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How much do we care about absolute versus relative income and consumption?

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Abstract

We find, using survey-experimental methods, that most individuals are concerned with both relative income and relative consumption of particular goods. The degree of concern varies in the expected direction depending on the properties of the good. However, contrary to what has been suggested in the previous literature, we find that relative consumption is also important for vacation and insurance, which are typically seen as non-positional goods. Further, absolute consumption is also found to be important for cars and housing, which are widely regarded as highly positional.

JEL classification: C91; D63; H21

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1. Introduction

There is considerable evidence that relative income and consumption are important determinants of both individual well-being and behavior, and even Adam Smith in his day noted that women in England required better clothing to appear in public without shame than women in Scotland did. Seminal contributions include Veblen (1898), who used the term conspicuous consumption to refer to expenditure in goods that signal the consumer's

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position in society, and Duesenberry's (1949) theory of consumption, which emphasized the importance of relative standings in determining consumption and savings patterns over time. Weiss and Fershtman (1998), Holländer (2001), and Brekke and Howarth (2004) provide good overviews of more recent literature on and implications of social status.

Still, the issue of *how* important relative income and consumption are for individual well-being, compared to their absolute counterparts, is much more difficult to answer, and this is the main concern of this paper. On one extreme, standard economic theory typically assumes, based on no empirical evidence, that only absolute income and consumption matter. On the other extreme, Easterlin (1974, 1995) and others conclude that only relative income seems to matter. This conclusion is largely based on a large number of survey-based psychological studies, where it is found that subjective happiness increases with income in a given country and in a given year, but also that average happiness in a given country seems to be roughly constant over time, even though average income increases. Furthermore, people also seem to be about equally as happy in different countries with different incomes. Others, such as Frank (1985a) and Oswald (1997), argue that utility depends on both absolute and relative income, but that the absolute component is rather small for richer countries such as the US.

The recently increased use of subjective welfare measures opens up exciting possibilities for economic theory (Frey and Stutzer, 2002a, 2002b). For example, the important conclusion by Clark and Oswald (1994) and Di Tella et al. (2001) that unemployment causes larger welfare losses than previously believed or assumed could not have been made based on conventional economics tools. There is also much evidence that self-reported subjective happiness is, compared to other sources, a quite good measure of individual well-being. Nevertheless, there are potential problems also with subjective welfare measures. For example, Brekke (1997) and Osmani (1993) argue that people may respond to questions about happiness relative to a subjective happiness norm and that this norm may be income-dependent too. A "very happy" response in a rich society would then reflect a happier person than the same response in a poorer society. Happiness may then still depend, at least partly, on absolute income. To gain further insights, comparisons with alternative empirical methods would therefore clearly be useful.

An alternative strategy for measuring the importance of relative standing is to ask individuals hypothetical questions regarding their choice among alternative states or outcomes, where their choice reveals their concern for relative positions (Johansson-Stenman et al., 2002; Solnick and Hemenway, 1998). Johansson-Stenman et al. used an experiment where Swedish students made repeated choices between alternative societies, described by an imaginary grandchild's income and the average income. For example, in one society the grandchild's income was US$ 2500 per month, which was lower than the average income of US$ 3000 per month. In the other society the grandchild's income was US$ 2300 which is higher than the average income of US$ 2000 per month. The task was to decide in which society the grandchild would be most content. It was found that most people do care about relative income, but also that absolute income is in most cases important for individual well-being. Here, we largely follow the same experimental design when measuring the positionality degree for income, although we apply it to a student sample from Costa Rica.

If income contributes to utility solely instrumentally through consumption, as is typically assumed, then utility must depend on relative consumption. The literature on positional goods (Hirsch, 1976; Frank, 1985a, 1985b, 1999) dealing with this issue typically assumes

that some goods are much more positional than others, so that relative consumption is more important for goods such as jewelry, cars, and houses compared to more non-positional goods such as bread, insurance, and leisure. If this is correct important policy implications follow, as discussed by Frank (1985a, 1985b, 1999). For example, if leisure is less positional than consumption in general, there are pure efficiency arguments in favor of an income tax. Boskin and Sheshinski (1978) and Ireland (2001) show that the optimal amount of redistribution from income taxes increases when income is partly positional and leisure is purely non-positional; Persson (1995) attempts to explain the very high income taxes in some countries such as Sweden, and Ljungqvist and Uhlig (2000) find arguments for a Keynesian stabilization tax policy, using similar assumptions. Ng (1987) and Ng and Wang (1993) show that publicly provided goods such as environmental quality should be over-provided relative to the basic cost-benefit rule in the case where relative private consumption (or income) matters for utility and where the publicly provided good is non-positional. Furthermore, if some goods are more positional than others, there are pure efficiency arguments in favor of differential commodity taxation since the size of the positional externalities, imposed on other people, varies between the goods.[1]

