoms and disorders: ONS interviewers used the CIS-R (Lewis *et al.,* 1992) described earlier. They recorded respondents' symptoms over the 1-week period before the interview date capturing symptom frequency, duration, severity and time since onset.

Assessment of paranoia symptoms and paranoid personality disorder: All respondents were screened for the presence of psychosis using the Psychosis Screening Questionnaire (Bebbington & Nayani, 1994). The PSQ has 5 sections to identify psychotic-like experiences that may have occurred within the past year: hypomania, thought control, paranoia, strange experiences, and hallucinations. Each section has an initial question followed by 1 or 2 follow-up questions to determine severity. For the purposes of the present study, only the paranoia section was of interest particularly the questions asking whether they felt people were against and deliberately trying to harm them. The highest severity of paranoia was

assessed using the third paranoia criterion question ''*Have there been times that you felt that a group of people was plotting to cause you serious harm or injury*?''.

Paranoid Personality Disorder was measured by the SCID (Axis II Interview). The DSM-IV defines Paranoid Personality disorder (PPD) as "A pervasive distrust and suspiciousness of others such that their motives are interpreted as malevolent, beginning by early adulthood and present in a variety of contexts" (APA, 1994, page 600), as indicated by four (or more) of the following: (1) suspects without sufficient basis, that others are exploiting, harming and or deceiving them; (2) is preoccupied with unjustifed doubts about the loyalty of friends and associates; (3) is reluctant to confide in others because of unwarranted fear that the information will be used maliciously against him or her; (4) reads hidden demeaning or threatening meanings into benign remarks or events; (5) persistently bears grudges, i.e., is unforgiving of insults, injuries, or slights; (6) perceives attacks on his or her character or reputation that are not apparent to others and is quick to react angrily or to counterattack and (7)has recurrent suspicions, without justification, regarding fidelity of spouse or sexual partner. To be diagnosed with PPD respondents have to report 4 or more of the criteria listed above.

Avoidance symptoms and Avoidant Personality Disorder: Avoidance symptoms and Avoidant Personality Disorder were measured by the SCID (Axis II) Interview. The DSM-IV defines Avoidant Personality Disorder as "A pervasive pattern of social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation, beginning by early adulthood and present in a variety of contexts" (APA, 1994, page 700).   The clinically trained interviewers had to make a judgment of the rating for each item on a four-point scale: 'inadequate

information', 'negative', 'sub-threshold', and 'threshold'. Each criterion was explored in turn with standard probes and thresholds for marking a criterion as present. To be diagnosed with an Avoidant Personality Disorder, the respondent needed to show 4 or more of the following: 1) avoids occupational activities that involve significant interpersonal contact, because of fears of criticism, disapproval, or rejection; 2) is unwilling to get involved with people unless certain of being liked; 3) shows restraint within intimate relationships because of the fear of being shamed or ridiculed; 4) is preoccupied with being criticized or rejected in social situations; 5) is inhibited in new interpersonal situations because of feelings of inadequacy; 6) views self as socially inept, personally unappealing, or inferior to others; 7) is unusually reluctant to take personal risks or to engage in any new activities because they may prove embarrassing. For the purpose of this study we focused on the presence of avoidant symptoms (criterion 1, 2, 5 and 7) in the sample of workers. It is noteworthy that participants may be showing symptoms of avoidance but do not necessarily meet the criteria for an avoidant personality disorder, so we do not report analyses for the prevalence of Avoidant Personality disorder but focus solely on the presence of avoidance symptoms. To meet the criteria for an Avoidant Personality Disorder, participants need to show 4 or more of the symptoms listed above.

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Data analysis

We analysed the data using SPSS v.20. We calculated the percentages of employees reporting different categories of general health and occupational health. We then examined the

percentages of employees who report psychiatric symptoms and the percentages with symptoms severe enough to be clinically significant in meeting diagnostic criteria for the relevant psychiatric disorder. We analysed how socioeconomic indicators (including job rank) explain variance in general health, occupational health and psychiatric symptoms using regression models. We then analysed the association between job rank and psychiatric symptoms using a non-parametric test (Kruskal-Wallis) and further assessed how job rank, general health and occupational health explain variance in psychiatric symptoms using regression models.

Results

Employees' general and occupational health: Of the 4,596 workers, only 494 (10.72%) workers reported fair or poor health, and the rest of the workers reported excellent, very good or good health. Only 11 (0.23%) workers reported that medication impairs their ability to do their job. There were 572 (12.45%) workers who reported that the state of their health has resulted in less work or regular activities. There were 583 (12.68%) workers who reported that health has limited the sorts of work or activities that they can do. There were 545 (11.86%) workers who reported that emotional problems have resulted in less work or regular activities. There were 275 (5.98%) workers who reported that pain has impaired their normal work extremely or quite a bit. In terms of somatic symptoms, only 430 (9.36%) workers received a score of between 1 and 4, and the rest received a score of 0.

Employees' psychotic and non-psychotic symptoms: As expected, the incidence of symptoms of mood disorders was greater than the incidence of more serious psychiatric symptoms and

diagnoses (psychosis and personality disorders) (see table 2). A score of less than 12 indicated the presence of non-clinically significant symptoms. For the sub-sample of 4,596 employees in the week prior to interview, most adults (84.9%) were in this category. Among the 15.1% of adults scoring 12 or more, 7.5% were in the range 12-17 indicating a level of symptoms that was significant, but unlikely to warrant treatment. The other half (7.5%) had symptoms of a level of severity likely to require treatment. 9% of the people with a neurotic disorder presented with mixed anxiety and depressive disorder. Women were more likely than men to have depressive episodes (2.5% *vs.* 1.9% respectively). In contrast to this, the overall prevalence of psychotic disorders in this sub-sample was 0.4% (0.3% of men, 0.5% of women). In both men and women, the highest prevalence was observed in those aged 35 to 44 years (0.7% and 1.1% respectively).

Moreover in the sub-sample of the 4,596 workers, 2,463 (53.6%) had depressive symptoms and 2,133 (46.4%) no depressive symptoms on the CIS-R. Out of the 4,596 workers 330 (7.1%) were signalled as having symptoms of less common and more severe psychiatric disorders, namely psychotic and personality disorders *e.g.* avoidant personality disorder and paranoid personality disorder. Out of 330 workers, 256 (78%) workers met 0 criteria for paranoid personality disorder.

