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# Achieving representativity in opportunity sampling: the 'Bradford effect' in the multilingual families Covid-19 survey

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**ABSTRACT**

Typically, families from ethnic minority backgrounds and socioeconomic disadvantage are underrepresented in research. Using secondary data from a survey of the language practices of multilingual families during the first wave of the Covid-19 pandemic, we sought to ascertain whether the unexpectedly large proportion of Bradford-based respondents affected the representativeness of the sample and/or the patterns of responses. Respondents were objectively categorised into five latent profiles, based on the demographics of the household and families' engagement with the Heritage Language (HL). The three of the household profiles considered 'engaged' with their HL reported more positive attitudes towards multilingualism. Their language practices also more markedly changed during the lockdown compared to families who were less engaged with their HL. One of the five profiles was deemed to represent those usually considered 'hard-to-reach' in research (i.e. ethnic minority, low socio-economic status). The Hard-to-reach and Unengaged profiles were mainly represented by Bradford families. We argue that the exceptional engagement of Bradford communities in research resulted in better representativity of family profiles in this national survey.

## Introduction

During the first wave of the Covid-19 pandemic (April – July 2020) all non-essential contact and travel were prohibited, increasing the time spent in the home. To investigate the effect of this lockdown on language practices in multilingual families, a consortium of researchers conducted a survey in the UK and the Republic of Ireland (ROI) (Serratrice et al., 2021).[1] The term 'multilingual' is to be understood in a broad sense, as it is based on respondents' self-identification as 'members of a household in which two or more languages are spoken'.

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While the study aimed to gather a representative and diverse range of responses from all over the country, the resultant geographical distribution of respondents was uneven, with the highest proportion overwhelmingly from Bradford (31%). Therefore, we sought to ascertain whether there was a 'Bradford effect' in the Multilingual Families survey: (i) Did the high level of participation from Bradford-based respondents affect the *representativeness* of the sample? (ii) Did the *responses* from Bradford-based respondents differ markedly from those of the rest of the sample?

### Representativeness

The representativeness of socially disadvantaged groups is often compromised in research. This can happen during sampling, recruitment, data collection, intervention delivery, and/or retention (Bonevski et al., 2014). Under-researched groups are sometimes labelled 'Hard-to-reach'. While this label is 'contested and ambiguous, [it is] commonly used in social research and health, especially in discourse around health and inequalities' (Flanagan & Hancock, 2010). The precise constituency of 'Hard-to-reach' groups depends on the focus of the research, but socio-economic disadvantage and (minority) ethnicity are among the most frequently invoked characteristics (Bonevski et al., 2014).

Bradford District is the 13th most deprived local authority in England (Walker, 2022). As a district featuring both high levels of socio-economic disadvantage and ethnic diversity (Office for National Statistics, 2021), Bradford could be an ideal area from where to recruit groups that are often under-represented in research.

For the survey sample to be considered representative, it would have to closely approximate the population as a whole regarding: socio-economic status (SES), ethnicity, household composition, and language practices in the home (demographics that are both relevant to, and documented by, the survey). The sample might also need to feature diversity of experiences during the pandemic-related lockdowns.

### Socio-economic status

SES is associated with children's language proficiency (Clegg & Ginsborg, 2006), academic success (Ricketts et al., 2014), and life chances (National Literacy Trust, 2019). It is often used as a proxy for several aspects of children's environment (Gatt et al., 2020). In their review of the impact of SES on cognitive development and language outcomes, Perkins et al. (2013) highlight two potential explanations for this. The first stems from the well-documented association between low SES and high chronic stress which impacts the cognitive control system underpinning language development. The second centres around lower quality of the home environment in terms of literacy practices, parental language, and parenting styles (all of which have an impact on children's language development). As there is no consensus yet on the primary determinants of the quality of the environment in which children grow up, SES is still usually relied on as a proxy variable. It is often operationalised as parental education (as in the present survey). However, parental education is unlikely to be a sufficient indicator in the target population, given that deprivation is associated with ethnicity (Fairley et al., 2014) in a complex interaction with bilingualism. Indeed, in England, the association between parental education and parental occupation is weaker in multilingual families than in monolingual families (De Cat, 2021).

### Ethnicity

The survey did not record information about ethnicity directly but asked which language (s) other than English is spoken in the home. We refer to these languages as Heritage Languages, i.e. minority languages spoken in (at least) the home and acquired alongside a majority language (here: English) – see Kupisch and Rothman (2018). Heritage Language (HL) proficiency is positively correlated with ethnic identity. Mu (2015) demonstrated that the significant, positive correlation between HL and ethnic identity is robust across different ethnic groups in English-speaking countries (USA, Canada, UK, and Australia). HL plays a role in ethnic identity construction and maintenance. However, the notion of ethnic identity is complex and elusive: it can be conceptualised along various dimensions (psychological, cross-cultural, anthropological, sociological, or attitudinal; Mu, 2015) and can fluctuate throughout an individual's lifetime. In multi-generation households where marked differences in HL proficiency exist, language barriers can lead to intergenerational conflict and reduce socialisation with the HL community, leading to fading ethnic identity in the youngest generation (Mu, 2015). Resultantly, attitudes towards the HL (recorded in this survey) could be an indicator of the strength of ethnic identity.

### Heritage language practices and household composition

Family Language Policy (FLP) is a fast-developing research area, which investigates family members' attitudes toward language use in the home as well as the explicit and overt planning of multilingual practices in the family (Higgins & Wright, 2021; Wright & Higgins, 2021). For instance, some families aim to adhere to a one-parent one-language policy, while others aim for a monolingual HL household. FLP plays a critical role in the language maintenance of HLs and in childhood bilingualism (Andritsou & Chatzidimou, 2020). Attitudes are an important aspect of FLP, as they reflect the role attributed to multilingualism in the negotiation of power, agency, and identity construction within the family (Wright & Higgins, 2021). There is a growing body of literature showing that HL practices, as a manifestation of FLP, are influenced by parental attitudes, including emotions, identity, and parental impact beliefs (Curdt-Christiansen & Huang, 2020; Sevinç & Mirvahedi, 2023).

Household composition can be expected to have a strong impact on language practices in the home. For instance, the presence of an older generation with limited proficiency in the societal language is likely to result in more HL used in the home (Ruby, 2012); the diversity of language practices is likely to be limited in single-parent households; and the presence of siblings is known to increase the amount of societal language spoken in the home – at least between the children (Tsinivits & Unsworth, 2021).

### Study aims

The present study aimed to investigate the respondent profiles *within* the sample[2] and determine whether the large proportion (1/3) of respondents from a geographical area featuring high levels of deprivation and ethnic diversity (i.e. Bradford) affected the distribution of respondent profiles in the sample. The characteristics used to define these

profiles are based on those reviewed above. In turn, we aimed to explore whether the views elicited in the survey vary by respondent profile and/or broad geographical area.