The empirical evidence for the hypothesis of varying degrees of positionality, besides introspection, is scarce, however. The only study, to our knowledge, that attempts to investigate the positionality degree for different goods empirically is Solnick and Hemenway, who let American students choose between one "relative alternative" and one "absolute alternative" for each good. They found that the concern for relative standings was strongest for the students' own attractiveness and supervisor's praise while weakest for vacation time. They also found that on average 48 percent of the respondents preferred the society with a higher relative but lower absolute income, which is consistent with the findings of Johansson-Stenman et al. if parameterized in the same way. However, since Solnick and Hemenway did not ask repeated questions for each good, they did not produce any parameter estimates of the positionality degree. This is therefore done here for the first time (as far as we know), by extending the experimental design from Johansson-Stenman et al. to different goods.

Section 2 describes the models underlying the experiments on the importance of relative income and consumption. Section 3 presents the set-ups, and Section 4 the results of the experiments. Section 5 draws conclusions.

2. Modeling relative income and consumption

There are many ways to incorporate relative standing into the utility function. Most studies have either used some kind of *ratio comparison* utility function, $U = v(x, r) \equiv v(x, x/\bar{x})$, where x is the individual's income (or consumption vector of different goods) and $\bar{x}$ is the average income in society (e.g. Duesenberry, 1949; Boskin and Sheshinski, 1978; Layard, 1980; Persson, 1995; Carroll et al., 1997), or some kind of *additive comparison* utility

[1] This holds quite generally, and for example also in the presence of optimal non-linear income taxes and weak separability between consumption of all goods and leisure in the utility function. Hence, the famous Atkinsson and Stiglitz (1976) result, that differential commodity taxation is inefficient or redundant under these conditions, does not apply.

function, $U = v(x, r) \equiv v(x, x - \bar{x})$ (e.g. Akerlof, 1997; Corneo and Jeanne, 1997; Knell, 1999; Ljungqvist and Uhlig, 2000). Clark and Oswald (1998) show important theoretical differences between these formulations, but the empirical evidence is scarce. The only result we are aware of is Johansson-Stenman et al. (2002) who, in a simple test, compared the ratio comparison utility function,

$$v = x^{1-\gamma}\left(\frac{x}{\bar{x}}\right)^{\gamma}, \tag{1}$$

to the additive comparison utility function,

$$v = x - \delta\bar{x} \tag{2}$$

Although the ratio-formulation performed better in terms of explaining respondent behavior, they concluded that more research is clearly needed. Lacking clear empirical evidence, we will present the results for both of these functional forms.[2]

It is likely that the positional concern is more complex in reality than in the stylized models most often used. For example, Knell analyses theoretically "within-class comparison," "upward comparisons," and "society-wide comparisons." The first two cases include people who care for their status as members of a specific group and those who want to be like the ones with higher status, respectively. Nevertheless, for empirical and experimental simplicity we solely deal with the latter type of comparison, i.e. we assume that people compare themselves to the average in society, which enables us to estimate the positionality degree for each good with only one parameter. It is easy to verify that the parameters γ and δ in (1) and (2) measure the *marginal degree of positionality*,

$$\alpha = \frac{(\partial v/\partial r)(\partial r/\partial x)}{\partial v/\partial x + (\partial v/\partial r)(\partial r/\partial x)}, \tag{3}$$

the fraction of the total utility change which comes from increased relative consumption from the last dollar spent. Still, in future research it would be of interest to consider less restrictive formulations.

