I read, therefore I buy? Analyzing the impact of flyer distribution and readership on purchase behaviour

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Abstract

Store flyers are one of the most important media used to feature retail and manufacturer promotions. Yet the body of research on their effectiveness on customer behaviour demonstrates significant gaps. We addressed this by conducting a field experiment with over 9,000 members of a retailer's loyalty programme to identify what drives customers to read flyers and understand how flyer distribution and readership impact upon customer purchase behaviour. The results show that flyer distribution and flyer readership do not seem to change purchase behaviour. However, they confirm that flyer proneness, loyalty to the retailer, subscription to its newsletter, and household size all positively contribute to the likelihood of flyer readership. Our findings thus provide a substantial advancement in the degree of ecological validity to flyer research and question the effect of flyer readership and distribution on purchase behaviour in the short term. Finally, results provide relevant managerial

implications as far as how retailers should revise their flyer distribution strategy to increase flyer readership and related effectiveness.

Keywords: store flyers; retail promotion; flyer readership; purchase behaviour; field experiment.

1. Introduction

Store flyers are weekly or monthly printed communications distributed both in and out of store and employed to communicate price cuts and brand image (Pieters et al., 2007; van Lin and Gijsbrechts, 2016). Flyers have a long history. Their name originates with the use in wartime of airborne leaflet propaganda whereby leaflets (flyers) were dropped and scattered over enemy cities by military aircraft (Ziliani and Ieva, 2015). Today they still represent one of the most widely used media by manufacturers and retailers to advertise price promotions (Gauri et al., 2017; Gázquez-Abad et al., 2014). Manufacturers use store flyers to reach consumers directly and obtain point-of-sale visibility (Mimouni-Chaabane et al., 2010). They are a key promotional tool for retailers because they influence shoppers both at home and in-store at various stages of their path to purchase (Guyt and Gijsbrechts, 2018). Flyers account for over half of the average retail marketing budget in Italy, France, and Spain (Gázquez-Abad and Martínez-López, 2016). In 2016, 110 billion flyers were distributed in 20 European countries, according to the European Letterbox Marketing Association.

It is not surprising, then, that there has been a significant stream of empirical research in marketing literature on the effects of store flyers. Some studies have found that store flyers lead to an increase in store traffic, sales, and profits (e.g., Bodapati and Srinivasan, 2006; Gauri et al., 2017; Gázquez-Abad and Martínez-López, 2016; Gijsbrechts et al., 2003; Guyt and Gijsbrechts, 2018; van Lin and Gijsbrecths, 2016). Most studies have focused on how the presence of an item in the flyer (positively) influences the store's outputs by employing scanner datasets and linking them to customer responses. However, it is possible that purchase decisions may be caused by unidentified, overarching variables that relate to such behaviour and not by flyer readership. We argue that the failure to measure flyer-receipt and flyer-readership behaviour may have confounded the actual influence of the weekly flyer on store sales. Most of what is known about flyer readership comes from industry studies carried out by marketing agencies (e.g., PRIMIR, ACNielsen, IRI Worldwide, Brandspark). For instance,

Google (2014) reported in 2014 that only 17% of customers of the Canadian sport retailer Sportchek read their biweekly flyers. According to Nielsen (2017), about one-quarter of North American consumers say they use flyers or direct mailings when making purchase decisions. The limited academic literature on flyer readership seems to support the above figures (e. g., Burton et al., 1999 and van Lin and Gijsbrechts, 2016). These findings challenge the assumption that, after receiving flyers, consumers are likely to read them and be influenced in their subsequent purchase behaviour. Indeed, both retailers and manufacturers have started to question the benefits of spending a substantial proportion of their advertising budget on store flyers (Jensen et al., 2014). Understanding whether (and how) customers receive, read, and react to flyers would be key for retailers to judge whether to keep printing flyers or to reduce, modify or even cease their distribution. In this respect, it is important to distinguish between flyer-receipt and flyer-readership behaviour. For instance, if consumers respond significantly to flyer distribution, it would support spending money on them. Yet even if the distribution of flyers does not elicit a significant consumer response, consumers may still react positively to reading them. In such a scenario, retailers would be better off focusing on increasing the likelihood of their flyers being read, rather than simply on distribution strategy. Thus, identifying what drives consumers to read flyers is key to helping retailers design them and target customers more effectively. Few studies have outlined the characteristics of the flyer reader (e.g. Burton et al., 1999; Schmidt and Bjerre, 2003; van Lin and Gijsbrechts, 2016; White et al., 1980). The results are mixed and the link between distribution and readership, and the related effects on purchase behaviour, have been mostly overlooked and deserve higher attention from academic research.

Our aim is to provide insights into the effects of flyer distribution and flyer readership on customer behaviour. Accordingly, we propose the following research questions:

RQ1. What is the effect on purchase behaviour of receiving a flyer versus not receiving one?

RQ2. What customer characteristics drive flyer readership?

RQ3. What is the effect of flyer readership on purchase behaviour?

To answer the research questions, we employed a field experiment to estimate the response of 9,902 retail customers to store flyers. The subjects were randomly assigned to two groups: 6,602 in the treatment group and 3,300 in the control group. A chain of 37 supermarkets which targets its customer base with a two-week print and online flyer provided the setting for the field experiment.

Our study contributes to the expansion of theoretical knowledge and practical implications for managers in two ways. We are the first to separate flyer receipt and flyer readership and analyse independently their effects on customer behaviour at the individual level. Most importantly, we create an experimental setting in cooperation with the retailer that allows for the assessment of actual behaviour and entails high degrees of ecological validity, in line with the call from Grewal et al. (2016). Previous research on flyers, although abundant, has lacked on the ecological validity side and derived managerial implications largely from inferring flyer readership in observational studies. By contrast, we manipulated real-life distribution of both physical and online flyers, we measured spontaneous flyer readership and we derived its impact on managerially relevant outcomes via the company loyalty database.

2. Literature review and conceptual development

Few studies in the vast literature on flyers have focused on receipt and readership. Table 1 provides an overview of these studies with reference to flyer-receipt and flyer-readership behaviour. Differences emerging in findings from previous studies might be due to different

methodologies, geographical contexts and time periods. Previous studies have employed a variety of methodologies, spanning from postal, telephonic or self-administered surveys (e.g. Schmidt and Bjerre, 2003; Jensen et al., 2014) to personal interviews (e.g. White et al., 1980) and household scanner data analysis (e.g. van Lin and Gijsbrechts, 2016). Several works have been conducted in the United States (White et al., 1980; Burton et al., 1999; Urbany et al., 2000) or in Denmark (Schmidt and Bjerre, 2003; Schmidt et al., 2012), but also in France (Simon, 2016) and in the Netherlands (van Lin and Gijsbrechts, 2016), across a period of more than forty years (since the paper by White et al., 1980). In the subsections below we discuss their findings as they relate to our study.