We aimed to:

1. Identify the different profiles of multilingual families who took part in this nation-wide survey, using structural equation models.
2. Determine whether the unexpectedly large proportion of Bradford-based respondents had a substantial impact on the representativity of the participant sample (in terms of family profiles).
3. Explore whether different profiles of multilingual families reported different impact(s) of the pandemic-related school closures on their HL practices.
4. Explore whether attitudes towards multilingualism differed across different multilingual family profiles.

The first part of this paper explains how we derived the predictor and outcome variables from the survey data. The second part investigates the relationship between different household language profiles and these outcomes.

## Method

### *Survey method and participants*

This research involved secondary analysis of data collected by the Centre for Literacy and Multilingualism at the University of Reading. Multilingual families were recruited through a non-probability, opportunistic sampling method (Serratrice et al., 2021): the call for participation was advertised on Twitter, on the *We Live Languages* distribution list (https://welivelanguages.com/), and by word of mouth. In the last month of data collection, at the bequest of the authors of the current paper, an additional recruitment campaign took place within Bradford, facilitated by local schools (as trusted intermediaries), who sent the call for participation via email to parents of children with English as an Additional Language. Ethical approval was granted by the University of Reading (2020-019-LS). Data collection took place April-July 2020. The survey was only available in English.

The survey questions related to several themes:

a. Household demographics (e.g. parental education)
b. Language(s) spoken in the home (e.g. extent to which the HL is spoken in the home and by whom)
c. Language practices within the home (e.g. frequency of the child's HL activities)
d. Attitudes towards the HL (e.g. does the parent consider it important or useful?)
e. Extent to which language use changed over lockdown (e.g. was the child exposed to more of the HL?).

There were 56 questions, yielding four types of response: 0–100 Likert scale reflecting the extent of agreement to a statement ($n = 42$), free-text responses ($n = 6$), multiple-

choice or dichotomous responses ($n = 7$), and numeric responses ($n = 1$). See Supplementary Material for the list of questions.

While 1031 families accessed the survey, only 867 families submitted responses. Furthermore, to be included in analyses, the respondent's household was required to: contain at least one person who considered themselves bilingual/multilingual, include at least one child (of any age), and reside in the UK or ROI. There were no stipulations regarding the number of parents/carers who spoke a language other than English, or the number of other languages spoken in the home. After removing families who did not meet these criteria, data were analysed for 805 multilingual families. The largest proportion of these families were from Bradford (30.7%), followed by the South of England (25.3%), London (23.2%), the North of England (6.5%), the ROI (5.8%), Scotland (4.1%), Wales (1.6%), the Midlands (0.6%), and Northern Ireland (0.5%). Seventy-two different languages (other than English) were reported.[3]

### Data-driven identification of participant profiles: a Latent Class Analysis

To identify the different multilingual family profiles in this survey, we used a data-driven approach exploiting SES (i.e. caregiver education), household composition (e.g. number of adults, children, and generations), adults' proficiency in the HL and in English, language practices (e.g. reading with the children in English or the HL), and practice-related attitudes (i.e. importance of literacy in the HL). These profiles were determined through Latent Class Analysis (LCA).

LCA is a statistical technique used to identify distinct underlying groups (in a population) that share similar observable, categorical characteristics, based upon patterns of participant responses (or *manifest* variables) (Law & Harrington, 2016). The resultant groups are referred to as latent classes, as they identify constructs that cannot be measured or observed directly in the available data. Classes are defined by patterns of associations between responses, indicating the relative likelihood of a particular response for each variable/survey question (Hagenaars & McCutcheon, 2002; Weller et al., 2020). Individuals are then assigned to one of the resultant classes using posterior probability (a Bayesian term for an updated probability after additional information) based upon their responses (Monga et al., 2007). Participants' responses are determined by their class membership (Weller et al., 2020).

LCA was conducted using the poLCA package (Linzer & Lewis, 2011) within R (R Core Team, 2021). Twenty-three indicators were included to determine household profiles (see Supplementary Material). Fit statistics, Bayesian Information Criterion (BIC), entropy, and log-likelihood were compared across models to determine the most appropriate number of classes to retain in the final model. Lower BIC and entropy scores and a higher log-likelihood indicates a better fitting model. Individuals were then categorised into their respective latent class using the posterior membership probability.

### Dimension reduction of the 'outcome' variables: Principal Component Analyses

Aims 3 and 4 focus on differences in the language practices and attitudes across multilingual household profiles, as empirically derived through LCA. These translate into the

following research questions: (i) *Did the lockdown impact HL practices differently across different types of household?* and (ii) *Do attitudes towards multilingualism differ across different types of household?* The items within each of these two themes are included in the Supplementary Materials. As these questions were centred on the same themes, many of the responses were interrelated (see Tables 1 & 2), which resulted in multicollinearity.

To overcome this issue of multicollinearity and derive a single outcome for each of the two themes, Principal Components Analysis (PCA) was conducted. PCA is a dimension-reduction technique used to determine new, uncorrelated principal components based upon a larger number of correlated variables (Abdi & Williams, 2010; Jolliffe, 2002). It can increase the interpretability of data whilst retaining maximum variance (Jolliffe & Cadima, 2016). The proportion of variance explained by each manifest variable is reflected by appropriate weighting in the final component scores.

PCA was conducted using the psych package (Revelle, 2021) in R (R Core Team, 2021). To determine the number of components to retain, eigenvalues, scree plots, and the amount of cumulative variance explained were compared for each model. General guidance is to retain components with eigenvalues greater than one and set the target amount of cumulative variance as 70–90% (Jolliffe, 2002). Once the most appropriate number of components was selected, the contribution of each item was interpreted for each component. When the loading was ≥ .50, components were considered to contribute a substantial amount of the variance and were therefore retained. Lastly, Oblimin rotations were applied. While rotations do not adjust the proportion of variance a component explains, they can alter item loadings and make patterns more distinct (Finch et al., 2017; Kellow, 2006).

## *Additional data preparation*

To investigate the presence of a 'Bradford effect' in the data, we derived a variable according to geospatial location (Bradford versus Elsewhere) from the open-ended question '*Where do you currently live?*'.

