

Is Concern for Relative Consumption a Function of Relative Consumption?

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Abstract

By using hypothetical choice experiments, this paper presents evidence that individuals' concern for relative consumption depends on their relative consumption. Individuals with consumption levels above society's average consumption level tend to have, in general, lower concern for relative consumption. This supports Duesenberry's (1949) notion that people are more concerned with upward social comparison than with downward social comparison.

JEL classification: C91

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1 Introduction

Empirical evidence suggests that many individuals would accept a reduced *absolute* level of income, if they could have a better *relative* income in society; see e.g. Solnick and Hemenway (1998, 2005), Johansson-Stenman et al. (2002), Carlsson et al. (2003, 2005), and Alpizar et al. (2005). Earlier studies have largely focused on the extent to which utility depends on both absolute and relative income.

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Duesenberry (1949) emphasizes how an individual's consumption decision is affected by the consumption of others, but his notion about relative consumption was for a long time overlooked. Lately, economists have accepted Duesenberry's idea, e.g., Frank (1985, p. 150) argues that "... concerns about relative standing are perfectly compatible with the economist's view that people pursue their own interest in a rational way". A scholar that advocates Duesenberry's notion today is Schor (1998, p. 4). She argues that individuals today make "comparison with, or choose a 'reference group', people whose income are three, four, or five times their own". One thing that Duesenberry (1949, p. 101) claims is that "Low-income groups are affected by consumption of high-income groups but not vice versa", i.e. individuals care about relative consumption when they do an upward social comparison. This notion of social upward comparison, i.e. individuals look at a richer reference group, is also confirmed empirically by Bowles and Park (2005). They find that work hours increases by the degree of income inequality. Usually in the economic literature, and in this study, individuals' reference level is assumed to be exogenously given. However, Stutzer (2004) finds empirically that individuals who live in communities with higher incomes have higher aspiration levels, *ceteris paribus*. This may indicate that the environment of individuals affects their reference levels. Furthermore, Falk and Knell (2004) show empirical evidence suggesting that reference levels of students increase with their abilities.

This paper tests Duesenberry's notion by conducting hypothetical choice experiments for people in academia using a survey. An already established choice experiment procedure, see Johansson-Stenman et al. (2002) and Aplizar et al. (2005), is used when respondent concern for relative consumption is measured. I run three choice experiments: one benchmark experiment and two additional choice experiments, analogous to the benchmark experiment but using different hypothetical relative consumption amounts. I find that the concern for relative consumption is a function of the respondents' relative consumption. Respondents who, hypothetically, are in a situation where they consume less than the society average are more concerned about their relative consumption compared to respondents who consume more than the society average.

This study is parallel to Ferrer-i-Carbonell's (2005) test for an asymmetric social comparison effect, where she tests how people's relative income affects their stated subjective happiness.¹ She finds that people's happiness is negatively affected if their income is below their reference levels, but people's happiness is not affected if their income is above their reference levels. However, according to Ferrer-i Carbonell and Frijters (2003), self-reported

¹There is a vast number of studies on how relative income affects happiness, but to my knowledge only Ferrer-i Carbonell (2005) discusses the asymmetric social comparison effect. For excellent surveys regarding happiness, economics, and relative income see, e.g., Frey and Stutzer (2002) and Van Praag and Ferrer-i Carbonell (2004).

well-being is not a physical phenomenon that can be easily and objectively measured. Moreover, self-reported well-being is considered to be problematic, e.g. potential income biases in the subjective happiness norm; see e.g. Brekke (1997) and Osmani (1993). Hence, a different test, compared to Ferrer-i-Carbonell (2005), regarding the asymmetric social comparison effect in the context of concern for relative consumption provides additional insights into the area of relative income/consumption.

Section 2 introduces the hypotheses for the concern for relative consumption, Section 3 explains the choice experiment, Section 4 presents the result, and in Section 5 I draw some conclusions.