[Insert Table 1 about here]

2.1. Flyer-Receipt Behaviour

Studies on flyer-receipt behaviour have reported that consumers seem to display, at least to a certain extent, a negative attitude or preference towards receiving flyers. Schmidt and Bjerre (2003) found that 25% of consumers think they receive too many flyers. This figure has been recently confirmed by Simon (2016), who reported that 22% perceive store flyers as intrusive. Despite these figures, retailers continue to distribute their store flyers indiscriminately without knowing whether consumers are likely to respond (Miranda and Kónya, 2007). However, none of these studies explicitly analyse the effect of flyer distribution on the customer response. Only Luceri et al. (2020) have addressed flyer distribution by developing a decision support system to optimize printed flyer distribution decisions. Their study shows that, under certain circumstances, it is possible to reduce the number of distributed flyers without a loss of sales, thus attracting attention to the question whether flyer distribution is really driving a significant impact on purchase behaviour.

2.2. Flyer-Readership Drivers

Evidence on what customer characteristics drive flyer readership is sparse and conflicting. Only four studies have focused on understanding why customers choose to read store flyers by attempting to identify these customers' socio-demographic, attitudinal, and behavioural characteristics. At the socio-demographic level, Burton et al. (1999) and Schmidt and Bjerre (2003) reported age and education as significant drivers of flyer readership. Nevertheless, the conclusions of these two studies stand in total opposition to each other: Burton et al. (1999) found that older and less educated consumers are more likely to read flyers, whereas Schmidt and Bjerre (2003) found that younger and more educated consumers read flyers more frequently. White et al. (1980) and van Lin and Gijsbrechts (2016) found no substantial difference in terms of socio-demography between flyer readers and non-readers (only the latter paper found a significant difference in terms of household size). Looking at attitudinal characteristics, Burton et al. (1999) and van Lin and Gijsbrechts (2016) both found that readers of flyers report that they pay more attention to prices and price cuts in general. Both studies conclude that price sensitivity is the strongest driver of flyer readership, with sale and coupon proneness also related factors but value consciousness having little or no effect. In terms of purchase behaviour, van Lin and Gijsbrechts (2016) found that readers of flyers do significantly differ from non-readers in that the former tend to be more frequent shoppers with higher overall spending levels. Tan et al. (2021) have also found that consumers that are deal prone and price conscious are more likely to read store flyers, while variety seeking, financial constraints, age and gender did not play a role in driving flyer readership.

2.3. Flyer-Readership Behaviour

Even if we don't know with certainty what drives customers to read flyers, we might enquire into the behaviour of those that do. While some studies (Miranda and Kónya, 2007; Schmidt et al., 2012; Urbany et al., 1996; Urbany et al., 2000) found that a significant

percentage (greater than 50%) of shoppers read flyers frequently, others (Burton et al., 1999; Jensen et al., 2014; Schmidt and Bjerre, 2003; van Lin and Gijsbrechts, 2016) found that a majority of shoppers do not read store flyers. Only Burton et al. (1999) and van Lin and Gijsbrechts (2016) considered individual consumer responses to reading flyers, and both studies found that flyer readership had a positive effect on shoppers' response. Specifically, Burton et al. (1999) found that reading flyers is significantly related to the number of advertised products purchased and the amount spent on these products. However, they did not check nor control for the selection bias that may have potentially affected their results: namely, that flyer readers may exhibit different characteristics from non-readers that explain differences in subsequent purchase behaviour. Van Lin and Gijsbrechts (2016) also found that flyer readers purchase more on promotion and pay more attention to prices. However, they did not estimate the effects of flyer distribution as distinct from flyer readership.

2.4. Research Framework

Drawing on the literature, we develop some theoretical expectations about the consequences of flyer distribution and flyer readership on purchase behaviour. Moreover, we aim to provide a comprehensive understanding of the key drivers of flyer readership. Figure 1 summarizes the conceptual framework of our research, which we discuss below.

[Insert Figure 1 about here]

2.4.1. Effects of Flyer Distribution

During the pre-purchase stage, consumers often search for information by means of conventional media, for example direct mail advertising flyers (Grewal et al., 2013). Store flyers are easy to use and save shoppers time and money. However, consumers have different reactions when receiving, processing, and memorizing information to make a purchase decision. According to Todd (2001), consumers have developed a fast and frugal heuristic

approach for decision making based on simple information. Flyers are normally distributed to household mailboxes (or e-mail addresses) as unsolicited printed (or online) material, normally every two weeks, to attract customers to stores (Ziliani and Ieva, 2015). Receiving these unsolicited flyers does not imply any 'active' effort on the part of the consumer - which perfectly fits with the above-mentioned heuristic decision-making process. On the one hand, it could be argued that distributing flyers among shoppers might work as a 'signal' and garner a (positive) response in terms of consumers' decisions (stronger, at least, than the response of those who do not receive flyers). On the other hand, it can be anticipated that a proportion of consumers might negatively perceive unsolicited flyers and thus refuse to read them. This may strongly mitigate the effect of flyer distribution, or worse, lead to it backfiring as consumers may actively avoid companies responsible for this perceived nuisance.

2.4.2. Drivers of Flyer Readership

We rely on a cost and benefit approach (e.g., Ailawadi et al., 2001) to identify and integrate consumer socio-demographic attributes, attitudes, and behaviours as drivers of flyer readership.

Table 2 summarizes the identified drivers of flyer readership following our expectations, based on a review of the studies displayed in Table 1. More details on the theoretical arguments supporting our expectations are available in Appendix A.

[Insert Table 2 about here]

2.4.3. Effects of Flyer Readership

By relying on the literature on the consequences of general feature advertising (e.g., Gedenk and Neslin, 1999; Haans and Gijsbrechts, 2011), we might expect that reading the flyer should have a positive effect on the shopper's decisions, even when controlling for selection bias. Therefore, flyer readers may be aware of supermarket offers, compared to non-

readers, before they visit the store (van Lin and Gijsbrechts, 2016). The offers might then guide those consumers to visit the promoting supermarket and to buy more flyer-promoted and in-store-promoted products than non-readers once in the store.

