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Sibling and Birth-Order Effects on
Positional Concerns

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Abstract

Survey data is used to investigate how birth order and having siblings affect positional concerns in terms of success at work and of income. We find that only-children are the most concerned with relative position, but that number of siblings increases the concern among those who grew up together with siblings. Furthermore, people whose parents often compared them with their siblings have stronger positional concerns in general. We find differences depending on whether the issue is relative income or relative successfulness, and that people generally have stronger positional concern in relation to friends, but less so in relation to parents and least in relation to siblings. We also find that younger respondents are far more concerned with relative position than older in all studied situations.

Key words: birth order, positional concern, only child, relative income, siblings.

JEL classification: D31, D63

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1. Introduction

This paper utilizes unique Swedish survey data to increase our understanding of the extent to which birth order and other family variables affect a person's positional concerns in terms of income and successfulness at work. By positional concern we mean the concern that people have with their own position compared to that of others in terms of e.g. income, successfulness, and consumption of certain goods. Ever since the seminal work by Easterlin (1974), many studies have indicated that relative issues affect people's well-being and are therefore important to investigate.[1] Yet, almost no work has been done to understand what in our backgrounds and childhood can explain the existence of positional concern. To our knowledge, this is the first study that links the potential effects of family variables, such as birth order and being the only child, to positional preferences.

Most of us have a sense that our siblings (or absence of siblings) affect us throughout our lives. From popular media we have for instance heard that if you are the oldest child you are orderly and likely to become a leader. One might also think that an only-child, who during childhood was always used to being the foremost (never surpassed by any brothers or sisters) would be eager to be more successful than others also as an adult, while a youngest child, who through his/her entire upbringing could not achieve as much as the older siblings, would not be equally concerned with relative status. Sulloway claims in a highly debated article from 1996 that first-borns are more conscientious than later-borns, and later-borns are more agreeable and extraverted, while Freese et al. (1999) find very small differences between first-borns and later-borns on social attitudes. However, Saroglou and Fiasse, (2003) argue that it is important to distinguish between middle-borns and the youngest, and not simply regard them both as later-borns.[2] Moreover, Beck et al. (2006) find in a within-family study that first-borns score higher on dominance and later-borns on sociability. Blake (1991) investigates whether only-children and others raised in small families are less social, more egocentric, and/or more goal-oriented but concludes that this is not the case. There

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[1] See e.g. Frank (1985a), Easterlin (1995), Solnick and Hemenway (1998), McBride (2001), Johansson-Stenman et al. (2002), Alpizar et al. (2005), Ferrer-i-Carbonell (2005), Torgler et al. (2006), and Carlsson et al. (2007).

[2] They find that last- and first-borns are similar in conscientiousness, religion, and educational achievement, while middle-borns are less conscientious, less religious, and have lower school performance.

are also quite a few studies that have found that birth order and/or family size affect educational and wage level.[3]

We specifically analyze how birth order and the presence or absence of siblings affect positional concerns. Thanks to our survey data, we can also check whether different siblings have different impacts on preferences, e.g. we make a distinction between the siblings one grew up with and those one did not grow up with, and we also analyze whether growing up with step- and half-siblings matters for positional concern. Since most previous sibling studies have used register data, this is, as far as we know, the first study that controls for growing up in these kinds of "new families."

Previous research has pointed to the importance of sibship sex composition,[4] so we examine whether gender-composition also affects positional concerns. According to Tesser (1980), a person's self-esteem is threatened by sibling comparison; the closer in age two siblings are and the better one performs compared to the other, the more the friction increases between them. It is also possible that comparisons between siblings enhance the degree of positional concern, so we analyze whether people who feel that their parents used to compare them with their siblings care more about their relative position than others.

Although most previous studies on positional concerns have focused on comparisons with "people in general," Kingdon and Knight (2007) found that a person can have several reference groups,[5] and Frank (1985b) argues that people compare themselves with those they compete with for important resources. We regard three specific reference groups, namely parents, siblings, and friends, and analyze whether positional concerns differ depending on the reference group and on the issue at hand. Moreover,

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[3] Hanushek (1992) finds that first-borns have better educational attainment, because being a first-born increases the likelihood of coming from a small family. Black et al. (2005) and Kantarevich and Mechoulan (2006) explain it with birth order rather than with family size. Booth and Kee (2008) find that both family size and birth order matter for educational attainment, while Kessler (1991) finds no effects of either birth order or family size on wage level.

[4] Kidwell (1982) finds that middle-born males have lower self-esteem but that being a sole brother among sisters clearly increases it; Argys et al. (2006) find that for smoking, drinking alcohol or belonging to a gang, younger brothers are more affected by their oldest sibling if this is a girl; Butcher and Case (1994) show that women who have grown up with only brothers have received more education than women with only sisters, while the sex composition of siblings does not affect men's education. Kaestner (1997) finds that those who grew up with sisters received more education.

[5] E.g., one's own past, family members, others with similar characteristics, and people at one's workplace.

Solnick and Hemenway (2005) find that positional concern varies widely across issues. Therefore, we do not consider relative income to be the only measure of position, but also look at relative successfulness at work, something that has not been done before.

The notion of positional concern has important policy implications since it affects, e.g., optimal taxation and optimal public goods provision.[6] According to Fisher and Torgler (2006), positional concern per se is undesirable because people with lower income perceive frustration over not being able to keep up with the Joneses, which may decrease trust in society. Relative status seeking also affects wage formation (Agell and Lundborg, 1995, 2003) and labor-force participation (Neumark and Postelwait, 1998).[7] Our study, which focuses on both relative income and relative successfulness at work, will be able to shed some light on for example people's behavior in the labor market and their educational choices.