Also, of the 330 workers, 74 (22.4%) respondents met between 1 and 6 criteria for paranoid personality disorder, and 73 (22.1%) for avoidant symptoms on the SCID II (see table 2 for a full description).

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Socioeconomic indicators and variance in general and occupational health: Linear regression models tested the association between job rank, household gross income, social class, personal gross income and socio-economic group on each of the following criterion variables that indicate general and occupational health, with table 3 showing the unique effect of each predictor: (1) general health, $R = .13$, $F (5, 3002) = 10.11$, $p = .001$; variables significantly associated with general health were household gross income and socioeconomic group, $p < .05$. (2) Impact of health on work, $R = .07$, $F (5, 3002) = 2.62$, $p = .023$; variables significantly associated with this were social class, personal gross income group and socioeconomic group, $p < .05$. (3) Limiting impact of health on work, $R = .04$, $F (5, 3003) = 1.17$, $p = 0.323$ (*n.s.*) (4) Emotional problems limiting work, $R = .08$, $F (5, 3003) = 3.51$, $p = .004$; variables significantly associated with this were the significant unique predictor was personal gross income, $p = .025$. (5) Pain interfering with work, $R = .07$, $F (5, 3001) = 2.52$, $p = .027$; variables significantly associated with this were household gross income was the significant unique predictor, $p = .043$. (6) Somatic symptoms, $R = .08$, $F (5, 3003) = 3.54$, $p = .003$; variables significantly associated with this were socioeconomic group, $p = .032$.

Socioeconomic indicators and variance in psychotic/non-psychotic symptoms: Linear regression showed that job rank, household gross income group, social class, personal gross income group and socio-economic group were significantly associated with depressive symptoms, $R = .10$, $F (5, 3003) = 5.70$, $p = .001$. Depressive symptoms were significantly associated with personal gross income group, socioeconomic group, and social class, $p < .05$. Job rank and household gross income group were not significantly associated with depressive

symptoms. Linear regression showed that job rank, household gross income group, social class, personal gross income group and socio-economic group were significantly associated with the presence of avoidant symptoms, $R = .27$, $F (5, 229) = 3.54$, $p = .004$; t tests showed that only household gross income was uniquely associated with avoidant symptoms, $p = .015$. On the other hand, paranoia symptoms were not significantly associated with job rank, household gross income, social class, personal gross income and socio-economic group on paranoia among workers, $R = .19$, $F (5, 229) = 1.62$, *n.s.*

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Job rank, occupational health and psychotic symptoms: Kruskal-Wallis tests were performed to examine the effects of job rank on paranoia and avoidant criteria. A Kruskal-Wallis test showed a statistically significant effect of job rank on the paranoid criteria ($H (2) = 10.09$, $p =.006$), with managers reporting the lowest number of paranoia criteria, supervisors the second-lowest, and lower rank workers the highest count ($M_{\text{(managers)}} = 2.63$, $SD_{\text{(managers)}} = 1.19$, $M_{\text{(foremen)}} = 3.09$, $SD_{\text{(foremen)}} =1.70$, $M_{\text{(non-managers/non-foremen)}} = 4.16$, $SD_{\text{(non-managers/non-foremen)}} = 1.86$). A further Kruskal-Wallis test showed that job rank had also an effect on avoidant personality disorder criteria of the SCID II ($H (2) = 44.52$, $p < .001$), with managers reporting the lowest, supervisors the second-lowest and lower rank workers the highest count of avoidant criteria ($M_{\text{(managers)}} = 1.82$, $SD_{\text{(managers)}} = 1.47$, $M_{\text{(foremen)}} = 3.13$, $SD_{\text{(foremen)}} =1.96$, $M_{\text{(non-managers/non-foremen)}} = 3.75$, $SD_{\text{(non-managers/non-foremen)}} = 2.04$). Regressing job rank, occupational and physical health onto paranoia criteria showed a significant effect, $R =.30$, $F (7, 320) = 4.54$, $p = .000$. Paranoia criteria were significantly associated with general health, emotional problems and job rank, $p < .05$. Testing avoidant criteria as the criterion variable showed

likewise, $R = .31$, $F (7, 320) = 5.01$, $p = .001$, there were significant associations with general health, health reducing work, health limiting work and job rank, $p < .05$. This showed that paranoia and avoidant symptoms are associated with job rank and occupational health. In other words, the lower the job rank the more likely the presence of paranoia and avoidant symptoms, indicating vulnerability to more severe psychopathology including psychosis and personality disorders (*e.g.,* paranoid schizophrenia and avoidant and paranoid personality disorders).

Discussion

In understanding the epidemiology of community mental health, our results show that an important consideration is a person's job rank, health problems associated with their job, and their socio-economic status.

This study found that socio-economic factors are associated with mental health outcomes, namely with the presence of depressive symptoms and poor physical health in a sample of UK workers, but it also shows that paranoia, a symptom most commonly seen in psychotic disorders, does not appear to be associated with socio-economic factors, such as social class, socio-economic group and personal income. Rather, paranoia has a strong association with job rank and occupational health, such as emotional problems impacting work. This suggests that there is no direct association between socio-economic factors and more severe forms of psychopathology. Although socio-economic factors are related to occupational health, it appears that the relationship between socio-economic factors and paranoia may be more complex than that observed between socio-economic factors and

mood- related disorders. Occupational health may mediate this relationship. This makes an important contribution to existing theory and epidemiological research on community mental health, which generally posits that low socio-economic background and low income may be conducive to psychopathology and poor health (Calixto & Anaya, 2014; Marmot & Smith, 1991). This research highlights the complexity of this issue – coupling socio-economic factors with poor health can shed greater light on the development of psychopathology among workers.

Our research shows that depressive symptoms such as panic, depressive ideas and obsessions are associated with socio-economic factors such as low income (Calixto & Anaya, 2014). Previous research suggests that socio-economic status is an important determinant of one's physical and mental well-being (Adler *et al*.,1994; Winkleby *et al.*, 1992). On the other hand, more severe forms of psychopathology, such as paranoia and avoidant personalities are associated with job rank and occupational health. Although the cross-sectional nature of this research precludes claims regarding causality, it is possible that paranoia and avoidance constitute adaptive reactions to the circumstances of low power experienced by workers in non-managerial and non-supervisory jobs. Indeed, the results suggest that paranoia and avoidant symptoms are more prevalent in low rank workers than in workers in managerial or supervisory jobs. Previous empirical work shows that power differentials at work, socio-economic factors and low rank cause poorer health, unhealthy functioning and general impairment (Marmot & Smith, 1991). Moreover, the findings suggest that power differentials at work are related to occupational health (limiting work and other activities and producing emotional issues at work) (Marmot & Smith, 1991; Lerner *et al*., 2004), which could in turn increase vulnerability to more severe forms of psychopathology (de Graaf, 1997).