3. Methodology

3.1. Field Experiment

In order to answer the research questions mentioned above, we employed a between-subject experimental design with randomized encouragement and partial treatment implementation, comparing one treatment group with a control group (e.g. Shadish et al., 2002).

The experiment was executed with the cooperation of a grocery retail chain active in Italy, which will remain undisclosed for confidentiality reasons. With 30% of the regional market share and 37 supermarkets, the retailer is a market follower. Every two weeks, it sends a promotional flyer to the customer base in both online and print format. A random sample of 9,902 subjects was obtained from the company loyalty programme database; this sample was drawn from a population of customers who had shopped at least once over the previous six months and had a valid e-mail address, postal address, and telephone number. The subjects were randomly assigned to two conditions: 6,602 customers in a treatment (flyer) group and 3,300 in a control (no flyer) group. In the flyer group, 3,301 were randomly assigned to a print flyer and 3,301 to an online flyer. Randomization was performed on SAS 9.4 by using the procedure that is endorsed by Shadish et al. (2002). It was further tested by analysis of variance (ANOVA) on the demographic and behavioural variables available in the customer database after randomization was performed, and no significant differences were detected across the two groups.

The offers that were included in the flyer had a validity of two weeks. At the end of this period, a computer-assisted telephone interviewing (CATI) survey was carried out with all the

customers assigned to the flyer and control groups in order to identify customers who had actually read the flyer and those who had not. The survey was conducted at the end of the period of validity of the flyer in question to avoid the 'mere measurement effect' of survey questions potentially changing subsequent purchase behaviour (Morwitz and Fitzsimons, 2004). In agreement with the retailer, the delivery of the following flyer was postponed by three days to avoid respondents' encounter with the new flyer. A market research agency was instructed to contact all the subjects involved in the experiment (9,902) within three days. No monetary compensation or any other type of incentive was offered to participants. Out of the 9,902 subjects contacted, 1,222 subjects were available and agreed to respond, resulting in a 12.3% response rate. Among the 1,222 surveyed customers, 749 respondents were able to recall whether they had read the store flyer or not. The 1,222 respondents were then weighted against the entire 9,902 customer group in order to control for non-response bias. The survey also allowed us to measure attitudinal consumer characteristics such as pre-purchase planning, price consciousness, shopping enjoyment, flyer proneness, value consciousness, power usage of technology, loyalty to the retailer, education, and household size. Information on the measured constructs is available in Appendix B. Common method bias (CMB) is a problem that potentially occurs in survey research when all variables are collected using the same method (Podsakoff and Organ, 1986), thereby potentially inflating the relationships among variables (Jordan and Troth, 2020). As reported in Jordan and Troth (2020), the main cause of CMB is the response tendency that respondents can apply uniformly across answers. Another cause is represented by the similarities in the structure or wording of survey items that generate similar answers by respondents as acknowledged in Edwards (2008). The present study relies both on self-reported data collected via a survey and on purchase behaviour data collected in the loyalty program database of the retailer. We checked the potential presence of CMB on the variables collected by survey and employed in our analysis. To this aim we used the most common statistical approach known as Harman's one factor test (Harman, 1976).

This test indicates problematic CMB if an exploratory factor analysis loads all items from each of the constructs onto a single factor, suggesting the factor accounts for a large amount of shared variance among the variables due to the common method. If that is not the case, it can be concluded that CMB is not an issue. In our analysis we follow the recommendation of Podsakoff et al. (2003) who define the threshold of 50% of variance above which one can claim that data are free from CMB.

With the use of SAS 9.4 exploratory principal component analysis was performed by considering all the constructs displayed in Appendix B. Results show that the first principal component explained around 26% of the variance, which is substantially lower than the 50% threshold, thus confirming the absence of CMB.

The experimental conditions are summarized in Figure 2 and the design of the experiment is available in Figure 3. Out of the 1222 customers, 749 customers were able to recall whether they read or not flyer: 203 customers read the flyer and were part of the treatment group, 24 customers read the flyer and were part of the control group; 78 customers did not read the flyer and were part of the control group and 444 did not read the flyer and were part of the treatment group.

[Insert Figure 2 about here]

[Insert Figure 3 about here]

3.2. Treatment

On an annual basis, the average flyer distributed by the retailer includes 248 products offered across 31 pages with a promotional validity of two weeks. Out of the 248 products included in the flyer, 29.4% are offered with a minimum discount of 30%. In the market of reference, the average supermarket retailer offers 205 products across 19 pages with a promotional validity of 13 days; 15.1% of these products are featured with a minimum

discount of 30%. Thus, the retailer involved in the experiment offers a flyer that includes higher price cuts and features more products and more pages than the average supermarket flyer in the same market.

The flyer employed for this experiment was 32 pages in length. It featured 268 products: 84.7% were national brands (13.1% belonged to market leader brands, 14.1% to follower brands, and the remaining 57.5% to other brands), and 15.3% were private label. Seventy-two percent of the featured products were promoted with a clear price cut and 32% of the promoted price cuts offered a minimum discount of 30%. The flyer was in line with the average annual flyer distributed by the retailer. The time period chosen was a standard promotional period that was not directly before, during, or after holiday seasons. Flyers distributed by competitors during the experimental period were also checked. Out of 268 products, only 45 were featured by competitors too. For 16 out of these 45 products, the retailer in our study was offering better prices. No coupons were included in the store flyer, nor in competitors' flyers. We performed a pilot study to address the typical feasibility issues of field experiments that relate to the treatment manipulation. The pilot study involved 882 customers and allowed the pre-testing of our construct measures that were included in the questionnaire.

The flyer was delivered door to door to the subjects or sent via an e-mail message that included a link to the online flyer. The print and online versions were identical in terms of layout and content. The authors specifically instructed the delivery agency to distribute the flyer to the specified addresses only. Therefore, the subjects in the control group did not receive any flyer from the retailer at their homes. However, these customers could have browsed the flyer online or had access to it in the store or through friends.