The remainder of this paper is organized as follows. Section 2 describes the design of our survey. Section 3 reports the descriptive statistics and empirical results from the analyses. We study the positional concerns both descriptively depending on birth order and in regressions where we first analyze the whole sample and then the subsample of respondents who were brought up together with siblings. In this section we also investigate whether the degree to which a person perceives having been compared with siblings is affected by the person's birth order. Finally, Section 4 concludes the paper.

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[6] Boskin and Sheshinski (1978), Oswald (1983), Persson (1995), Ireland (2001), and Aronsson and Johansson-Stenman (2008) all study the effects on optimal taxation and Ng (1987) those on public goods provision.

[7] Neumark and Postlewaite (1998) find that a woman's labor-market decision depends on the labor-market status of her sisters and on the relative income of her sisters and their spouses; if a woman's spouse earns less than her sister's, and the sister is non-working, the woman is more likely to join the labor force in order to achieve a higher family income than her sister.

2. Design of survey

Our survey includes five different questions about concerns for relative successfulness at work and for relative income. The respondents were asked to state how important it is for them to be more successful at work than their parents, friends, and the siblings they grew up with. They responded on a 1-5 scale, where 1 means *Of no importance* and 5 means *Very important*. We also asked them how important it is for them to not earn less than their friends and the siblings they grew up with. The formulation in the survey was the following:

Box 1. The questions about positional concerns.

Mark the box that best describes how important the statement is to you. Number "1" means Of no importance and " 5" means Very important. You can also mark the alternative Not applicable if you do not have any siblings.	Of no impor- tance				Very impor tant	Not appli- cable
	1	2	3	4	5	
To be more successful at work than my parents	☐	☐	☐	☐	☐	
To be more successful at work than my friends	☐	☐	☐	☐	☐	
To be more successful at work than my siblings (with whom I grew up)*	☐	☐	☐	☐	☐	☐
To earn no less than my friends	☐	☐	☐	☐	☐	
To earn no less than my siblings (with whom I grew up)	☐	☐	☐	☐	☐	☐

* = To be able to know which sibling(s) the respondents compared themselves with when answering the survey, we asked them to compare themselves with the siblings they grew up with. According to the results of our pilot survey, the siblings who a person grew up with have the strongest influence on that person.

We also asked whether the respondents grew up as only-children or if they had siblings, and if they did, when their siblings were born and which of them they were brought up with. Since family size has proven to be very important in birth-order studies (see e.g. Kidwell, 1981, and Booth and Kee, 2008), we also use information about the number of each respondent's siblings. Due to new family make-ups, people grow up with different types of siblings or they might have siblings they do not live with. For example, it is possible that step- and half-siblings affect positional concerns differently than biological siblings, and that those who did not grow up with their siblings are different than both only-children and those who grew up with their siblings. In this study we are able to distinguish between biological, adoptive, and half- and step-siblings and between siblings one lived with and others. Since most previous

sibling studies have used register data about current households, we have not found any other study that controls for growing up in these kinds of "new families."

We then asked for the respondents' subjective perception of their birth order, i.e. whether they *feel* like an oldest-, a middle-, or an only-child, etc. Thus, our questions give information about birth order in three different ways: (1) by including all the siblings a respondent had as a child, (2) by including only the siblings he/she shared at least half his/her childhood with, and (3) his/her subjective perception of his/her birth order. We also tested which of (1) and (2) that corresponds best to (3). We find that the distribution of those a person grew up with (regardless of whether the siblings were biological or not) corresponds better to his/her subjective perception than to the distribution of all the siblings he/she had, or to the narrower definition of including biological and adopted siblings only. In this paper we therefore define siblings as the siblings with whom a person shared at least half of his/her childhood.

In order to disentangle birth-order effects from other family effects, we asked the respondents about several family-specific characteristics such as economic standard during childhood, and whether their parents lived together at least until the respondent turned 15. These are both factors that affect a person's childhood and possibly positional concern. To control for whether one's parents lived together is also important for us since we want to distinguish the effect of living with step- and half-siblings from the effect of broken families. The question of birth-order effects is closely related to that of the mother's age; the youngest children tend to have older mothers than the oldest children. While the oldest child in a family might receive more parental attention, the standard of living is often better for the youngest child. This might boost the effects of being born last and underestimate the effects of being a first-born (Kantarevic and Mechoulan, 2006). We therefore also asked for the age of each respondent's mother.

In addition to several questions about socio-economic characteristics, we included a number of subjective questions related to childhood and family. For example, we asked whether the respondents think they have been affected by their birth order or by being an only-child. Since we believe that comparison during childhood increases

positional concern, we also asked the respondents whether they perceive that their parents compared them with their siblings during childhood. The question read:[8]

Box 2. The question about perceived comparison during childhood.

Do you perceive that your parents compared you with your siblings during your childhood? ☐ No ☐ Yes, but seldom ☐ Yes, quite often ☐ Yes, very often

As indicated by Johansson-Stenman and Martinsson (2006) and Falk and Knell (2004), positional concern could decline with age. Therefore, we look at two age groups: one consisting of 25-year-olds and one consisting of 40-year-olds.