These results also support previous literature about the established relationship between low social rank and paranoid ideation (Gilbert, 2001; Gilbert *et al.*, 2005; Lopes, 2011). Evolutionary theorists have been arguing that low rank individuals learn to fear and to avoid other people in order to steer clear of harm (Gilbert, 2001; Gilbert *et al*., 2005). The present study suggests that the same principle may apply to workplace rank. People with a low job rank may view the workplace as a threatening context, which can explain a general disengagement and avoidance, which in turn is typical of avoidant and paranoid personalities (Carrol, 2009). Yet, the workplace is also a social context which cannot be easily avoided due to people's dependence on it for their livelihoods. Individuals may be socially obligated to develop strategies for coping. Previous research shows that the aforementioned reactions can constitute adaptive ways of coping with the social threats associated with having a low rank (Gilbert, 1992; Gilbert, 2001; Gilbert *et al*., 2005; Lopes, 2011). People may perceive them as a means of avoiding conflict and potential harm – both social and psychological - by developing avoidant personality traits. These are, thus, essentially disengagement strategies. The development of avoidant personality traits allows the low job rank individual to continue to function psychologically in an inherently threatening context. Moreover, high sensitivity to threat in the form of paranoia about malevolent behaviors from higher rank individuals can be adaptive among people with non-managerial or supervisory jobs. Indeed, feeling paranoid about what higher rank individuals will do to you may be an adaptive strategy formed to deal with social situations and experiences of abuse and bullying by managers (Kramer, 1999). Furthermore, avoiding potential conflict is perceived as minimizing the likelihood of being harmed or loosing benefits *e.g.,* being fired. Thus, from the perspective of a subordinate, it is better to "be safe than sorry" (Gilbert, 1992).

It is noteworthy that our results support studies showing that paranoia and an avoidant personality disorder are comorbid and prevalent in low rank individuals (Carrol, 2009). Both are characterized by a degree of mistrust of other people and consequential social withdrawal. Avoidant people tend to lack confidence and tend to believe that they will perform inadequately in certain social situations (Carrol, 2009) and as such they will fail to move up the ranks because they avoid going for promotions, etc. Is it possible that avoidant personality traits could – together with paranoia ("I have to watch my back since the manager is not to be trusted") – constitute an adaptive preventative mechanism in a workplace?

All in all, this may contribute to theory and research on how self-identity processes and self-protection mechanisms enable people to cope with threatening social situations (Jaspal & Breakwell, 2014), but it also alerts us to important contributions of evolutionary psychology to understanding the presence of psychopathology in the workplace. This preliminary cross-sectional study, which does not allow for causal assertions, does nonetheless demonstrate the need for integrating distinct paradigms and subdisciplines of psychology in order to understand the nature of the complex associations between workplace rank and paranoid psychopathology.

Although paranoid and avoidant strategies may be effective in dealing with social contexts of conflict and competition at work, they are maladaptive in the long term, potentially leading to the development of psychopathology (Kramer, 1999; Gilbert, 2001). Indeed, when these mechanisms are in place, they become dysfunctional as the individual may be unable to develop self-confidence, self-esteem and resilience (Lopes, 2011). These are of course important principles of identity development and psychological well-being (Jaspal & Breakwell, 2014).

Although this study was conducted in 2000, 2015/16 data from the UK's Labour Force Survey (Health and Safety Executive, 2016) shows that the prevalence and incidence of depression, anxiety and other common psychiatric conditions remains broadly similar to what was observed in the 2000 sample. Indeed, the 2015/16 data showed a prevalence among UK workers of common psychiatric disorders like depression and anxiety of around 1,510 per 100,000 workers and an incidence of 690 per 100,000, which suggested that the estimated rate of common psychiatric problems has remained much the same for over two decades in the UK (Health and Safety Executive, 2016). Some authors suggest a worsening of common mental health problems among some age groups between the years 2007 and 2014 because of the economic recession (Stansfeld, Clark, Bebbington, King, Jenkins, Hinchcliffe, 2016) therefore the psychiatric symptoms we observed in the 2000 sample are likely to have remained level or worsened since. There have, however, been improvements in how people can access support for mental health problems because in 2008 the UK government established the Improving Access to Psychological Problems Therapies (IAPT) programme, a scheme within the freely accessible National Health Service (NHS). It has helped improve public access to treatments such as Cognitive and Behavioural Therapy but some authors (*e.g.* Harvey, Handerson, Lelliott & Hotopf, 2009) argue that IAPT may not be as effective in helping people with common mental health problems resume employment because many IAPT services do not have employment support as a treatment pathway and IAPT schemes such as the "Pathways to work Programme" could be improved. Researchers also argue that there is no standardized return-to-work or employment support scheme embedded within NHS mental health services (Kamau 2016, 2017a; Harvey *et al.*, 2009) and that, in spite of the social inclusion rhetoric, secondary services are still very much oriented towards crisis

care and risk management of those with severe mental health problems (Harvey *et al.*, 2009).

For instance, a study by Kamau (2016) of 3,329 adult clients of the NHS mental health

service interested in employment support (*e.g.* appropriate information or signposting about

returning to work) did not receive the support. The study found that people taking medication

for a mental illness are significantly more likely to receive the support because selective

serotonin reuptake inhibitors, benzodiazepines and other common prescriptions impair

workplace performance through impaired cognitive processing, memory and perception, by

causing drowsiness, confusion or fatigue, and by increasing accident proneness (Smith,

Wadsworth & Moss et al. 2004) but argued that people recovering from a mental illness

without taking medication still need employment support. A major obstacle is therefore that

NHS occupational rehabilitation programmes in the UK are still poorly developed and

unevenly distributed geographically (Harvey *et al.*, 2009).