**Table 1.** Means (*M*), standard deviations (*SD*), and Pearson correlations with confidence intervals between the items within the theme related to the impact of language practices as a result of lockdown.

| Variable | M | SD | 1 | 2 | 3 |
|---|---|---|---|---|---|
| 1. Agreement as to whether the respondent's child(ren) use HL for recreation more now than before lockdown | 56.92 | 32.77 | – | – | – |
| 2. Agreement as to whether the respondent's child(ren) speak HL more now than before lockdown | 71.31 | 30.51 | .61** [.56, .65] | – | – |
| 3. Agreement as to whether the respondent's child(ren) hear HL more now than before lockdown | 66.94 | 32.30 | .57** [.52, .61] | .55** [.50, .60] | – |
| 4. Agreement as to whether the respondent's child(ren) speak HL more to communicate with family online now than before lockdown | 57.39 | 32.91 | .57** [.52, .62] | .53** [.48, .58] | .56** [.51, .60] |

** < .001.

**Table 2.** Means (M), standard deviations (SD), and Pearson correlations with confidence intervals between the items within the theme related to attitudes and beliefs towards multilingualism.

| Variable | M | SD | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1. How much being multilingual impacts parent's identity | 85.23 | 20.31 | – | – | – | – |
| 2. How much being multilingual impacts child's identity | 80.36 | 24.70 | .45** [.39, .50] | – | – | – |
| 3. Importance of keeping in contact with family who do not speak English (respondent's opinion) | 87.75 | 21.14 | .52** [.46, .56] | .34** [.27, .40] | – | – |
| 4. Importance of keeping in contact with family who do not speak English (child's opinion) | 80.71 | 25.94 | .32** [.26, .38] | .50** [.45, .55] | .64** [.60, .68] | – |
| 5. Opinion of how important it is for the child(ren) to use their HL to speak with family members | 88.67 | 18.92 | .43** [.37, .48] | .37** [.31, .43] | .54** [.49, .59] | .43** [.37, .48] |

** < .001.

## Results

### Respondent groups and the 'Bradford effect'

### What are the groups and how do we interpret them? Results of the Latent Class Analysis

Our first aim was to identify the different profiles of multilingual families who took part in the survey. Based on the model fit statistics, a five-class model was selected as being the most appropriate fit for the data (entropy: 0.951, suggesting good separation of individuals into classes). The most likely characteristics of each class are listed in the Supplementary Materials. We interpret and label each class as distinct respondent profiles below, ordered according to their proportion in the sample.

In the first class, both parents speak a HL (not necessarily the same one). The parents are highly educated, both achieving at least an undergraduate degree, and self-report speaking English 'very well'. Furthermore, both parents are likely to be 'engaged' with their HL, based on the language practices in the home (i.e. children watching TV, or being read to, in the HL). We labelled this profile '**Engaged with 2 bilingual parents**'. The largest proportion of families were categorised into this profile (28% of the whole sample).

In the second class, families are likely to have one parent who speaks a HL, and either there is no second parent, the second parent is an English monolingual, or the second parent has a different HL which is not used within the home. Both parents have high levels of education (at least a Masters degree) and have near-native English proficiency levels. While it is unlikely for the children to read books in the HL, there is relatively high engagement in activities in that language (i.e. watching TV, being read to). Parents in this profile feel it is important for their child to read and write in the HL. We labelled this profile '**Engaged with 1 bilingual parent**', which accounts for 22% of the sample.

In the third class, there are more likely to be three generations living in the home. The parents are most likely to speak the same HL, but the extent to which they use it in the home varies. There is likely to be a marked difference between the parents' English proficiency level and that of other adults in the home, which we interpret as indicating that these other adults (probably from an older generation) are likely to have relatively low English proficiency. Compared to other family profiles, parents are more likely to have lower levels of education, with at least one parent only educated up to secondary school. There is a relatively high level of engagement with the HL. Many of the differences between this and the other profiles are related to family demographics (rather than language practices), which we interpret as a socio-economic difference. We label this profile the 'Hard-to-reach' (i.e. the more socio-economically deprived, who risk being under-represented in research). It comprises 22% of the sample.

In the fourth class, there tends to be only one child in the home, of pre-school age. Responses are likely to be similar to the other 'Engaged' profiles for questions specific to language practices, except for 'age-related' questions such as whether the child reads in the HL (as they are likely too young to read) or play videogames. We label this profile '**Young and Engaged**'. It represents 15% of the sample.

In the fifth class, English is the main language in the home, and parents are likely to have the same HL. Both parents speak English (at least) 'very well' and are likely to hold an undergraduate degree. Families are unlikely to engage in
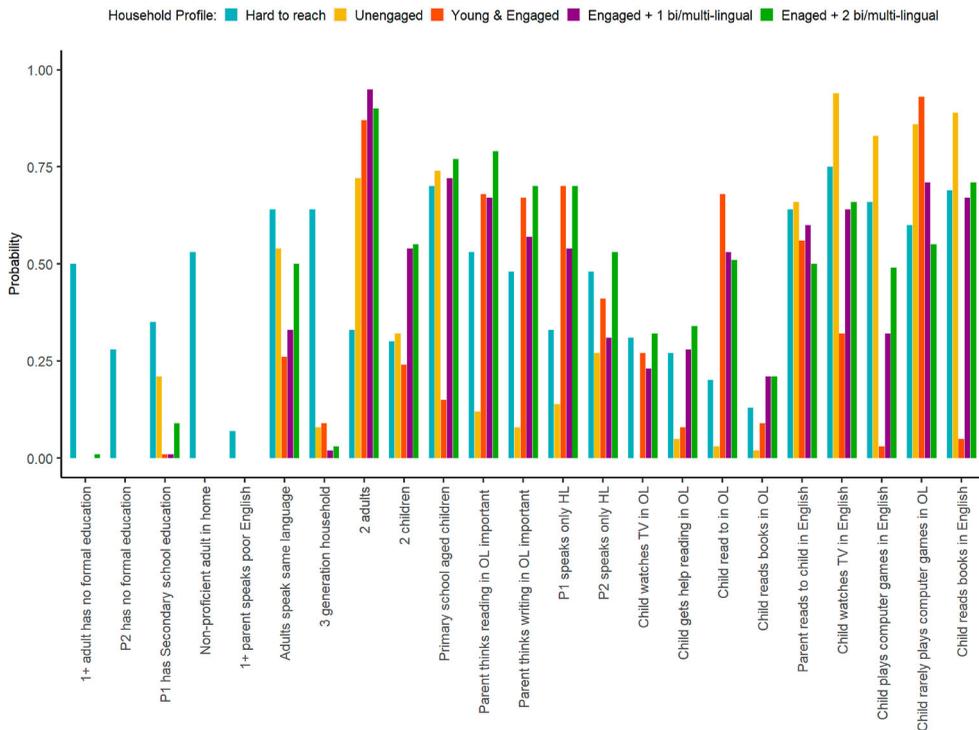


**Figure 1.** Summary of selected predicted probabilities for each household profile. Note: P1 = Parent 1; P2 = Parent 2; HL = Heritage Language; OL = Other Language.

activities in the HL and are more likely to rate the importance of the child reading and writing in the HL as low. We label this profile '**Unengaged**'. It comprises 12% of the sample.

Figure 1 shows the 23 indicators used to derive the five latent household profiles, and the relative probability of an individual from each latent profile selecting each particular response. The left-most part of the figure highlights the distinctive profile of the 'Hard-to-reach' group: compared with the other groups, there was a much higher probability that one or two parents had no formal education, that there was at least one non-proficient adult living in the home, that at least one parent had low levels of English proficiency, and that the household includes three generations.

