

Submitted to Stephen Fournier as Part of Final Examination to Regression Analysis.

## **Par II: Subject of the Study: Logit Model for the Determinant of Purchasing Magazine**

### **Background**

What were the factors that really matters to an individual whether or not he purchased a magazine was the subject of the study. The study was completed by using the Stata program and developing a Logit model on 18 variables from 673 respondents. Buying a magazine mainly depends on the considered variables of household income, marital status, dual income if married, minor, home ownership, resident type, race, language, previously purchased a parenting magazine, previously purchased a children's magazine. We developed a Logit model out of the

above factors that most significantly increase the likelihood of buying a magazine.

### **Summary Statistics and their Analysis**

Income of the 673 respondents ranged from \$0 to maximum of \$75,000, with a variation of \$23813 around the mean income of \$35,078.75. Length of their stay in the city ranged from 0 to maximum of 72 years, with a variation of 13.55 years in their mean length of stay of 17.62 years. Among 673 respondents 371(55.13%) were female, 302 (44.87%) were male, 235 (34.92%) were found married and 438 (65.08%) still looking for their partner or had other alternatives. In respect of the education, 195 (28.97%) had got at most college education and rest 478 (71.03%) had no such degree.

For the employment; 230 (34.18%) were employed as professional jobs while 443(65.82%) had other job categories, 39 (5.79%) of them found retired from their job and rest 634 (94.21%) were on job or did not reach retirement age, unemployment was found low at 21 (3.12%) of the respondents compared to a very high numbers 652 (96.88%) were found in the job market or other sort of engagement. Similarly, some 156 (23.18%) of the respondents had dual income by if married and rest 517 (76.82%) might have other arrangement, 245 (36.40%) had minors under age of 18 years and rest 428 (63.60%) were found without minors, 244 (35.26%) had managed their own residential house and rest 429 (63.74%) had other alternative for living, bulk of the houses 449 (6.72%) were found single family types while remaining 224 (33.24%) had other arrangement. By race, 466 (69.24%) respondents were white compared to 207 (30.76%) non-white, substantial number of them 612 (90.94%) had their primary language as English in their house and only a few 61 (9.06%) spoke other than English language in their house, 48 (7.13%) of them were found previously purchased a children's magazine and remaining 625 (92.87%) did have other than this arrangement. Only a few of them 57 (8.47%) had previously purchased a parenting magazine while remaining 616 (91.53%) did have other arrangement for the reading news papers.

There was highly significant mean difference in income between respondents who purchased and who did not purchase magazine. The respondents who used to purchase magazine had higher mean income of \$68920 and the mean difference is \$41560 ( $t = -23.97$ ,  $p < 0.001$ ). There was also highly significant mean difference in length of residency in the current city among the respondents who purchased magazine and who did not: respondents who purchased magazine had higher mean length of stay as 22.25 years at current city; the mean

difference was 5.68 years ( $t = -4.28$ ,  $p < 0.001$ ). There was significant difference in the expected and observed frequency in of female who purchase magazine ( $\chi^2 = 4.04$ ,  $p \leq 0.05$ ). Higher number of female were expected (56) to buy paper than observed (46). There was significant difference in the expected and observed frequency of dual income holders' who purchase magazine ( $\chi^2 = 63.87$ ,  $p \leq 0.001$ ). Lower number of dual income holders are expected (29) to buy paper than observed (63). There was significant difference in the expected and observed frequency in people having own resident who purchase magazine ( $\chi^2 = 96.64$ ,  $p \leq 0.001$ ). Higher number of own resident holders were observed (93) than expected (45) to buy paper. There was significant difference in the expected and observed frequency in white people who purchased magazine ( $\chi^2 = 27.57$ ,  $p \leq 0.001$ ). Higher number of white people are expected (38) to buy paper than observed (14). There was significant difference in the expected and observed frequency in English speaker in their house who purchase magazine ( $\chi^2 = 4.77$ ,  $p \leq 0.05$ ). Higher number of English speaker in their house are expected (11) to buy paper than observed (5). There was significant difference in the expected and observed frequency in people who have already purchased previous child magazine ( $\chi^2 = 15.08$ ,  $p \leq 0.001$ ). Lower number of people who have purchased child magazine are expected (9) to buy paper than observed (19).

### Logit Model for Determinant of Buying Magazine

The Table 1 below explains likelihood of buying magazine. Similarly, being a female, dual income holder, minor in the house, has own resident, there is increase in the likelihood of purchasing magazine. Also being white English speaker, previously purchased children magazine, there is increase in the likelihood of purchasing the magazine. For each \$1000 increase in the income of the respondents is associated with less than 1 percent increase in the odd of buying magazine. Similarly, higher female increases likelihood of buying magazine. The higher the dual income holder in a family, there is higher likelihood of buying the magazine.

**Table 1: Logit model for the determinants of purchasing magazine**

	<u>Model M1</u>		<u>Model M2</u>	
<u>Variables</u>	<u>Odds</u>		<u>Odds</u>	
income	1.00	***	1.00	***
isfemale	5.19	***	4.46	***

ismarried	1.76		
hascollege	0.76		
isprofessional	1.25		
isretired	0.31		
unemployed	2.69		
residencelength	1.02		
dualincome	1.57	2.34	*
minors	3.10	2.86	**
own	2.88	2.60	*
house	0.40		
white	6.45	5.28	***
english	4.62	5.22	*
prevchildmag	4.75	4.87	*
prevparentmag	1.61		*
_cons	0.00	0.00	
<b>Other Stats</b>			
Pseudo R2		0.70	
AIC		208.65	
BIC		249.26	
LR test (prob)		0.40	
HL GOF Prob> Chi2		0.92	

**Note:** Note: \*\*= $p < 0.01$ , \*\*\*= $p < 0.001$ , LR  $\chi^2 = 8.33$ ,  $p > \chi^2 = 0.40$

For the respondents, higher the own resident for a white, English speaking within family with previously purchased children magazine, there is higher likelihood of buying the magazine.

The odd of buying magazine by female is 4.46 times the odd of from the others respondents, the odd of buying magazine by dual income holder respondents is 2.34 times the odd of from the others and the odd of buying magazine by a family who has minors of less than 18 years is 2.86 times the odd of buying the magazine from the others respondents. In the similar way, the odd of buying magazine by the respondents who have their own resident is 2.60 times the odd of from the rest of the respondents and the odd of buying magazine the by respondents who are white is 5.28 times the odd of from the non-white people. The odd of

buying magazine by the respondents who have English as a primary language in their house is 5.22 times the odd of from the others whose primary language in their house is other than English. Finally, we found that, the odd of buying magazine by the respondents who have purchased child magazine previously is 4.87 times the odd of from the respondents who have not opted this.

The Table 1 also shows (LR and GOF test) that the model is a good fit. After calculating the probability of buying the magazine by a respondent with above character, the probability is very very low at 0.3 percent.

## Conclusion

The model is a good fit. However, there is not enough statistical evidence that a respondent will buy the magazine. The probability that a person of the given character will buy a magazine is very very low. There is only 0.3 percent probability that a given respondent will purchase the magazine with the information provided by the data.

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