2.1. Measuring positionality

Consider a hypothetical choice between two societies, where in society A the individual's income is US$ 2500 per month and the average income is US$ 3000, while in society B the individual's income is US$ 2040 per month and the average income is US$ 2000. In all other respects, the societies are identical. If an individual is indifferent between these two societies, we have in the case of the ratio comparison utility function that

$$(x_{\mathrm{A}})^{1-\gamma}\left(\frac{x_{\mathrm{A}}}{\bar{x}_{\mathrm{A}}}\right)^{\gamma} = (x_{\mathrm{B}})^{1-\gamma}\left(\frac{x_{\mathrm{B}}}{\bar{x}_{\mathrm{B}}}\right)^{\gamma} \rightarrow \gamma = \frac{\ln[x_{\mathrm{B}}/x_{\mathrm{A}}]}{\ln[\bar{x}_{\mathrm{B}}/\bar{x}_{\mathrm{A}}]} = 0.5, \tag{4}$$

[2] Since we are only interested in the ordinal properties of the utility function, any monotonic transformation of (1) and (2) are equally valid utility functions.

while for the additive comparison utility function we have that

$$x_A - \delta\bar{x}_A = x_B - \delta\bar{x}_B \rightarrow \delta = \frac{x_A - x_B}{\bar{x}_A - \bar{x}_B} = 0.46. \quad (5)$$

Hence, if an individual is indifferent between the two societies we have that $\gamma = 0.5$ (or that $\delta = 0.46$). Consequently, if he prefers society A then $\gamma = 0.5$ (or $\delta < 0.46$), and vice versa. By letting individuals make repeated pair-wise choices between hypothetical societies with different implicit marginal degrees of positionality, it is possible to estimate more precisely the degree of positionality for income.

We use similar experiments to measure the degree of positionality for different goods by letting individuals make tradeoffs between their own consumption and their relative consumption, keeping everything else equal. In Appendix A, it is shown that the marginal degree of positionality for income is equal to a weighted sum of the marginal positionality for each good where the weights are the income shares spent on each good.[3] This holds irrespective of the structure of relative consumption, whether ratio or additive comparisons or a combination of these is the correct formulation. This implies that if only relative income matters for happiness, then all market goods must have a value of α equal to one, given that α cannot be larger than one for any single good. Conversely, if α is not equal to one for all goods, it follows that absolute income as well must matter for utility. On the other hand, if α varies among the goods, i.e. is not equal to zero for all goods, it follows that utility must depend on *both* absolute and relative income.[4]

3. Design of the experiments

A total of 325 students from The University of Costa Rica took part in the experiment. The students were interviewed in the classroom as part of a lecture, and the average group size was 30 students.[5] The survey lasted for approximately 30 min, and there was no show-up fee paid. In addition to printed information, the respondents were given verbal information before each section of the experiment.

The experiment consisted of three sections: (i) the relative income experiment, (ii) the relative consumption experiment, and (iii) questions regarding the respondent's socio-economic status. Following Johansson-Stenman et al., the respondents were instructed to consider *the well-being of their imagined grandchild* when making their choices. This was to help the respondents liberate themselves from their current circumstances. Further, it is possible that utility may also depend on income and consumption changes over time (i.e. positional in the time-dimension); see for example, Frank and Hutchens (1993). At the same time, it is presumably cognitively easier, and perceived to be a more natural task, to choose what is best for an imagined grandchild than to choose for a complete stranger.

[3] The Appendix A is available on the JEBO website.

[4] This is not true, however, if income enters the utility function directly, not only indirectly through consumption. For example, it appears reasonable that some top executives derive utility from having a higher wage than others, irrespective of their consumption.

[5] This was a general course offered to students in several different areas including law, economics, engineering, political science, and natural sciences, among others.

Table 1
Societies in relative-income experiment

Set		Grandchild income	Average income	Marginal degree of positionality if indifference between A and B	
				Ratio comparison, γ	Additive comparison, δ
	Society A	300,000	360,000		
1	Society B	300,000	240,000	0	0
2	Society B	285,000	240,000	0.124	0.125
3	Society B	270,000	240,000	0.25	0.24
4	Society B	245,000	240,000	0.5	0.45
5	Society B	220,000	240,000	0.75	0.67
6	Society B	210,000	240,000	0.9	0.75
7	Society B	200,000	240,000	1.0	0.83

Amounts in Colones per month.

The respondents were frequently reminded that they should *not* choose what they considered the overall best society, but the society that would be the best for their grandchild. The students were told that the societies were identical in all respects except the issue being analyzed. It was also stressed that prices and goods were the same in all societies.

