Article:

Examining individual social status using the MacArthur Scale of Subjective Social Status: Findings from the Born in Bradford study

Rachael H. Moss [a,*], Brian Kelly [a], Philippa K. Bird [b], Kate E. Pickett [c]

[a] *Bradford Institute for Health Research, Bradford Teaching Hospitals Foundation Trust, Bradford, UK*
[b] *Leeds Teaching Hospitals NHS Trust, Leeds, UK*
[c] *Department of Health Sciences, University of York, York, UK*

A B S T R A C T

Subjective social status is how a person perceives their social class relative to other people and has frequently been associated with people's health and well-being. A frequently used measure of subjective social status is the MacArthur Scale of Subjective Social Status that depicts social status as a 10 rung ladder, asking individuals to rank themselves on this ladder relative to other people, either in their local neighbourhood or wider society. The Born in Bradford's Better Start birth cohort study aims to understand the lives, relationships, wellbeing, and social and economic circumstances of pregnant women and their children in three inner city areas of Bradford, UK. Pregnant mothers were asked to report their subjective social status, using the MacArthur subjective social status scales, comparing themselves to other people in their local neighbourhood and in England as a whole. This paper explores the characteristics of the women who gave responses, examines associations between the Mac-Arthur subjective social status measures and other subjective and objective measures and looks specifically at the characteristics of women who reported either very low or very high subjective social status. On average, women reported that they had a higher social status compared to others within their local neighbourhood (*mean* ladder rung = 6) and, although participants were from areas of Bradford with very high levels of deprivation, 23% placed themselves on the top three rungs, 8–10. Respondents reported that they had an average social status when comparing themselves to people in all of England (*mean* ladder rung = 5) and 13% placed themselves on the top rungs 8–10. These findings raise important questions about the interpretation of the MacArthur scale of subjective social status.

1. Introduction

Socio-economic status is a person's position within the social class hierarchy in society, relative to other people (Diemer et al., 2013), subjective social status has been described as an individual's perception of their own position in that hierarchy (Jackman & Jackman, 1973). A large multicohort and meta-analysis (using individual level data) from 48 independent prospective cohort studies found that higher morbidity and mortality was associated with lower socio-economic status (Stringhini et al., 2017).

Objective measures of socio-economic position (e.g., income or attained education (Präg et al., 2016)) have been consistently linked to health outcomes, demonstrating social gradients in health and variations between different groups of individuals within communities (i.e., presenting as inequalities) (Cundiff & Matthews, 2017;

Navarro-Carrillo, G. et al., 2020). There has also been an increasing focus on the ways in which relative social status, including subjective social status, are related to health.

In a cross-national comparison of 29 countries, subjective social status was found to be associated with health even more strongly than objective measures of social status. More specifically, self-rated health and psychological well-being were found to be related to subjective social status in all countries irrespective of individuals' objective social status (Präg et al., 2016). Such examples illustrate that individuals' perception of their social standing has the potential ability to influence an individual's health.

Subjective social status is typically measured by using the MacArthur Scale of Subjective Social Status developed by Adler et al. (2000). The instrument presents subjects with a picture of a 10 rung ladder and individuals are asked to rank themselves on one of these rungs by

---

* Corresponding author.
E-mail address: rachael.moss@bthft.nhs.uk (R.H. Moss).

determining where they stand in relation to other people either in their country or local neighbourhood. The ladder has been frequently used over the past 20 years to measure subjective social status in epidemiological research. Studies have shown there is an association between subjective social status (when using the ladder measure) and health outcomes, including both physical (Cundiff & Matthews, 2017) and mental health (Rubin, 2021; Scott et al., 2014). We acknowledge that it is difficult to get comparative estimates of depression and anxiety when measured by the Public Health Questionnaire (PhQ) and Generalized Anxiety Disorder assessment (GAD) within our population of pregnant women, but a recent study (Arias-de-la-Torre et al., 2021) found that 8.53% of women in the sample scored 10 or above on the PhQ, compared to 14.5% in our sample.

Quon and McGrath (2014) identified that the effects of a subjective social status-health association (when utilising the ladder measure) were largest for mental health outcomes (amongst adolescents) compared to self-rated health and physical health outcomes. There are independent associations of both objective and subjective social status measures with health when using the ladder measure to measure subjective social status (Demakakos et al., 2008; Kim et al., 2018; Singh-Manoux et al., 2005).

The scale has been used extensively and has been used to measure subjective social status within a range of diverse populations (e.g., pregnant women (Reitzel et al., 2007), adolescents (Ritterman et al., 2009) and children (Amir et al., 2019)). The scale has also been identified as being a reliable measure when used across more than one time point (Amir et al., 2019; Goodman et al., 2001; Operario et al., 2004) and being a valid measure when correlated with objective measures of socio-economic status (Cundiff et al., 2013).

We previously identified a high level of non-response towards the MacArthur scale questions amongst two cohorts in Bradford: an ethnically diverse sample of pregnant women and young people involved in a co-production activity (Moss et al., 2023). The high levels of missingness identified and the overwhelmingly negative feedback (from young people) raised issues about the validity of the data gathered from the MacArthur scale. This is an area of consideration that needs to be acknowledged when looking at the data gathered from the MacArthur scale when used in any other population group/age of individuals.

In this paper, we further explore the patterns that we described while exploring the level of missingness in our earlier paper (Moss et al., 2023). More specifically, we examine the self-reported subjective social status ratings of mothers within the Born in Bradford's Better Start study (BiBBS), a birth cohort with ongoing recruitment (established in 2016).

Bradford is located in the north of England within the county of West Yorkshire. The city has a population of over 535,000 people which is ethnically diverse, with a large Pakistani population and growing Eastern European and Roma communities. The city has high levels of material deprivation. BiBBS recruits pregnant women from three wards in Bradford (the 'Better Start' area), which are within the 10% most deprived areas in England (Bradford District Council, 2019), based on the 2019 Indices of Multiple Deprivation (IMD, a relative measure of deprivation) (Department for Communities and Local Government, 2019). The first tranche of data from BiBBS, including women recruited between January 2016 and November 2019 (Dickerson et al., 2022), is available for analysis and is examined here.

We aim to provide a description and exploration of subjective social status in a particular contemporary, place-based and demographically diverse context. Our objectives are to, i) examine the demographic characteristics of mothers (who answered at least one of the MacArthur ladder questions) within the BiBBS cohort, ii) to explore the association between individuals' scores on both the England and local neighbourhood ladders with subjective social status and objective social status variables and, iii) to establish the relationship between participant characteristics and their likelihood of scoring highly on either MacArthur ladder scale.

*Think of this ladder as showing where people stand **in your neighbourhood**.*

By your neighbourhood, I mean within about a mile or 20 minute walk of your home.

At the top of the ladder are people who are the best off- those who have the most money, the best education, and the most respected jobs. At the bottom of the ladder are the people who are the worst off- who have the least money, least education and the least respected job or no job.

The higher up you are on this ladder, the closer you are to the people at the top; the lower you are, the closer you are to the bottom.
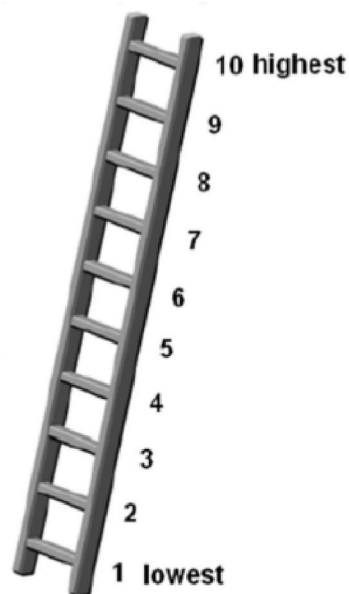
Where would you place yourself on the ladder in relation to other people in your neighbourhood? Please tick the box for the rung where you think you stand at this time in your life relative to other people **in your neighbourhood**.

Fig. 1. The MacArthur scale neighbourhood question, as presented in the baseline questionnaire. **Note.** The England scale question is identical to this question, except it asks individuals to rate their status 'relative to other people in England'.

Table 1
Characteristics of mothers in the Born in Bradford Better Start cohort (using data up to 31 November 2021).