2 Hypothesis

Suppose an individual's utility depends both on his relative consumption, r_i , and on his absolute consumption, c_i , as follows:²

$$u_i = \nu(c_i, r_i) = c_i^{1-\gamma} r_i^\gamma \equiv c_i^{1-\gamma} \left(\frac{c_i}{\bar{c}}\right)^\gamma, \quad (1)$$

where c_i is individual i 's level of consumption, \bar{c} is his reference group's level of consumption, and γ is the marginal degree of positionality (MDP). The definition of marginal degree of positionality (γ) is the same as in Alpizar et al. (2005), and is

$$\gamma = \frac{(\partial\nu/\partial r_i)(\partial r_i/\partial c_i)}{\partial\nu/\partial c_i + (\partial\nu/\partial r_i)(\partial r_i/\partial c_i)}, \quad (2)$$

which follows from (1). The marginal degree of positionality (γ) is the fraction of total utility change that comes from the increased relative consumption from the last krona spent.³ For instance, $\gamma = 0.2$ implies that from an additional krona, 20 % of the utility increase comes from the increased *relative* consumption. It is easy to see that when $\gamma = 0$, the utility function collapses to an ordinary utility function, where merely individual i 's absolute consumption matters. If $\gamma = 1$, utility depends merely on individual i 's relative consumption. It is possible also that the MDP may be negative, or exceeds one.

According to e.g. Duesenberry (1949), low-income individuals compare themselves with high-income individuals but not vice versa. Hence, we have an upward social comparison in the economy. In the hypothetical choice experiment all respondents are given the same reference-level: the society

²The concern for relative consumption can of course be measured with other utility functions than a ratio comparison, for example with an additive comparison utility function; see e.g. Knell (1999) and Alessie and Lusardi (1997). In Section 4 a sensitivity analysis is performed with respect to the choice of utility function.

³The Swedish currency. SEK 7.90 \approx \$1 on March 10, 2006.

average consumption level. Then it is possible to test if relative consumption has an impact on the marginal degree of positionality. Hence, I formulate the following hypotheses:

$$H_0 : \gamma \text{ independent of } r_i$$
$$H_1 : \gamma \text{ decreases with } r_i.$$

The alternative hypothesis implies that the concern for relative consumption is higher for a respondent who consumes less than the society average compared to a respondent who consumes more than the society average, consistent with Duesenberry.

3 The Choice Experiment

The respondents' marginal degree of positionality are elicited with choice experiments that follow the design of an already established choice experiment procedure; see Johansson-Steman et al. (2002) and Alpizar et al. (2005).⁴ The eliciting technique allows each respondent to choose a fictitious grandchild. This technique is used in order to disentangle the respondents' actual consumption from the hypothetical consumption choices that they entertain in the survey.

The respondents read the following information before conducting the positional experiment:

Now we ask you to choose between two different future situations for a fictitious grandchild. We want you to choose the situation that you would consider the fictitious grandchild to enjoy the most and be most content in. The two situations will be described with the average monthly consumption in society in addition to your grandchild's monthly consumption which varies between the situations. The grandchild will live in a residential area that hosts a cross-section of the population.

The two situations are the same in all aspects except the levels of consumption, i.e. the grandchild's monthly consumption and the average monthly consumption vary. **The price level of goods is the same in both the situations, as are the items to purchase.** That is, for e.g. 100 SEK your grandchild can purchase exactly the same in both situations. In both situations a centrally located apartment with 4 rooms with a kitchen costs around 10,000 SEK, while 3 rooms with a kitchen in some suburban areas costs 5,000 SEK. The degree of inequality in society is the same in both situations. The environmental load of pollution is identical, i.e. lower consumption is not better for the environment.

⁴This study uses consumption instead of income as in Johansson-Stenman et al. and Alpizar et al.

Note that there is no "right" answer, but we ask you to make as thoughtful answers as possible. You may go back and correct your answers if you change your mind.

After this introductory text the respondents read a sample question; see *Appendix A* for this question.

