**Cognitive function, covariates, and COVID-19 vaccine hesitancy in**

**Understanding Society and Generation Scotland**

**Timings of assessments in Generation Scotland**

Generation Scotland baseline – 2006-2011

CovidLife1 – April-June 2020

CovidLife2 – July-August 2020

CovidLife3 – February 2020

*Timing of assessments in Understanding Society (USoc)*

Wave 3 (C) – 2011 to 2012

Wave 10 (J) – 2018 to 2019 (last complete wave before COVID)

COVID data collection, vaccine questions – Nov 2020

**Generation Scotland variables to be used in analyses**

*USoc variables to be used*

**Vaccine hesitant (CovidLife3):**

1 – Unlikely or very unlikely

0 – Likely or very unlike

Remove those who reported having had the vaccine and those who answered “Don’t know” or “prefer not to answer”.

*Vaccine hesitant (COVID data):*

1 – Unlikely or very unlikely

0 – Likely or very unlike

Remove those who responded “don’t know”, refused, inapplicable, or otherwise missing.

**Cognitive ability (Generation Scotland baseline – 2006-2011)**

First unrotated PC of:

* Digit symbol
* Logical memory (immediate + delayed)
* Mill Hill vocabulary
* Verbal fluency (C + F + L)

Should we also look at each test individually?

*Cognitive ability (USoc wave 3, 2011-2012)*

First unroated PC of:

* Immediate recall
* Delayed recall
* Verbal fluency
* Serial 7s
* Number series
* Numerical problem solving

**Demographics**

**Age in years at vaccine hesitancy assessment (CovidLife3)**

*Age in years at Nov COVID data collection*

**Sex (Generation Scotland baseline 2006-2011)**

*Sex (USoc wave 10)*

**Ethnicity (CovidLife1)**

1 – Non-white ethnicity

0 – white ethnicity

*Ethnicity (USoc wave 10 )*

1 – Non-white ethnicity

0 – white ethnicity

**Socioeconomic**

**Education (CovidLife1)**

1 – No degree

0 – Degree

*Education (USoc wave 10)*

1 – No degree

0 – Degree

Coding is slightly more complicated than in CL – will likely need input on exactly what do classify as a ‘degree’

**Deprivation (CovidLife1)**

Scottish Index of Multiple Deprivation (based on postcode provided at CovidLife1)

Coded 1 (most deprived) to 10 (least deprived).

*Carstairs index*

Though this has been done before in USoc the data are not readily available. It would require access to linked geographic data that are restricted; once we get that we would then need to link Carstairs to location

**Occupational social class (CovidLife1)**

CovidLife1 asked about the type of work (unskilled to managers; question below), but the way the questionnaire was designed, quite a lot of participants (n = 3959 (21.5%) didn’t answer this question). Type of work question:

*Which of the following best describes the type of work you did in your last or current job?*

* Managers, directors and senior officials (1)
* Associate professional and technical occupations (2)
* Administrative and secretarial occupations (3)
* Skilled trades occupations (4)
* Sales and customer service occupations (5)
* Process, plant and machine operatives (6)
* Elementary (unskilled) occupations (7)
* Never worked (8)
* Not applicable (97)
* Pefer not to answer (98)

*Occupational social class (USoc wave 10)*

USoc provides NNSEC 3, 5, and 8. NNSEC3 might be best:

Management & professional, Intermediate, and Routine for ‘low social class’. Routine includes Lower supervisory & technical and Semi-routine at this resolution.