We recommend that NHS mental health services (and similar services in other countries)

developing employment support programmes for workers coping with psychiatric symptoms

use our findings in three main ways. First, we recommend that training programmes for

psychiatric staff (*e.g.* care programme approach training, Kamau, 2014) improve their

awareness about how job rank and other socioeconomic factors are associated with

psychiatric symptoms. Second, we recommend that psychiatric staff designing employment

support (specifically, individual placement and support programmes also known as supported

employment schemes) consider whether or not a client's assigned job rank will contribute to

worse symptoms. Third, we recommend that psychiatric staff provide employment support to

not just working clients diagnosed with a psychiatric disorder but also workers presenting

psychiatric symptoms that are occupationally relevant in that they lead the worker to seek

help or advice from their family doctor or other clinician because of occupational impairment. For example, statistics showing that depression is the most prevalent mental disorder among working-age adults in the UK and causes the most occupational impairment (Lelliot, Tulloch & Boardman et al. 2008; Fournir, DeRubeis & Amsterdam et al. 2015) but not all workers presenting with depressive symptoms that cause occupational impairments may meet the criteria for major depressive disorder – but this does not mean that they would not benefit from employment support schemes run by the NHS. We recommend integrating employment support into regular mental health treatment because *e.g.* Lagerveld, Blonk, & Brenninkmeijer et al. (2012) found that work-focused CBT administered to employees on long-term sick leave because of a psychiatric disorder led to them returning to work 65 days sooner and having less severe symptoms than employees getting regular CBT.

There is also still much work to be done by many organisations in the UK in safeguarding the mental health of their workers. We recommend that organisations explore endemic and persistent issues that workers feel contribute to mental health problems such as workload pressures, tight deadlines, too much responsibility and lack of managerial support (Health and Safety Executive, 2016). We therefore recommend that organisations initiate mental health awareness-raising campaigns for their workers, provide confidential employee assistance programs to reduce the presence of mental health symptoms (*e.g.*, depressive symptoms, see Lorant *et al.*, 2003), and be aware of how they as organisations can supplement NHS mental health services in offering support for workers returning to work with a mental illness. We also recommend that organisations improve provision for workers with mental health problems within existing occupational health services. For example, provision for pregnant workers and those returning from maternity leave should include

information, advice and signposting about postpartum depression or psychosis (which is not adequately supported by the NHS, Kamau, 2017a). We also encourage organisations to be aware of the interaction between physical health and mental health; for example, support for workers recovering from cancer should include mental health support (Kamau, 2017b).

Future research should test the effectiveness of these recommendations and other ways that our current findings can help psychiatric staff, mental health services and organizations provide better support for workers with psychiatric disorders and symptoms. Future research should also explore whether demand characteristics play a role in explaining some of the variance in psychiatric symptoms associated with job rank. Managers and supervisors might feel under pressure to present 'normal' mental health and they may withhold their true responses to questions about panic, depressive ideas, and so on. People with the tendency to impression manage what others think of them tend to be successful at rising in job rank (Anderson & Brown, 2010; Cheng *et al.,* 2010; Morf & Rhodewalt, 2001) and thus there is somewhat a 'Catch 22' in how to accurately diagnose a high ranking worker. In addition, because this is a cross-sectional study, it may well be that people with avoidant personalities may be drawn to lower rank positions in their jobs and not the other way around. Future research should therefore use longitudinal designs to measure how these symptoms develop progressively over time.

In conclusion, we have found that job rank and socioeconomic factors explain variance in workers' general health, occupational health and psychiatric symptoms. This is among the first studies to show that the lower the job rank, the worse a worker's psychiatric symptoms: for example, we have found that ordinary workers present more paranoid symptoms and avoidant personality disorder symptoms than supervisory workers, who in turn

present more symptoms than managerial workers. We hope that this article will stimulate additional new research into the epidemiology of workers' mental health.

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Table 1: The workers' demographics

Works in an organization with >25 employees	65.8% (3025)
Employees who took >10 days off from work because of health in the past year	32.1% (1477)
Mean number of days off from work in the past year	20.93 *(SD*=43.05)
Social class based on occupation	I – Professional occupations 5.9% (273)
	II – Managerial and technical occupations 33.0% (1517)
	IIINM – Skilled non-manual occupations 25.1% (1154)
	IIIM – Skilled manual occupations 17.1% (785)
	IV – Partly skilled occupations 14.1% (647)
	V – Unskilled occupations 4.5% (208)
	Armed forces 0.3% (12)
Sex	Males 47.8% (2198)
	Females 52.2% (2398)
Married	51.4% (2363)
Education	University degree 22.7% (862)
	A Levels or equivalent 19.7% (751)
	Teaching qualification 9.9% (377)
	Secondary school (O Levels or similar) 41.1% (1564)
	Other/none 6.6% (250)
Have a criminal conviction	10.3% (475)
Ethnicity	White 94% (4326)

	African or West Indian 2.39% (110)
	Asian 1.63% (75)
	Other 1.80% (83)
Personal gross income	Range 1-32 (*M*=19.36, *SD*= 7.70)
Household gross income	Range 1-32 (*M*=26.67, *SD*=5.48)

Table 2: The workers' psychiatric diagnoses, symptoms and use of mental health services

Workers with ≥1 long-standing illnesses	36.6% (1684 workers, of which 2.72% or 125 have mental disorders)
Of the workers with ≥1 long-standing illnesses, incidences of chronic mental disorders (ICD-10)	Anorexia nervosa 0.12% (2)
	Anxiety 0.65% (11)
	Bulimia 0.18% (3)
	Depression 4.04% (68)
	Severe depression 0.12% (2)
	Manic depression 0.12% (2)
	Nervous breakdown 0.06% (1)
	OCD 0.12% (2)
	Panic attacks 0.30% (5)
	PTSD 0.18% (3)
	Sleep walking 0.06% (1)
	Schizoaffective disorder 0.06% (1)
	Stress 1.25% (21)
Workers taking psychiatric medication	2.83% (130)
Had suicidal thoughts in lifetime	14.8% (787)
Workers who consulted their family doctor about mental health problems in the last year	11.01% (506)
Workers who had been hospital inpatients in the last year (medical/other conditions)	6.83% (314)
Workers who had been hospital outpatients in the last year	36.05% (1657)

