BEHAVIOURAL DIFFERENCES IN CONSUMPTION OF CHILDREN AND ADULTS: A FIELD STUDY[1]

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Abstract

In general, children and adults' consumption behaviour is analysed within the household decision-making process. This paper, however, explores children and adults' consumption behaviour contemplating children and adults as two separated and independent economic agents. By using a field study that involves observation in the Spain's Barcelona zoo, we show that children have some form of preferences that differs from that of the adults, leading to different consumption behaviour between adults and children. This finding reinforces the idea that children play an important role as economic decision makers and consumers.

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INTRODUCTION

The economic behaviour of children has come under scrutiny by economic literature in the past few years after evidence that economic behaviour starts in childhood (Krause and Harbaugh, 1999; Harbaugh et al., 2001a; Harbaugh et al., 2007). In general, this emerging literature analyses behavioural differences of adults and children through experimental evidence (Fehr et al. 2008; Castelli et al. 2010; Harbaugh et al., 2001b; Harbaugh and Krause, 2000; Harbaugh et al., 2003; Harbaugh et al., 2002; among others). Instead, this paper uses a field research to study behavioural differences of adults and children with an emphasis on consumption behaviour.

There is still only little work examining children and adults' consumption behaviour. This being the case, children's consumer role as economic decision makers is examined within the family context (Turley, 2001; Dauphin et al., 2010; Blichfeldt et al., 2011). This study, however, explores behavioural differences in consumption contemplating children and adults as two separated and independent economic agents. To do this, we observe the naturally occurring consumption behaviour taking place in the Spain's Barcelona zoo. The zoo offers children certain autonomy that allows them to make effective decisions; it offers recreation for people of all ages; and, to some extent, the zoo offers goods non–rival in consumption. Therefore, the zoo is a good case to study consumption behaviour of children and adults about the same good.

The paper is organised as follows. The next section presents the conceptual framework that guides our empirical analysis. The section empirical analysis addresses the method used in collecting the data, explains the empirical specification and reports the results. Finally, the last section concludes and suggests topics for further research.

CONCEPTUAL FRAMEWORK

In various experiments on children Harbaugh *et al.* (2001b) find that children adjust their consumption behaviour in ways consistent with the generalised axiom of revealed preferences with which children's consumption choice admits the standard tools of utility analysis modelled in this section.

Next, we describe the good used to examine consumption behaviour. By good we refer to a zoo exhibit. We number the zoo exhibits through n (assuming a finite number of them). We refer to a generic zoo exhibit as l and denote by y_l the time spent on looking

at that particular zoo exhibit. A consumption choice (i.e., a description of the time invested in viewing each of the n zoo exhibits) is represented by a vector with n components. Thus, if a consumer chooses a particular consumption choice $y=(y_1, y_2,..., y_l, y_n)$, it reflects that the consumer spends y_1 units of time on viewing, for example, the monkeys' exhibit, y_2 units of time on viewing the giraffes' exhibit, and so on. We discard the possibility of consumption choices containing negative components. Therefore, we take the set of consumption choices to be the n dimensional non–negative real orthant, denoted by R^n_+. That is, the consumption choices available for the consumer include all vectors of the n zoo exhibits such that every component is non–negative. We also discard consumption choices that are not available to a consumer at a particular time. In other words, we omit those consumption choices that the consumer cannot enjoy because her leisure time is lower than the time needed for the consumption choice to be enjoyed.

Once established possible available consumption choices for the consumer, we next try to figure out which point the consumer would choose from all possible consumption choices. To do that, we need information about the consumer's preferences over the goods. Formally, we assume that these preferences can be represented by a utility function $U(y,w)$ increasing in y and decreasing in w (the physical fatigue involved in consuming a particular consumption choice), and being quasi–concave in these two variables.

Empirical literature, largely outside economics, suggests that y, in turn, depends on some characteristics or attributes such as animal activity (Bitgood *et al.*, 1988; Johnston 1998), interaction (Anderson *et al.*, 2003), animal species (Marcellini and Jenssen, 1988), proximity of visitor to animal (Bitgood *et al.*, 1988), and exhibit location (Mitchell *et al.*, 1990). Put slightly more mathematically, $y = f(q)$, where q is a K–dimensional vector of the attributes of the n zoo exhibits. In words, the time invested in viewing the zoo exhibits is increasing and concave in q when the attributes of the exhibits are more preferred to the consumer according to her preferences.

In addition, we assume that the other argument of the utility function, physical fatigue (w), is increasing and convex in q when the attributes associated with the n zoo exhibits are less preferred to the consumer according to her preferences, $w = g(q)$.