### What is the geographical distribution of the groups?

Our second aim was to determine whether the high proportion of Bradford participants had an impact on the representativity of the sample. A Location variable (Bradford vs Elsewhere) was used to partition the data and explore the distribution of respondent profiles identified through LCA. More than half of the Bradford families were categorised as 'Hard-to-reach' ($n = 133$, 53.8%). By contrast, this profile was only represented by a small proportion of families from elsewhere ($n = 61$, 10.9%). This difference is statistically significant (two-proportions $z$ test: $z = 170.04$, $p < .001$). Another notable difference is the relatively high proportion of 'Unengaged' multilingual families in the Bradford sample ($n = 54$, 21.9%), compared with Elsewhere in the UK ($n = 47$, 8.4%) which was also statistically significant ($z = 5.31$, $p < .001$). Figure 2 (a) shows the distribution of families within each household profile by location. Figure 2(b) shows that the five multilingual family profiles identified through the LCA are relatively evenly distributed throughout the sample as a whole (when not divided according to geographic area).
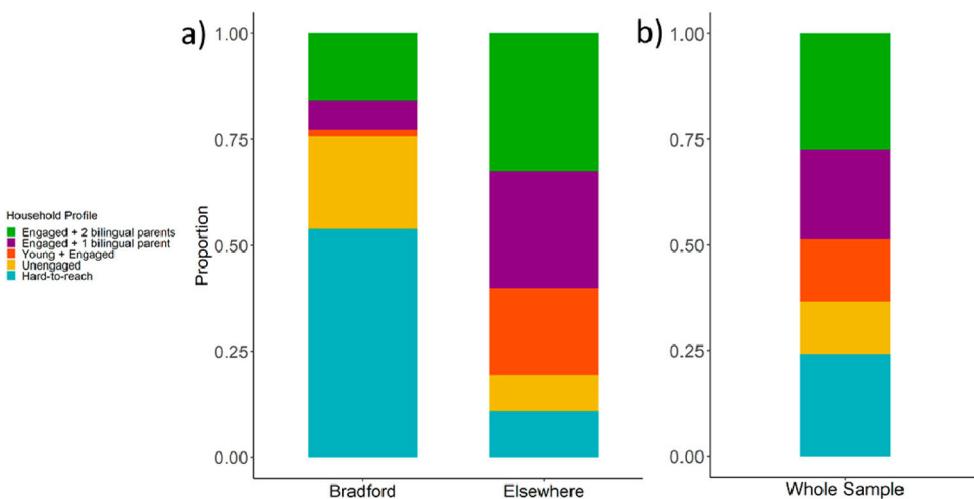


**Figure 2.** Proportion of each household profile for (a) Bradford versus Elsewhere; (b) the whole sample.

### Outcome variables: results of the Principal Components Analyses

### Respondent groups and the 'Bradford effect'

To facilitate interpretation of our third and fourth aims, we carried out two further PCAs. Based on the model fit statistics, a single-class model was selected as being the most appropriate for both the impact of lockdown on HL practices (cf. Aim 3) and parental attitudes towards multilingualism (cf. Aim 4). All items included within both models substantially loaded onto a single component. See Table 3 for a breakdown of the unique variance each item contributed towards the final model.

The resultant latent factors ('Impact of lockdown on HL practices' and 'Parental attitudes towards multilingualism') were used as dependent variables in the subsequent analyses. Figures 3 and 4 illustrate the correlation between responses to each relevant question and the component ('Impact of lockdown on HL practices' or 'Parental attitudes toward multilingualism'). Figure 3 shows that the Impact of lockdown on HL practices is positively correlated with agreement that the exposure to and use of the HL had increased in that time (including for recreation and online). Figure 4 shows that the PCA score for Parental attitudes and beliefs towards multilingualism is positively correlated with (i) the belief that multilingualism has an impact on the parents' and the children's identity, (ii) agreement that it is important for the parents and for the children to keep in touch with family who don't speak English, and (iii) agreement that it is important children use the HL with family members.

Figure 5 shows the distribution of the two outcome variables derived via PCA. Note that although these latent variables were standardised, they do not have an exact mean of zero due to missing data. The right-hand plot shows that parental attitudes towards multilingualism were generally positive, with a large proportion of participants selecting the maximum response of agreement. Furthermore, there were differences in the distribution of responses between participants from Bradford and Elsewhere. Lower

**Table 3.** Items and component loadings for each component score.

| Component | Item | Component Loading | Variance Explained |
|---|---|---|---|
| Impact of lockdown on HL practices | Agreement to which child(ren) hear their HL more now than before the lockdown | .82 | .67 |
| | Agreement to which child(ren) speak their HL more now than before the lockdown | .82 | |
| | Agreement to which child(ren) speak their HL more to communicate with family online now than before the lockdown | .81 | |
| | Agreement to which child(ren) use their HL for recreation more now than before the lockdown | .84 | |
| Parental attitudes and beliefs towards multilingualism | Opinion of how much being multilingual impacts the parent's identity | .71 | .56 |
| | Opinion of how much being multilingual impacts the child's identity | .82 | |
| | Importance of keeping in contact with family who do not speak English (respondent's opinion) | .69. | |
| | Importance of keeping in contact with family who do not speak English (child's opinion, as reported by the respondent) | .78 | |
| | Opinion of how important it is for the child(ren) to use their HL to speak with family members | .74 | |
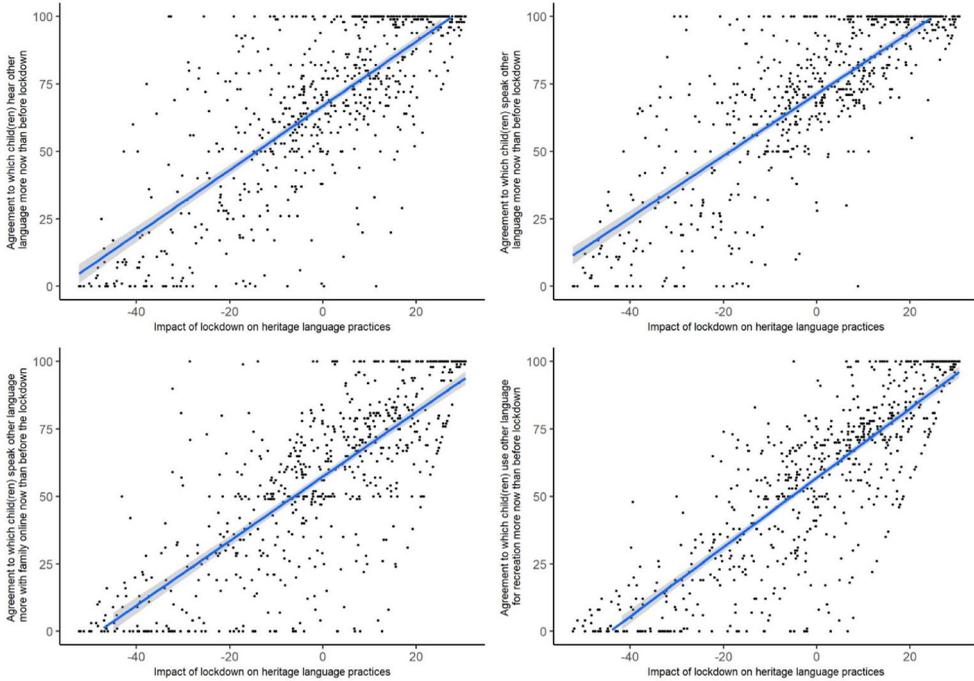
**Figure 3.** Correlation between each item entered into the PCA and the resulting component (Impact of lockdown on heritage language practices).