3. Results

We use survey responses from a mail questionnaire sent out in March 2007 to a random sample of 6,000 Swedes – men and women, with and without siblings. Three thousand were born in 1967 and the rest in 1982.[9] A single reminder was sent out three weeks after the main survey. The response rate of the study was 42 percent after correcting for those who had moved or for other reasons had not received the questionnaire.

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[8] In order to not affect the answers to the positional concern questions, the comparison question was placed two pages and several questions before the positional concern questions.
[9] The main questionnaire was revised after we had analyzed the answers from the pilot survey conducted in December 2006.

3.1 Descriptive statistics

Table 1 presents the descriptive statistics of the variables used in the analyses.

Table 1. Descriptive statistics of independent variables. Full sample.

Variable	Explanation	Mean	St. Err.
Oldest	= 1 if respondent is an oldest-child	0.348	0.477
Middle	= 1 if respondent is a middle-child	0.186	0.389
Youngest	= 1 if the respondent is a youngest-child	0.346	0.476
Twin	=1 if respondents is a twin	0.021	0.142
Only child	=1 if respondent is an only-child	0.062	0.241
Lived alone	=1 if respondent had siblings but did not grow up with them	0.038	0.190
No. of siblings	= number of siblings a respondent has grown up with	1.711	1.256
Siblings; grew up/not grew up with	=1 if respondent who had siblings he/she grew up with also had siblings he/she didn't grow up with	0.143	0.350
Space; 2 years	= if respondent had siblings within 1-2 years of age	0.281	0.450
Space; 5 years or more	= if respondent's closest siblings were at least 5 years older or younger	0.197	0.398
Step/half sibling(s)	=1 if respondent had half-siblings	0.100	0.301
Woman with only sisters	=1 if respondent is a female and only lived with sisters	0.176	0.388
Woman with only brothers	=1 if respondent is a female and only lived with brothers	0.185	0.388
Man with only sisters	=1 if respondent is a male and only lived with sisters	0.111	0.314
Man with only brothers	=1 if respondent is a male and only lived with brothers	0.115	0.319
Parents income lower than average	=1 if economic standard was lower than average during childhood	0.231	0.422
Parents lived together	= 1 if respondent's parents lived together at least until he/she was 15	0.774	0.418
Mother's age	= age of the mother when respondent was born	27.248	5.430
Grew up in big city	=1 if respondent grew up in one of the three biggest cities in Sweden	0.195	0.396
Grew up in small town	=1 if respondents grew up in small town ≤ 20,000 habitants/countryside	0.404	0.491
Woman	=1 if respondent is female	0.601	0.490
Age group 25	=1 if respondent is 25 years old	0.461	0.499
Income	= respondent's personal monthly income level today	19.606	11.335
University	=1 if respondent has university education > 3 years	0.257	0.437
Often compared during childhood*	=1 if respondent has often been compared with her/his siblings during childhood	0.255	0.436
No. of individuals	2,291		

* The mean is from the sub sample, excluding only-children and those who lived alone.

About 35 percent of the respondents are first-borns, about 19 percent are middle-borns, and nearly 35 percent are last-borns according to our definition where we include only siblings with whom one grew up. About 2 percent are twins and 6 percent are only-children. Furthermore, the share of respondents who had siblings but did not

grow up with any of them is about 4 percent. On average, each respondent grew up with 1.71 siblings. Ten percent had step-siblings and/or half-siblings they grew up with, while 14 percent had both siblings they grew up with and siblings they did not grow up with.[10] Finally, because we are interested in whether sibling comparison affects positional concern, it is interesting that nearly 26 percent of the respondents who grew up with siblings perceive that their parents quite or very often compared them with their siblings. When comparing the descriptive statistics of the respondents with national statistics, we find that in terms of the share of respondents with university education, this study corresponds very well with the national level shares (Statistics Sweden 2007).[11] However, the share of women is significantly higher in our study (namely 60 percent), and the net response rate is slightly higher for the older cohort than for the younger. Unfortunately, there are no statistics available regarding the shares of first-/middle-/last-borns and only-children born in 1967 and 1985; we are therefore not able to test whether our shares of the different birth orders are representative or not. However, the shares of first- and last-borns are about equal in our sample.

3.2 Positional concerns

When it comes to the questions that capture positional concerns, the respondents were asked to state how important they think it is to be more successful at work than their parents, friends, and siblings, respectively, and to not have lower income than friends and siblings (see Box 1, Section 2). Table 5 shows that most people are not very concerned with relative successfulness at work and income, but there are differences among the questions.

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[10] We also divided the sample between those who are 25 and those who are 40 years old. We find that according to the Chi-square tests, the share of middle-borns is significantly (at 5 % level) lower among the 40-year-olds than among the 25-year-olds, while the share of only-children is higher. Compared to the older age group, those in the younger age group had significantly more siblings who they lived with. The shares of the respondents do not differ between the two age groups in terms of having lived with half- and step-siblings, not having lived with any siblings, and having had both siblings one lived with and siblings one did not live with.

[11] Percentile tests show that at the 5 % significance level, the level of higher education among the respondents in this study does not differ from the corresponding distribution of all people living in Sweden. About 24 % of people aged 25-44 years have at least 3 years of university education (Statistics Sweden, 2007).