3.3. Dependent Variables

The employed dependent variables were measured at the individual level on the 9,902 customers who were involved in the experiment by means of information retrieved from the loyalty card database. We considered the following three outcomes in the main analysis:

- the number of store visits ($Y_{Nvisits}$): measured as the number of times a customer visited the store and made a purchase during the validity period of the flyer
- the amount spent on flyer-promoted products ($Y_{FlyerVal}$): measured as the amount spent on products that were featured in the flyer and were also highlighted in-store by means of reminders – a common practice across supermarket retailers
- the amount spent on in-store-promoted products ($Y_{InStoreVal}$): measured as the amount of money that was spent on in-store-promoted products at the individual customer level.

In our follow-up analysis relating to flyer readership, we also considered the following outcome variables:

- The number of flyer-promoted products bought ($Y_{FlyerNum}$): measured as the number of products bought that were featured in the flyer and were also highlighted in-store by means of reminders
- The number of in-store-promoted products bought ($Y_{InStoreNum}$): measured as the number of products bought that were promoted in the store but not on the flyer.

3.4. Analytic Strategy

The focus of this work is to shed light on flyer readership and its impact on purchase behaviour. Figure 4 shows all the analyses implemented with reference to the three research questions and the related robustness checks.

[Insert Figure 4 here]

3.4.1. Effect of Flyer Distribution: An ITT Analysis to Estimate the Effect of Sending Flyers

Before estimating the effect of flyer readership, it is useful to estimate the effect of sending flyers (the random assignment to store flyers) since this provides insights on the role of flyer distribution[1]. This effect is estimated using an intention-to-treat (ITT) analysis (Lachin, 2000; Lee et al., 1991). We ran an ITT analysis in order to estimate the effect of sending store flyers to customers. This type of analysis is employed by assuming the participants received the treatment to which they were assigned. It preserves randomization and provides an unbiased estimation of the effect of being assigned to a certain treatment, not of taking the treatment. In our study, ITT analysis is managerially relevant because it mirrors real-life retailing scenarios by allowing non-compliance and protocol deviations (Gupta, 2011). Our analysis involved the straightforward comparison of the 6,602 customers assigned to the flyer group with the 3,300 customers assigned to the control group. Three regression models were conducted employing flyer assignment as a unique independent variable: (1) a negative binomial regression model with the number of store visits as the outcome variable ($Y_{Nvisits}$); (2) an ordinary least squares (OLS) regression model with the log-transformed continuous outcome of amount spent on flyer-promoted products – Log($Y_{FlyerVal}$); (3) an OLS regression model with the log-transformed outcome of amount spent on in-store-promoted products – $Log(Y_{InStoreVal})$.

3.4.2. Drivers and Effects of Flyer Readership

To answer RQ2 and RQ3, two potential sources of bias must be dealt with: (1) potential bias due to survey non-response, (2) endogeneity bias. In the estimation of the flyer readership effect, it is likely that flyer readership might be endogenous due to a possible reverse causality phenomenon. For instance, some might argue that a customer might buy more flyer-promoted

products not because he or she has read the flyer but because of his or her positive attitudes towards promotional offers and past purchase behaviour.

Potential bias caused by survey non-response may have affected our results in view of the fact that only 1,222 of the 9,902 customers actually answered the survey. The presence of non-response bias was evaluated by means of multiple tests on the following variables available in the customer database: (1) amount spent (total and on promotion only) and number of store visits in the last six months, (2) subscription to the retailer newsletter, (3) registration with the retailer website, (4) age, (5) gender. Non-response bias was identified given that respondents were found to differ from non-respondents as far as some of the above-mentioned variables are concerned. Hence, we opted to use the reweighting method (Gelman and Carlin, 2001). Following Kizilcec (2014), we first estimated the likelihood of responding to the survey (π_i) by using a response propensity model and then used the estimated response propensities to determine the inverse probability weights[2] $w_{i,S} = \frac{1}{\pi_i}$ (e.g. Horvitz and Thompson, 1952).

After correcting for the non-response bias, first we estimated a logistic regression employed to identify the drivers of flyer readership, which was employed as the outcome. Consumer socio-demographic, attitudinal, and behavioural variables, displayed in Table 2, were employed as predictors. Subsequently, we estimated the effect of flyer readership using the inverse probability treatment weighting (IPTW) method (Austin and Stuart, 2015; Horvitz and Thompson, 1952). To estimate the inverse probability of treatment weights and to combine them with survey weights, we employed Stata and followed the procedures and user-written commands[3] endorsed by Garrido et al. (2014). More details on the employed methodology are available in Appendix C.

The IPTW was employed on data gathered from the customer database merged with information collected by the customer survey. Flyer readership was assessed by asking

customers if they had read the flyer of the supermarket in the considered promotional period. Out of the 1,222 customers that responded to the survey, 749 were able to recall whether they had read or not the flyer. Out of them, only 227 customers declared that they had read the flyer, with a corresponding 30% flyer readership rate. This figure appears to be in line with open rate figures from previous studies, reporting flyer readership figures ranging from 27.8% to 49.2% (Burton et al., 1999; van Lin and Gijsbrechts, 2016).

4. Results

4.1. Role of Flyer Distribution: Results of The ITT Analysis

Table 3 reports results from the ITT analysis, which estimates the effect of sending flyers on purchase behaviour. The negative binomial regression model shows that flyer assignment did not have a significant effect on the number of store visits, χ^2 (df = 1) = 0.08, p = 0.77.

Additionally, the two OLS regression models show that flyer assignment did not have any significant effect on the amount spent on flyer-promoted products, t (df = 1) = 0.68, p = 0.50, nor on the amount spent on in-store-promoted products, t (df = 1) = 0.42, p = 0.68.

[Insert Table 3 about here]

4.2. Drivers of Flyer Readership

The logistic regression model was run to identify consumer characteristics that predict flyer readership. We have also included in the model a dummy variable, namely flyer distribution, indicating whether the customer was assigned or not to receive the flyer. The results are presented in Table 4. The following variables were found to positively predict flyer readership: subscription to the newsletter, z (df = 1) = 3.43, p <0.01, flyer proneness, z (df = 1) = 3.94, p < 0.001, and loyalty to the retailer, z (df = 1) = 1.91, p = 0.06. On the other hand, the following variables were found to be negatively related to flyer readership: amount spent on products not on promotion, z (df = 1) = -2.22, p <0.05, power usage of technology, z (df =

1) = -1.99, p <0.05, and households with four components compared to households with five or more components, z (df = 1) = -2.50, p <0.05. Finally, flyer distribution seems to be significantly related to flyer readership, z (df = 1) = 1.76, p =0.08.