Three different hypothetical choice experiments were conducted. One was the **benchmark** experiment, with the same values as Johansson-Stenman et al. (2002). The other two experiments were analogous to the **benchmark** experiment. Either the respondents entertain a consumption level that is always below the society average (**under** experiment) or they entertain a consumption level that is always above the society average (**over** experiment). See Table 1 for the different consumption amounts in the three choice experiments. After reading the introduction text, the respondents were assumed to be able to conduct the experiments. The first pair-wise question in the **benchmark** experiment was:

Compare situation A with B.

Situation A: Your grandchild's monthly consumption is 25,000 SEK/month. The average monthly consumption in society is 30,000 SEK/month.

Situation B: Your grandchild's monthly consumption is 25,000 SEK/month. The average monthly consumption in society is 20,000 SEK/month.

Given the described conditions, which of situations A and B do you regard to be the best for your grandchild, i.e. the situation your grandchild would enjoy the most and be the most content in.

Note that the price level is the same in situation A and B, e.g. for 100 SEK your grandchild can buy exactly the same in both situations. In addition, the load of environmental pollution and the degree of inequality are exactly the same in both situations.

- Situation A – go to experiment 2 p. 8.
- Situation B – go to question 1:2.
- Situation A and B are equally good – go to experiment 2 p. 8.

Adjacent to each answer, the respondents could read how to proceed. The different answers for pair-wise question no. 1 (in all three experiments) contained three possible answers: situation *A*, situation B_1 , or indifferent between situation *A* and B_1 . If the respondent preferred situation *A* or was indifferent between situation *A* and B_1 , the experiment ended. But, if the respondent preferred situation B_1 , the respondent continued to the subsequent pair-wise question no. 2. The possible answer set then consisted of situation *A* or situation B_2 . If the respondent preferred situation B_2 , the

experiment continued until he or she chose situation A in a subsequent pair-wise question, or until there were no more questions. There were in total seven pair-wise questions.⁵ All three choice experiments (**benchmark**, **over** and **under**) follow this procedure.

In Table 1 we can see the different pair-wise choice questions and their corresponding consumption amounts for all three experiments. In order to illustrate how the MDP value is calculated, we look at pair-wise question no. 3 in the **benchmark** experiment, i.e. situation A vs. situation B_3 in Table 1. MDP values of the other pair-wise questions are calculated analogously. From the information in Table 1, we know that society's average consumption is 30,000 SEK in situation A , while the grandchild's consumption is 25,000 SEK; meanwhile in situation B_3 society's average consumption is 20,000 SEK and the grandchild's consumption is 23,000 SEK. If, for example, the respondent i is indifferent between two situations (A and $B_{j=3}$), his marginal degree of positionality can be solved from the knowledge that $c_{iA}/\bar{c}_A^\gamma = c_{ijB}/\bar{c}_B^\gamma$, which comes from eq. (1) and where γ is the only unknown. For the other two experiments, i.e. (**under** and **over**), the marginal degrees of positionality can be calculated analogously for pair-wise question no. 3, although the consumption amounts are different. To illustrate how the marginal degree of positionality is calculated for pair-wise question no. 3 ($j = 3$) in all three experiments, I show below the calculation procedure:

$$\gamma = \frac{\ln\left(\frac{c_{ijB}}{c_{iA}}\right)}{\ln\left(\frac{\bar{c}_B}{\bar{c}_A}\right)} \approx \frac{\ln\left(\frac{23,000}{25,000}\right)}{\underbrace{\ln\left(\frac{20,000}{30,000}\right)}_{\text{benchmark}}} \approx \frac{\ln\left(\frac{28,550}{31,000}\right)}{\underbrace{\ln\left(\frac{20,000}{30,000}\right)}_{\text{under}}} \approx \frac{\ln\left(\frac{26,800}{28,200}\right)}{\underbrace{\ln\left(\frac{30,000}{39,000}\right)}_{\text{over}}} \approx 0.2. \quad (3)$$

In these illustrating examples the marginal degree of positionality is approximately 0.2, which implies that from an additional krona, 20 % of the utility change comes from the increased relative consumption.

