Socio-demographic and spatial disaggregation of E-commerce use in the grocery market in Great Britain

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Summary

We make use of a large consumer survey of grocery e-commerce shopping behaviours undertaken by a major market research company. This presents a novel opportunity to spatially analyse self-reported consumer behaviours. We find that e-commerce usage differs by both channel and consumer demographics, with the 25-34 and 35-44 age groups most regularly engaging with e-commerce services. Using the case study are of Yorkshire and the Humber, we find evidence of higher e-commerce usage in more rural areas with limited access to physical retail stores.

KEYWORDS: e-commerce; groceries, consumer preference, consumer behaviour, Yorkshire and the Humber

1. Introduction

Kantar World Panel (2018) report that grocery e-commerce sales account for 7.2% of all fast-moving consumer goods (FMCG) sales in the UK, with the sector forecast to grow from £11.4Bn in 2018 to £17.3Bn by 2023 (IGD, 2018). Market research highlights the UK as having a higher order frequency than any other country, with an estimated average of 15.4 online food transactions per household per year (Rigby, 2017).

The proliferation of new retail channels such as home delivery and click and collect facilities has resulted in a more complex set of omni-channel interactions between consumers and retailers with consumers making use of a full range of channels for their grocery shopping (Elms et. al, 2016).

These complex interactions between consumers and multiple retail channels pose new operational and strategic challenges for retailers. Verhoef et al. (2015) argue that giving consumers' freedom to use channels interchangeably makes it virtually impossible to control consumer purchase behaviour. Paramount for retailers in tackling this problem is an understanding of who their consumers are, which channel(s) they are likely to use and where they live.

Through analysis of a novel data set, this research seeks to answer the following questions:

1. To what extent do different sociodemographic groups engage with grocery e-commerce?
2. How does grocery e-commerce engagement among different sociodemographic groups differ by e-commerce channel?
3. To what extent is there a geography to e-commerce use? Is this geography mediated by the location of physical grocery infrastructure?

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2. Data and Methodology

The data used in this paper was provided by YouGov via the Consumer Data Research Centre (CDRC). The data is based on multiple surveys in 2015 and 2016 and relates to 19,033 respondents, a subset of YouGov's 1 million strong national panel. **Table 1** presents a selection of questions contained in the survey that we analyse in this work.

Table 1 E-commerce channel frequency questions and response options

Questions	Response options
How frequently do you order groceries online for home delivery?	Regularly
How frequently do you order groceries online for collection in-store?	Occasionally
How frequently do you order groceries online for collection at a collection point?	Rarely
	Never

Survey responses were pre-aggregated by geography and socio-demographic characteristics of respondents. The 19,033 respondents were separately grouped by gender, age band, social class and geography. **Table 2** shows the breakdown of respondents by gender and **Table 3** breaks down the respondents by age band. Both are given with reference to a national comparison based on the composition of population in Great Britain at the 2011 UK Censuses.

Table 2 Survey population by gender

Gender	Survey sample	National comparison
Male	47.43%	47.49%
Female	52.66%	52.61%

Table 3 Survey population by age band

Age band	Survey sample	National comparison
18-24	6.21%	11.94%
25-34	12.96%	16.93%
35-44	14.93%	17.71%
45-54	18.09%	17.75%
55+	47.82%	35.86%

Responses for the survey are pre-aggregated at the local authority district (LAD) level in Great Britain. The data contains responses that cover each of the LADs in Great Britain, the distribution of which is shown in **Figure 1.**