3.1. The relative income experiment

In the relative income experiment, the respondents make repeated choices between two societies, A and B, described by the average income and the grandchild's income. In all other respects, the societies are identical. Society A is a fixed alternative where the average income is 360,000 Colones per month and the grandchild's income is 300,000 Colones per month.[6] This society is then compared with seven different B societies with varying individual incomes but a given average income (an example is presented in Appendix B). The grandchild's income in society B was chosen to correspond to a certain degree of positionality if the individual is indifferent between the two societies. This is calculated both for the ratio comparison in (1) and for the additive comparison in (2). The societies are presented in Table 1, which also shows the order in which they were presented in the experiment.

If an individual chooses society B in questions 1 and 2, but society A in question 3, then the individual is willing to sacrifice 15,000 Colones per month in order to be above the average, but not as much as 30,000 Colones per month. This corresponds to a marginal degree of positionality between about 0.125 and 0.25 (for both the additive comparison and the ratio comparison case).

3.2. The relative consumption experiment

In the experiment on relative consumption, the respondents make choices between two societies described by the average consumption and the grandchild's consumption of a particular good. Again, the societies are identical in all other respects. To test the hypothesis

[6] US$ 1 corresponds to 300 Colones using the exchange rate of November 2001.

Table 2
Societies in relative-consumption experiment

Set		Grandchild consumption	Average consumption	Marginal degree of positionality if indifference between society *A* and *B*	
				Ratio comparison, γ	Addit. comparison, δ
	Car A	4,500,000	5,400,000		
1	Car B	4,065,000	3,600,000	0.25	0.24
2	Car B	3,670,000	3,600,000	0.5	0.46
3	Car B	3,320,000	3,600,000	0.75	0.66
	Housing A	36,000,000	43,200,000		
1	Housing B	32,500,000	28,000,000	0.25	0.24
2	Housing B	29,400,000	28,000,000	0.5	0.46
3	Housing B	26,500,000	28,000,000	0.75	0.66
	Insurance A	900,000	1,080,000		
1	Insurance B	813,000	720,000	0.25	0.24
2	Insurance B	735,000	720,000	0.5	0.46
3	Insurance B	663,000	720,000	0.75	0.66
	Vacation A	20	25		
1	Vacation B	18	16	0.25	0.24
2	Vacation B	16	16	0.5	0.46
3	Vacation B	14	16	0.75	0.66

Amounts in Colones except for vacation, which is in days per year.

that the degree of positionality depends on the type of good that is consumed, we include four different types of consumption in the experiment: cars, housing, insurances, and days of vacation.

How much to spend on each good is of course up to the consumer in a free society. Therefore, it is not straightforward to generalize the relative income experiment to measure the importance of relative consumption of different goods. We deal with this problem by letting the company at which the grandchild works provide the goods as a fringe benefit. For example, the grandchild could receive a car at a value of 3 million Colones as a benefit. The grandchild is then still free to choose characteristics such as size and brand according to his taste, as long as the value corresponds exactly to the one specified for that good. For each good, the respondent makes three choices between a fixed alternative A and a varying alternative B (an example is presented in Appendix B). The construction is, in all other respects, the same as for the relative income experiment, and the choices will reveal the marginal degrees of positionality. The societies are presented in Table 2, along with the implied marginal degree of positionality if the respondent is indifferent between the two societies.

4. Results of the experiment

4.1. Income experiment

Of the 325 responses, 13.5 percent were inconsistent in the sense that they switch from choosing society A to choosing society B in a later choice, which violates the monotonicity assumption of the utility function. Some potential explanations for such behavior are

Table 3
Results relative income experiment

Parameter values		*No.*	Frequency	Cumulative frequency
Ratio comparison	Additive comparison			
$\gamma < 0$	$\delta < 0$	62	0.22	0.22
$0 < \gamma < 0.124$	$0 < \delta < 0.125$	61	0.22	0.44
$0.124 < \gamma < 0.25$	$0.125 < \delta < 0.24$	12	0.04	0.48
$0.25 < \gamma < 0.5$	$0.24 < \delta < 0.45$	27	0.10	0.58
$0.5 < \gamma < 0.75$	$0.45 < \delta < 0.67$	23	0.08	0.66
$0.75 < \gamma < 0.9$	$0.67 < \delta < 0.75$	3	0.01	0.67
$0.9 < \gamma < 1$	$0.75 < \delta < 0.83$	8	0.02	0.69
$\gamma \geq 1$	$\delta > 0.83$	87	0.31	1.00

learning and fatigue effects.[7] Irrespective of the cause, we exclude these responses from the analysis. The results of the experiment are presented in Table 3.