Age	Mean	SD
Respondent age	29.3	5.5

Age Group (years)	N	%
Under 25	414	21.1%
25 to 29	622	31.7%
30 to 34	578	29.5%
35 plus	346	17.7%

Ethnicity	N	%
White British	242	12.4%
Pakistani heritage	1225	62.8%
Central or Eastern European	52	2.7%
Other	431	22.1%
Missing	10	

Whether born in the UK	N	%
Yes	980	50.2%
No	972	49.8%
Missing	8	

National 2019 IMD Decile	N	%
1 (Most deprived)	1643	84.3%
2	270	13.9%
3	32	1.6%
4	1	0.1%
5	2	0.1%
6-10 (Least deprived)	0	0
Missing	12	

Education status	N	%
No qualifications	147	8.1%
Less than five GCE's or equivalent	560	30.9%
Five or more 5 GCE's or equivalent	240	13.2%
A levels or equivalent	235	13.0%
Degree or equivalent	631	34.8%
Don't know	38	
Other	9	
Missing	100	

Household NS-SEC (and whether unemployed)	N	%
Managerial, administrative and professional	552	31.9%
Intermediate occupations	214	12.4%
Small employers and own account workers	198	11.4%
Lower supervisory and technical occupations	453	26.2%
Semi-routine and routine occupations	160	9.2%
Unemployed	153	8.8%
Missing	230	

Self-reported financial status	N	%
Living comfortably	690	37.2%
Doing alright	741	39.9%
Just about getting by	300	16.2%
Finding it quite difficult	97	5.2%
Finding it very difficult	29	1.6%
Do not wish to answer/don't know	90	
Missing	13	

Change in financial situation (compared to a year ago)	N	%
Better off	520	30.3%
About the same	998	58.1%
Worse off	200	11.6%
Don't know	129	
Do not wish to answer	93	
Missing	20	

2. Methods

2.1. Study design

This study is a cross-sectional analysis of data collected as part of a self-reported survey in pregnancy conducted as part of the Born in Bradford's Better Start (BiBBS) birth cohort.

2.2. Study setting and data source

BiBBS is a birth cohort, aiming to recruit 5000 babies, their mothers and their mothers' partners who live within three (inner city) wards within the Better Start area of Bradford (West Yorkshire, UK) between 2016 and 2023 (Dickerson et al., 2016). The three wards within the Better Start area are some of the most deprived areas within Bradford and are in the most deprived decile of all English neighbourhoods, based on the 2019 IMD (Department for Communities and Local Government, 2019).

Women are eligible for the study if they are pregnant, if they live in the Better Start area and if they are due to give birth at Bradford Teaching Hospitals Foundation Trust. At recruitment during pregnancy, participants complete a baseline questionnaire with questions on family life and relationships, housing and neighbourhood, spoken languages, social and financial circumstances, health and wellbeing, this pregnancy and plans for the baby in pregnancy.

2.2.1. Participants

This paper analyses data from the current data freeze (including all women recruited up to 31 November 2021.The data was frozen at this point to allow data analysis for this exploration to take place). All 1861 women completed a baseline survey upon recruitment into the BiBBS cohort. If women did not have English as their first language, our team would arrange for an interpreter or a team member who can speak the appropriate language to transcribe the survey aloud and then write in their answers. Although data was also gathered from mothers' partners, we have unfortunately not been able to get the same level of consent amongst this group, so felt it would be unsuitable to include partners data in this exploration.

Ladder responses are missing for 14.6% of eligible participants on the neighbourhood ladder and 17.2% of eligible participants on the England ladder question (this missingness is explored in more detail in Moss et al., 2023) (See Appendix A for further details of which groups had higher levels of missing data on each ladder question.).

2.2.2. Ethics

The collection of the BiBBS cohort baseline and routine health data has been approved by Bradford Leeds NHS Research Ethics Committee (15/YH/0455, see Dickerson et al., 2016). All participants provided informed consent and data are anonymised and stored securely at the Bradford Institute for Health Research. This paper analyses secondary data so additional ethical approval was not required.

2.3. Measures

2.3.1. Baseline questionnaire (utilises data gathered from January 2016–November 2021)

The baseline questionnaire includes the MacArthur scale of subjective social status. This is a validated item which asks participants to rank their socioeconomic position (financial, education and occupation) in relation to others. Participants were shown a picture of a ladder with 10 rungs, and were asked to mark where they would place themselves on the ladder in relation to other people in their local neighbourhood, and in relation to other people in England.

The MacArthur scale items in the BiBBS questionnaire are displayed in a format similar to that used in Fig. 1.

Other measurements of socio-economic status at baseline included

Table 1 (*continued*)

Age	Mean	SD
Depression (PHQ-8)	**N**	**%**
None (Score 0 to 4)	977	53.6%
Mild (Score 5 to 9)	582	31.9%
Moderate (Score 10 to 14)	188	10.3%
Moderately severe (Score 15 to 19)	56	3.1%
Severe (Score 20 to 24)	20	1.1%
Missing	137	
Anxiety (GAD-7)	**N**	**%**
None (Score 0 to 4)	1288	69.8%
Mild (Score 5 to 9)	367	19.9%
Moderate (Score 10 to 14)	117	6.3%
Severe (Score 15 to 21)	73	4.0%
Missing	115	

items on education status, occupation and self-reported financial status. Mothers and their partners were (individually) asked about their highest educational qualification and the country in which they obtained this qualification. Participants answered questions about their current job (or about a previous job if they are currently unemployed) and the nature of this job (i.e., whether they were self-employed, how many people work for their employer, if they supervise employees, how many hours they work per week and which category of work best describes the work they do). Questions were also asked about the financial status of participants' households, and whether their financial situation had changed in the last year. They provided information on socio-demographic characteristics including their date of birth, ethnic group/background, and the country they were born in. Participants self-reported their mental health and wellbeing using the validated PHQ-8 (depression; Kroenke et al., 2009) and GAD-7 (anxiety; Löwe et al., 2008) scales. The address of respondents was used to link to the 2019 IMD for the lower super output area (LSOA) of residence; the IMD combines information from several domains to provide a measure of relative material deprivation that is calculated for all 32,844 LSOAs in England, and often expressed in deciles. (Department for Communities and Local Government, 2019).

2.4. Statistical analysis

We calculated descriptive statistics for sample characteristics; age, ethnicity, whether born in the UK, IMD decile, education status, household occupation, self-reported financial status, self-reported change in financial status, and levels of depression and anxiety. We examined the overall distribution of responses to the local neighbourhood and England ladder questios and carried out a series of separate simple linear regression models for both ladder rankings for each of the sample characteristic variables; reporting the strength of associations, as well as the amount of variation in ladder responses explained by each sample characteristic, as represented by the R squared values. We describe the association between the ladder scores and other measures of socio-economic status (objective and subjective). To explore the characteristics of those who placed themselves highly on the ladders we carried out a series of unvariable and multivariable logistic regression models for the outcome of scoring high (score of 8–10) on each ladder measure, and report the odds ratios associated with scoring high on each ladder score.

The IMD categories have been collapsed to a dichotomous variable of being in the most deprived IMD decile or not, due to the distribution of IMD deciles with 84.3% of respondents in the most deprived decile; the categories of finding it difficult financially and finding it very difficult have been combined due to small numbers in these categories; and the depression and anxiety categories have been collapsed to none, mild, and moderate to severe as the percentage in moderate to severe is relatively small (14.5% for depression, and 10.3% for anxiety). The

Table 2
Response to local neighbourhood and England ladder questions.

Where would you place yourself on the ladder?				
	Ladder type			
	Local Neighbourhood		England	
		Mean (95% CI)		Mean (95% CI)
Total		6.2 (6.1–6.3)		5.5 (5.4–5.6)
Ladder score	**N**	**% (95% CI)**	**N**	**% (95% CI)**
10 (highest)	75	4.5 (3.6–5.6)	55	3.4 (2.6–4.4)
9	85	5.1 (4.1–6.2)	42	2.6 (1.9–3.5)
8	233	13.9 (12.3–15.6)	114	7.0 (5.9–8.4)
7	299	17.8 (16.1–19.7)	221	13.6 (12.0–15.4)
6	297	17.7 (16.0–19.6)	274	16.9 (15.1–18.8)
5	474	28.3 (26.2–30.5)	501	30.8 (28.6–33.1)
4	126	7.5 (6.3–8.9)	218	13.4 (11.8–15.2)
3	55	3.3 (2.5–4.3)	127	7.8 (6.6–9.2)
2	16	1.0 (0.6–1.6)	42	2.6 (1.9–3.5)
1 (lowest)	16	1.0 (0.6–1.6)	31	1.9 (1.3–2.7)
Don't wish to answer	264		315	
Missing	20		20	
Total	1960	100.0	1960	100.0

	Local Neighbourhood		England	
Ladder score category summary	N	% (95% CI)	N	% (95% CI)
High (8–10)	393	23.4 (21.5–25.5)	211	13.0 (11.4–14.7)
Mid (4–7)	1196	71.4 (69.1–73.5)	1214	74.7 (72.5–76.8)
Low (1–3)	87	5.2 (4.2–6.4)	200	12.3 (10.8–14.0)
Don't wish to answer	264		315	
Missing	20		20	
Total	**1960**	**100.0**	**1960**	**100.0**

educational status variable has also been collapsed to A-level or above or below A-level, this was partly due to numbers in each response but more so because in the UK achieving A-level or above requires continuing in education post aged 16 years, and this has been identified as a key measure of educational inequality (Tackey et al., 2011).