⁵This procedure was chosen in order to reduce the time effort each respondent had to put in. Nonetheless, it has pros and cons: It minimizes the time effort, but it also gives the respondents the opportunity to end the experiments if they choose the alternative that allows them to end, which hence gives downward biased parameter values. Furthermore, the procedure takes away most of the non-monotonic answers.

Table1

The three different experiments with their different values of the fictitious grandchild's consumption (c_i) and the average level of consumption for society (\bar{c}).

Name of experiment	Pair-wise* quest.	Grandchild's consumption (c_i)	Average consumption (\bar{c})	γ if indifferent between A and B _j .	
Benchmark	A	25,000	30,000	Ratio	(Additive†)
	B ₁	25,000	20,000	-	(-)
	B ₂	24,000	20,000	0.00	(0.00)
	B ₃	23,000	20,000	0.10	(0.10)
	B ₄	20,400	20,000	0.20	(0.20)
	B ₅	18,400	20,000	0.50	(0.46)
	B ₆	17,400	20,000	0.75	(0.66)
	B ₇	16,650	20,000	0.90	(0.76)
Over Consumption levels in A imply that $c_i > \bar{c}$	A	31,000	30,000	Ratio	(Additive)
	B ₁	31,000	20,000	-	(-)
	B ₂	29,750	20,000	0.00	(0.000)
	B ₃	28,550	20,000	0.10	(0.125)
	B ₄	28,550	20,000	0.20	(0.245)
	B ₅	25,300	20,000	0.50	(0.570)
	B ₆	22,850	20,000	0.75	(0.815)
	B ₇	21,500	20,000	0.90	(0.950)
Under Consumption levels in A imply that $c_i < \bar{c}$	A	28,200	39,000	Ratio	(Additive)
	B ₁	28,200	30,000	-	(-)
	B ₂	28,200	30,000	0.00	(0.000)
	B ₃	27,450	30,000	0.10	(0.083)
	B ₄	26,800	30,000	0.20	(0.156)
	B ₅	24,700	30,000	0.50	(0.389)
	B ₆	23,200	30,000	0.75	(0.556)
	B ₇	22,300	30,000	0.90	(0.656)
		21,700	30,000	1.00	(0.722)

Note: * The subscript numbers of B represent the pair-wise question number. The pair-wise questions are presented in a consecutive order for each respondent.

† The additive comparison function is $u_i = \nu(c_i, \bar{c}) = c_i - \delta\bar{c}$.

3.1 The Questionnaire

The questionnaire consists of four sections: (i) background questions; (ii) experiment 1: regarding respondent habit-formation behavior; (iii) experiment 2: regarding respondent concern for relative consumption; and, (iv) questions about respondent characteristics. There was no monetary compensation or any other perks given to the respondents. The habit-formation experiment is beyond the scope of this paper and is presented in a separate paper.

The survey focused on two categories of people in the academic environment: those employed (professors and lecturers) by Göteborg University, and students at Göteborg University and Chalmers University of Technology. These two groups were chosen partly because they are at different stages in their life-cycles, and partly because they are easy to get in touch

with. Another reason is that they are trained to read and understand abstract questions. In mid-January 2005 the employees received the questionnaire through the university internal mail system, and those who did not answer received a second identical questionnaire in mid-February 2005 as a reminder. During the same time period, students in business, social work, and mechanical engineering were targeted and approached at the end of a lecture, and were asked if they wished to - voluntarily - participate in a survey. Conducting the experiments took, on average, around 20 minutes.

At first, 1,007 questionnaires were sent to all professors and lecturers registered in the end of 2004. However, it turned out that only 994 names were valid, since people had resigned, were on leave of absence, abroad, or had passed away. From these 994 questionnaires, 286 were returned and completed. An additional 44 questionnaires were returned as well, but these did not contain any useful information. This gives a response rate of 28.8 % (27.7 % and 30.8 % for lecturers and professors, respectively). In total 605 students took part in the experiment, representing five different lecture groups: two groups of social work students where the participating rate was, on average, 85 %; two groups of business students where the participating rate was, on average, 85 %; and one group of engineering students where the participating rate was 99 %. The total sample therefore consists of 891 respondents.