Thus, the consumer attends to solve

$$\max_q U(y,w),$$

subject to

$$y = f(q),$$

$$w = g(q).$$

The first-order condition,

$$\frac{\partial U}{\partial y}\frac{\partial f(q)}{\partial q}+\frac{\partial U}{\partial w}\frac{\partial g(q)}{\partial q}=0$$

balances marginal (dis)utility of the less preferred attributes to the consumer, $\frac{\partial U}{\partial w}\frac{\partial g(q)}{\partial q}$, with the marginal utility of the consumption, $\frac{\partial U}{\partial y}$, that results from the more preferred attributes to the consumer, $\frac{\partial f(q)}{\partial q}$.

The resulting levels of consumption depend on the consumers' preferences for the attributes associated to the zoo exhibits which influences on U, $\frac{\partial y}{\partial q}$.[4] Thus, we may observe different combinations of viewing times (consumption) and the attributes, when preferences for these attributes differ among visitors.

EMPIRICAL ANALYSIS

Method and data

We observed the naturally occurring consumption behaviour of both children and adults taking place in the Spain's Barcelona zoo in autumn 2003. The observation procedure consisted on walking around the zoo in sessions of two to three hours, following the same itinerary and counting the number of visitors looking at each exhibit to identify those exhibits with greater attracting power. We then randomly selected children and adults without children (hereafter adults) and controlled their viewing time in front of the selected exhibits.[5] Thus, according to the example discussed in the previous section, the time invested in viewing the selected zoo exhibits mirrored the consumption behaviour of both children and adults.

To examine children consumption behaviour in "isolation" we controlled their viewing time only in cases where adults waited patiently (i.e., no action or passive behaviour), while children were viewing the animals. By doing this, we ensured that the observed behaviour of children may be completely attributed to them. However, we cannot discard this consumption behaviour be the result of a decision reached by a consensus

[4] $\frac{\partial f(q)}{\partial q}=\frac{\partial y}{\partial q}$

[5] Because of time constraints, we only focused on the seven exhibits where visitors concentrated most: elephants, dolphins, penguins, gorilla babies, lions, tigers, and seals. The gorilla's exhibit was the most popular during the time of our study. Nevertheless, we excluded it because the white gorilla named Floquet de Neu was sick and people used to wait for a long time in front of his exhibit. We also excluded from the study other animal venues such as the aquarium and the demonstration farm because most of these spectacles had a fixed duration.

of the form "I will wait here while you observe" between adults and children.

Our data comprises a panel of 124 viewing time observations, 74 adults and 50 children (see Table 1 for some statistics of the Barcelona zoo visitors).[6] Besides the viewing time data, we recorded two events during the visitor's viewing time: (i) whether the animal was active, and (ii) the tendency of the animal to interact with the visitor.

Table 1. Socio-demographic characteristics of Spain's Barcelona zoo visitors

Type of visitors	Families with children	57.5%
	Groups of friends	19.2%
	Families without children	16.1%
	Lone visitors	4.2%
	Other groups	2.9%
Time spent on the zoo walk	< 1 hour	0.4 %
	1 and 3 hours	38.7%
	3 and 5 hours	43.7%
	> 5 hours	17.2%

Source: Direcció de Comunicació Corporativa i Qualitat, 2001.

Empirical specification

The message of the conceptual framework is that the consumption behaviour of the zoo selected exhibits depends on both the attributes of the zoo exhibits and the individuals' preferences for these attributes. This point shows that, in our case, the functional form of consumption behaviour resembles that of the hedonic function. Thus, an appropriate way to provide insights on behavioural differences in consumption of children and adults would be through the estimation of hedonic behaviour equations. If children and adults' preferences for the attributes associated to the zoo exhibits differ, we would expect different consumption decisions between children and adults.

Our measure of consumption behaviour is the number of seconds invested by visitors in viewing the most visited exhibits. We estimated ordinary least-squares (OLS) regressions for both adults and children consumption behaviour. Control variables include the following attributes: animal activity, proximity of visitor to animal, exhibit

[6] According to our data, children account for 40% of the sample, a percentage well below the 57.50% reported by the figures of the visitors' composition (see Table 1). We attribute this difference to the observation procedure followed to measure the exhibit viewing time. For example, if children were carried in strollers, we assumed that adults managed or controlled the time in front of the exhibits and, therefore, they were not included in the sample.

location, interaction, and animal species.