Data were analysed using STATA version 17 (StataCorp, 2021). All statistical models employed a complete case analysis, levels of missing data are reported in the tables describing the sample, and the response to the ladder questions.

3. Results

The demographic and socioeconomic characteristics of the sample are shown in Table 1. Some women had more than one pregnancy in the sample; the 1960 pregnancies included 1861 women (1763 women with one pregnancy, 97 women with two pregnancies, and 1 woman with three pregnancies). As the ladder outcomes and the other subjective and objective measures of SES are time variant, and can change between pregnancies, the analysis was carried out at the pregnancy level.

The mean age of the sample was 29.3 years (SD: 5.5 years). The majority (62.8%) of participants were of Pakistani heritage; with 12.4% of White British background, 2.7% Central or Eastern European and 22.1% other ethnicities. Half of the participants were born in the UK (50.2%), and half were born in other countries. The relationship between ethnicity and country of birth is explored further in Supplementary material 1, Tables A and B. Around half of Pakistani heritage women (50.8%) were born outside the UK, and so were first generation migrants; the remaining Pakistani heritage women (49.2%) were born in the UK. All Central/European women were first generation migrants; and over two thirds (68.4%) of women from other ethnic groups were first generation migrants.

There is very little variation in the IMD scores for the BiBBS cohort: 84.3% of participants are in the most deprived IMD decile. A map of IMD scores in Bradford and the BiBBS area is provided in Appendix 2. Over a
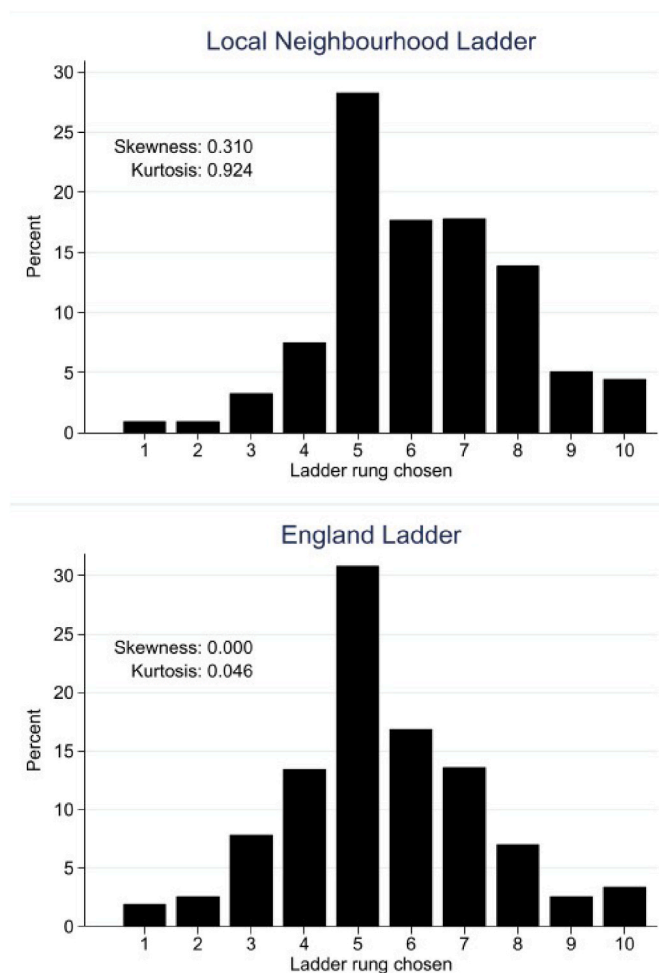
Local Neighbourhood Ladder

Skewness: 0.310
Kurtosis: 0.924

England Ladder

Skewness: 0.000
Kurtosis: 0.046

Fig. 2. Distribution of responses to local neighbourhood and England ladder scales.

third of women (34.8%) have achieved a degree qualification, 30.9% have achieved less than five GCE's, and 8.1% of mothers have no educational qualifications. In most households there is at least one person employed, with 8.8% being in unemployed households. On self-reported financial status, 37.2% stated they were living comfortably, 39.9% stated they were doing alright, 16.2% were just about getting by, 5.2% were finding it quite difficult, and 1.6% were finding it very difficult. Most, 58.1%, stated that they were doing about the same financially today as they were a year ago, 30.3% stated they were better off, and 11.6% stated that they were worse off. While most women had no depression or anxiety, as recorded by the PHQ8 and GAD7 respectively, 31.9% had mild depression, 14.5% had moderate to severe depression, 19.9% had mild anxiety, and 10.3% had moderate to severe anxiety.

3.1. Response patterns to the MacArthur Scale of Subjective Social Status

Responses to the two ladder questions are presented in Table 2 and Fig. 2. Most respondents placed themselves around the middle of both ladders. The mean ladder score is significantly higher for the local ladder, at 6.2 (95% CI: 6.1–6.3) compared to 5.5 (95% CIs: 5.4–5.6) for the England ladder. Fig. 2 illustrates that the distribution of the local ladder score is skewed towards the higher rungs (skewness: 0.310), while the distribution for the England ladder is more normally distributed (skewness: 0.000). So the percentage who rated themselves as high on the ladder (score 8 to 10) is also significantly larger for the local ladder than the England ladder, 23.4% (95 CI: 21.5%–25.5%) and 13.0% (95

CI: 11.4%–14.7%) respectively.

As indicated in Table 2, there were relatively high numbers of participants who stated that they did not wish to answer the question or who did not complete the question.

Results from linear regression models examining the association between the ladder response and sample characteristics, including other subjective and objective social status measures.

A series of separate linear regression models were constructed to explore the strength of the association between the ladder responses and sample characteristics, including other subjective and objective social status measures. These additional subjective measures include: self-reported financial status, change in financial situation, depression and anxiety and the additional objective measures include: age, ethnicity, whether or not an individual was born in the UK, IMD status, education status and household NS-SEC level.

We report the predicted mean ladder score for categories of sample characteristics. In this analysis we have collapsed the categories for some variables (see Methods for more detail) from those reported in Table 1. The results of these separate linear regression models are presented in Table 3, as well as Fig. 3 for the local neighbourhood ladder and Fig. 4 for the England ladder.

3.2. The association between ladder response and other subjective and objective social status measures

The R-squared values reported in Table 3 indicate the strength of the association, or more precisely the proportion of variation in the ladder responses that can be explained by the explanatory variable in the model. There is a stronger association between the ladder response and subjective measures, and a weaker association with objective measures; and overall the strength of the associations for all social status measures is stronger with the local neighbourhood ladder than for the England ladder. The R-squared values indicate that the subjective measure of self-reported financial status explains 14.3% of the variation in the local ladder and 7.5% of the variation in the England ladder; and the subjective measure of self-reported change in financial status explains 5.7% of the variation in the local ladder and 4.3% of the variation in the England ladder.

The objective measures explain less of the variation in the ladder responses; 0.3% for the local ladder and 0.0% the England ladder for IMD, 1.2% for the local ladder and 0.0% the England ladder for educational status, and 4.3% for the local ladder and 1.0% the England ladder for occupational status. The strongest association is with self-reported financial status; and we find that those living comfortably had a mean ladder score of 6.89 (95% CI: 6.76–7.02) for the local neighbourhood and 6.04 (95% CI: 5.89–6.18) for England, compared to 4.58 (95% CI: 4.27–4.89) for the local neighbourhood and 4.48 (95% CI: 4.14–4.82) for England for those who were finding finances difficult. The strongest association with an objective measure was with household occupation, and it is those who live in unemployed households that have the lowest ladder scores; 5.31 (95% CI: 4.99–5.62) for the local ladder and 5.05 (95% CI: 4.72–5.39) for England, compared to those in households with a managerial, administrative or professional person, who had a mean ladder score of 6.60 (95% CI: 6.45–6.75) for the local neighbourhood and 5.63 (95% CI: 5.48–5.75) for England. The differences in ladder scores for categories in other objective measures, IMD and education status, are not statistically significant.