Workers with CISR symptoms score>0	Somatic 9.4% (430)
	Fatigue 33.7% (1551)
	Poor memory16.79% (772)
	Irritability 37.6% (1728)
	Depression 18.6% (853)
	Worry 37.1% (1706)
	Anxiety 17.8% (820)
	Phobia 11.8% (547)
	Panic 1.7% (76)
	Obsessions 6.5% (299)
Workers with psychotic and paranoia symptoms of the PSQ	**Workers with paranoid symptoms:** Felt people were against them 23.35% (233 Managers, 183 Foremen and 657 lower rank workers) Felt people were deliberately against them 10.1% (111 Managers, 77 Foremen and 274 lower rank workers) Felt people were plotting to harm them* 1.26% (16 Managers, 11 Foremen, 31 lower rank workers) **Workers with psychotic symptoms:** Felt controlled by an outside force 9.46% (435) Heard or saw things others could not 3.83% (176) Heard voices with no one around 0.78% (36)
Workers showing Avoidant Personality Disorder (4 + avoidant criteria symptoms on the SCID II)	*N*=330 1.2% met 4 avoidant criteria on the SCID II (0 Managers, 2 Foremen and 2 lower rank workers)

	3.3% met threshold for avoidant criterion 1 (0 Managers, 1 Foreman and 10 lower rank workers)
	3.3% met threshold for avoidant criterion 2 (1 Manager, 1 Foreman and 9 lower rank workers)
	6.4 % met threshold for avoidant criterion 5 (1 Manager, 5 Foremen an 15 lower rank workers)
	4.2% met threshold for avoidant criterion 7 (2 Managers, 4 Foremen and 14 lower rank workers)
Workers showing Paranoid Personality Disorder (4+ paranoid criteria on the SCID II)	*N*=330
	77.57% met 0 symptoms on the SCID II (55 Managers, 49 Foremen and 152 lower rank workers)
	1.2% met 4 paranoid criteria on the SCID II (0 Managers, 2 Foremen and 2 lower rank workers)
Substance use	Tobacco 29.09% (1337)
	Alcohol 91.36% (4199, of which 18.78% or 863 have 6+ alcohol drinks weekly and 1.46% or 67 have them daily)
	Amphetamines in the last month 0.48% (22)
	Cocaine in the last month 0.70% (32)
	Crack in the last month 0.04% (2)
	Ecstasy in the last month 0.83% (38)
	Tranquilizers in the last month 0.20% (9)
	Cannabis in the last month 5.18% (238)

* Highest severity paranoia criterion

Table 3: Unique effects of job rank, income, class and socioeconomic group on general/occupational health, depressive, paranoia and avoidant symptoms

Outcome	Predictors	Standardized beta	Significance of the predictor's unique effect
General health	Job rank	β=-0.04	t=-1.59, p = 0.112
	Household gross income	β=-0.08	t=-3.77, p = 0.001
	Personal gross income	β=-0.04	t=-1.78, p = 0.076
	Social class	β=-0.03	t=-0.87, p = 0.387
	Socioeconomic group	β= 0.09	t=2.43, p = 0.015
Impact of health on work	Job rank	β=0.02	t=0.60, p = 0.549
	Household gross income	β=0.02	t=1.06, p = 0.289
	Personal gross income	β=0.06	t=2.29, p = 0.022
	Social class	β=0.08	t=2.42, p = 0.016
	Socioeconomic group	β=-0.07	t=-1.77, p = 0.077
Limiting impact of health on work	Job rank	β=0.01	t=0.43, p = 0.670
	Household gross income	β=0.01	t=0.42, p = 0.674
	Personal gross income	β=0.05	t=1.92, p = 0.055
	Social class	β=0.04	t=1.14, p = 0.254
	Socioeconomic group	β=-0.02	t=-0.56, p = 0.575
Emotional problems	Job rank	β=0.04	t=1.63, p = 0.103

limiting work	Household gross income	β=-0.00	t=-0.12, p = 0.905
	Personal gross income	β=0.05	t=2.24, p = 0.025
	Social class	β=-0.05	t=-1.46, p = 0.144
	Socioeconomic group	β=0.07	t=1.84, p = 0.066
Depressive Symptoms of the CIS - R	Job rank	β=-0.033	t=--1.37, p =0.191
	Household gross income	β=-0.019	t=-.878, p = 0.380
	Personal gross income	β=-0.061	t=--2.537, p = 0.11
	Social class	β=-0.070	t=1.857, p = 0.43
	Socioeconomic group	β=-0.124	t=-3.347, p = 0.001
Avoidant Symptoms of the SCID II	Job rank	β=0.026	t=.310, p =0.757
	Household gross income	β=-0.195	t=-2.444, p = 0.015
	Personal gross income	β=-0.021	t=.241, p = 0.810
	Social class	β=0.168	t=1.305, p = 0.193
	Socioeconomic group	β=-0.055	t=-0.404, p = 0.686
Paranoia Symptoms of the PSQ	Job rank	β=0.045	t=1.797, p = 0.073
	Household gross income	β=-0.013	t=-.576, p =0.565
	Personal gross income	β=0.028	t=1.14, p =0.253
	Social class	β=-0.040	t=-1.150, p = 0.250
	Socioeconomic group	β=-0.005	t=-.130, p = 0.897

Psychiatric Disorder

Psychiatric Symptoms

ICD-10 F32.01

Mild Depressive Disorder

With Somatic Symptoms

Mild Depressive Episode Symptoms

Depressive Episode

Score of 12 or above in the CIS-R

ICD-10 F32.10

Moderate Depressive Disorder

Without Somatic Symptoms

Moderate Depressive Episode Symptoms

ICD-10 F32.11

F32.11 Moderate Depressive Disorder

With Somatic Symptoms

Included: Paranoia symptoms on the PSQ

ICD-10 F20-F30

Psychotic Disorders

Not Included:

Thought Interference

Perceptual Abnormalities

Hypomania

Hallucinations

Strangeness of Experience

DSM-IV 301.82

Avoidant Personality Disorder:

4 or more avoidant symptoms on the SCID II

Avoidant symptoms

DSM-IV 301.0

Paranoid Personality Disorder: 4 or more paranoia criteria on the SCID II

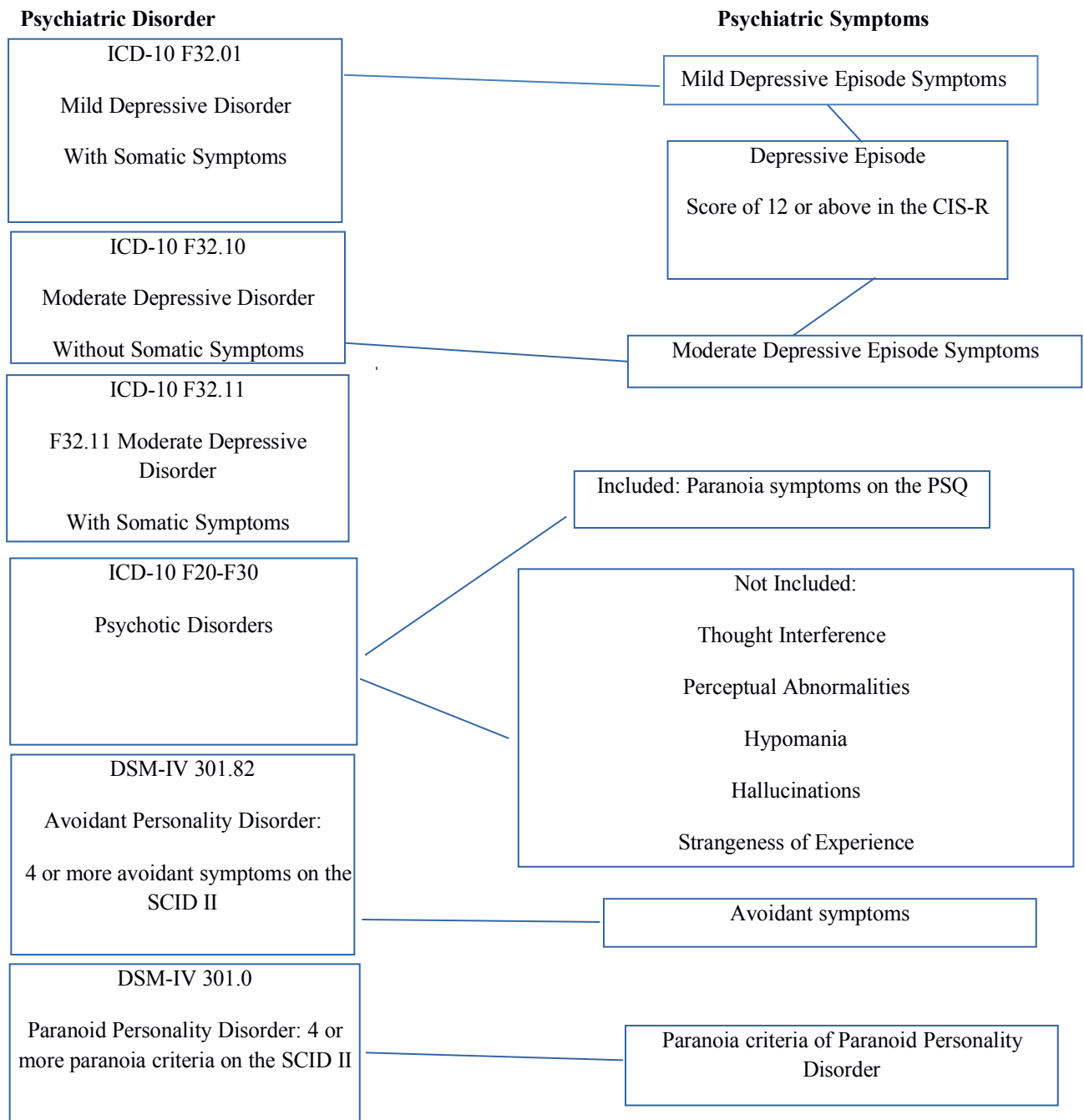