Empirical results

Table 2 shows the OLS estimates for adults and children consumption behaviour. We estimated several regressions including different combinations of the above mentioned attributes of the zoo exhibits. For adults and children, we started from a common general specification, which after progressive filtering yielded group–specific regressions. In the case of adults consumption behaviour, animal activity, proximity of visitor to animal, and exhibit location play a significant role in the decision to consume the good (column i). The signs of the coefficients are as expected and consistent with the literature. The viewing time increases with animal activity (Bitgood *et al.*, 1988; Johnston, 1998), with shorter distance between the animal and the visitor (Bitgood *et al.*, 1988), and with exhibits placed at the end of the zoo (Mitchell *et al.*, 1990). While children consumption behaviour is affected by animal activity and interaction (column ii). The viewing time increases with animal activity and with some tendency of the animal to interact with the visitors. Similar results have been found by Bitgood *et al.* (1988), Johnston (1998), and Anderson *et al.* (2003).[7]

Table 2. Results of the OLS Regression Analysis

Source of variation[(1)]	Adults group (i)			Children group (ii)		
	Coefficient (mean ± SE)		*t* ratio	Coefficient (mean ± SE)		*t* ratio
Constant	272.02	± 65.74	4.14†	95.04	± 21.24	4.47†
Animal activity	49.84	± 21.04	2.37‡	99.39	± 33.59	2.96†
Proximity	-25.51	± 8.99	-2.84†			
Location A	-162.17	± 2.25	-2.60‡			
Location B	-168.33	± .27	-2.79†			
Interaction				125.36	± 39.17	3.20†
Observations	74			50		
R^2	.18			.23		
Mean viewing time[(2)]	103.28			150.72		

[7] Note, however, that animal species plays no role neither in adults nor in children consumption behaviour. This should come as no surprise given the procedure followed to measure consumption behaviour. Recall we focused our attention on the exhibits with greater attracting power and this attracting power is perhaps highly related to animal species.

NOTE. –[†]Statistically significant at 1% level and [‡]statistically significant at 5% level. The estimated equations pass the standard misspecification tests at a 99% and 95% confidence level.

(1) Variables: animal activity = dummy variable with value 1 when the animal walks, jumps, etc, 0 otherwise; proximity = variable reflecting the proximity of visitor to animal in meters; location A = dummy variable with value 1 if the exhibit is placed at the beginning of the zoo walk, 0 otherwise; location B = dummy variable with value 1 if the exhibit is placed in the centre of the zoo walk, 0 otherwise; interaction = dummy variable with value 1 if there is some tendency of the animal to interact with the visitors, 0 otherwise.

(2) The difference between the children and adults' viewing time is statistically significant ($t = 2.58$, $p < .05$). The higher viewing time of children indicates that, on average, children consumed more of these goods than adults.

In short, the sources of variation of consumption behaviour are not the same for adults and children. More precisely, consumption behaviour of adults is affected by two attributes –proximity of visitor to animal and exhibit location- that do not affect children consumption behaviour. In turn, interaction only plays a role on the consumption behaviour of children. These results indicate, for this particular case study, that children have some form of preferences (a favoured attribute or a favoured combination of attributes) that differs from that of the adults, which could be leading to different consumption behaviours. These results are in line with those studies showing that children may influence the household decision-making process. Turley (2001), for example, shows the influence of children on the demand for recreational activities and that the presence of children has an observable effect on the recreational decisions of visiting groups. Blichfeldt et al. (2011), explain that tweens are very active during up-front vacation decision-making, and wish for (and have) a say in regard to issues such as destination choice. Dauphin et al. (2010) demonstrate that it may be incorrect to assume that there are no more than two decision-makers when a household comprises teenage or adult children. In addition, our study supports the findings of others in the field of economic behaviour of children. Harbaugh and Krause (2000) show that the altruistic behaviour of younger children is different from that of adults in repeated experiments. Harbaugh *et al.* (2002) find differences between children and adults' behaviour about risk attitudes.

DISCUSSION AND CONCLUSIONS

In general, children and adults' consumption behaviour is analysed within the household decision-making process. This study, however, explores children and adults' consumption behaviour contemplating children and adults as two separated and independent economic agents. To do that, this paper takes distance from the mainstream literature on children economic behaviour -that uses experimental evidence- and makes

use of a field research that involves observation in the Spain's Barcelona zoo. This method has not yet been performed in the economic behaviour of children, as far as we know.

Our results show that children have some form of preferences towards the observed good that differs from that of the adults, leading to different consumption behaviours between adults and children. This finding reinforces the idea that children play an important role as economic decision makers and consumers, with which it may be incorrect to assume no more than one decision-maker when a group comprises children. However, the role children play as economic decision makers may be the result of a consensus previously reached between adults and children. And this form of cooperative decision-making process is possibly related to the family education, with which education may have an important role in the economic decision making.

Although it may be problematic to extend the results beyond this particular case study, we could formulate two working hypotheses. First, individuals' preferences may change, at the aggregate level, as individuals become adults. Second, the environment could shape preferences altering them from generation to generation. In any case, which of these two possible explanations could lead to different consumption behaviour between children and adults is a question that needs further research.

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