The median degree of positionality is between 0.25 and 0.5 (0.25 and 0.45 for the additive comparison case). However, the distribution of responses is almost bipolar; 44 percent of the respondents have a degree of positionality of less than 0.1, and 31 percent have a degree of positionality higher than 1.0. The mean degree of positionality is 0.45 and 0.40, respectively.[8]

In Section 2, we defined the marginal degree of positionality as the fraction of the total utility change from the last dollar spent which comes from increased relative income or consumption. Our results show that, on average, 45 percent of the utility increase from a small income increase arises from enjoying a higher relative income (40 percent for the additive formulation). This fraction is clearly lower than the hypothesis of 100 percent corresponding to the hypothesis that only relative income matters, but it is also higher than the zero percent hypothesis stating that only absolute income matters.

4.2. Consumption experiments

The results of the consumption experiments are presented in Table 4.[9]

The median degree of positionality is between 0.5 and 0.75 (0.46 and 0.66) for cars and housing, while lower than 0.25 (0.24) for insurance and vacation. The same pattern holds for the mean degree of positionality.[10] Consequently, there are differences in the degree

[7] Using a binary probit model, we tried to explain the occurrence of inconsistent responses, but none of the parameters were significant.

[8] The individual marginal degree of positionality is set to the median value of the corresponding interval. For the extreme cases $\gamma \leq 0$ and $\gamma \geq 1$, we set the degree to -0.0625 and 1.05, respectively, and for the extreme cases $\delta \leq 0$ and $\delta > 0.83$, we set the degree to -0.0625 and 0.95, respectively. In our theoretical model, both δ and γ are in the closed interval [0, 1], but the construction of the experiment does not allow for indifference, therefore the adjustment described above.

[9] The share of inconsistent responses varied between 4 and 7 percent in the different consumption experiments. Again, we exclude these responses from the analysis.

[10] The individual marginal degree of positionality is set to the median value of the corresponding interval. For the extreme cases, $\gamma < 0.25$ and $\gamma > 0.75$ we set the degree to 0.05 and 0.95, respectively, and for the extreme cases $\delta < 0.25$ and $\delta > 0.66$ we set the degree to 0.05 and 0.86, respectively. Due to the quite bi-polar response distribution, the estimated means are somewhat sensitive to the extreme-case assumptions.

Table 4
Results of consumption experiments

	Car			Housing			Insurance			Vacation		
	No.	Frequency	Cumulative frequency	No.	Frequency	Cumulative frequency	No.	Frequency	Cumulative frequency	No.	Frequency	Cumulative frequency
$\gamma < 0.25$, $\delta < 0.24$	96	0.32	0.32	100	0.33	0.33	158	0.51	0.51	157	0.51	0.51
$0.25 < \gamma < 0.5$, $0.24 < \delta < 0.46$	40	0.13	0.45	24	0.08	0.41	27	0.09	0.60	26	0.09	0.60
$0.5 < \gamma < 0.75$, $0.46 < \delta < 0.66$	35	0.12	0.57	37	0.12	0.53	31	0.10	0.70	28	0.09	0.69
$\gamma > 0.75$, $\delta > 0.66$	130	0.43	1.00	141	0.47	1.00	96	0.30	1.00	96	0.31	1.00
Mean values	$\bar{\gamma} = 0.55$, $\bar{\delta} = 0.50$			$\bar{\gamma} = 0.56$, $\bar{\delta} = 0.51$			$\bar{\gamma} = 0.41$, $\bar{\delta} = 0.37$			$\bar{\gamma} = 0.41$, $\bar{\delta} = 0.37$		

Table 5
Impact of removing lexicographic responses on the mean marginal degree of positionality

	Removing always non-positional	Removing always highly positional	Removing both types
Car	0.68	0.47	0.60
Housing	0.70	0.49	0.63
Insurance	0.50	0.31	0.38
Vacation	0.50	0.30	0.38

of positionality in the expected direction among different types of goods: the more visible goods, cars and housing, are more positional than less visible ones. At the same time, it is surprising that the mean degree of positionality is relatively high even for goods such as vacation and insurance.[11] Solnick and Hemenway asked American students to choose between 1 week of vacation for themselves given that others had none and 2 weeks given that others had 4 weeks on average; this implies that $\delta = 0.25$ in the case of indifference. Only 20 percent went for the positional alternative, compared to about 50 percent in Table 4.