The students and the employees were randomly divided into two groups where: one group answered the **benchmark** experiment and the other answered both the **over** and **under** experiments. Although the respondents are to various degrees trained in handling abstract problems, the experiments are complex and difficult to understand, which may suggest that an order effect exists. To test for this there were in total 4 versions of the questionnaire, where the two types of experiments (habit and positionality) have different orders.⁶

For the relative consumption experiments, out of 1,254 choice experiment answers, 29 (2.3 %) were inconsistent, e.g. they answered the first and third pair-wise questions, but not the second.⁷

⁶The order of the experiments were: (I) **over** & **under** and habit (II) habit and **over** & **under** (III) **benchmark** and habit, and (IV) habit and **benchmark**. The questionnaires were distributed among the students and the employees using the following procedure: For the students, I interrupted lectures in the lecture halls and distributed the questionnaires row by row. I had mixed the different versions so that every fourth student received the same version. Therefore a student who answered a certain version had different versions of the questionnaires on each side. This procedure minimizes the "peeking" effect that may otherwise be present. For the employees I assigned a uniformly distributed continuous number between 0 and 1 to each one in the data set. If these numbers were within a certain predetermined interval the respondents received a predetermined version of the questionnaire that corresponded to the interval.

⁷The inconsistent (non-monotonic) answers may be explained by that the respondents read the instructions by themselves - I did not explain the experiment procedure to them. There were 11 inconsistent answers for the benchmark experiment, and 7 and 11 for the

4 The result

From the results of the choice experiments (see Table 2) it is possible to observe that the results from this survey are in line with Dueseneberry's claim: $\gamma_{under} = 0.544 > \gamma_{bench} = 0.325 > \gamma_{over} = 0.181$.⁸ The results immediately suggest that the concern for relative consumption is higher for a respondent who consumes less than the society average, compared to a respondent who consumes more than the society average, i.e., supporting the alternative hypothesis. The results from these three choice experiments also indicate that there to some degree exists a concern for relative consumption, which has earlier been recognized by e.g. Solnick and Hemenway (1998), Johansson-Stenman et al. (2002), Carlsson et al. (2003, 2005) and Alpizar et al. (2005).

This study has a lower mean MDP than in the experiment of Johansson-Stenman et al. (0.43). In the case of only students, the mean MDP is even lower; see table 2.⁹ Their median degree of positionality is between 0.2 and 0.5, while the median MDP in the **benchmark** experiment is between 0.0 to 0.1. One simple explanation may be that people in general are more positional regarding their income compared to their consumption level, since these choice experiments use relative consumption while Johansson-Stenman et al. (2002) use relative income.

Moreover, Johansson-Stenman et al. (2002) perform a crude test of which comparison function (ratio or additive) works best from the assumption that respondents' marginal degree of positionality are the same regardless of respondent relative income. In addition to their original experiment, they construct two other experiments where the grandchild's income is either always much lower or always much higher than the aver-

over experiment and **under** experiment, respectively.

⁸The calculation of the mean value is made after first assessing values to the two extreme cases $\gamma < 0$ and $\gamma > 1$. I give these extreme cases the numerical values -0.05 and 1.05, respectively, which are the same values Johansson-Stenman et al. (2002) use. On the other hand, we do not know the distribution of γ and if γ is normally distributed it implies other extreme values of γ (than -0.05 and 1.05) which leads to that the mean γ_{over} cannot be positive; but the same order still holds between three experiments. The distribution of γ is an area for future research. The other numerical values are given the values that correspond to the marginal degree of positionality that is in the mid of each interval. The mean values are then calculated as: all respondent MDP values are summed up and divided by the number of respondents. The same procedure is also used for the other two mean MDP values.