3.3. The association between ladder response and other sample characteristics

Table 3, and Figs. 3 and 4, also present the associations between the ladder scores and other sample characteristics. There is a relatively large variation in mean ladder scores by ethnicity, with Pakistani heritage women ranking themselves higher on both the local and England ladders; the mean ladder score for Pakistani heritage women was 6.35 (95%

Table 3

Predicted mean ladder score (with 95% confidence intervals) and R-squared values from separate univariate linear regression models for individual sample characteristics.

	Local Neighbourhood			England		
	N	Mean ladder score	(95% CI)	N	Mean ladder score	(95% CI)
Age group (years)						
Under 25	354	6.16	(5.98–6.35)	337	5.58	(5.39–5.78)
25 to 29	540	6.38	(6.23–6.53)	529	5.58	(5.43–5.74)
30 to 34	493	6.14	(5.99–6.30)	474	5.46	(5.30–5.63)
35 plus	289	5.82	(5.62–6.03)	285	5.19	(4.98–5.41)
R^2	0.011			0.006		
Ethnicity						
White British	229	5.86	(5.63–6.08)	227	5.00	(4.76–5.23)
Pakistani heritage	1041	6.35	(6.25–6.46)	1005	5.62	(5.51–5.73)
Central/Eastern European	45	6.02	(5.51–6.54)	40	5.38	(4.81–5.94)
Other	359	5.84	(5.66–6.03)	351	5.40	(5.21–5.60)
R^2	0.019			0.012		
Whether an individual was born in the UK						
No	800	5.96	(5.83–6.08)	764	5.48	(5.35–5.61)
Yes	876	6.37	(6.25–6.48)	861	5.48	(5.35–5.60)
R^2	0.013			0.000		
National 2019 IMD Decile						
Most deprived decile	1400	6.13	(6.03–6.22)	1361	5.48	(5.38–5.58)
Not most deprived decile	264	6.41	(6.19–6.62)	252	5.49	(5.26–5.72)
R^2	0.003			0.000		
Education status						
Lower than A level	809	6.00	(5.88–6.12)	774	5.50	(5.37–5.63)
A level or higher	763	6.39	(6.26–6.51)	753	5.49	(5.36–5.62)
R^2	0.012			0.000		
Highest occupation of an individual in the household (NS-SEC)						
Managerial, admin, professional	495	6.60	(6.45–6.75)	482	5.63	(5.48–5.79)
Intermediate occupations	189	6.28	(6.03–6.52)	180	5.35	(5.09–5.61)
Small employers, own account	168	5.99	(5.74–6.25)	168	5.26	(4.99–5.53)
Lower supervisory, technical	395	6.03	(5.87–6.20)	379	5.54	(5.36–5.72)
Semi-routine, routine	139	6.02	(5.74–6.30)	134	5.51	(5.21–5.82)
Unemployed	111	5.31	(4.99–5.62)	111	5.05	(4.72–5.39)
R^2	0.043			0.010		
Self-reported financial status						
Living comfortably	606	6.89	(6.76–7.02)	587	6.04	(5.89–6.18)
Doing alright	648	6.11	(5.98–6.24)	623	5.37	(5.24–5.51)
Just about getting by	265	5.41	(5.21–5.61)	259	4.86	(4.64–5.07)
Finding it quite/Very difficult	107	4.58	(4.27–4.89)	106	4.48	(4.14–4.82)
R^2	0.143			0.075		
Change in financial situation (compared to a year ago)						
Better off	466	6.61	(6.45–6.77)	439	5.91	(5.75–6.08)
About the same	888	6.24	(6.13–6.35)	871	5.46	(5.34–5.58)
Worse off	173	5.13	(4.88–5.39)	172	4.60	(4.34–4.87)
R^2	0.057			0.043		
Depression (PHQ-8)						
None (Score 0 to 4)	846	6.35	(6.24–6.47)	825	5.61	(5.48–5.73)
Mild (Score 5 to 9)	509	6.12	(5.96–6.27)	489	5.40	(5.24–5.57)
Moderate/Severe (Score 10 +)	243	5.70	(5.48–5.92)	238	5.13	(4.90–5.36)
R^2	0.017			0.009		
Anxiety (GAD-7)						
None (Score 0 to 4)	1106	6.31	(6.21–6.42)	1075	5.58	(5.47–5.69)
Mild (Score 5 to 9)	336	6.04	(5.85–6.22)	324	5.28	(5.09–5.48)
Moderate/Severe (Score 10 +)	175	5.63	(5.37–5.89)	172	5.12	(4.85–5.39)
R^2	0.016			0.009		

CI: 6.25–6.46) and 5.86 (95% CI: 5.63–6.08) for the local and England ladder respectively, compared to 5.62 (95% CI: 5.51–5.73) for the local ladder and 5.00 (95% CI: 4.76–5.23) for the England ladder for White British women.

Those who were born in the UK placed themselves significantly higher on the local ladder than those born outside the UK, 6.37 (95% CI: 6.25–6.48) for those born in the UK compared to 5.96 (95% CI: 5.83–6.08) for those not born in the UK. There was no difference in mean ladder score for England based on whether the respondent was born in the UK. The relationship between ethnicity and country of birth is explored further in Supplementary material 1, Table C. This indicates that it is only Pakistani heritage women born outside the UK that place themselves higher on the local ladder compared to White British women; 6.66 (95% CI: 6.51–6.81) for Pakistani heritage women not born in the UK compared to 6.04 (95% CI: 5.89–6.19) for Pakistani heritage women

born in the UK, and 5.86 (95% CI: 5.63–6.08) for White British women. All other groups were not significantly different from White British women for the local ladder. All Pakistani heritage women, whether they were born in the UK or not, placed themselves higher on the England ladder than White British women; 5.73 (95% CI: 5.57–5.88) for Pakistani heritage women not born in the UK compared to 5.50 (95% CI: 5.34–5.67) for Pakistani heritage women born in the UK, and 5.00 (95% CI: 4.76–5.24) for White British women. Other groups were not significantly different from White British women for the England ladder.

Those aged 35 years or over ranked themselves lower on both ladders, though the differences in the mean ladder score by age group were not statistically significant. There were relatively large differences based on the depression and anxiety status of respondents. Those with moderate to severe depression had a mean ladder score of 5.70 (95% CI: 5.48–5.92) for the local ladder and 5.13 (95% CI: 4.90–5.36) for the
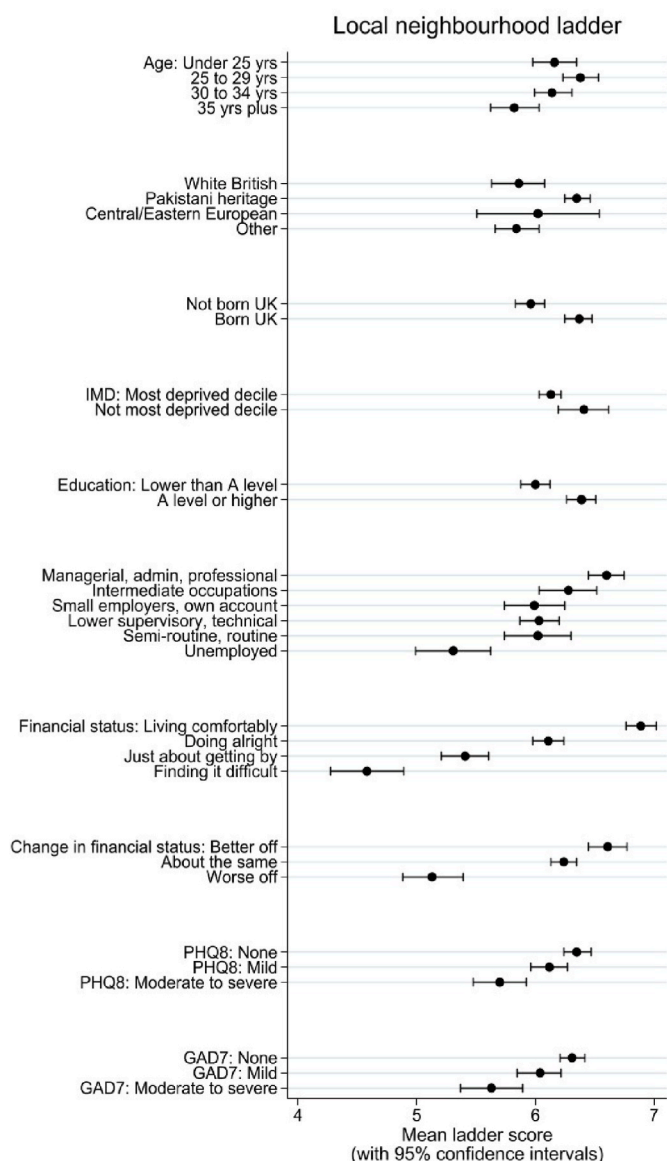
Fig. 3. Mean local neighbourhood ladder score (with 95% confidence intervals) by sample characteristics.