As expected, the mean degree of positionality for income is between the corresponding values for the less positional goods, vacation and insurances, and the more positional goods, cars and housing (remember that marginal degree of positionality for income is a weighted sum of the marginal degrees of positionality for each good, as shown in Appendix A).

4.3. Potential biases

There are several potential explanations for the large share of "extreme" answers besides the fact that these might reflect true preferences. It appears reasonable that some respondents used a lexicographic strategy as a cognitively cheap attempt to solve the exercise, even though their underlying true preferences may be more complex (see, e.g. Payne et al., 1993). Another possibility is related to the desire to obtain a certain self-image. Akerlof and Kranton (2000) argue that individuals' self-image, or identity, is an important factor in explaining many kinds of human behavior. If individuals adopt a self-image either of being concerned or of not being concerned about status, lexicographic responses seem rational. Similarly, to understand a complex world we clearly need to simplify it, implying that more simplistic explanations are often attractive. Arguably, a world where individual well-being depends solely on absolute consumption, or solely on relative consumption, is easier to comprehend than a world where well-being depends on both absolute and relative consumption. Lexicographic responses are useful in maintaining or amplifying both of these views.

Furthermore, as noted by a referee, many people perhaps feel that they *should* not care much about relative income and consumption. Answering on behalf of a future family member may then imply a systematic bias downwards of the estimated positionality since they may think that their grandchild should not care either.

In Table 5, we therefore report the results of the experiments when removing two types of lexicographic responses: (i) respondents who always opted for society A (i.e. they are

[11] Note that we focus solely on vacation *time*. Certain kinds of vacation *trips* are presumably both quite visible and positional.

non-positional for all goods) and (ii) respondents who always opted for society B (i.e. they are highly positional for all goods). After removing both types of lexicographic responses the mean positionality differences increase somewhat among the goods. We only report the result for the ratio-comparison utility function, but the pattern is the same for the difference-comparison case.

As pointed out by a referee, there is also a potential bias related to the familiarity of the situation. Suppose, for example, that the respondent is knowledgeable about cars. The second choice situation in the experiment corresponds to the choice between a new VW Golf in a society where others have even more exclusive cars and a new VW Polo where others have a less valuable car. The argument is that it is cognitively much easier to compare how much more one would prefer the Golf to the Polo than to judge how much less attractive one would find the Golf if others have even better cars (or how much more attractive one would find the Polo if others had clearly worse cars). This too might bias the estimated positionality downwards. Furthermore, one reason that goods such as cars are expected to be more positional than, for example, insurances, is that cars are more visible. In the experimental context, all goods are in a sense equally visible for the respondents when they make their choices. This may imply that vacation and insurance are less positional in reality than what the results here indicate. Nevertheless, despite these potential biases, we still find that goods such as cars and housing are strongly positional and that they are more positional than goods such as vacation and insurances.

4.4. Econometric analysis

To test whether the differences between the estimated degrees of positionality are statistically significant or not, we carried out χ^2 tests of the difference in the distribution of answers for the different goods and for income. As revealed by Table 6, we cannot reject the null hypothesis of the same underlying distribution for income compared to insurance and vacation, respectively, but we can strongly reject the null hypotheses between cars and housing, on the one hand, and insurance, vacation, and income on the other.

Next, we turn to the question of which individual factors determine the responses in terms of positionality. In the regressions the dependent variable is the degree of positionality. In order to account for the fact that we observe interval-censored values, we estimate an interval regression model. Since the experiment is complex, we feared that there could be order effects and enumerator effects (there were three different enumerators). Therefore, the order of the goods was shifted in the second part of the experiment. However, after testing for order and enumerator effects in the ordered probit models, we cannot reject the absence

Table 6
Results of χ^2 tests of the differences in distribution of answers for different goods and income

	Income	Car	Housing	Insurance
Car	15.54*			
Housing	15.79*	4.58		
Insurance	1.60	22.82*	22.13*	
Vacation	1.21	23.51*	22.47*	0.134

* Reveals a significant difference at the 1 percent level; the critical level is 11.34 (the critical level at the 10 percent level is 6.25) with 3 degrees of freedom.