⁹There may be a problem with sample selection between the two groups, since those who do not wish to undertake the experiments may have similar characteristics, i.e. MDP values. For example, if the share of non-respondents is higher for the employed group (it is easier for them to skip the experiments) with a certain characteristic, its standard deviation of MPD would differ compared to the student group. Hence, I test if the variance is equal between the two groups by running a Levene's test. Thereby I can conclude that the variance is equal between the two respondent groups in the **under** and **benchmark** experiment, but not in the **over** experiment.

age income in society.¹⁰ These two experiment are analogous to the **under** and **over** experiments. Johansson-Stenman et al. (2002) find that the mean marginal degree of positionality are lower for both the **under** experiment (0.37), where the grandchild's consumption is always below the average, and the **over** experiment (0.31), where the grandchild's consumption is always above the average. Hence, their MDP structure is $\gamma_{lower} = 0.37 < \gamma_{medium} = 0.43 > \gamma_{higher} = 0.31$, which is inconsistent with the mean MDP structure I find. My notion is that this difference depends on their use of other values in their choice experiments. For example, people on the brink of poverty do not have the luxury to accept a reduced level of income in order to have a better relative income. Earlier analogous studies such as Carlsson et al. (2003, 2005) and Alpizar et al. (2005) find mean values of MDP to be in the interval of 0.28-0.79.¹¹

Table2

The results from the three different choice experiments.

Parameter values positionality	Under n=389 Freq.	Benchmark n=438 Freq.	Over n=398 Freq.
$\gamma < 0$	0.129	0.327	0.588
$\gamma = 0$	0.062	0.114	0.088
$0 < \gamma < 0.1$	0.069	0.062	0.045
$0.1 < \gamma < 0.2$	0.043	0.034	0.010
$0.2 < \gamma < 0.5$	0.147	0.116	0.038
$0.5 < \gamma < 0.75$	0.172	0.126	0.085
$0.75 < \gamma < 0.9$	0.064	0.048	0.023
$0.9 < \gamma < 1.0$	0.044	0.082	0.083
$\gamma > 1$	0.270	0.091	0.040
$\bar{\gamma}$	0.544	0.325	0.181
$std\bar{\gamma}$	0.419	0.409	0.377
$\bar{\gamma}_{employed}$	0.517 (n=123)	0.353 (n=134)	0.115 (n=130)
$std\bar{\gamma}_{employed}$	0.407	0.417	0.325
$\bar{\gamma}_{students}$	0.552 (n=266)	0.312 (n=304)	0.212 (n=268)
$std\bar{\gamma}_{students}$	0.425	0.406	0.396
Levene's test*			
significance value	0.274	0.580	0.000

Note: n is the number of respondents who answered in the different experiments.

* tests if the variance is equal between employed and student groups. A value higher than 0.10 suggests that the variances are equal.

The result here is also consistent with recent happiness studies such as

¹⁰For the **under** experiment, this study's relative consumption ratios - grandchild vs. society's average - in situations A and B_1 are 72.3% and 94%, respectively, while in Johansson-Stenman et al. (2002) the corresponding relative income ratios are 50% and 75%, respectively. For the **over** experiment, this study's relative consumption ratios in situations A and B_1 are 103% and 155%, respectively, while in Johansson-Stenman et al. (2002) the corresponding relative income ratios are 200% and 300%, respectively.

¹¹When they calculate their mean MDP they use the same extreme values as in this study.

Ferrer-i-Carbonell (2005). In a German data set she finds that individuals with income levels above their individual specific reference levels are not happier, but individuals with income levels below their reference levels are less happy. Unlike Ferrer-i-Carbonell (2005), where actual levels of income are used, the design of these experiments allows the individuals to have both a hypothetical low and high *relative* consumption, which strengthens the empirical evidence of existing asymmetric social comparison effects. Although these studies indicate the existence of an asymmetric social comparison effect, more research with different methodology is beneficial, particularly eliciting information of individuals' marginal utility when they make an upward social comparison.