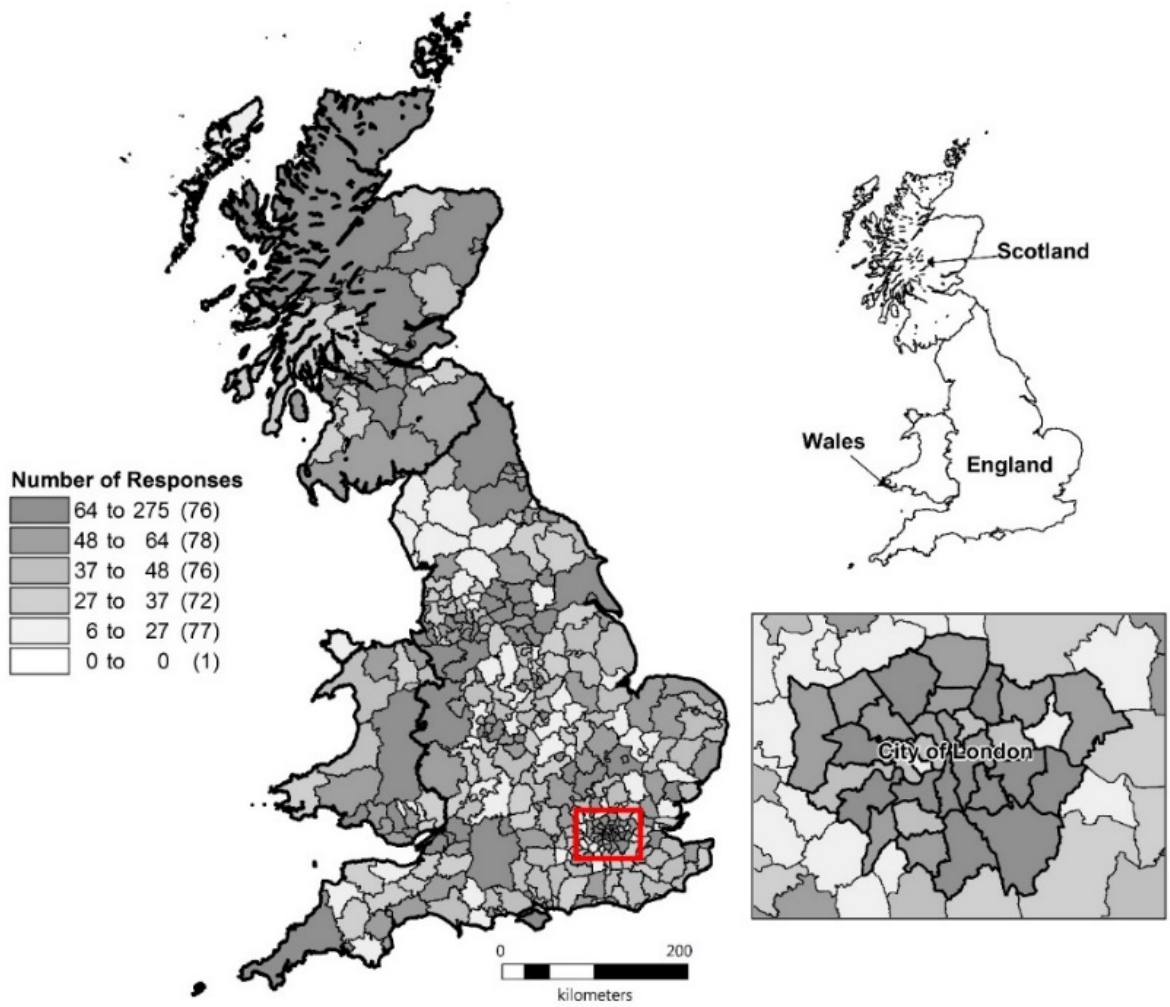


Figure 1 Survey responses at the LAD level

This paper uses the two largest grocery store categories (supermarkets and hypermarkets) from the Geolytix 'Retail Points' open dataset as the physical retail landscape. The data set captures grocery store locations in GB with larger stores likely to have the capacity to offer e-commerce services. Major grocers often using their store network to fulfil and distribute online orders as a cost effective alternative to distribution centres (Jeffers, 2016).