Table 2. Breakdown of responses (in percent) to the questions. Full sample.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)	Not relevant
To be more successful at work than my parents	62.7	12.2	14.5	6.7	3.9	
To be more successful at work than my friends	49.3	18.8	20.8	8.2	2.9	
To be more successful at work than my siblings (with whom I grew up)	59.1	14.2	12.7	4.5	1.7	7.8
To earn no less than my friends	45.3	21.5	21.3	8.5	3.4	
To earn no less than my siblings (with whom I grew up)	59.5	14.0	12.8	4.0	1.5	8.1

Solnick and Hemenway (2005) find that people are positional in different respects, and that no-one in their sample was altogether positional or non-positional. In our sample, three percent stated "of no importance" for all questions, and only a handful stated "very important" for all questions. The distributions of the responses are statistically different among the questions according to the Chi-square tests. We also find rather low correlations between questions (Appendix A presents a correlation matrix). However, the correlations are higher concerning the same reference group than concerning the same relative issue, and the strongest correlation is found between the two questions relating to siblings. Table 3 shows the mean values of the responses to each question, separated into birth-order groups and whether the respondent was an only-child or did not live with their siblings. Tables showing the complete distributions for these groups are presented in Appendix B.

Table 3. Mean values of responses (1-5), depending on birth order among siblings, and on whether the respondent was an only-child or did not live with his/her siblings. Full sample.

	All	Oldest	Middle	Youngest	Twin	Did not live with siblings	Only child
To be more successful at work than my parents	1.77	1.81	1.69	1.72	2.15	1.99	1.83
To be more successful at work than my friends	1.97	2.02	1.93	1.91	1.96	2.02	2.10
To be more successful at work than my siblings (whom I grew up with)	1.65	1.64	1.69	1.63	1.91		
To earn no less than my friends	2.03	2.02	2.08	2.02	1.98	1.94	2.13
To earn no less than my siblings (who I grew up with)	1.63	1.61	1.68	1.63	1.59		
No. of individuals	2, 291	797	426	793	47	86	142

The mean values of all responses show that people are generally more concerned about relative successfulness in relation to their friends than in relation to their parents. Overall, people are significantly more concerned with how well their incomes measure up to the incomes of their friends than about how their level of success compares to the success of friends, although the mean values are very similar.[12] Those who were not brought up with their siblings are more concerned with being more successful than their parents than the other categories are, and the differences between this group and youngest-children and middle-borns, respectively, are significant according to the Wilcoxon test. When it comes to being more successful than one's friends, only-children are the most concerned, but only the difference between them and youngest-children is statistically significant. There are no significant birth order-related differences in positional concern in relation to siblings with one exception: Twins are more concerned with relative success than others, but since they are so few, the result should be interpreted with care. People with siblings are significantly less positional in relation to their brothers and sisters than in relation to parents and friends.[13] This could either be completely true or could reflect that it is not really acceptable to be positional in relation to siblings.

3.3 Positional concern in relation to parents and friends, full sample

So far, we have only looked at descriptive statistics on positional concerns. To be able to see whether the differences in positional concern due to birth order prevail when we control for a number of family and socio-economic variables, we turn to a regression analysis. In this section, we analyze positional concerns in relation to parents and friends. Table 4 presents the results of least square regressions of relative success at work and relative income for the full sample.[14] In the next section and in Table 5, we present results of OLS regressions for a relative comparison with siblings for the subsample of those who grew up together with siblings. In all the OLSs, the standard errors are White-heteroskedasticity adjusted.

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[12] Both comparisons are tested with one-tailed t-tests.
[13] According to a one-tailed t-test.
[14] The questions were also investigated with ordered probit. The signs and significance of the coefficient of OLS and ordered probit do not differ substantially between these models. In the next section we show the OLS results, which allow us to compare the coefficients between the different regressions.

Table 4. The results of ordinary least square. The dependent variable is how important it is to be more successful at work and to not earn less than the reference group, on a 1-5 scale, where 1 means *Of no importance* and 5 means *Very important*. Full sample.

Variable	*Parents* Coeff.	P-value	*Friends* Coeff.	P-value	*Friends* Coeff.	P-value
	To be more successful at work than my...				*To earn no less than my...*	
Intercept	1.552	0.000	1.327	0.000	1.358	0.000
Oldest	0.028	0.654	0.094	0.117	0.005	0.941
Middle	-0.241	0.002	-0.062	0.423	-0.017	0.834
Twin	0.219	0.334	-0.004	0.981	-0.088	0.639
Only-child	0.337	0.012	0.381	0.005	0.262	0.048
Lived alone	0.399	0.009	0.255	0.081	-0.003	0.981
No. of siblings	0.126	0.000	0.090	0.005	0.082	0.008
Siblings; grew up/not grew up with	0.077	0.314	0.045	0.524	0.057	0.426
Space; 1-2 years	-0.041	0.498	0.008	0.889	-0.024	0.677
Space; 5 years or more	-0.007	0.918	-0.031	0.633	-0.097	0.150
Step-/half-sibling	-0.089	0.338	-0.195	0.030	-0.271	0.003
Woman with only sisters	0.074	0.386	0.099	0.232	0.145	0.087
Woman with only brothers	0.042	0.637	0.102	0.216	0.088	0.305
Man with only sisters	0.019	0.850	-0.005	0.962	-0.064	0.511
Man with only brothers	0.033	0.730	0.056	0.580	0.041	0.696
Parents income lower than average	0.282	0.000	0.015	0.797	0.025	0.670
Parents lived together	0.025	0.723	0.021	0.739	-0.045	0.490
Mother's age	-0.010	0.058	-0.001	0.919	0.004	0.469
Grew up in big city	-0.015	0.830	0.043	0.503	0.027	0.684
Grew up in small town	-0.150	0.004	-0.126	0.013	-0.144	0.006
Woman	-0.110	0.159	-0.196	0.010	-0.071	0.345
Age group 25	0.399	0.000	0.586	0.000	0.528	0.000
Income	0.003	0.282	0.010	0.000	0.013	0.000
University	0.209	0.000	0.337	0.000	0.206	0.000
R^2	0.059		0.090		0.068	
No. of individuals	2,291		2,278		2,289	