In order to test if I can reject the Duesenberry's hypothesis I run a simple interval regression, where the MDP is the dependent variable and the **under** and **over** experiments are dummy variables. Furthermore, I include two dummy variables: if the respondents are students and if they took the positional experiment before the habit experiment (a significant dummy will then suggest that there is an order effect). The results in Table 3 show that the marginal degree of positionality is significantly higher in situations where the respondents make an upward social comparison. Therefore, I can reject the null hypothesis: MDP does decrease with relative consumption. Thus, this survey supports Duesenberry's (1949) claim that people generally care more about relative consumption when they make an upward social comparison. In addition, we can see that there is no significant difference between students and employed respondents.¹²

A notable feature in the **under** experiment (see Table 2) is that 27 % of respondents have $\gamma_{under} > 1$.¹³ If the respondents' true utility function is instead an additive comparison function equal to $u_i = \nu(c_i, \bar{c}) = c_i - \delta \bar{c}$ it changes the MDP values. MDP, (δ), is now calculated as

$$\delta = \frac{c_{iA} - c_{iB}}{\bar{c}_A - \bar{c}_B}. \quad (4)$$

One implication of changing the comparison functional form is that higher MDP values from the **under** and the **benchmark** experiments decline. For example, the MDP values of $\gamma_{under} > 1$ in the **under** experiment decline to $\delta_{under} > 0.72$ (see Table 1). On the other hand, the opposite is true for the **over** experiment (now $\delta_{over} > 1.04$ instead of $\gamma_{over} > 1.00$).

This implies that with an additive comparison function (4) the mean MDP values change to: $\delta_{under} = 0.441 > \delta_{bench} = 0.319 > \delta_{over} = 0.221$.

¹²Moreover, I have also run regressions with objective variables such as: age, gender, and number of siblings, but none of these turns out to be significantly different from zero. This implies that respondents' different stages in the life-cycle do not influence their MDP. The results are available from the author upon request.

¹³Over 18% of the respondents that have $\gamma \leq 0$ and $\gamma > 1$ in the **over** and in the **under** experiment, respectively. Their preferences are completely reversed in these two experiments.

The structure of mean MDP values is consistent given different comparison utility functions.¹⁴ Using the additive MDP values I run a new interval regression to see if the dummy variables (for the experiments) are significant. The result in Table 3 shows evidence suggesting that the MDP values are significantly higher in situations where the respondents make an upward social comparison. Hence, the hypothesis that MDP decreases with relative consumption cannot be rejected for any of the types of utility functions.

Table3

Interval regression estimates of the marginal degree of positionality parameters.

Utility functions	Ratio (γ)		Additive (δ)	
Variables	Coefficient	std. err.	Coefficient	std. err.
Constant	0.325***	(0.027)	0.278***	(0.024)
Under Experiment	0.208***	(0.027)	0.110***	(0.024)
Over Experiment	-0.137***	(0.027)	-0.079***	(0.024)
Student	0.030	(0.024)	0.030	(0.021)
Order effect	-0.033	(0.022)	-0.024	(0.020)
Observations	1225		1225	

Note: Standard errors in parentheses. * significant at 10%;
 ** significant at 5%; *** significant at 1%.

4.1 Possible biases

A notable feature in Table 2 is the fraction of respondents having a negative marginal degree of positionality, $\gamma < 0$, in the experiments.¹⁵ The evidence suggests that there is a tendency that the fraction of the respondents with $\gamma < 0$ is negatively related with the relative consumption in the experiments. For example, in the **over** experiment, a little more than 58% of the respondents have $\gamma_{over} < 0$.¹⁶ Meanwhile in the **under** experiment, the corresponding fraction is a little more than 12%.

Why do we see this distinct difference in the fraction of respondents having negative MDP in the different choice experiments? Suppose now that a respondent's preferences are $\gamma < 0$ and $\gamma > 0$ for the **over** and

¹⁴I have also tested changing the extreme MDP values for both utility functions, i.e. for the ratio comparison utility function; instead of $\gamma = -0.05$ and $\gamma = 1.05$, the MDPs now have the values $\gamma = -0.50$ and $\gamma = 1.50$, respectively. This alteration of the extreme MDP values will of course change the mean MDP values, but the same structure between the mean MDP values is still present. Also, there is still a significant difference between the experiments even under the two types of comparison utility functions.