These results seem also to confirm the reliability of the recall measure employed to track flyer readership: flyer proneness and subscription to newsletter were positively related to flyer readership, while the amount spent on products not on promotion was negatively related to flyer readership.

[Insert Table 4 about here]

4.3. Effect of Flyer Readership: Results of the IPTW Analysis

In the estimation of the propensity score, the inclusion of as many variables as possible is the preferred approach (Wang et al., 2015), considering that the exclusion of a potentially important confounder might have a relevant impact in terms of bias inflation (Stuart, 2010).

Using the estimated propensity scores, propensity score weights were computed according to formulas (1) and (2) in Appendix C. In order to adjust for potential bias due to extreme weights, following Lanehart et al. (2012), normalized weights were computed. Afterwards, standardized differences in the weighted sample were calculated per each covariate. A standardized difference that is less than 0.10 indicates a negligible difference in the mean or prevalence of a covariate between treatment and control groups (Austin, 2011; Normand et al., 2001): all the employed covariates displayed a standardized difference below this cut-off value. Table 5 presents all the variables included in the logistic regression used to estimate the propensity score before and after the IPTW with standardized differences.

[Insert Table 5 about here]

A weighted negative binomial regression was run for number of store visits, while a weighted least squares regression was run on the amount spent on flyer-promoted products

and on in-store-promoted products. Across these three regressions, the covariates employed in the propensity score estimation were also included as control variables.

The weighted negative binomial regression model shows that flyer readership did not have a significant effect on the number of store visits, t (df = 1) = 1.44, p = 0.15 (Table 6).

[Insert Table 6 about here]

In our next analysis we considered only those customers who had actually visited the store (n = 467) and ran the IPTW procedure for this subset of subjects to ensure that balance was achieved for this subset as well.

[Insert Table 7 about here]

The two weighted OLS regression models show that flyer readership did not have any effect on the amount spent on flyer-promoted products, t (df = 1) = .16, p = .87, nor on the amount spent on in-store-promoted products, t (df = 1) = 1.15, p = .25 (Table 8).

[Insert Table 8 about here]

Flyer readership did not have any significant effect on purchase behaviour. After balancing the two groups by means of control variables, customers who read the flyer did not display a higher number of store visits, nor did they spend more on flyer-promoted or in-store-promoted products, than customers that did not read the flyer. A follow-up analysis was performed by employing the same above-mentioned analytic approach to test the effect of flyer readership on two additional outcomes: the number of flyer-promoted products ($Y_{FlyerNum}$) and the number of in-store-promoted products ($Y_{InStoreNum}$). Results were in line with what has been found as far as amount spent on flyer-promoted products and amount spent on in-store-promoted products are concerned.

5. Discussion

5.1. Key findings

This study estimates separately the effect of flyer distribution and flyer readership on purchase behaviour at the customer level.

Findings indicate that customers do not significantly change their purchasing behaviour either because of receiving a store flyer or because of reading it. Receiving a flyer had no effect on the outcomes we tested. This could be because customers did not even notice the arrival of the flyer or because they simply decided not to read it. Either scenario could be explained by the high number of flyers that shoppers receive both from their retailer of choice and from a variety of competitors. In our study only 30% of customers actually read the flyer, a result that is in line with previous work (e.g., Miranda and Kónya, 2007; van Lin and Gijsbrechts, 2016) and which suggests that the majority of consumers do not read flyers. Our findings also point to certain consumer characteristics that are related to flyer readership. Specifically, flyer proneness, loyalty to the retailer, subscription to the retailer's newsletter, and household size (to a certain extent) all positively contribute to the probability that a customer will read a flyer. On the other hand, the amount spent on non-promoted products and the increasing consumer confidence with technology decreases the probability of flyer reading. An interesting finding of our study is that price consciousness does not emerge as a significant driver of flyer readership. A likely explanation for this finding is that – additionally to information related to deal offers – retailers are increasingly using flyers with the main goal of providing information about their portfolios and stores. Our findings substantiate that price cuts are no longer the reason to read flyers. This conclusion is supported also by the fact that value consciousness was not a significant driver of flyer readership.

By accounting for selection bias, our study showed, surprisingly, that customers who read the flyer did not visit the store more frequently nor spend more money on flyer-promoted or

in-store-promoted products than those who did not read it. It might be argued that reading the flyer made no impact on existing customers since visiting the store would be part of their shopping routine anyway. With reference to spending on promoted products, our findings accord with those of Neslin (2002), who contended that displays are more conducive to consumer stockpiling because more shoppers notice such displays than read flyers.

5.2. Theoretical implications

The present study, by employing a field experiment, provides a substantial advancement in the degree of ecological and external validity to flyer research and questions the role of store flyers as marketing stimuli to drive short-term sales. Moreover, the present work offers an actionable approach for retailers to assess flyer effectiveness. Results show that if self-selection bias into reading the flyer is taken into account, flyer distribution and readership do not impact purchase behaviour. Results point to the need to revise the role of the store flyer as a salient stimulus capable of developing mental availability for the promoted brands (Romaniuk and Sharp, 2016) that leads to an associated behavioural response. By disentangling the role of flyer distribution from readership, we show that flyers do not influence consumer behaviour. Moreover, our study points to the importance of developing field experiments in real-life scenarios in addition to observational or lab studies.

5.3. Managerial Implications

The findings from our field experiment provide valuable and actionable insights for retailers to enhance flyer distribution and readership.

First, we empirically show that distributing store flyers among loyal customers does not generate any significant short-term response in terms of store traffic and sales. Acknowledging the inability of flyers to generate any response on the loyal customers' side should point managers to significantly revise their flyer distribution strategy, for instance by shifting attention to prospects. Distributing flyers to prospects chimes with the findings of

several studies (e.g., Yoon and Tran, 2011) that suggest that non-loyal customers could be more responsive to promotions than loyal ones. An analysis of a retailer's loyalty database would reveal the density of loyal customers per geographical area, down to single streets and addresses, and hence return 'targetable' zones. Moreover, as far as flyer distribution, retailers should evaluate different forms of distributing flyers that could be less costly and more effective. Retailers could improve their online advertising strategies as far as store flyers to revise the flyer online distribution strategy. For instance, retailers could run display or search online advertising strategies towards existing customers by driving them to landing pages where they can browse flyers. Re-balancing their communication budget in favour of the online might lend a greater opportunity for personalizing the content displayed.