We interpret the dependent variables as the degree of positional concern on a 1-5 scale. We find that only-children and especially those who had siblings but did not live with them are the most concerned about their success at work in relation to that of their parents, which was also suggested in Table 3. The latter effect is not due to divorced parents, since this is controlled for in the regression. Thus, it appears that those who grew up without siblings compare themselves with their parents more than those who did live with siblings. Middle-borns are less positional in relation to their parents

than last-borns.[15] The effect of being a twin is also large, but insignificant, possibly due to the very few observations. Moreover, the higher the number of siblings one grew up with, the more one cares about success in relation to both parents and friends. That the number of siblings increases positional concern is in line with the results by Johansson-Stenman et al. (2002).

When it comes to the importance of being more successful than friends, only-children distinguish themselves as by far the most positional. Also those who did not live with their siblings perceive it to be important to be more successful than friends, although less so than only-children. Oldest children are also more positional than youngest children, but the effect is insignificant.[16] On the other hand, those who grew up with step- or half-siblings are significantly less concerned about position relative to their friends, both in terms of successfulness and income; however, the effect in terms of income is the largest. Kantarevic and Mechoulan (2006) do not find any effects of half-siblings when studying education but contrary to us, they do not distinguish whether a respondent has lived together with his/her half sibling(s) or not. We, however, find that half- and step-siblings really have an effect on positional concern if one grew up with them.

The results regarding the importance of not earning less than friends show once again that only-children care more about relative position than others, but the more siblings a person grew up with the more he/she cares about his/her income relative to that of friends. Consequently, all regressions show that only-children distinguish themselves as those who care the most about relative issues. Thus, not having siblings is more important for positional concern than birth order per se. A woman who lived with only sisters is clearly more concerned about not earning less than her friends compared to women who lived with only brothers or with both brothers and sisters. When

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[15] The effects of the birth order variables are valid for a given number of siblings. However, first-borns on average grew up with 1.57 siblings, while last-borns grew up with 1.59 and the middle-borns grew up with 2.96 siblings. Thus, even when we account for the fact that middle-borns on average grew up with 1.37 more siblings than last-borns, the middle-borns are less positional in relation to parents.

[16] The p-value is 0.117. However, there is a birth order effect of being the oldest sibling. When dividing the sample between the two age groups we find that an oldest sibling is significantly and substantially more concerned about his/her success relative to friends than a last-born is (the value of the coefficient is 0.184 and p-value is 0.020) among 40-year-old respondents. On the other hand, there is no oldest-child effect among the 25-year-olds (p-value is 0.967).

dividing the sample into the two age groups, some differences become apparent:[17] Only-children have substantially stronger positional concerns in the older age group than in the younger. Moreover, having grown up with step- and/or half-siblings reduces positional concerns in both age groups, but when the reference group is friends the reduction is insignificant for the older age group.

If the parents had a lower than average income during a respondent's childhood, he/she is more eager to surpass them, which could be interpreted at least partly as an income effect (successfulness and income are likely to be correlated) and not necessarily as a pure relative comparison effect. On the other hand, the age of one's mother decreases positional concern in relation to parents. Thus, a larger age gap between a child and her mother decreases the level of relative comparison. As pointed out by Kanarevic and Mechoulan (2006), there could be a positive correlation between the mother's age and economic standard, which might bias the results. However, this is not the case in our study.[18]

In addition to the birth order and other family related results, there are some other interesting findings. The 25-year-old respondents are more positional than the 40-year-olds regardless of what is compared and of the reference group. We actually find that respondent age is the most important variable in terms of explaining differences in positional concern. This effect is especially large in terms of friends, i.e. friends are a much more important reference groups for young adults than for those who are older. Previous literature also indicates that age affects positional concern: Falk and Knell (2004) find a negative but insignificant effect of age on positional concern and according to Johansson-Stenman and Martinsson (2006), age affects own status concern negatively. However, we cannot be certain whether it is mainly an age or a cohort effect.[19]

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[17] The results are not presented, but are available on request.

[18] We do not find significant correlation between mother's age and economic standard during childhood. Moreover, excluding one or both of the variables has no effect on the signs and significance of the other, which implies that we should not have this kind of problem in our study.

[19] To be able to distinguish the age effect from the cohort effect we need to do a follow up study after 15 years. It would be interesting to investigate whether people born in 1982 will have stronger positional concern when they turn 40 than those born in 1967 currently have.

Furthermore, McBride (2001) and Kingdon and Knight (2007) find that relative income is more important for people with high income than for low-income earners, while we find that people with higher incomes perceive both income and successfulness in relation to friends and siblings to be important, but not in relation to parents. Thus, also here the reference group matters. People who grew up in small places are generally less positional than others, while those with university education have stronger positional concerns than others, two effects that are stable across all regressions. Although the sign of the coefficient "Woman" is negative in all regressions, women are only significantly less positional than men in terms of being more successful than their friends. Johansson-Stenman et al. (2002) and Alpizar et al. (2005) find women to be more positional than men. However, Solnick and Hemenway (2005) do not find any significant difference between men and women in terms of positional concerns.