scores were more common in the Bradford sample, whilst higher scores were dominated by families Elsewhere. When looking at the impact of lockdown on HL practices (5a), a flatter distribution was observed, indicating greater variability. This is particularly true
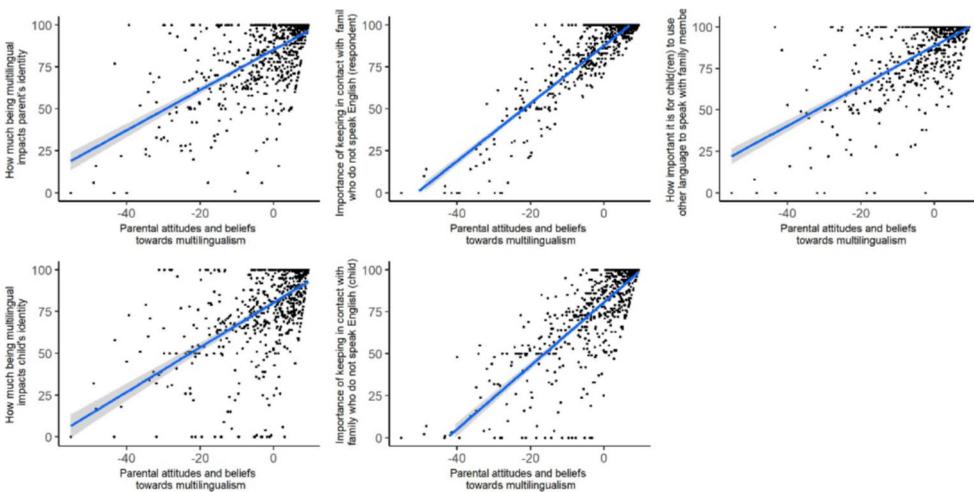


**Figure 4.** Correlation between each item entered into the PCA and the resulting component (Parental attitudes and beliefs towards multilingualism).
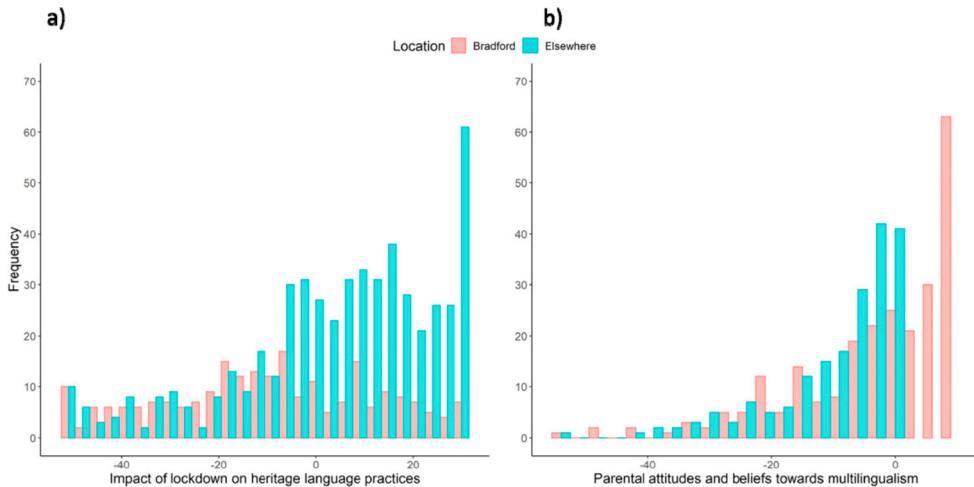
**Figure 5.** The variability of component scores between Bradford and elsewhere in the UK for 'Impact of lockdown on heritage language practices' and 'Parental attitudes and beliefs towards multilingualism'.

of Bradford-based respondents. The distribution of responses in the Elsewhere group is strongly skewed to the right, suggesting that most respondents in that group believed that lockdown had an impact on their HL practices.

### Findings from the Covid survey

To investigate the impact of lockdown on HL practices (Aim 3), and attitudes towards multilingualism (Aim 4), the responses from each relevant set of questions were reduced into a single variable through PCA (as described in the previous section). A one-component model was found to best fit the data for both analyses, which yielded the two latent variables of interest (for Aims 3 and 4, respectively). Higher values of the impact of lockdown variable (cf. Aim 3) can be interpreted as an increase in children's HL exposure, an increase in speaking the HL, an increase in online use of the HL, and an increase in HL use for recreation. The variable representing attitudes towards multilingualism (cf. Aim 4) can be interpreted as the impact of being multilingual on the parent's identity and the child's identity, the importance (child's and parents' perspective) of keeping in contact with non-English-speaking family members, and the importance for the child of using the HL to communicate with family.

In this section, we use the two latent variables as outcome variables in modelling analyses predicting (i) the impact of lockdown on different types of multilingual households, and (ii) whether different types of multilingual households vary in their beliefs and attitudes towards multilingualism. Two linear regression models were fitted where the outcome variable was a latent variable derived via PCA (as reported above), and the predictor variable was the latent household profile, derived via LCA. In both models, the Hard-to-reach household profile was used as the reference category.