Table 7
Interval regression for the income and consumption experiments[a]

Variable [mean]	Income	Car	Housing	Insurance	Vacation
Intercept	0.204 (0.114)	0.470 (0.000)	0.555 (0.001)	0.101 (0.564)	0.044 (0.815)
Female [0.478]	0.364 (0.001)	0.123 (0.259)	0.299 (0.038)	0.252 (0.079)	0.424 (0.006)
Parents' income [4.111]	−0.029 (0.149)	−0.012 (0.567)	−0.037 (0.161)	−0.042 (0.115)	−0.051 (0.067)
Left [0.399]	0.173 (0.110)	0.005 (0.959)	0.195 (0.169)	−0.034 (0.814)	0.069 (0.647)
Economics [0.097]	0.421 (0.028)	0.208 (0.259)	−0.005 (0.984)	0.367 (0.149)	0.459 (0.084)
Law [0.201]	0.376 (0.011)	0.258 (0.080)	0.265 (0.162)	0.339 (0.079)	0.206 (0.306)
Social science [0.302]	0.203 (0.107)	0.243 (0.067)	0.056 (0.737)	0.403 (0.019)	0.264 (0.133)

[a] *P*-values in parentheses. The reported mean values differ slightly between experiments due to missing values.

of such effects, except for the housing experiment where we could not reject an interview or an order effect.[12]

Table 7 reports the estimated coefficients for the income and the consumption experiments under the assumption of a ratio comparison utility function.[13]

The results seem to suggest that women care more about relative income and consumption than men do. This is a bit surprising since, as discussed by Frank (1999, pp. 134–135), evolutionary arguments suggest the opposite: that men should be more status concerned. The explanation is that evolution occurred mostly under polygynous mating systems where men with high relative income could have several wives while those with low relative income typically had none. A possible reason for our result is related to perceived fairness, which is recently experimentally demonstrated to be a much more important determinant of individual behavior than is typically assumed (Fehr and Gächter, 2000; Fehr and Fischbacher, 2002). It appears reasonable that comparisons to others become more salient to people who consider themselves discriminated, or unfairly treated, and Costa Rica is a society traditionally dominated by men; for example, it is widely known that many women feel discriminated at the labor market.[14] It is also possible, however, that women do not care more about status, but that they believe that relative income and consumption are more important for happiness generally than men believe. This could perhaps reflect the frequently made presumption that women are more socially oriented (cf. Eckel and Grossman, 1998, 2002), and hence that their perception of what is important in life is more closely related to other people, including other people's consumption.

Furthermore, students majoring in economics, law, and social sciences tend to make more positional choices than the base case consisting of students majoring in technology, natural sciences, and other subjects. Since all of these students are in the beginning of their programs, these differences probably reflect sample-selection effects rather than influences from the education. There are no clear effects from political preferences or parents' income.

5. Conclusions

We have found that, on average, both absolute and relative income and consumption matter for individual utility, or well-being. The differences are in the expected direction, so that goods widely considered positional, like houses and car ownership, are also found to be more positional than goods typically seen as non-positional, such as vacation and insurance. Income is in between, which is also expected. These differences could, from a pure efficiency point of view, motivate substantially higher taxes on the more positional goods.[15]

[12] One enumerator implied a somewhat larger positionality for housing. We performed several order tests. Housing became more positional if it was good number 2 (compared to if it was good 1, 3 or 4).

[13] The results in terms of relative size of the coefficients and significance do not change if we instead assume an additive comparison utility function.

[14] As a comparison, there was no significant gender effect in the income experiment conducted by Johansson-Stenman et al.

[15] Needless to say, however, there are many practical problems associated with such a tax system, as discussed for example by Frank (1999) and Ireland (2001).

The mean estimates of the marginal degree of positionality for houses and car ownership was found to be much smaller than unity, implying that absolute consumption appears still to be important. At the same time, the mean degree of positionality is considerable also for vacation and insurance, implying that relative consumption is important here too, contrary to what is typically assumed in the literature. Although we are somewhat surprised by the magnitudes, we do not consider these findings *per se* unintuitive. Indeed, would you be equally content with a three-week vacation if others have five weeks or they have only one week? And wouldn't you feel less secure with the same insurance level if you knew that most others are better insured than you?

Nevertheless, the results from experimental and survey-based studies, including this one, should always be treated with care, and there may also be other sources of bias than the ones discussed. Still, as far as we know this is the first attempt to estimate explicitly the positionality degree for different goods, and we therefore strongly welcome other empirical strategies, experimental set-ups, and samples to increase the knowledge in this important area and to see how robust the findings in this paper are.