Loyalty to the retailer appears as a positive driver of flyer readership: this finding points retailers to continue communicating with their loyal customers. In this respect, retailers could use online flyers as they have been found by previous literature (Ieva et al., 2018) to yield the same results in terms of memory and purchase behaviour than print ones, but cost less to produce and distribute. As increasing flyer readership has emerged as a focal point for retailers, we suggest that there are at least two avenues at their disposal: expanding the number of occasions and places where the flyer can be found (e.g. trolleys, store entrance, online aggregator), and working on the appeal of the flyer content (e.g. adding recipes, horoscope). For instance, employing staff at the store entrance to distribute store flyers could increase flyer readership and the contextual relevance of the flyer. Even though our results do not support the capacity of flyers to impact customer behaviour in the short-term, retailers should frame the decision regarding the amount of investment in this form of communication considering competitors' and suppliers' reactions and potential long-term flyer effects. For instance, stopping flyer distribution might increase the visibility and the readership of competitors' flyers and could reduce promotional fees that manufacturers correspond to the retailer.

Finally, our study provides a replicable way for retailers to introduce a measurement routine to provide an answer for their urging questions on flyer effectiveness.

5.4. Limitations and Future Research Directions

This work, despite its contributions, has several limitations. First, we provide an estimation of only the short-term effect of store flyers. Second, our study involved existing customers enrolled in a loyalty programme. This choice was unavoidable, since we aimed to measure the behavioural response to flyers at the individual level. Given that 82% of the total sales of the retailer involved in the experiment is accounted for by loyalty program members - in line with findings for supermarket retailing (Nielsen, 2016) - we believe in the relevance of our findings. That said, it would be useful to analyse the flyer-readership behaviour of customers who are not members of the retailer's loyalty programme in order to extend the external validity of these results.

Third, given that our experiment required the cooperation of both a retailer and a flyer distribution agency—thus involving several feasibility issues—it was not possible to deploy multiple field experiments testing the effects of several types of store flyer (e.g., with varying number of pages or products) across different periods. The effect estimated in our study is influenced by the previous cumulative customer exposure to store flyers that may have caused sales inertia. Finally, it would be very interesting to understand how retailers could leverage new flyer distribution strategies, in the stores or on flyer aggregators, to increase flyer relevance and consumer attention towards store flyers. We identify the following questions for future research:

- Are store flyers more effective in supporting brand awareness of featured products (a potential benefit for the manufacturer) or in promoting the retailer's store image?

- What is the comparative effectiveness of reading the flyer in store versus out of store for the print and online formats?

- *What are the long-term effects of promotional flyers on memory, attitudes and purchase behaviour?*

5.5. Conclusions

To summarize, our study has focused on the impact of flyer distribution and readership on purchase behaviour in grocery retailing. A field experiment involving more than nine thousands customers and a survey on more than seven hundred customers have allowed us to collect information at the individual customer level. The ITT analysis, a logistic regression and an IPTW Analysis employed on the collected data led us to estimate flyer distribution and readership effectiveness and to identify main drivers of flyer readership. Results show that flyer distribution and readership have no significant impact in the short-term on purchase behaviour - in terms of store visits, amount spent and amount spent on flyer-promoted products - at the individual customer level. In sum, empirical evidence calls for a revision of the flyer role to increase its salience and impact as a marketing stimulus.

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Footnotes

[1]It could be wondered whether the online or print medium played a role in the effect of flyers on purchase behaviour. To address this question, it was tested if there was any difference in the effect of online versus print distribution of flyers on purchase behaviour: no significant difference was found. As far as flyer readership, it was not possible to test the difference in the effect of online versus print on purchase behaviour due to the low number of readers in each condition.

[2]The use of the inverse probability weights implies that those units with a low response propensity receive higher weights and vice versa.

[3]Specifically, the following Stata routines were employed: st0026, st0149, pbalchk (e.g. Becker and Ichino, 2002; Leuven and Sianesi, 2003; Lunt, 2013)

Tables

Table 1 Studies on flyer receipt-and-readership behaviour (chronological order)

Studies	Receipt behaviour	Readership behaviour	Profile flyers readers	Variables considered to profile flyers readers	Study area	Method	Main conclusions
White et al. (1980)	×	×	×	*Socio-demographic aspects* (income, race, gender, age, length of residency)	U.S.	Personal interviews	• The distribution process of store flyers is concentrated in high population density areas; rural consumers have learned to look for flyers at retail outlets • 6% of individuals pay no attention whatsoever to the store flyer they receive • There are no differences between the demographic profile for flyer readers and nonreaders
Urbany et al. (1991)		×			U.S.	Phone survey	On average, consumers: • examine 1.81 flyer ads *per* week • spent 10.55 minutes reading flyer ads *per* week
Urbany et al. (1996)		×			U.S.	Phone and postal survey	• 52% of respondents report regularly reading the flyers of two or more stores to compare prices and/or check for price specials
Burton et al. (1999)		×	×	*Attitudinal predictors* (price sensitivity, value consciousness, sale and coupon proneness) and *demographic aspects* (age, income, education, gender)	U.S.	Self-administered survey and scanner-base information	• 34.5% of shoppers examine flyers before shopping • Price conscious shoppers seem to be more interested in flyers. Indeed, price sensitivity appears to be the strongest predictor of flyer readership • Exposure to the weekly flyer for supermarkets is significantly related to the number of advertised products purchased and the amount spent on these products • Older consumers are more likely to read the store flyer. Education level is negatively related to flyer readership
Urbany et al. (2000)		×			U.S.	Phone and postal survey	• Shoppers report a substantial degree (80%) of vigilance in reading ads and flyers • 23% of single-store shoppers do not read flyers
Schmidt and Bjerre (2003)	×	×	×	*Socio-demographic aspects* (education, employment, household size, age)	Denmark	Postal survey	• 25% of consumers think they receive too many flyers • 51% of individuals read flyers rarely or never • Younger and more educated consumers read flyers more frequently