### Multilingual household profiles as a predictor of the impact of lockdown on language practices

The first model determined the extent to which multilingual household profile predicts the impact of lockdown on HL practices. Overall, there was a significant effect of household profile ($R^2 = .13$, $F(4, 751) = 27.68$, $p < .001$). Families with a 'Young and Engaged' household profile experienced the greatest impact of lockdown on HL practices, M = 7.06, SD = 23.9 (see Figure 6). Meanwhile, on average, the 'Unengaged' (M = -17.6, SD = 21.9) and 'Hard-to-reach' (M = −4.62, SD = 19.9) families experienced a lesser impact of lockdown on HL practices. Note that the outcome variable is a latent measure derived from questions answered on a 0–100 scale in terms of *agreement*. We interpret strong agreement as a likely reflection of the *perceived strength* of the impact but can only do so with modest levels of confidence (as the questions did not probe strength of impact directly). *Post-hoc* planned contrasts with Tukey corrections indicated that the 'Hard-to-reach' profile experienced significantly less of an impact of lockdown on HL practices compared to 'Engaged with 1 bilingual parent' ($p = .002$, $r = 0.14$), 'Engaged with 2 bilingual parents' ($p < .001$, $r = 0.17$), and 'Young and Engaged' ($p < .001$, $r = 0.17$) profiles, whilst the 'Hard-to-reach' experienced a larger impact compared to the 'Unengaged' profile ($p < .001$, $r = 0.18$). Furthermore, the 'Unengaged' household profile experienced less impact compared to 'Engaged with 1 bilingual parent' ($p < .001$, $r = 0.28$), 'Engaged with 2 bilingual parents' ($p < .001$, $r = 0.31$), and 'Young and Engaged' ($p < .001$, $r = 0.30$). Visual inspection of the results shows that, in the 'Hard-to-reach' respondent category, the distribution of scores of the outcome variable (Impact of lockdown on HL practices) is quite evenly distributed across the entire range, whereas in all the other groups it is positively or negatively skewed.
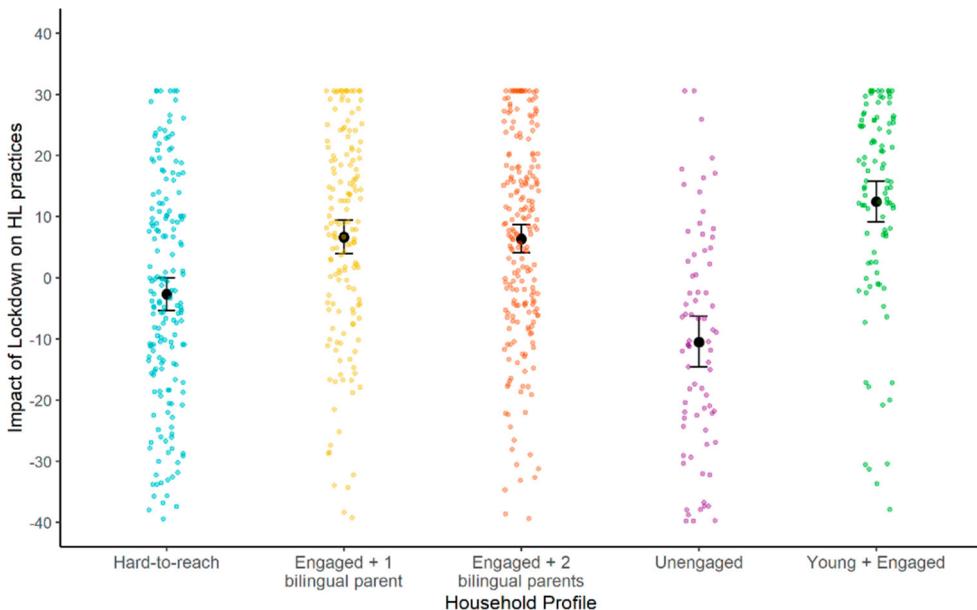


**Figure 6.** Mean scores for impact of lockdown on HL practices for each household profile (error bars represent 95% confidence intervals).

Compared to the 'Hard-to-reach' profile (reference category), the three 'engaged' profiles ('Engaged with 1 bilingual parent'; 'Engaged with 2 bilingual parents'; and 'Young and Engaged') experienced a significantly greater impact of lockdown on HL practices, all $p < .001$ (see Table 4). However, there was a significantly smaller impact of lockdown for the 'Unengaged' profile compared to the 'Hard-to-reach' profile, $p < .001$.

### Multilingual household profiles as a predictor of parental attitudes towards multilingualism

The second model explored the extent to which household profile could predict parental attitudes towards multilingualism. Household profile significantly predicted parental attitudes ($R^2 = 0.11$, $F(4,800) = 23.83$, $p < .001$). The 'Engaged with 2 bilingual parents' profile showed the most positive attitudes towards multilingualism, $M = 3.57$, SD = 7.21 (see Figure 7). Compared to the sample average ($M = 2.15$, SD = 11.09), the 'Unengaged' families had less-positive attitudes towards multilingualism ($M = -7.84$, SD = 15.0). Post-hoc planned contrasts with Tukey corrections showed that the 'Hard-to-reach' profile was significantly less positive towards multilingualism compared to the 'Engaged with 1 bilingual parent' ($p = .006$, $r = 0.12$) and 'Engaged with 2 bilingual parents' ($p < .001$, $r = 0.19$) profiles, yet more positive compared to the 'Unengaged' profile ($p < .001$, $r = 0.15$). Meanwhile, the 'Unengaged' profile was less positive towards multilingualism compared to 'Engaged with 1 bilingual parent' ($p < .001$, $r = 0.25$), 'Engaged with 2 bilingual parents' ($p < .001$, $r = 0.30$), and 'Young and Engaged' ($p < .001$, $r = 0.22$) profiles. No other significant differences between profiles were found.

Compared to the 'Hard-to-reach' household profile, the three 'Engaged' household profiles had significantly more positive attitudes, all $p \leq .01$ (see Table 5). Again, the 'Unengaged' families had significantly less-positive attitudes compared to the 'Hard-to-reach' families, $p < .001$.

## Discussion

This study investigated whether there was a 'Bradford effect' in a survey exploring the impact of lockdown on multilingual families in the first wave of the Covid-19 pandemic in the UK. Bradford-based respondents represented 31% of the total of the opportunistic sample. Such a stark regional difference in participation rate was unexpected, as the survey targeted individuals from all regions throughout the UK and ROI. Therefore, we wanted to elucidate whether the high proportion of Bradford-based respondents had had an impact on (i) the representativeness of the sample, and (ii) the responses.

**Table 4.** Linear regression table for impact of lockdown on heritage language practices across household profiles.

| | Est. | S.E. | t-value | p-value |
|---|---|---|---|---|
| Intercept | −4.62 | 1.51 | −3.07 | <.001 |
| Engaged with 1 bilingual parent | 8.31 | 2.22 | 3.75 | <.001 |
| Engaged with 2 bilingual parents | 10.01 | 2.06 | 4.86 | <.001 |
| Unengaged | −12.97 | 2.6 | −4.98 | <.001 |
| Young and Engaged | 11.69 | 2.5 | 4.68 | <.001 |