According to the birth-order literature, first-borns are likely to have higher levels of education and income (see e.g. Hanushek, 1992; Black et al., 2005; Kantarevic and Mechoulan, 2006, and Booth and Kee, 2008). Thus, the variables capturing whether a respondent has a university education and/or a higher income might include indirect effects of the birth-order variables. We test this by re-estimating all the regressions without the income and university variables, and the coefficient of the variable "oldest" increases slightly. However, the effect on positional concerns of being the oldest sibling is still far smaller than the effects of being an only-child or a person who had siblings but did not grow up with them.

Summarizing the results, we see that birth order and being an only-child affect positional concerns differently depending on the issue and the reference group, which is in line with the results by Solnick and Hemenway (2005) who find that positional concern varies widely across issues. The socio-economic variables are on the other hand very stable across the regressions. Our results give a very clear picture that only-children and those who did not live with their siblings care more about relative issues than others. However, Table C1 in Appendix C shows that only-children perceive that they are affected by birth order/being an only-child the least. Our finding that only-children care the most about both relative successfulness and relative income indicates that they are affected more by growing up without siblings than they believe.

3.4 Positional concern in relation to siblings, sub sample

We are also interested in positional concern in relation to siblings. Table 3 suggests that people with siblings are the least concerned about their position in relation to their sisters and brothers and that there are no significant birth-order differences in this regard. Moreover, as mentioned before, while envy and rivalry among siblings are common, it might be less common to admit to. We therefore want to investigate whether people care about successfulness and income in relation to the siblings they grew up with, and whether the fact that parents often compared their children affects positional concern. Table 5 shows the results of two least square models where only respondents who grew up with siblings are included. Also here, the dependent variable is the 1-5 scale, where five means very important.

Table 5. The results of ordinary least square. The dependent variable is how important (on a 1-5 scale, where 1 means Of no importance and 5 means Very important) it is to be more successful at work and to not earn less than siblings. Subsample: respondents with siblings.

Variable	To be more successful at work than my siblings....		Not to earn less than my siblings....	
	Coeff.	P-value	Coeff.	P-value
Intercept	1.103	0.000	1.108	0.000
Oldest	-0.017	0.762	-0.024	0.662
Middle	-0.054	0.454	-0.001	0.988
Twin	0.209	0.286	-0.032	0.833
No. of siblings	0.078	0.004	0.049	0.078
Siblings; grew up/not grew up with	0.063	0.322	0.094	0.143
Space; 2 years	0.046	0.378	0.057	0.277
Space; 5 years or more	0.048	0.417	0.069	0.220
Step-/half-sibling	-0.119	0.146	-0.187	0.016
Woman with only sisters	0.160	0.039	0.175	0.020
Woman with only brothers	0.017	0.816	0.003	0.995
Man with only sisters	-0.063	0.480	-0.101	0.251
Man with only brothers	-0.079	0.390	-0.005	0.965
Often compared	0.346	0.000	0.320	0.000
Parents income lower than average	0.061	0.271	-0.011	0.836
Parents lived together	0.100	0.103	0.012	0.847
Mother's age	-0.001	0.854	-0.001	0.917
Grew up in big city	-0.027	0.659	0.039	0.524
Grew up in small town	-0.125	0.009	-0.066	0.160
Woman	-0.200	0.013	-0.092	0.242
Age group 25	0.419	0.000	0.435	0.000
Income	0.008	0.001	0.010	0.000
University	0.108	0.045	0.031	0.557
R^2	0.081		0.074	
No. of individuals	2,033		2,035	

No birth-order variables are significant for the relative comparisons with siblings. (Being a twin clearly increases the positional concern in terms of successfulness, but the effect is insignificant). The family-specific variables seem to be more important in determining positional concerns in relation to siblings than one's place in the sibship. For example, the concern both for relative successfulness at work and for relative income increases with the number of siblings. Women who lived with only sisters care more about relative successfulness and income than respondents with other sibling gender compositions. This finding confirms that positional concern is larger when people compare themselves with others who are similar to them, as found by McBride (2001).

We also find that living together with half- and/or step-siblings decreases positional concern for income in relation to siblings (as well as decreases positional concern in relation to friends, as shown in Table 4). One explanation might be that it could be

more sensitive for parents if step- or half-siblings do not get along than if the same happens between biological siblings. It is therefore possible that parents more actively try to decrease the friction between step- or half-siblings, leading to less positional concerns between them. The perception of often being compared with one's siblings increases positional concerns substantially in both regressions. The coefficients capturing this effect are very large and highly significant. Consequently, the birth-order variables are not important in explaining the relative comparison with siblings. Rather the characteristics of the sibship, such as the number of siblings, their gender composition, and especially whether a respondent perceives that he/she has often been compared with his/her siblings, are of greater importance. This result partly differs from those found for positional concern in relation to parents and friends. Thus, people do not only differ in positional concerns in relation to a reference group, these concerns also have different determinants for different reference groups.

In addition to the birth-order and family-related results, we find that people with higher income care more about both income and successfulness in relation to their siblings, compared to people with lower income. And as before, the younger respondents perceive both relativity issues to be far more important than the older respondents do.

3.5 Birth order and sibling comparison during childhood

Table 5 shows that parental comparison between siblings clearly increases positional concerns among siblings. It is therefore of interest to investigate what makes respondents perceive that they were often compared with their siblings by their parents during childhood, and whether there are differences in this perception depending on birth order. To analyze this we use a binary probit model, where the dependent variable is one if a respondent stated that his/her parents quite or very often compared him/her with siblings (The question in Box 2). Those who are only-children and those who did not grow up with their siblings are excluded from this analysis. Table 6 shows the results.