Fig. 4. Mean England ladder score (with 95% confidence intervals) by sample characteristics.

England ladder, compared to those with no depression who had a mean ladder score of 6.35 (95% CI: 6.24–6.47) for the local ladder and 5.61 (95% CI: 5.48–5.73) for the England ladder. Also, those with moderate to severe anxiety had a mean ladder score of 5.63 (95% CI: 5.37–5.89) for the local ladder and 5.12 (95% CI: 4.85–5.39) for the England ladder, compared to those with no anxiety who had a mean ladder score of 6.31 (95% CI: 6.21–6.42) for the local ladder and 5.58 (95% CI: 5.47–5.769) for the England ladder.

Results of logistic regression models looking at the characteristics of women who rank themselves as high on the ladder measures.

We carried out a series of logistic regression models with the outcome of scoring high (a score of 8, 9, or 10) on each ladder in order to further explore the characteristics of the 23.4% (95% CI: 21.5%–25.5%) and 13.0% (95% CI: 11.4%–14.7%) of respondents who ranked themselves highly on the local and England ladders respectively. The modelling strategy was to carry out univariable models for all covariates of interest (those measures reported in Table 1), then to model all covariates in a single multivariable model, and finally to estimate a more parsimonious, multivariable model; the results from these models are given in Tables 4a–b, and the results from the final multivariable model are represented in Figs. 5 and 6. In these models we have collapsed the
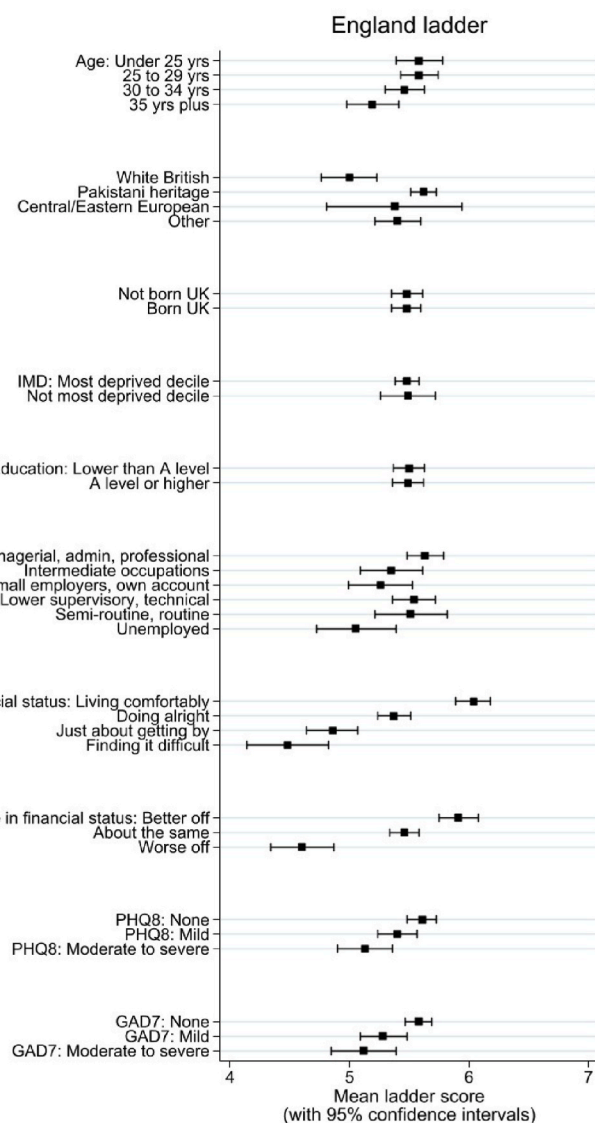
household occupation measure to two categories - whether the household is unemployed or not, this seemed to be the main difference in the variation of the ladder scores when we looked at the broader household occupation categorisation, as seen in Table 3 above.

The final model indicates that Pakistani heritage women were more likely to rank themselves as high on the ladder measures compared to White British women, around twice as likely for the local neighbourhood (O.R. 2.06, 95% CI: 1.33–3.18), and almost three times as likely for the England ladder. And in the final model, after controlling for ethnicity, those that were born in the UK were more likely to rank themselves higher than those not born in the UK (O.R. 1.38, 95% CI: 1.05–1.82) for the local ladder, while there was no significant difference for the England ladder. Both Pakistani heritage women born in the UK and not born in the UK ranked themselves higher than White British women, the differences between Pakistani heritage women born in the UK and not born in the UK were not statistically significant (see Supplementary material 1; Tables D and E). Also in the final multivariable model, compared to those aged 35 or over, younger respondents were more likely to rank themselves as high on the local ladder; almost twice as likely for under 25 (O.R. 1.72, 95% CI: 1.09–2.71) and 25–29 years (O.R. 1.92, 95% CI: 1.28–2.89). For these demographic variables there is a similar, arguably slightly stronger, association with the England ladder;

Table 4

Odds ratios for likelihood of reporting as high (score of 8, 9, or 10) on the ladder measures.

4a. Local neighbourhood ladder

	Univariable		Multivariable		Final Multivariable	
	O.R.	(95% C.I.)	O.R.	(95% C.I.)	O.R.	(95% C.I.)
Age Group (reference: aged 35 plus)						
Under 25	1.63	(1.09–2.42)	1.56	(0.95–2.56)	1.72	(1.09–2.71)
25 to 29	1.98	(1.38–2.85)	1.70	(1.09–2.63)	1.92	(1.28–2.89)
30 to 34	1.50	(1.03–2.18)	1.14	(0.73–1.79)	1.41	(0.93–2.14)
Ethnicity (reference: White British)						
Pakistani heritage	1.96	(1.33–2.88)	1.86	(1.16–2.97)	2.06	(1.33–3.18)
Central/Eastern European	1.20	(0.51–2.79)	1.31	(0.45–3.79)	1.46	(0.58–3.66)
Other	1.51	(0.98–2.35)	1.81	(1.04–3.14)	2.03	(1.23–3.38)
Whether born in UK (reference not)						
Born in UK	1.25	(0.99–1.57)	1.29	(0.95–1.77)	1.38	(1.05–1.82)
IMD (reference: not in most deprived decile)						
In most derived decile	0.82	(0.61–1.11)	1.10	(0.77–1.59)		
Education (reference: lower than A level)						
Educated to A level or above	1.42	(1.13–1.80)	1.24	(0.93–1.66)		
Employment status (reference: unemployed)						
Employed	3.68	(1.84–7.36)	2.74	(1.27–5.88)	2.95	(1.45–6.01)
Self-reported financial status (reference: finding it difficult)						
Living comfortably	7.91	(3.61–17.33)	6.38	(2.16–18.8)	6.05	(2.57–14.25)
Doing alright	3.76	(1.71–8.28)	3.15	(1.07–9.27)	3.21	(1.36–7.58)
Just about getting by	1.82	(0.78–4.29)	1.80	(0.58–5.52)	1.68	(0.67–4.25)
Self-reported change in financial status (reference: worse off)						
Better off	3.29	(1.98–5.45)	1.07	(0.58–1.97)		
About the same	2.46	(1.51–4.02)	1.05	(0.59–1.87)		
PHQ8 category (reference: none)						
Mild	0.71	(0.55–0.93)	0.82	(0.59–1.15)		
Moderate to Severe	0.52	(0.36–0.76)	0.84	(0.49–1.45)		
GAD7 category (reference: none)						
Mild	0.70	(0.52–0.95)	0.95	(0.64–1.41)		
Moderate to Severe	0.49	(0.32–0.76)	0.80	(0.44–1.47)		