S.E. = Standard Error.
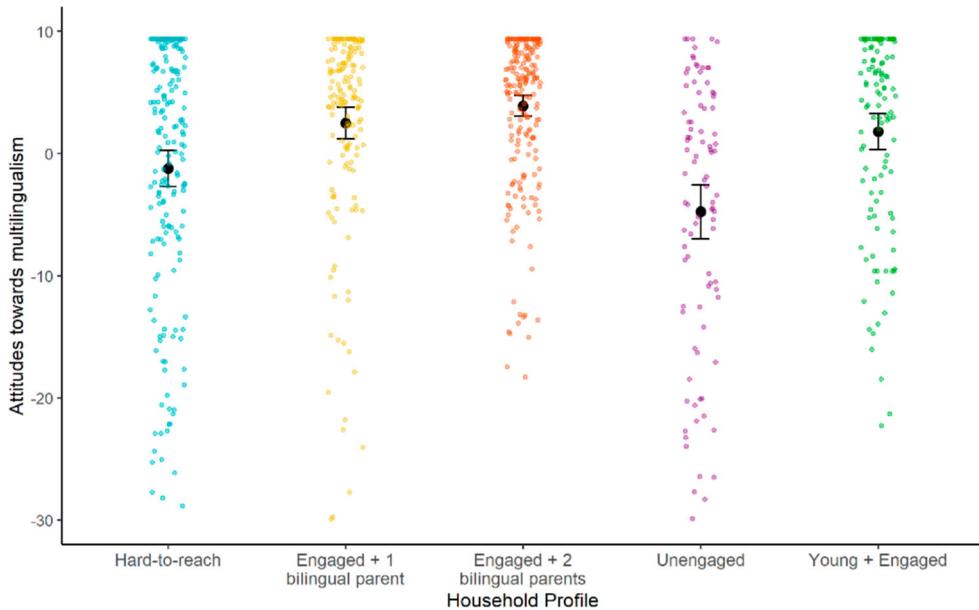
**Figure 7.** Mean scores for 'Parental attitudes and beliefs towards multilingualism' for each household profile (error bars represent 95% confidence intervals).

## Respondent profiles

Our first aim was to identify the different profiles of multilingual families represented in this survey. Through LCA, multilingual household profiles were objectively defined for the participant sample. This was informed by household demographics (household composition, parental education, parental proficiency in the societal language), language practices in the home (HL use; literacy practices in HL and in English), and perceived importance of literacy in English and in the HL. We included both factual questions about literacy practices in each language and attitudinal questions related to these, as these attitudes are likely to reflect on the practice in some way (e.g. level of encouragement, quality of parental involvement, number of books in the home).

The optimal model distinguished five household profiles (i.e. five latent classes), characterised mainly by their engagement with their HL. We labelled these profiles as: 'Engaged with 2 bilingual parents'; 'Engaged with 1 bilingual parent'; 'Hard-to-reach'; 'Young and Engaged'; and 'Unengaged' (in descending proportion within the sample).

**Table 5.** Linear regression table for 'Parental attitudes and beliefs towards multilingualism' across household profiles.

|  | Est. | S.E. | t-value | p-value |
|---|---|---|---|---|
| Intercept | −2.13 | 0.75 | −2.83 | <.001 |
| Engaged with 1 bilingual parents | 3.77 | 1.1 | 3.42 | <.001 |
| Engaged with 2 bilingual parents | 5.70 | 1.03 | 5.52 | <.001 |
| Unengaged | −5.70 | 1.29 | −4.42 | <.001 |
| Young and Engaged | 3.29 | 1.22 | 2.69 | .01 |

S.E. = Standard Error.

Each profile was characterised by a unique combination of likely responses, despite some level of overlap between profiles.

Four of the profiles are predominantly defined by traits related to HL practices and FLP (coupled with children's age, as families with the youngest children were naturally more restricted in the language-related activities the children could engage in). They differ in the level of parental engagement with the HL(s) ('Engaged' versus 'Unengaged') and whether one or two parents (or caregivers) spoke a HL in the home ('1 bilingual parent' versus '2 bilingual parents'). By considering the level of engagement with the HL, this classification goes beyond the profiles of families typically[4] considered in bilingualism research – where the key distinction is between HL-monolingual vs multilingual households, the latter comprising one-parent-one-language households and households where both parents speak the HL, but children (also) interact in the societal language within the home (e.g. most of the contributions in the special issue on input and experience in bilingual development edited by Grüter & Paradis, 2014).

One profile was predominantly defined by demographic characteristics associated with low SES (rather than by characteristics related to bilingualism): it featured lower levels of parental education, lower levels of proficiency in the societal language (English), and multigenerational households. These traits may be indicators of reduced social mobility potential. Indeed, while multigenerational households can be experienced in many ways, and can be motivated by many different factors, financial constraints are one of the predominant reasons for multigenerational homes (Pew Research Centre, 2022). Although we are mindful that the causal effect of multigenerational households on social mobility is not yet well understood, especially within a migration background (Song, 2021),[5] the high prevalence of this multilingual family profile in participants from Bradford is consistent with a low social mobility interpretation (Pickett et al., 2021). We labelled this profile 'Hard-to-reach', in line with previous literature suggesting that participants with low SES tend to be under-represented in research, especially among ethnic minorities (Bonevski et al., 2014; Flanagan & Hancock, 2010).

## *The Bradford effect*

Our second aim was to determine whether the large proportion of Bradford-based respondents in the survey (31%) had a substantial impact on the representativity of the participant sample. We therefore inspected the distribution of bilingual household profiles in Bradford vs Elsewhere in the UK, to estimate whether Bradford participation affected the representativity of the population sampled in the survey. This revealed marked differences: the 'Hard-to-reach' profile (24% of the total sample) was mainly represented among Bradford respondents (54% vs 11% Elsewhere). Bradford also featured a higher proportion of 'Unengaged' family profiles (21% of the Bradford sample) compared with the rest of the UK (8.4% of the Elsewhere sample). Importantly, however, the five multilingual family profiles identified through the LCA are quite evenly distributed in the sample as a whole, when geographical location is not taken into account (as shown in Figure 2(b)). We therefore conclude that the high level of participation of Bradford-based respondents significantly increased the representativity of the overall respondent sample in this survey, by increasing the proportion of 'Unengaged' and 'Hard-to-reach' profiles to levels closely comparable to the other three profiles. The three profiles

featuring high levels of parental engagement with bilingualism were also represented within Bradford but accounted for only a quarter of responses (compared with 81% Elsewhere).

Why such a high level of participation from the Bradford multilingual community? In Bradford, recruitment was facilitated by local schools who sent the call for participation via email to parents of children with English as an Additional Language. Elsewhere, recruitment was via Twitter and the We Live Languages distribution list (https://welivelanguages.com/), which parents interested in language research had to have previously signed up to. In Bradford, local communities are highly engaged with child-related research. Such engagement is likely, in part, due to the success of the Born in Bradford project (Raynor, 2008; Wright et al., 2013) in developing and maintaining strong, healthy relationships with the families, communities, and professionals that live and work within the city. This was echoed in a recent report by Bradford Opportunity Area, who were able to reach over 662,625 children and young people, and 1,866 schools within the district over a period of six years (Centre for Applied Education Research, 2022). Indeed, engaging so-called 'Hard-to-reach' groups requires a level of trust and representation to be established between the public body and the community (Good Governance Institute, 2020). The higher level of representation of the 'Unengaged' family profile in Bradford could be due to the same reasons. Participating in a survey on multilingualism if you don't highly value passing on your HL requires greater willingness to participate in research related to your children. The probability of reaching this group is therefore likely to be higher in areas where both community trust and research engagement are greater to begin with.