Table 6. The results of binary probit. The dependent variable is one if a respondent perceives that his/her parents *often* compared him/her with the siblings. Subsample: respondents with siblings.

Variable	Marginal effect	P-value
Intercept	-0.406	0.000
Oldest	0.054	0.038
Middle	-0.002	0.954
Twin	0.016	0.816
No. of siblings	0.018	0.091
Siblings; grew up/not grew up with	0.029	0.320
Space; 2 years	0.033	0.156
Space; 5 years or more	-0.022	0.401
Step-/half-sibling	0.037	0.315
Woman with only sisters	0.040	0.241
Woman with only brothers	-0.071	0.019
Man with only sisters	-0.030	0.459
Man with only brothers	0.069	0.114
Parents income lower than average	0.070	0.005
Parents lived together	0.017	0.525
Mother's age	0.002	0.418
Grew up in big city	0.026	0.335
Grew up in small town	-0.019	0.365
Woman	0.090	0.004
Age group 25	-0.006	0.767
Pseudo R^2	0.027	
No. of individuals	2,068	

We find clear differences among different groups; oldest children are much more inclined to perceive that their parents often compared them with their siblings than twins, last-borns, and middle-borns are. It is possible that first-borns perceive a comparison with a younger brother or sister as tougher than a younger sibling does when being compared with an older sibling. This kind of comparison might be especially hard to handle if the younger sibling outperforms the older in some way, as argued by Tesser (1980). As we have information on both the existence of siblings and whether one was brought up with them, we are able to distinguish between the effects of the siblings a person grew up with from those of the siblings who were more distant. The higher the number of siblings a person lived with, the higher the probability that the person perceives him/herself as often having been compared with siblings. On the other hand, having lived together with step- or half-siblings or having both siblings one grew up with and siblings one did not grow up with have no significant effect on the perception of often having been compared with siblings. [20]

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[20] Furthermore, remember that the results in Table 5 show that a person's perception that he/she was often compared with his/her siblings substantially increases positional concern. Thus, the "Often compared" variable in the regressions about positional concern in relation to siblings includes indirect effects of the birth-order variables. However, if we remove the comparison variable from the regressions

Women and those who experienced a below-average economic standard during childhood are more likely to perceive that they often used to be compared with their siblings. These effects are quite large; 9 and 7 percentage points respectively. Interestingly, there are no significant differences between the two age groups of respondents; the feeling of having been compared during childhood does not seem to decline with age. Finally, whether a person perceives to have been compared with his/her siblings is affected by the sibship sex composition. Women who lived with only brothers are less likely to perceive that they were compared with their brothers than women who (also) grew up with sisters. Similarly, the sign of the marginal effect capturing males who lived with only sisters is negative, although the marginal effect is insignificant, indicating that people of unique gender in a sibship are less likely to perceive that they were often compared with their siblings during childhood. This is also confirmed by the fact that the signs of the marginal effects representing women and men who grew up only with same-gender siblings are positive, although insignificant.

3.6 Comparison between siblings, effects on all reference groups

It is possible that people who were often compared as children have become more positional in general and not only in relation to their siblings. To be able to compare the results between all the different analyses, we exclude those who were only-children and those who did not live with their siblings. Table 7 shows the coefficients of the OLS regressions for all reference groups.[21]

Table 7. Coefficients of the variable "Often compared." Subsample: respondents with siblings. P-values in parentheses.

	To be more successful than my…..			To earn no less than my…..	
	Parents	*Friends*	*Siblings*	*Friends*	*Siblings*
Often compared	0.431	0.236	0.346	0.275	0.320
with siblings	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

As seen in Table 7, those who perceive that they were compared with their siblings are more positional in relation to all reference groups; the coefficients are large and significant. Having been compared with siblings interestingly has the largest effect on concern about measuring up to one's parents, i.e. those who compared the siblings in

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on positional concerns, the signs and the economic and statistical significance of the birth-order variables do not change, indicating that these indirect effects are small in Table 5.

[21] All the other explanatory variables reported in Table 5 are included in the regressions, but not reported in Table 7.

the first place. The second largest effect is seen in concern about measuring up to one's siblings, while the effect for friends is slightly smaller. Thus, if parents compare their children, it has lasting effects and makes the children more positional in general but mainly in relation to their family members.

One could think that those who were often compared with their siblings during childhood not only care more about relative issues but are also more successful and have higher income in absolute terms. If so, comparing siblings might be positive and push children to better achievements. We therefore compare the mean personal income of these respondents with the mean personal income level of those who were not compared often and find an interesting result: Those who perceive that they were often compared with their siblings have significantly lower income (at the 5 % significance level) than those who perceive that they were not compared often. Moreover, the shares of respondents with at least three years of university education do not significantly differ between those who perceive that they were compared often and those who do not.[22]

4. Conclusions

By using a survey method, the aim of this paper was to investigate whether having siblings and birth order affect positional concern and whether this concern varies with issue and reference group. We study the importance of income and successfulness at work relative to three different reference groups, namely parents, friends, and siblings, and conclude that family and background variables are indeed important determinants of positional concern. Although people are generally not very concerned about relative income or relative successfulness at work, we do find variations in the degree of positional concern depending on the reference group and on the issue at hand: positional concern is the strongest in relation to friends, and the weakest in relation to siblings.