4b. England ladder

	Univariable		Multivariable		Final Multivariable	
	O.R.	(95% C.I.)	O.R.	(95% C.I.)	O.R.	(95% C.I.)
Age Group (reference: aged 35 plus)						
Under 25	2.45	(1.44–4.17)	3.15	(1.57–6.32)	2.83	(1.52–5.26)
25 to 29	2.08	(1.25–3.45)	2.47	(1.28–4.75)	2.17	(1.21–3.89)
30 to 34	1.82	(1.08–3.07)	2.08	(1.07–4.03)	1.98	(1.09–3.57)
Ethnicity (reference: White British)						
Pakistani heritage	2.26	(1.32–3.87)	3.51	(1.70–7.24)	2.92	(1.50–5.69)
Central/Eastern European	3.83	(1.56–9.41)	3.68	(1.09–12.48)	4.36	(1.54–12.35)
Other	1.65	(0.90–3.03)	2.40	(1.04–5.54)	2.10	(0.98–4.48)
Whether born in UK (reference not)						
Born in UK	0.83	(0.62–1.10)	0.95	(0.64–1.42)	0.91	(0.64–1.29)
IMD (reference: not in most deprived decile)						

Table 4 (*continued*)

4b. England ladder

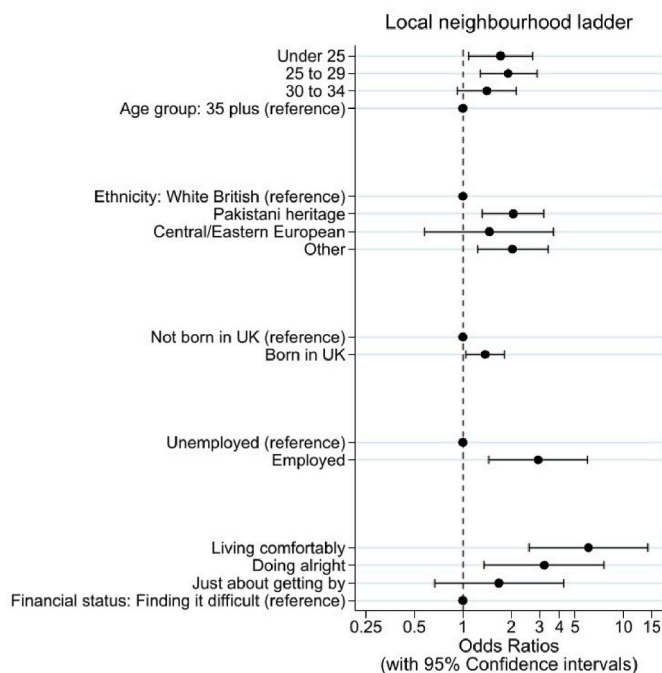|	Univariable		Multivariable		Final Multivariable	
	O.R.	(95% C.I.)	O.R.	(95% C.I.)	O.R.	(95% C.I.)
In most derived decile	1.13	(0.75–1.70)	1.35	(0.81–2.24)		
Education (reference: lower than A level)						
Educated to A level or above	0.63	(0.46–0.85)	0.57	(0.39–0.84)		
Employment status (reference: unemployed)						
Employed	1.18	(0.63–2.19)	0.95	(0.46–1.97)	1.15	(0.57–2.29)
Self-reported financial status (reference: finding it difficult)						
Living comfortably	2.70	(1.27–5.72)	1.78	(0.67–4.69)	1.69	(0.78–3.68)
Doing alright	1.60	(0.75–3.43)	1.08	(0.41–2.85)	1.07	(0.49–2.34)
Just about getting by	0.91	(0.39–2.17)	0.56	(0.19–1.68)	0.63	(0.25–1.57)
Self-reported change in financial status (reference: worse off)						
Better off	3.50	(1.77–6.94)	1.34	(0.59–3.04)		
About the same	2.32	(1.19–4.53)	1.16	(0.53–2.54)		
PHQ8 category (reference: none)						
Mild	0.95	(0.68–1.33)	1.32	(0.86–2.02)		
Moderate to Severe	0.82	(0.53–1.29)	1.86	(0.97–3.57)		
GAD7 category (reference: none)						
Mild	0.74	(0.50–1.10)	0.68	(0.40–1.15)		
Moderate to Severe	0.63	(0.36–1.08)	0.67	(0.31–1.41)		

Fig. 5. Odds ratios (with 95% confidence interval) for recording as high on the local neighbourhood ladder from multivariable logistic regression model.

Fig. 6. Odds ratios (with 95% confidence interval) for recording as high on the England ladder from multivariable logistic regression model.

those under 25 were almost three times more likely to rank themselves as high on the England ladder than those aged 35 and over (O.R. 2.83, 95% CI: 1.52–5.26).

IMD was not significantly associated with either ladder score, but in the final multivariable models most measures of social status were only significantly associated with respondents ranking themselves as high on the local ladder, not on the England ladder. In the final multivariable
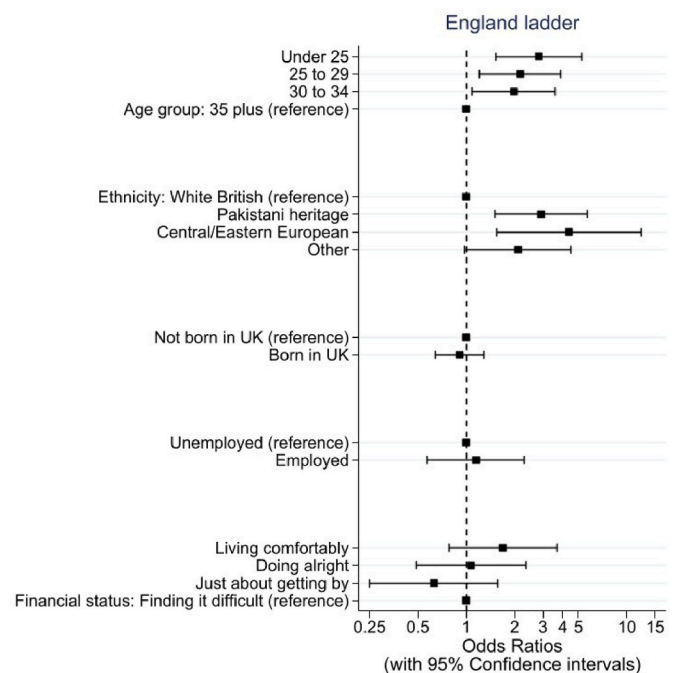
model respondents in employed households were almost three times as likely to rank themselves as high on the local ladder compared to those in unemployed households (O.R. 2.95, 95% CI: 1.45–6.01); but there was no statistically significant association with the England ladder measure. Similarly in the final multivariable model, those in households that reported they were living comfortably in the self-reported financial status measure were around six times more likely to rank themselves

Table 5
Missing ladder responses by ethnicity, whether or not they were born in the UK, financial and educational status.

Missing responses	Local neighbourhood	England
Ethnicity		
White British	5%	6%
Pakistani heritage	15%	18%
Central/Eastern European	14%	23%
Other	17%	19%
Whether born in UK		
Born outside the UK		21%
White British (born in the UK)		6%
Financial status of those with missing MacArthur ladder data		
Finding it very difficult	14%	
Living comfortably	12%	
Maternal education status		
No qualifications	27%	
Degree or equivalent	15%	

high on the local ladder, compared to those who were finding finances difficult (O.R. 6.05, 95% CI: 2.57–14.25); but again there was no statistically significant association with the England ladder measure. Educational status has a different pattern of associations than these other social status measures. For the local ladder those with A-level or above rank themselves as higher in the univariable model, but this difference is no longer significant in the final multivariate model. However the relationship is different for the England ladder, here those educated to A-level or above were less likely to rank themselves high (O.R. 0.57, 95% CI: 0.39–0.84), compared to those who had below A-level education status. Measures of depression and anxiety were significantly associated with the local ladder response in the univariable models, but were no longer significant in the multivariable models; and these measures had no significant association with the England ladder.

4. Discussion

In our study, the majority of women ranked themselves in the middle of both the local neighbourhood and the England ladders. The mean score for the England ladder was significantly lower than the mean score for the local neighbourhood ladder. All ladder responses were found to be more strongly associated with other subjective social status measures (self-reported financial status and change in financial status) than they were with objective social status measures.

This study used a particularly socioeconomically deprived and multiethnic sample, with the majority of mothers being of Pakistani heritage (62.8%) and most (84.3%) living in neighbourhoods in the most deprived IMD decile within England. It is noteworthy that our findings were unexpected, women ranked themselves higher on both the local neighbourhood and the England ladder than we had expected, given the geographic and socioeconomic context of the population. Chen et al. (2022) identified a similar discrepancy between objective and subjective measures of social status when comparing subjective status with (residential) area-level deprivation amongst women in Hong Kong.