### *Impact of lockdown on HL practices*

Our third aim was to investigate the impact of lockdown on HL practices, and whether this varied by Multilingual Family Profile. Firstly, responses from the relevant set of questions were reduced to a single variable, using PCA. The optimal, one-component model yielded a latent variable reflecting the lockdown-related increase in children's HL exposure and use, an increase in online use of the HL, and an increase in HL use for recreation. We used this latent variable as an outcome measure in a linear regression model with Family Profile as the predictor variable. Generally, respondents from the 'Hard-to-reach' profile reported lower-than-average agreement that the lockdown resulted in increased HL experience for children in their families. Compared to the 'Hard-to-reach' families, those who were 'Engaged' with the HL were significantly more likely to report an increase in HL experience as a result of lockdown (especially the families with only pre-literate children). The 'Unengaged' families were significantly less likely to report this increase than the 'Hard-to-reach' families.

Overall, the impact of lockdown on HL practices depended on families' prior levels of engagement with HL practices. In general, those with low levels of prior engagement experienced little change in HL practices, contrary to those with high levels of prior engagement. However, plotting the frequency distributions of the impact of lockdown on HL practices (Figure 5(a)), it was clear that there was variability within the sample: across all groups, there were both families reporting a high level of impact, and families reporting a low level of impact. Factors other than prior engagement with HL practices

and SES will have had an impact – though investigating these was beyond the scope of the present study. Additionally, the widespread use of 0–100% agreement scales in this survey adds a level of uncertainty in the interpretation of results: stronger agreement that a practice has changed does not necessarily entail that there was a marked level of change. Although this is a reasonable interpretation, it might be more subject to variability between respondents than a direct estimate of the extent of change.

### Attitudes towards multilingualism as an expression of ethnic identity

Our fourth aim was to investigate attitudes towards multilingualism in this sample. Using PCA, we reduced the responses from the relevant set of questions into a single, latent variable which reflected the impact of being multilingual on both the parent's and the child's identity, the importance (in the eyes of the child and the parent) of keeping in contact with non-English-speaking family members, and the importance for the child of using the HL to communicate with family. This latent variable features a skewed distribution: the mean aligns with 75% indicating higher agreement rating in each of the relevant questions in the set from which the latent variable was derived, and few scores align with agreement ratings below 50%. This suggests that, across the sample, attitudes towards multilingualism were generally very positive.

The questions from which the latent variables were derived all related to the impact of HL on identity and family connections (in the heritage community). In light of the 'mutually constitutive effect between ethnic identity and HL' (Mu, 2015, p. 251), we propose that this latent variable should be interpreted as an index of ethnic identity, apprehended as an attitudinal construct with socio-psychological resonances. Consequently, we take the results to indicate that, on average, the three 'Engaged' multilingual family profiles report a stronger sense of ethnic identity through HL than the 'Hard-to-reach' group, whose sense of ethnic identity through HL is in turn stronger than that of the 'Unengaged' group. The strongest sense of ethnic identity through HL was unsurprisingly observed in the 'Engaged with 2 bilingual parents' group.

### Further thoughts on the so-called hard-to-reach, as represented in this survey

The 'Hard-to-reach' group is not defined by bilingualism-related traits but by SES-related traits. In that light, the flatter distribution observed in this group (compared with the other four groups) for both the 'Impact of lockdown', and 'Attitudes towards multilingualism' variables is unsurprising. This group features no predominant profile in terms of attitudes towards the HL, and a large variety of experiences with respect to the effect of lockdown. Combined, these observations suggest a more fluid HL identity in this respondent profile: there is a greater variability in multilingual attitudes and practices among the 'Hard-to-reach' group, suggesting that additional variables (not captured in our analysis of the survey data nor by the data themselves) are at play.

The 'Hard-to-reach' and 'Unengaged' respondent profiles were mostly represented by the Bradford-residing respondents. In the remainder of the sample, the likelihood of participating in the survey seems to have been strongly determined by higher levels of education and higher levels of engagement with the HL. Bradford defies this trend: there, participation in the survey seems to have stemmed from *a priori* high level of engagement

with child-related research. While we acknowledge that the representativity of such respondent profiles outside of Bradford was not ideal, and it would have been preferable to gather responses from a more diverse sample across all regions, it is this engagement within Bradford that enabled a more diverse range of profiles, experiences, and opinions to be represented in this national survey. As such, we hope that the factors identified further above as likely reasons for the high level of engagement of 'hard-to-reach' participants in Bradford will allow future research in other regions to recruit participant samples that are more representative of population diversity.

## Conclusions

Five respondent profiles were identified in the survey via Latent Class Analysis and found to be predictive of participants' responses. Multilingual families with high levels of engagement with the Heritage Language report more positive attitudes towards multilingualism, which can be interpreted as a socio-psychological indicator of ethnic identity. These families also experienced greater changes in Heritage Language practices during Lockdown, resulting in the children experiencing more of the Heritage Language. Meanwhile, the language practices of multilingual families with higher English language engagement (in opposition to their Heritage Language) remained relatively unchanged during the Lockdown.

The large proportion of Bradford-residing respondents had a substantial impact on the representativity of the participant sample: it afforded a more balanced distribution of respondent profiles by contributing the majority of responses from the 'Hard-to-reach' and 'Unengaged' profiles. We argue this is due to the high levels of research engagement in Bradford communities, which has been cultivated and maintained as part of the Born in Bradford project.

## Notes

1. The project was led by the Centre for Literacy and Multilingualism at the University of Reading and Bilingualism Matters@Reading in collaboration with colleagues from CamBiling-Network at the University of Cambridge, UCL BiLingo, the University of Oxford, NALDIC, Mother Tongues Ireland, and We Live Languages.
2. We did not attempt to assess the representativity of the respondent sample against national benchmarks.
3. The Heritage Languages reported in the final respondent sample are: Afrikaans, Albanian, Arabic, Basque, Bengali, Bette, British Sign Language, Bulgarian, Cantonese, Catalan, Croatian, Czech, Dutch, Estonian, Farsi, Filipino, Finnish, Flemish, French, German, Greek, Gujarati, Hausa, Hebrew, Hindi, Hindko, Hungarian, Icelandic, Igbo, Irish Gaelic, Italian, Japanese, Kiswahili, Korean, Kurdish, Latvian, Lithuanian, Luxembourgish, Macedonian, Malayalam, Mandarin, Mandinka, Marathi, Norwegian, Pashto, Persian, Polish, Portuguese, Patwari, Punjabi, Russian, Serbo-Croat, Slovak, Slovene, Spanish, Swahili, Swedish, Tamil, Turkish, Twi, Urdu, Uyghur, Vietnamese, Welsh, Yoruba, Mirpuri, Romanian.
4. Note however that the fast-developing field of Family Language Planning is drawing attention to under-documented profiles of multilingual families (see Lanza, 2021). Ethnographic approaches seem to be leading this development, while psycholinguistic approaches tend to remain more 'conventional'.
5. For instance, in some cultures, it is expected that people will look after older generations in the home (Bristow, 2021).

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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