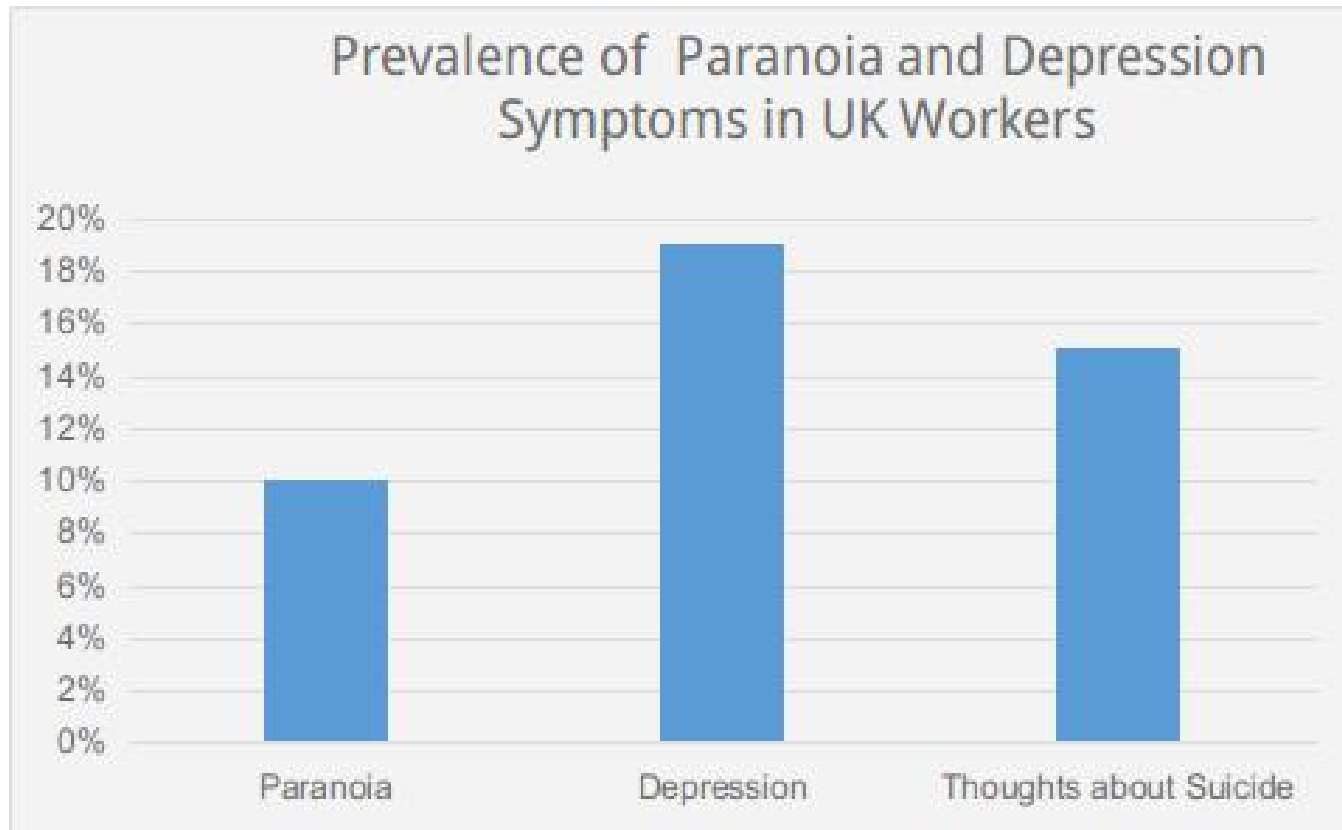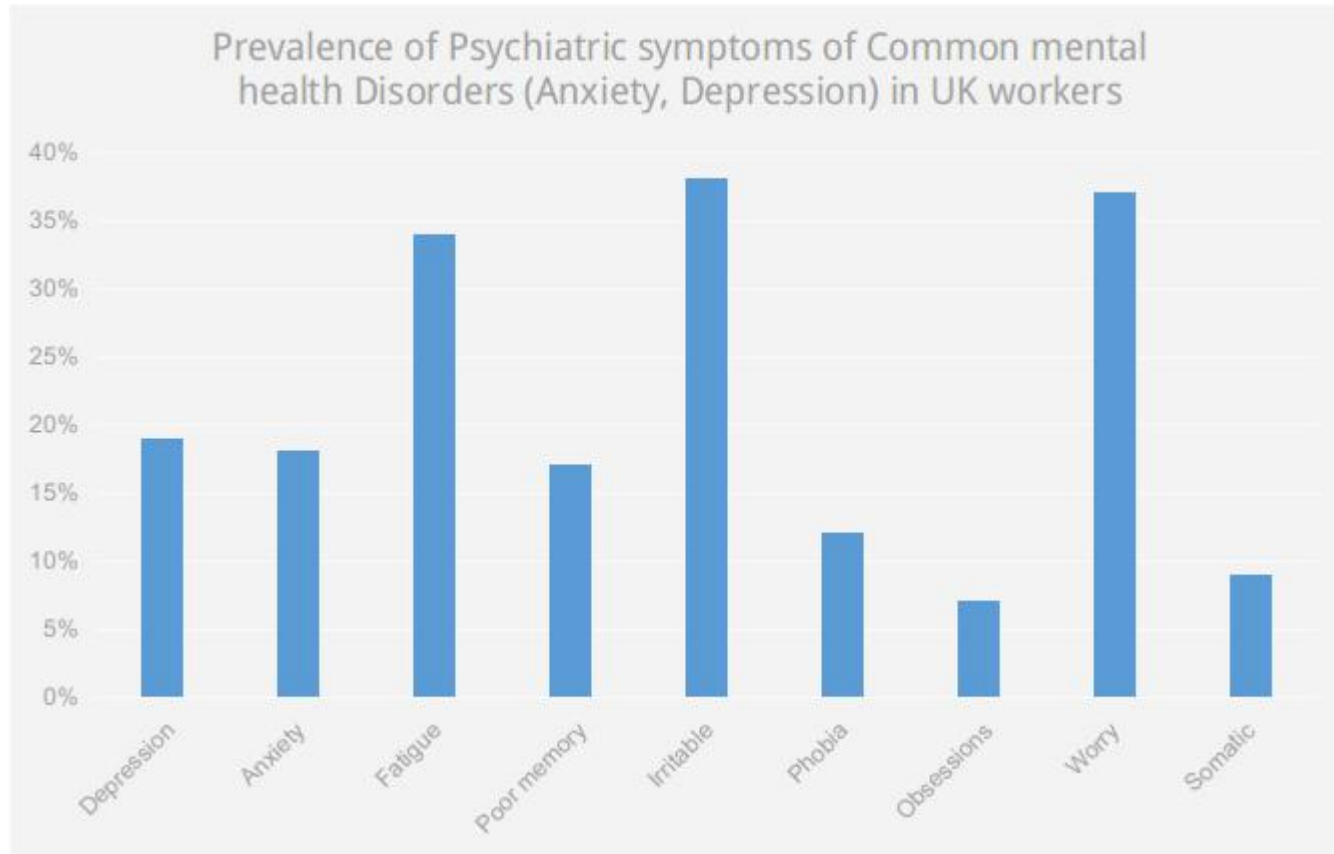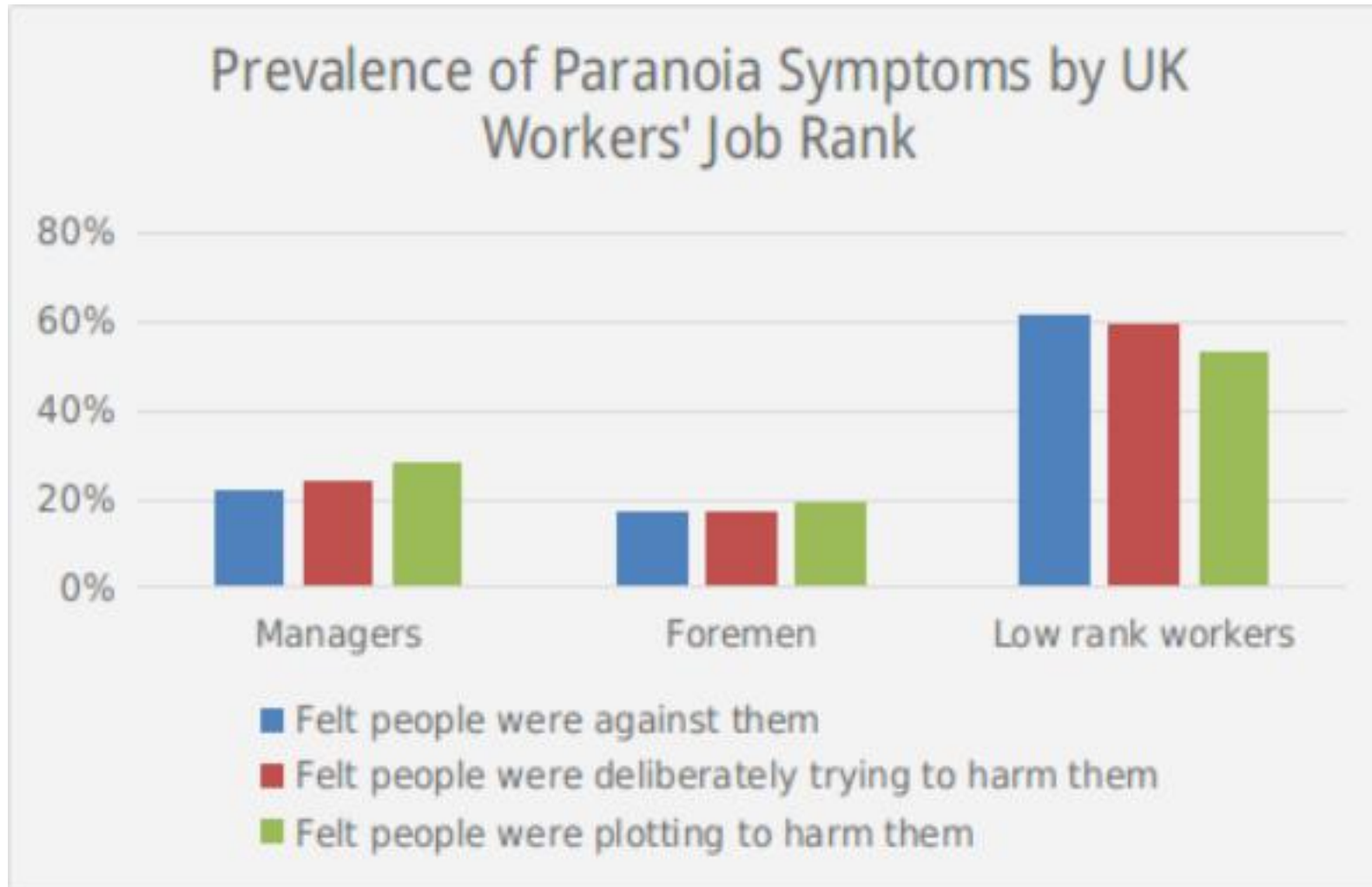Paranoia criteria of Paranoid Personality Disorder