Could either housing type or tenure be used as an indicator of SES instead of occupation? Collected at CovidLife1. Questions below:

*What type of accommodation do you live in? (CovidLife1)*

* House or bungalow (1)
* Flat or apartment (2)
* Hostel (3)
* Mobile home or caravan (4)
* Sheltered housing (5)
* Homeless (6)
* Other (7)
* Prefer not to answer (98)

*What is the status of the accommodation in which you and your household live? (CovidLife1)*

* Own outright (1)
* Own with mortgage (2)
* Rent from local authority/housing association (3)
* Rent from private landlord or agency (4)
* Pay part rent and part mortgage (5)
* Live rent free (6)
* Other (7)
* Don’t know (99)
* Prefer not to answer (98)

USoc could potentially complement with derived vars for housing tenure, or just house ownership (own outright, mortgaged, rented, rent-free)

**Comorbidities**

For health conditions we asked the following (this was based on the list of conditions of those instructed to shield, plus a few extra conditions). Asked at CovidLife1

Question: *Do you have any of the following medical conditions? Select all that apply, or select None of the above*

* Asthma (1)
* Chronic obstructive pulmonary disease (COPD) including chronic bronchitis and emphysema (2)
* Severe chest conditions such as cystic fibrosis or severe asthma (requiring hospital admissions or courses of steroid tablets) (3)
* Chronic heart disease, such as heart failure (4)
* Chronic kidney disease (5)
* Chronic liver disease, such as hepatitis (6)
* Chronic neurological conditions, such as Parkinson’s disease, motor neurone disease, multiple sclerosis, a learning disability or cerebral palsy (7)
* Diabetes – Type 1 (8)
* Diabetes – Type 2 (9)
* Digestive disorder – e.g. ulcerative colitis, Crohn’s disease, irritable bowel disorder (10)
* High blood pressure (11)
* Currently undergoing chemotherapy or radiotherapy for treating cancer (12)
* Currently have cancer of the blood or bone marrow (e.g., leukaemia) (13)
* Problems with your spleen – e.g., sickle cell disease, or you have had your spleen removed (14)
* Received an organ transplant and remain on immunosuppression medication (15)
* A weakened immune system as a result of conditions such as HIV and AIDS, or medicines such as steroid tablets or chemotherapy (16)
* Other medical condition which may mean you are at increased risk of severe illness from COVID-19 (17)
* ⊗Prefer not to answer (98)
* None of the above (96)

Doesn’t map exactly onto common CVD/cardiometabolic disease definitions. Any advice how to group these for the comorbidities?

*Cardiometabolic disease (wave 10):*

* Congestive heart failure
* Coronary heart disease
* Angina
* Heart attack or infarction
* Stroke
* Diabetes
* Hypertension

*Cancer (wave 10):*

* Lung
* Breast
* Prostate
* Liver
* Skin/melanoma
* Bowel
* Other
* “Cancer or malignancy” Old category, still used in wave 10

*Respiratory disease:*

* Chronic bronchitis
* Asthma
* Emphysema
* COPD

I also think we should include **shielding status (CovidLife1),** as this might play an important role in vaccine hesitancy.

Shielding variable available in USoc COVID data collection from June 2020

**Psychological factors**

**GAD-7 and PHQ-9 (CovidLife1)**

OR

**GHQ-28 (Generation Scotland baseline – 2006-2011)**

*GHQ (all COVID waves)*

*Life satisfaction (most COVID waves)*

*Loneliness (most COVID waves)*

**IPIP – Neuroticism (CovidLife1)**

OR

**Eysenck personality questionnaire – Neuroticism (Generation Scotland baseline – 2006-2011)**

*Big 5 (USoc wave 3)*

Would we want other psychological measures to be collected at the same time as cognitive ability (i.e., Generation Scotland baseline 2006-2011) or at the same time as all over variables (i.e., CovidLife 2020)?

Neuroticism and extraversion are assessed at both Generation Scotland baseline (using Eysenck personality questionnaire) and CovidLife1 (using International Personality Item Pool). CovidLife1 also assessed conscientiousness, which would be interesting to look at in relation to vaccine hesitancy.

USoc has short measures of each of the five factors, measured once. The IPIP measures (as in GS) are generally better than the Eysenck measures, plus we get C if we uses IPIP. I think we ought to use personality measured at the same time, within sample. So between the 2 samples we would have overlap with N, C, and E, which all have logical links to vaccine attitudes.