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Appendix A. Proof of the relationship between relative income and relative consumption

Let us consider the consumer choice with n different goods that are positional to a varying degree. It is convenient to write the utility functions as follows:

$$U = v(x_1, \ldots, x_n, r_1, \ldots, r_n) = u(x_1, \ldots, x_n, \bar{x}_1, \ldots, \bar{x}_n), \tag{A.1}$$

where v is quasi-concave in its arguments. Since we are not interested in price changes, we can normalize the consumer price for all goods to unity. It is also useful to express some (quasi-) indirect utility functions as follows:

$$U = \omega(m, r_m, a_1, \ldots, a_n) \equiv \omega\left(m, r_m, \frac{\bar{x}_1}{\bar{m}}, \ldots, \frac{\bar{x}_n}{\bar{m}}\right) = V(m, r_1, \ldots, r_n), \tag{A.2}$$

where m is the income needed to obtain utility U at the relative consumption levels r_1, …, r_n, or at fixed relative income r_m and market shares for different goods a_1, …, a_n. Differentiating (A.2) with respect to m, and using (3) for each good j, we get

$$\begin{aligned}\frac{\partial \omega}{\partial m} + \frac{\partial \omega}{\partial r_m}\frac{\partial r_m}{\partial m} &= \frac{\partial V}{\partial m} + \sum\nolimits_j \frac{\partial V}{\partial r_j}\frac{\partial r_j}{\partial x_j}\frac{\partial x_j}{\partial m} = \frac{\partial V}{\partial m} + \sum\nolimits_j \alpha_j \frac{\partial u}{\partial x_j}\frac{\partial x_j}{\partial m} \\ &= \frac{\partial V}{\partial m} + \rho \sum\nolimits_j \alpha_j \frac{\partial x_j}{\partial m}.\end{aligned} \tag{A.3}$$

We have directly that $(\partial\omega/\partial m) = (\partial V/\partial m)$. From individual utility maximization, taking consumption of others as given and price normalized to 1, we have that $\rho = \partial u/\partial x_j = \partial v/\partial x_j + (\partial v/\partial r_j)(\partial r_j/\partial x_j) = \partial\omega/\partial m + (\partial\omega/\partial r_m)(\partial r_m/\partial m)$ at the optimum. Hence, we can re-write (A.3) as

$$\frac{(\partial\omega/\partial r_m)(\partial r_m/\partial m)}{\partial\omega/\partial m + (\partial\omega/\partial r_m)(\partial r_m/\partial m)} = \sum\nolimits_j \alpha_j \frac{\partial x_j}{\partial m}. \tag{A.4}$$

The left-hand side of (A.4) is a measure of the marginal degree of positionality for income given that the overall market shares of different goods are held constant. Thus, we have

$$\alpha_m = \sum\nolimits_j \alpha_j \frac{\partial x_j}{\partial m} = \sum\nolimits_j \sigma_j \gamma_j \alpha_j, \tag{A.5}$$

where $\sigma_j \equiv (\partial x_j/\partial m)(m/x_j)$ is the income elasticity for good j, and $\gamma_j \equiv (x_j/m)$ is the individual expenditure share for good j.

Appendix B. Sample questions

B.1. Income experiment

Question 2. Choose between society A and B for your grandchild.

Society A:
- Your grandchild's income is 300.000 Colones/month.
- The average income in society A is 360.000 Colones/month.

Society B:
- Your grandchild's income is 288.000 Colones/month.
- The average income in society B is 240.000 Colones/month.

Given the prerequisites described in the introduction, choose the society you consider to be in the best interest of your grandchild, i.e. the society in which your grandchild will be most content.

☐ Society A
☐ Society B

(It is important that you focus only on the best interest of your grandchild, not on the society that is best for others or on the better society overall. Also, remember that prices are the same in both societies.)

B.2. Consumption experiment

The societies A and B are the same except for the information given below. Hence, even though other people spend more (on average) on cars in society A, their consumption of other goods is the same in societies A and B.

Question 2. Choose between society A and B for your grandchild.

Society A:
- The company provides a car with a market value of 4,500,000 Colones for your grandchild.
- In the society the average market value of cars is 5,400,000 Colones.

Society B:
- The company provides a car with a market value of 3,675,000 Colones for your grandchild.
- In the society the average market value of cars is 3,600,000 Colones.

Choose the society you consider to be in the best interest of your grandchild, i.e. the society in which your grandchild will be most content.

☐ Society A
☐ Society B

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