Miranda and Kónya (2007)	×	×			Australia	Personal interviews	• 31.5% of respondents admit theydo not read flyers and trash them on receipt • Of remaining shoppers, around 53% respond that they do not look forward to receiving store flyers in their mail • Almost 70% do not take flyers with them for reference when they go shopping
Schmidt et al. (2012)		×			Denmark	Fingerprint analysis	• Flyers having 50+ pages are read by 76% of adults • Flyers having less than 24 pages show much lower figures (ranging from 31% to 11%)
Jensen et al. (2014[a])	×	×			Denmark	Self-reported data	• 80.4% of respondents receive flyers weekly • 58.3% of these receivers read flyers at least once a week
Simon (2016)	×				France	Personal interviews	• 22% of respondents perceive store flyers as intrusive
van Lin and Gijsbrechts (2016)		×	×	*Purchase indicators* (avg. spending, % bought on promotion, avg. number of trips per week, entropy in chains visited, % of shopping trips during weekends and in the evening), *socio-demographic* aspects (age, household size and income), and *attention paid to prices and price cuts*	The Netherlands	Household scanner panel data	• 49.2% of households read supermarket flyers, 27.8% of households read drugstore flyers • Readers of flyers purchase more on promotion and pay more attention to prices. They can hardly be profiled by their socio-demographics, and they do significantly differ (from non-readers) on shopping-related variables
This paper	×	×	×	*Past online-browsing behaviour* (registration to the retailer website, subscription to the newsletter), *past purchase behaviour* (amount spent (not) on promotion in the past 6 months, # of store visits in the past 6 months), *psychographics* (flyer-proneness, pre-purchase planning, price consciousness, shopping enjoyment, power usage of technology, value consciousness and loyalty to the retailer) and *demographics* (age, gender, education, household size)	Italy	Field experiment and CATI survey	• Flyer distribution has no effect on customer purchase behaviour • Flyer readership is driven by psychographic and behavioral variables: subscription to the retailer newsletter, flyer proneness and household size are positive predictors of flyer readership, whereas amount spent on not promoted products and power usage of technology are negative predictors of flyer readership • Flyer readership has no effect on customer purchase behaviour

[a]Instead of profiling flyer readers, these authors analyze the profile of passive receivers of sales flyers *vs*. active decliners of sales flyers (they use the following variables: price consciousness, environmental concerns, dispersion of store patronage, deal information processing, deal-related behaviour, shopping behaviour, consumer attitudes towards flyers and demographics – gender, household size and income)

Table 2 Summary of drivers of flyer-readership

Driver	**Expected effect**
Psychographics	
Price consciousness	+
Value consciousness	+
Shopping enjoyment	+
Pre-purchase planning	+
Flyer proneness	+
Loyalty to the retailer	−
Power usage of technology	−
Past online browsing behaviour	
Registration to the retailer website	+
Subscription to the retailer newsletter	+
Past purchase behaviour	
Amount spent (€) on promotion in the past 6 months	+
Amount spent (€) not on promotion in the past 6 months	−
Number of store visits in the past 6 months	+
Socio-demographics	
Age	n.e.
Gender	n.s.
Household size	+
Education	n.e.

n.e. = no expectations; n.s.=not significant

Table 3 Results (mean) of the ITT analysis on purchase behaviour

Variable	**Flyer group**	**No-flyer group**
Number of store visits [ns]	1.6	1.5
Amount spent (€) on flyer-promoted products [ns]	19.5	18.7
Amount spent (€) on in-store promoted products [ns]	6.7	6.4
N	6,602	3,300

ns = not significant

Table 4 Results on the drivers of flyer readership

Independent variables	**Estimate**	**Std. Error**
(Intercept)	-0.7482764	1.755569
Price consciousness	-0.1027793	0.063637
Value consciousness	-0.0780448	0.1138718
Shopping enjoyment	-0.0030724	0.1076515
Pre-purchase planning	0.0790823	0.0824778
Flyer proneness	0.2354809***	0.059833
Loyalty to the retailer	0.1610255+	0.0844779
Power usage of technology	-0.0968575	0.0485766
Registration to the retailer website	0.1755186	0.2581465
Subscription to the retailer newsletter	0.7516991**	0.2194676
Amount spent (€) on promotion in the past 6 months	0.000796	0.0005366
Amount spent (€) not on promotion in the past 6 months	-0.0007048*	0.0003173
Number of store visits in the past 6 months	0.0041028	0.0054715
Age	0.0032922	0.0078611
Gender	-0.014572	0.2173872
Number of components within household =1	-0.1737083	0.4326401
Number of components within household =2	-0.4229936	0.3948305
Number of components within household =3	-0.4475075	0.3844681
Number of components within household =4	-0.9506145*	0.3809015
Education= elementary/high/secondary school	-1.39675	1.474011
Education= bachelor's or master's degree	-1.368486	1.477446
Flyer Distribution	0.489773+	0.2786209
Region	0.1241064	0.2580814

p<0.10, *p<.05, **p<0.01, ***p<0.001 Education= advanced master/PhD and Number of components within household >4 are, respectively, the levels of reference

Table 5 Means and standardized differences between treatment and control groups in the weighted sample (N = 749)

	Before IPTW		After IPTW		
Variable	**Treated mean**	**Untreated mean**	**Treated mean**	**Untreated mean**	**Standardized difference**
Consumer demographics					
Age	47	46.1	45.7	46.3	-0.05
Gender = male	29%	30%	33%	31%	0.04
Education =elementary/high/secondary school	72%	69%	71%	70%	0.03
Education =bachelor's or master's degree	26%	31%	29%	30%	-0.03
Number of components within household =1	11%	10%	11%	10%	0.00
Number of components within household =2	26%	25%	25%	26%	-0.01
Number of components within household =3	26%	23%	25%	24%	0.01
Number of components within household =4	20%	31%	27%	28%	-0.02
Consumer psychographics					
Power usage of technology	6.3	6.6	6.4	6.5	-0.02
Pre-purchase planning	5.4	5.0	5.2	5.1	0.02
Price consciousness	4.3	4.3	4.3	4.3	-0.01
Shopping enjoyment	3.5	3.4	3.5	3.4	0.02
Flyer proneness	5.3	4.4	4.9	4.8	0.08
Value consciousness	6.1	5.9	6.0	6.0	0.03
Loyalty to the retailer	5.7	5.4	5.6	5.5	0.09
Past purchase behaviour					
Amount spent on promotion in the past six months	263.2	230.2	279.77	265.72	0.05
Amount spent not on promotion in the past six months	481.6	517.7	574.6	552.1	0.04
Number of store visits in the past six months	27.5	25.8	29	28	0.04
Past online browsing behaviour					
Registration to the retailer website	23%	14%	22%	21%	0.03
Subscription to the newsletter	43%	25%	33%	33%	0.00
Additional covariates					
Survey weights	3.5	2.3	2.0	2.0	0.00
N	227	522	227	522	