3. Results

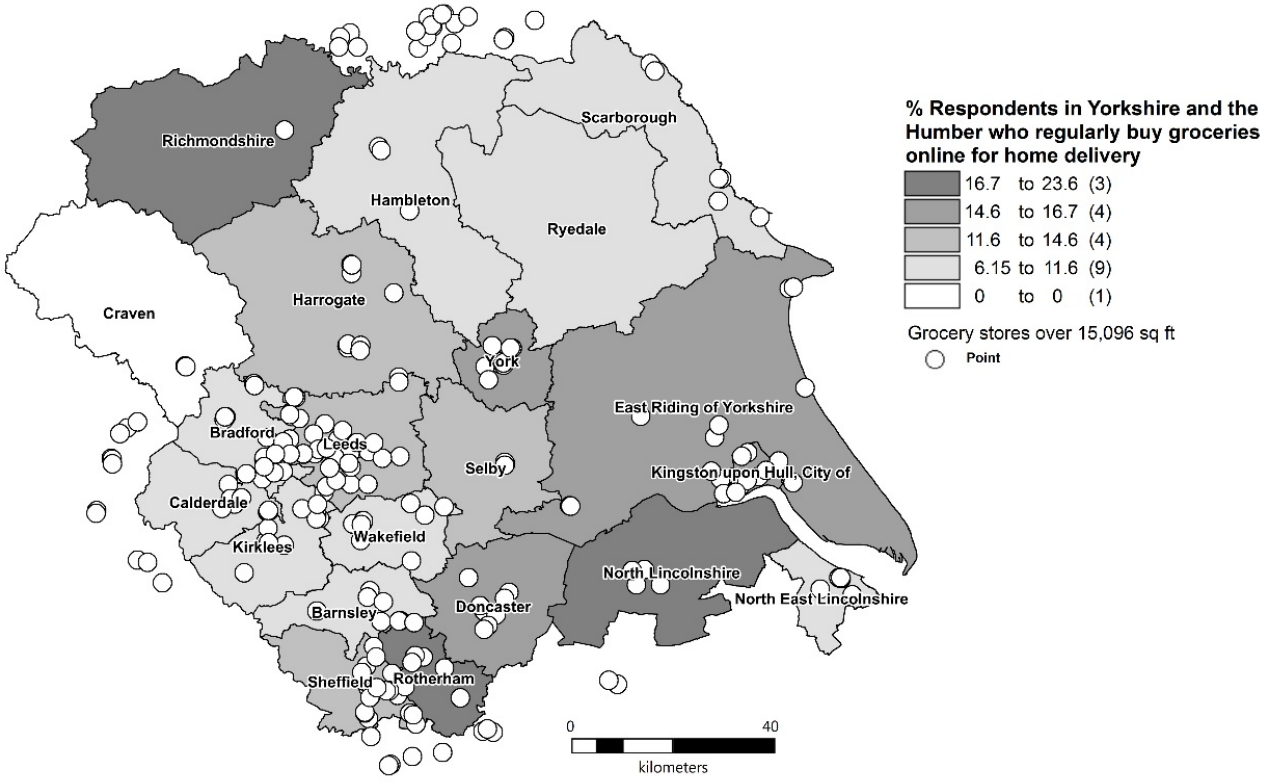
Responses were analysed at both the national level and within a smaller study area (Yorkshire and the Humber) to consider the extent to which different sociodemographic groups engage with grocery e-commerce and how these behaviours differ across different e-commerce channels.

At a national level, home delivery is by far the most popular E-commerce channel for consumers in GB with 13.04% of respondents regularly using the service. Uptake for E-commerce collection services are very low in comparison. Collection in-store services see 0.92% of respondents regularly using the services, with just 0.37 % of respondents regularly collecting groceries from a collection point. **Table 4** shows the breakdown for regular and occasional users in each E-commerce channel.

Table 4 E-commerce use by channel

Question	Regularly used (% of respondents)	Occasionally used (% of respondents)
How frequently do you order groceries online for home delivery?	13.04	11.18
How frequently do you order groceries online for collection in-store?	0.92	2.85
How frequently do you order groceries online for collection at a collection point?	0.37	0.98

Figure 2 shows both regular and occasional users of home delivery services in Yorkshire and the Humber with store data overlaid.