¹⁵If $\gamma < 0$, it may imply a kind of altruism. Then, if the respondents have a higher consumption level than the society average, it is more likely that the respondents have altruistic feelings compared to when the respondents have a consumption level that is lower than the society average.

¹⁶In pilot studies, equally high fractions of respondents have revealed that their preferences were less or equal to zero. I have even reversed the order of the experiments so that the respondents would answer the last question first (in this setup), but this gave approximately the same high marginal degree of positionality.

the **under** experiments, respectively. The respondent’s cognitive evaluation process for the pair-wise questions begins with the comparison of situation A ’s consumption possibilities, followed by situation $B'_{j=1}$ ’s consumption possibilities, where $j \in \{1, 7\}$ and indicates the pair-wise choice question. For example, when the respondent studies pair-wise question no. 1 in the **over** experiment, he sees that in situation A the grandchild consumes more than average. Meanwhile in situation B_1 , the grandchild has a substantially higher relative consumption compared to situation A . Then, if the respondent has an aversion against a situation where the grandchild would belong to a group in society with a high relative consumption (“brat aversion”) or if the respondent has some kind of altruistic preferences, he chooses A over B_1 . The larger the consumption gap in situation B_1 , i.e. $c_{j=1B} > \bar{c}_B$, the more likely it is that the respondent chooses situation A . Another explanation may be what Johansson-Stenman et al. (2002) suggest. Respondents choose not to care so much about relative consumption, because they think such preferences are not good for future family members to have. This notion may influence respondents to choose $\gamma < 0$ in the **over** experiment. Moreover, one explanation that cannot be neglected is that the respondents choose the non-positional situation in order to end the experiments as fast as possible; which would give a downward biased MDP value.

In the **under** experiment the grandchild’s consumption level is always below average ($c_i < \bar{c}$). If the respondent has an aversion against his grandchild belonging to a group of individuals that consume less than average, the respondent chooses situation B_1 over situation A . This is obvious, since in situation B_1 the grandchild’s consumption is closer to the society average compared to situation A . Thus, the respondent then cares to some degree about his grandchild’s relative consumption.

Furthermore, in total only 14 individuals chose such parameter values that enabled them to end the experiments as soon as possible. Such a low fraction (3.2%) of respondents ought to rule out the explanation that the low mean MDP is due to the respondents having ended the experiments without revealing their true preferences. Another explanation may be that depending on in which order the respondents performed the relative experiments, the proportion of respondents that chose $\gamma \leq 0$ may differ. On the other hand, we can see in Table 3 that the dummy for the order effect in the interval regression is not significant. Therefore, it seems that the order affect did not effect the proportion of respondents that chose $\gamma \leq 0$.

5 Conclusion

Previous studies of the concern for relative income have found that individuals often accept a reduced *absolute* level of income if they can have a better *relative* income in society. By using hypothetical choice experiments, this

paper tests Duesenberry's (1949) hypothesis that individuals who make an upward social comparison have a higher concern for their relative consumption than those who make a downward social comparison. The empirical results support Duesenberry's hypothesis. Moreover, I find that there are no systematic differences between students and employees in their concern for relative consumption. This suggests that the concern of individuals for relative consumption is independent of where the individuals are in their life-cycles.

Appendix A

Below is a sample question that the respondents read before performing the experiments.

Example:

Compare situation A with B.

Situation **A**: Your grandchild's monthly consumption is **25,000** SEK/month. The average monthly consumption in society is **30,000** SEK/month.

Situation **B**: Your grandchild's monthly consumption is **23,000** SEK/month. The average monthly consumption in society is **20,000** SEK/month.

In this example your grandchild consumes **2,000** SEK more per month in situation **A** compared to situation **B**.

We also see that your grandchild consumes **5,000** SEK/month more than the average in situation **A**. Meanwhile, in situation **B** this amount is **3,000** SEK/month more than the average.

You shall later on, given the written information, choose which of situations **A** or **B** you consider to be the best for your grandchild, i.e. the situation your grandchild would enjoy the most and be the most content in. Situation **A** will always be the same.

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