Figure 1. Flowchart to show derivation of disorders in the General National Comorbidity Survey and to illustrate which Psychopathological symptoms are being measured in this sample
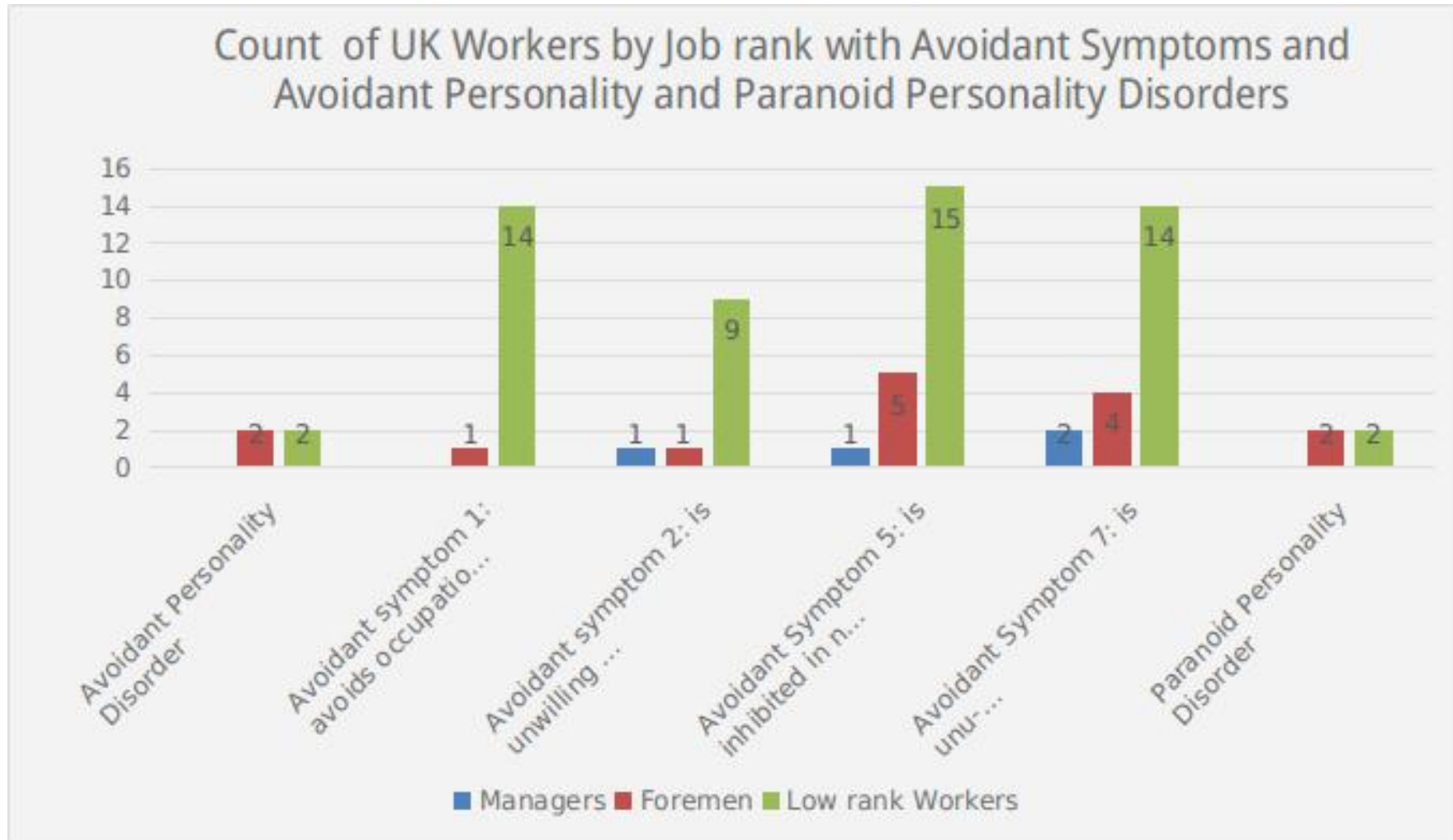
Graphs

Prevalence of Paranoia and Depression Symptoms in UK Workers

Prevalence of Psychiatric symptoms of Common mental health Disorders (Anxiety, Depression) in UK workers

Prevalence of Paranoia Symptoms by UK Workers' Job Rank

Legend:
- ■ Felt people were against them
- ■ Felt people were deliberately trying to harm them
- ■ Felt people were plotting to harm them

Count of UK Workers by Job rank with Avoidant Symptoms and Avoidant Personality and Paranoid Personality Disorders