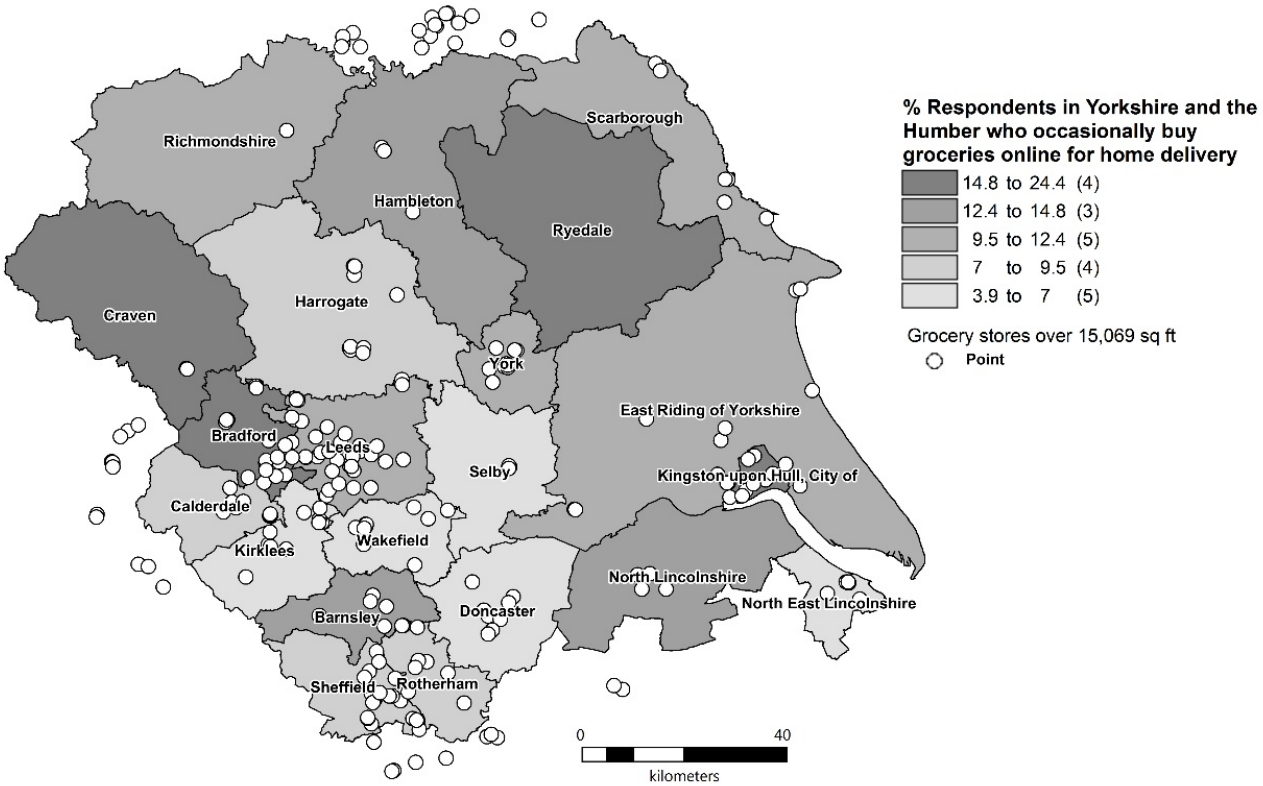


Figure 2 Home delivery regular users (top) and occasional users (bottom)

When assessing regular users, we generally see a higher percentage within the more rural areas with a lower number of physical stores. When this is expanded to occasional users this pattern is more pronounced. Rural areas such as Ryedale and Craven, which exhibit a low percentage of regular users, have amongst the highest percentage of occasional users. This suggests that whilst consumers may not use the service for all their grocery shopping, it may be used in complementary fashion with physical retail grocery shopping.

4. Conclusion

This work presents a novel opportunity to analyse comprehensive self-reported consumer behaviours in the UK grocery retail sector, with data relating to consumer behaviours across all major grocery retailers and linked to location of residence. Results highlight the complex relationship between supply and demand and the important roles geography and physical access play in e-commerce channel engagement. Further research in necessary to build a more comprehensive understanding of e-commerce demand and the relationship with supply within the grocery industry. This research should build upon results presented in this work by making use of smaller underlying geographies for analysis. This will allow for the building of a more comprehensive picture of E-commerce demand at the small area level and further investigation into the nuanced interactions between supply and demand. Individual level survey data can also be employed for analysis to further research the drivers behind consumer behaviour and channel choice at the individual level, the results of which could support future retail location modelling activities.

5. Acknowledgements

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Biographies

Ryan Urquhart is a first year PhD student within the School of Geography at the University of Leeds. His research is focussed on E-commerce in Grocery retailing and is funded as part of the Economic and Social Research Council data analytics and society centre for doctoral training.

Nick Hood is a Fellow in the School of Geography and the Consumer Data Research Centre at the University of Leeds. His core interests are in the fields of customer behaviour, retail location planning and electoral behaviour.

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Alison Heppenstall is an expert in AI and ML approaches. A particular focus of her work is the development of methodologies for solving complex spatial problems. Prof. Heppenstall currently holds an ESRC-Alan Turing Fellowship.