$^{+}p<0.10$, $^{*}p<.05$, $^{**}p<0.01$, $^{***}p<0.001$ Education= advanced master/PhD and Number of components within household >4 are, respectively, the levels of reference

Table 6 Weighted negative binomial regression model estimating the effect of flyer readership on number of store visits

Independent variables	Estimate	Std. Error
Flyer readership	0.131216	0.0876186
Amount spent on flyer-promoted products and in-store promoted products in the last six months before treatment	0.0003235^{+}	0.0001811
Amount spent not on promotion in the last six months before treatment (€)	0.0001332	0.0001049
Number of store visits in the last six months before treatment	0.0239961***	0.0019731
Registration to the retailer website	0.0719039	0.1038223
Subscription to the retailer newsletter	-0.074497	0.0989014
Pre-purchase planning	0.0099092	0.0377312
Flyer proneness	-0.0334379	0.0284041
Shopping enjoyment	-0.031198	0.0475795
Price consciousness	-0.0015075	0.028582
Value consciousness	-0.0573585	0.0607052
Power usage of technology	-0.0180024	0.0220209
Loyalty to the retailer	0.0528648	0.0352978
Education: elementary/high/secondary school	0.1368661	0.4538114
Education: bachelor's or master's degree	-0.0196322	0.4687618
Number of components within household =1	0.1761001	0.2123374
Number of components within household =2	-0.0068468	0.1932041
Number of components within household =3	-0.2656849	0.1846165
Number of components within household =4	-0.0833087	0.1797436
Gender	-0.166356	0.1034544
Age	-0.0026532	0.0038393
Region	0.2523022*	0.1196958
(Intercept)	-0.2498788	0.6633438

$^{+}$p<0.10, *p<.05, **p<0.01, ***p<0.001 Education= advanced master/PhD and Number of components within household >4 are, respectively, the levels of reference

Table 7 Means and standardized differences between treatment and control groups in the weighted sample (N = 467)

	Before IPTW		After IPTW		
Variable	**Treated mean**	**Untreated mean**	**Treated mean**	**Untreated mean**	**Standardized difference**
Consumer demographics					
Age	48.1	47.1	45.7	46.26	-0.05
Gender = male	26%	25%	33%	31%	0.04
Education =elementary/high/secondary school	73%	70%	71%	70%	0.03
Education =bachelor's or master's degree	25%	30%	29%	30%	-0.03
Number of components within household =1	13%	10%	11%	10%	0.01
Number of components within household =2	23%	3%	25%	26%	-0.01
Number of components within household =3	25%	22%	25%	24%	0.01
Number of components within household =4	19%	32%	27%	28%	-0.02
Consumer psychographics					
Power usage of technology	6.3	6.5	6.4	6.5	-0.02
Pre-purchase planning	5.4	5.1	5.2	5.1	0.02
Price consciousness	4.2	4.1	4.3	4.3	-0.01
Shopping enjoyment	3.6	3.4	3.5	3.4	0.02
Flyer proneness	5.4	4.3	4.9	4.7	0.08
Value consciousness	6.1	5.9	6.0	6.0	0.03
Loyalty to the retailer	5.7	5.5	5.6	5.5	0.09
Past purchase behaviour					
Amount spent on promotion in the past six months	330.7	319.6	279.8	265.7	0.05
Amount spent not on promotion in the past six months	619.3	720	574.6	552.1	0.04
Number of store visits in the past six months	33.7	36	29	28	0.04
Past online browsing behaviour					
Registration to the retailer website	25%	16%	0.22	0.21	0.03
Subscription to the newsletter	45%	29%	0.33	0.33	0.00
Additional covariates					
Sample weights	3.3	2.2	2	2	0.00
N	152	315	152	315	

$^{+}p<0.10$, $^{*}p<.05$, $^{**}p<0.01$, $^{***}p<0.001$ Education= advanced master/PhD and Number of components within household >4 are, respectively, the levels of reference

Table 8 Weighted OLS regression estimating the effect of flyer readership on the log-amount spent on flyer-promoted products and in-store promoted products

	Amount spent on flyer-promoted products		Amount spent on in-store promoted products	
Independent variables	**Estimate**	**Std. Error**	**Estimate**	**Std. Error**
Flyer readership	-0.0248004	0.1112227	0.0569368	0.1087401
Amount spent on flyer-promoted products and on in-store promoted products in the last six months before treatment (€)	0.0019593***	0.0002362	0.0013045***	0.0002647
Amount spent not on promotion in the last six months before treatment (€)	0.0000776	0.0001227	0.0002169	0.00012
Number of store visits in the last six months before treatment	0.0007934	0.002507	0.0045165+	0.0027171
Registration to the retailer website	-0.0364836	0.1456091	-0.1457016	0.1169624
Subscription to the retailer newsletter	-0.0211088	0.1225507	0.0658558	0.1070373
Pre-purchase planning	-0.0532532	0.0531753	-0.0716339+	0.041027
Flyer proneness	-0.0549504	0.0348862	-0.0380695	0.0338099
Shopping enjoyment	-0.0723125	0.0737774	-0.0120532	0.0543611
Price consciousness	0.0210229	0.041554	-0.0376325	0.0376947
Value consciousness	0.036479	0.0627025	0.1284234	0.0782538
Power usage of technology	-0.0257996	0.0279451	-0.0295692	0.0311698
Loyalty to the retailer	0.0606981	0.0418785	-0.0265074	0.0463593
Education: elementary/high/secondary school	0.7795893***	0.1842974	0.2309827	0.4036259
Education: bachelor's or master's degree	0.4826371*	0.2173041	0.0921412	0.4184243
Number of components within household =1	-0.5439239+	0.2938736	-0.2334776	0.2419648
Number of components within household =2	-0.3498856	0.2568265	-0.2319733	0.2143484
Number of components within household =3	-0.3415636	0.2513642	-0.2929604	0.2154457
Number of components within household =4	-0.5315746*	0.2576111	-0.3873668+	0.2219518
Gender	-0.0535201	0.126698	-0.2537827*	0.1191811
Age	0.0001151	0.0057252	-0.0033021	0.0047728
Region	0.2283857+	0.1272483	0.4265332***	0.4265332
(Intercept)	1.586894*	0.6358172	1.004058	0.804032

+p<0.10, *p<.05, ***p<0.001 Education= advanced master/PhD and Number of components within household >4 are, respectively, the levels of reference