There could be many reasons why women rated their subjective social status higher than expected. First, some may not have understood the questions and what was being asked of them. Forty-three percent of the sample stated that English was not their first language (n = 1065), with Urdu (n = 425) and Punjabi (n = 274) being the next most frequently spoken first languages. Almost half of the sample did not have English as their first language and as such may not have had a sufficient understanding of English to allow them to conceptualise where they would rate themselves while simultaneously comparing their ranking with that of others. Looking at the difference between respondents' local neighbourhood and England ladder rankings, most ranked themselves higher on the local neighbourhood ladder than for the England ladder. However, the difference is not as large as we may anticipate, the average difference being less than one ladder rung higher for the local neighbourhood area compared to England (M: 0.68, 95% CI: 0.61–0.67).

Additionally, it is worth noting that we identified ethnic differences in whether or not a woman had no qualifications but these differences seemed to be a result of larger differences by whether a woman was born in the UK. We found that women with lower socio-economic status were more likely to have no educational qualifications.

Second, it is of note that 50.2% of women were born in the UK, and these women placed themselves significantly higher than those who were not born in the UK. Those born outside the UK may have used a slightly different mental framework for understanding their place on the ladders (and where they stand in relation to others). We carried out analysis based on ethnicity and country of birth to explore whether being a first generation migrant had an effect of how women perceived their place on the ladders. We found some differences; first generation Pakistani migrants ranked themselves higher on the local ladder than Pakistani heritage women born in the UK, but there was no difference between these groups with the England ladder. In the final multivariable models, we found that both Pakistani heritage women born in the UK and not born in the UK ranked themselves higher than White British women. The differences between Pakistani heritage women born in the UK and not born in the UK were found not to be statistically significant. It is hard however to understand how this framework may have influenced individuals but it does appear that different thought patterns have taken place within this group.

Thirdly, education status was found to vary across the sample, with 34.8% having achieved a degree/equivalent. Women that had fewer than 5 GCE's were found to have higher levels of missingness on both ladders (17% versus 10.9%: local ladder and 21.2% versus 12.3%: England ladder respectively) compared to those with 5 or more GCE's (in this study, missingness was dealt with by undertaking a complete case analysis). It is possible that those with a degree may be more likely to perceive themselves as having higher subjective social status because of this academic achievement.

These factors may have been influential for our sample, but there could also be a wider concern about the measures of subjective social status. Our earlier work (Moss et al., 2023) found a high level of missing responses when using this measure in two diverse cohorts. Literature highlights that being exposed to the judgement of others is a 'social evaluative threat' with accompanying physical stress response (Dickerson & Kemeny, 2004) and being asked to rank themselves in comparison to other people may have triggered sensitivities and similar stress in our sample.

Social desirability bias could also explain why some women scored themselves higher than we had expected – it is common for people to present themselves in the most favourable way, particularly with respect to the judgement of others (King & Bruner, 2000). This tendency can be apparent when individuals are trying to align themselves with 'social norms' and distance themselves from behaviours/traits that are deemed undesirable (Krumpal, 2013). Goodman et al. (2001) acknowledge that this may be a dominant part of individuals' thinking when rating themselves on the MacArthur ladder.

Key strengths of this study include the use of birth cohort data, which includes extensive routine health and demographic data allowing for the comparison of multiple objective and subjective measures of social status, and composition of the cohort focuses on a diverse, multi-ethnic and deprived group that are often underrepresented in research. However, this study has some limitations; the multi-ethnic cohort shapes the generalisability of the findings to other populations that lack similar demographic characteristics, particularly because this sample only focuses on pregnant women living in the Better Start area of Bradford. We appreciate that there will also be other additional variables that may influence an individual's subjective social status that we have not included in this analysis because they have not been measured in this cohort.

In conclusion, this study has found pregnant women in Bradford rated themselves as having high social status compared to other people in their neighbourhood and these women also ranked their social status

as average when comparing themselves to everyone living in England. We also found that Pakistani heritage women were more likely to rate themselves as having high social status compared to White British women; twice as likely for their neighbourhood and almost three times as likely for England. The results are noteworthy because they are different to what was expected; further research could explore this phenomenon in other communities, including other deprived and multicultural communities.

Ethical statement

The collection of the BiBBS cohort baseline and routine health data has been approved by Bradford Leeds NHS Research Ethics Committee (15/YH/0455, see Dickerson et al., 2016). All participants provided informed consent and data are anonymised and stored securely at the Bradford Institute for Health Research. This paper analyses secondary data so additional ethical approval was not required.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2023.101463.

Appendix A

Patterns of MacArthur Scale of Subjective Social Status items - Missing data.
It was found that women who were White British and born outside of the UK were the least likely to have missing data for the MacArthur items. Please see Table 5 below to see the variation of missing responses across different personal characteristics.

Appendix B

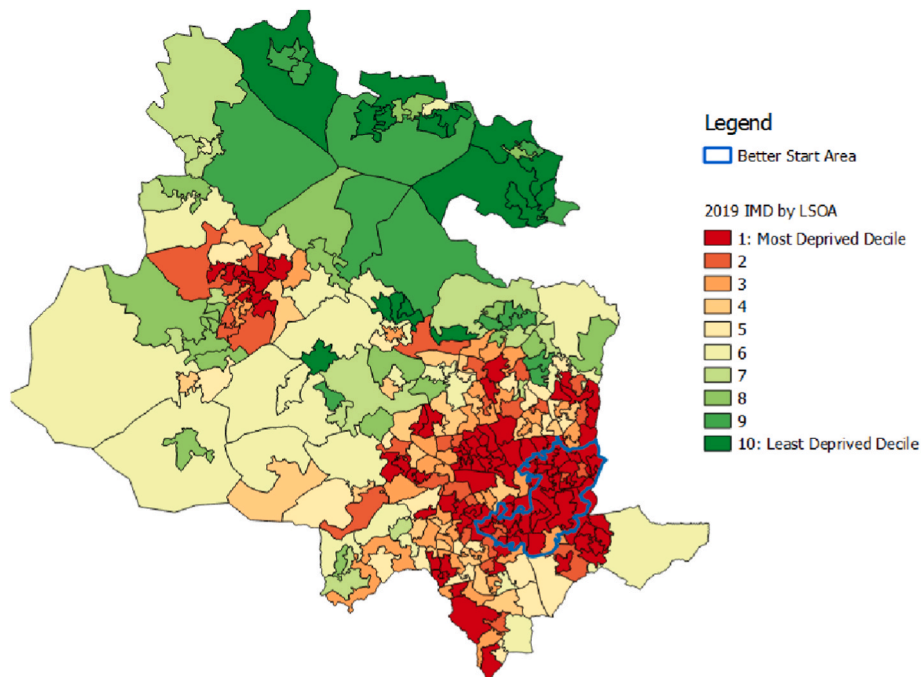Index of Multiple Deprivation (2019)
Source: https://www.gov.uk/government/collections/english-indices-of-deprivation.

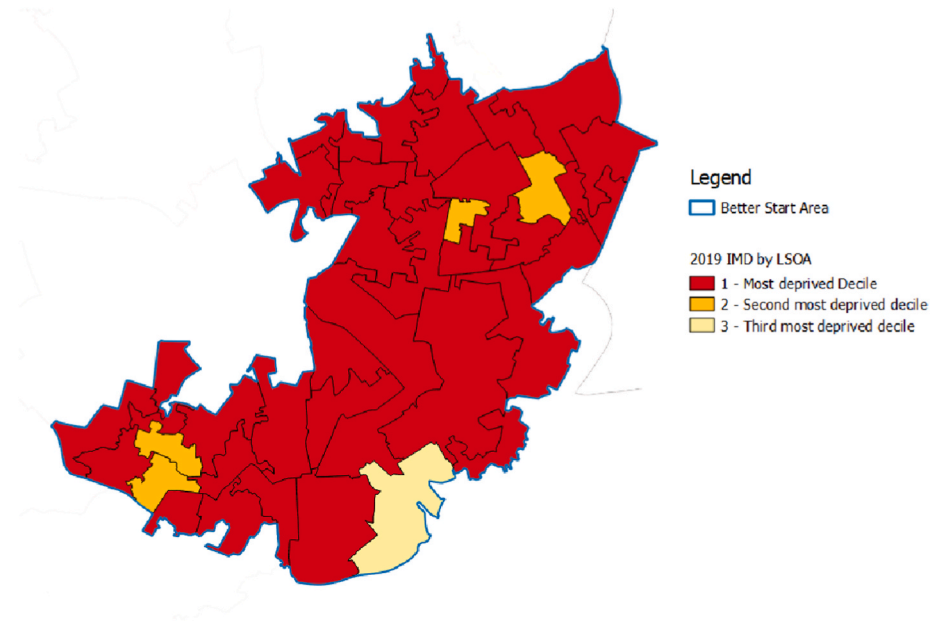**Fig. 7.** IMD deciles by LSOA for Bradford

Fig. 8. IMD deciles by LSOA for Bradford Better Start Area

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health psychology, 19*(6), 586. https://psycnet.apa.org/doi/10.1037/0278-6133.19.6.586.

Amir, D., Valeggia, C., Srinivasan, M., Sugiyama, L. S., & Dunham, Y. (2019). Measuring subjective social status in children of diverse societies. *PLoS One, 14*(12), Article e0226550. https://doi.org/10.1371/journal.pone.0226550

Bradford District Council. (2019). *Poverty and deprivation.* https://ubd.bradford.gov.uk/aboutus/po verty-in- bradforddistrict/#:~:text=Bradford%20District%20ranks%2013th%20most,City%20of%20Kin gston%20upon%20Hull. (Accessed 21 March 2022).

Chen, X., Woo, J., Yu, R., Chung, G. K. K., Yao, W., & Yeoh, E. K. (2022). Subjective social status, area deprivation, and gender differences in health among Chinese older people. *International Journal of Environmental Research and Public Health, 19*(16), 9857. https://doi.org/10.3390/ijerph19169857

Cundiff, J. M., & Matthews, K. A. (2017). Is subjective social status a unique correlate of physical health? A meta-analysis. *Health Psychology, 36*(12), 1109. https://doi.org/10.1037/hea0000 534

Cundiff, J. M., Smith, T. W., Uchino, B. N., & Berg, C. A. (2013). Subjective social status: Construct validity and associations with psychosocial vulnerability and self-rated health. *International Journal of Behavioral Medicine, 20*, 148–158. https://doi.org/10.1007/s12529-011-9206-1

Demakakos, P., Nazroo, J., Breeze, E., & Marmot, M. (2008). Socioeconomic status and health: The role of subjective social status. *Social Science & Medicine, 67*(2), 330–340. https://doi.org/10.1016/j.socscimed.2008.03.038

Department for Communities and Local Government. (2019). https://www.google.com/url?q=https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019&sa=D&source=docs&ust=1669636766216190&usg=AOvVaw0-zv59ZzzH44qsBnDElgNP. (Accessed 10 February 2023).

Dickerson, J., Bird, P. K., McEachan, R. R., Pickett, K. E., Waiblinger, D., Uphoff, E., Mason, D., Bryant, M., Bywater, T., Bowyer-Crane, C., Sahota, P., Small, N., Howell, M., Thornton, G., Astin, M., Lawlor, D. A., & Wright, J. (2016). Born in Bradford's better Start: An experimental birth cohort study to evaluate the impact of early life interventions. *BMC Public Health, 16*(1), 1–14. https://doi.org/10.1186/s12889-016-3318-0

Dickerson, J., Bridges, S., Willan, K., Kelly, B., Moss, R. H., Lister, J., Netkitsing, C., Atkinson, A. L., Bird, P. K., Uphoff, E. P., & Mason, D. (2022). Born in Bradford's Better Start (BiBBS) interventional birth cohort study: Interim cohort profile. *Wellcome Open Research, 7*, 244. https://doi.org/10.12688/wellcomeopenres.18394.1, 2022 Oct 3.

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*(3), 355. https://doi.org/10.1037/0033-2909.130.3.355

Diemer, M. A., Mistry, R. S., Wadsworth, M. E., López, I., & Reimers, F. (2013). Best practices in conceptualizing and measuring social class in psychological research. *Analyses of Social Issues and Public Policy, 13*(1), 77–113. https://doi.org/10.1111/asap.12001

Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: Development and evaluation of a new indicator. *Pediatrics, 108*(2). https://doi.org/10.1542/peds.108.2.e31. e31-e31.

Jackman, M. R., & Jackman, R. W. (1973). An interpretation of the relation between objective and subjective social status. *American Sociological Review, 38*(5), 569–582. https://doi.org/10.2307/2094408

Kim, K. W., Wallander, J. L., Peskin, M., Cuccaro, P., Elliott, M. N., & Schuster, M. A. (2018). Associations between parental SES and children's health-related quality of life: The role of objective and subjective social status. *Journal of Pediatric Psychology, 43*(5), 534–542. https://doi.org/10.1093/jpepsy/jsx139

King, M. F., & Bruner, G. C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology and Marketing, 17*(2), 79–103. https://doi.org/10.1002/(SICI)1520- 6793(200002)17:2%3C79::AID-MAR2%3E3.0.CO;2-0

Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B., Berry, J. T., & Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *Journal of Affective Disorders, 114*(1–3), 163–173. https://doi.org/10.1016/j.jad.2008.06.026

Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: A literature review. *Quality and Quantity, 47*(4), 2025–2047. https://doi.org/10.1007/s11135-011-9640-9

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. *Medical Care*, 266–274.

Moss, R. H., Kelly, B., Bird, P. K., & Pickett, K. E. (2023). Turning their backs on the 'ladder of success'? Unexpected responses to the MacArthur Scale of Subjective Social Status. *Wellcome Open Research, 8*(11), 11. https://doi.org/10.12688/wellcomeopenres.18655.2.

Navarro-Carrillo, G., Alonso-Ferres, M., Moya, M., & Valor-Segura, I. (2020). Socioeconomic status and psychological well-being: Revisiting the role of subjective socioeconomic status. *Frontiers in Psychology, 11*, 1303. https://doi.org/10.3389/fpsyg.2020.01303

Operario, D., Adler, N. E., & Williams, D. R. (2004). Subjective social status: Reliability and predictive utility for global health. *Psychology and Health, 19*(2), 237–246. https://doi.org/10.1080/08870440310001638098

Präg, P., Mills, M. C., & Wittek, R. (2016). Subjective socioeconomic status and health in cross- national comparison. *Social Science & Medicine, 149*, 84–92. https://doi.org/10.1016/j.soc scimed.2015.11.044

Quon, E. C., & McGrath, J. J. (2014). Subjective socioeconomic status and adolescent health: A meta- analysis. *Health Psychology, 33*(5), 433. https://doi.org/10.1037/a0033716

Reitzel, L. R., Vidrine, J. I., Li, Y., Mullen, P. D., Velasquez, M. M., Cinciripini, P. M., Cofta- Woerpel, L., Greisinger, A., & Wetter, D. W. (2007). The influence of subjective social status on vulnerability to postpartum smoking among young pregnant women. *American Journal of Public Health, 97*(8), 1476–1482. https://doi.org/10.2105/AJPH.2006.101295

Ritterman, M. L., Fernald, L. C., Ozer, E. J., Adler, N. E., Gutierrez, J. P., & Syme, S. L. (2009). Objective and subjective social class gradients for substance use among Mexican adolescents. *Social Science & Medicine, 68*(10), 1843–1851. https://doi.org/10.1016/j.socscimed.2009.0 2.048

Rubin, M. (2021). Explaining the association between subjective social status and mental health among university students using an impact ratings approach. *SN Social Sciences, 1*(1), 1–21. https://doi.org/10.1007/s43545-020-00031-3

Scott, K. M., Al-Hamzawi, A. O., Andrade, L. H., Borges, G., Caldas-de-Almeida, J. M., Fiestas, F., Gureje, O., Hu, C., Karam, E. G., Kawakami, N., Lee, S., Levinson, D., Lim, C. C. W., Navarro-Mateu, F., Okoliyski, M., Posada-Villa, J., Torres, Y., Williams, D. R., Zakhozha, V., & Kessler, R. C. (2014). Associations between subjective social status and DSM-IV mental disorders: Results from the world mental health surveys. *JAMA Psychiatry, 71*(12), 1400–1408. https://doi:10.1001/jamapsychiatry.2014.1337.

Singh-Manoux, A., Marmot, M. G., & Adler, N. E. (2005). Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine, 67*(6), 855–861. https://doi:10.1097/01.psy.0000188434.52941.a0.

StataCorp. (2021). *Stata statistical software: Release, 17.* College Station, TX: StataCorp LLC.

Stringhini, S., Carmeli, C., Jokela, M., Avendaño, M., Muennig, P., Guida, F., Ricceri, F., d'Errico, A., Barros, H., Bochud, M., & Chadeau-Hyam, M. (2017). Socioeconomic status and the 25×25 risk factors as determinants of premature mortality: A multicohort study and meta-analysis of 1·7 million men and women. *The Lancet, 389* (10075), 1229–1237. https://doi.org/10.1016/S0140-6736(16)32380-7

Tackey, N. D., Barnes, H., & Khambhaita, P. (2011). *Poverty, ethnicity and education.* York: Joseph Rowntree Foundation.