This study has four strong main results. First, only-children and those who lived without their siblings have the strongest positional concern. Thus, birth order itself has less

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[22] The income comparison is tested by using a t-test, while the education comparison is done with a Chi-square test.

of an effect than whether one shared childhood with siblings. One possible explanation is that only-children have more pressure to live up to their parents' expectations than people with siblings and that they were always the "best" child in the family and were never outperformed by any siblings. However, we also found that only-children are the least likely to perceive themselves to be affected by birth order/being an only child. However, the results of this study show that they really are more affected by growing up without siblings than they think. As mentioned in the introduction, Blake (1991) finds that only-children are not significantly less social, more egocentric, and/or more goal-oriented than those with siblings but we find that they definitely have stronger positional concerns. Second, for those who grew up with siblings, the number of siblings increases positional concern regardless of reference group. Third, a person cares substantially more about relative position if that person perceives that he/she was compared with siblings during childhood. This effect is both large and highly significant in relation to all reference groups, indicating that how parents treat their children has long lasting effects on the children. Finally, positional concern in relation to siblings depends more on sibship composition than on birth order. For example women who only grew up with sisters are more positional in this context than women who (also) grew up with brothers are.

We also found that it is important in a birth-order study to control for all types of siblings. Having lived together with half- or step-siblings decreases positional concern in general. Hanushek (1992) argues that first-borns achieve better at school than later-borns because they are more likely to come from small families. However, this study clearly shows that although only-children, first-borns, and those who had siblings but were not raised with them all come from small families, they generally do not have equal positional concerns and should therefore be analyzed separately.

Except for the family and sibling effects, we found that both education and income strongly affect positional concerns, which is in line with previous research (see e.g. McBride, 2001, and Kingdon and Knight, 2007). Moreover, we found a very strong age effect: the 25-year-olds are far more positional than the 40-year-olds regardless of reference group and whether the issue is relative success or relative income. This indicates that positional concerns are strong when people are young adults and then decreases with age. Alternatively, it could be a cohort effect that people born at the end

of the 1960s are less concerned with relative issues than people born in the beginning of the 1980s. Hence, an important task for future research is to further investigate the age and cohort effects on positional concern.

In summary, we have found that the early childhood years matter for how much a person cares about relative income and relative successfulness. The family environment in which a child lives and how the parents treat him/her do affect the strength of his/her positional concern as an adult. This might in turn affect educational and work-related choices, as well as how people as adults deal with comparisons with others. In this study, we asked the respondents to compare themselves with their parents, friends, and siblings, i.e. people close to them. Further research is needed to investigate whether the results are similar when other, more distant, reference groups are used.

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Appendix A

Table A1. Correlation matrices for positional concern

	Success, parents	Success, friends	Success, siblings	Income, friends
Success, friends	0.598			
Success, siblings	0.640	0.630		
Income, friends	0.444	0.673	0.517	
Income, siblings	0.521	0.550	0.774	0.641

The strongest correlation is between the two comparisons with siblings, followed by the two questions about friends. However, although the correlations between the answers to the questions concerning the same issue (success or income) are lower than the correlation concerning the same reference group, the correlation between "success, parents" and "success, friends" is higher than that between "success, parents" and "income, friends."

Appendix B

Table B1. Percentage of responses for the question: To be more successful at work than my parents.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)
All	62.7	12.2	14.5	6.7	3.9
Oldest child	62.0	12.4	13.5	7.1	5.0
Middle child	67.5	10.1	12.5	5.6	4.2
Youngest child	62.7	13.3	16.0	5.5	2.5
Twin	60.0	6.4	8.5	10.6	14.9
Not lived with siblings	52.9	13.0	20.0	10.6	3.5
Only child	60.8	10.5	16.1	10.5	2.1

Table B2. Percentage of responses for the question: To be more successful at work than my friends.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)
All	49.3	18.8	20.8	8.2	2.9
Oldest child	45.9	20.5	21.8	9.1	2.5
Middle child	53.1	17.9	16.2	8.3	4.5
Youngest child	50.9	19.0	20.5	7.6	2.0
Twin	52.2	17.4	19.6	4.4	6.5
Not lived with siblings	45.9	15.3	31.7	4.7	2.4
Only child	48.2	13.5	22.4	9.9	5.0

Table B3. Percentage of responses for the question: To be more successful at work than my siblings.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)
All	64.0	15.6	13.6	5.0	1.8
Oldest child	63.7	16.5	13.6	4.7	1.5
Middle child	62.0	15.9	14.9	5.3	1.9
Youngest child	65.7	14.4	13.0	5.2	1.7
Twin	57.8	15.6	13.3	4.4	8.9

Table B4. Percentage of responses for the question: To earn no less than my friends.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)
All	45.3	21.5	21.3	8.5	3.4
Oldest child	45.4	22.2	21.4	7.1	3.9
Middle child	44.5	20.9	21.6	8.5	4.5
Youngest child	45.9	21.6	20.0	9.7	2.8
Twin	51.1	23.4	10.6	6.4	8.5
Not lived with siblings	44.8	23.0	25.3	6.9	0.0
Only child	42.2	16.9	27.5	12.0	1.4

Table B5. Percentage of responses for the question: To earn no less than my siblings.

	Of no importance (1)	(2)	(3)	(4)	Very important (5)
All	64.6	15.3	13.9	4.5	1.7
Oldest child	65.0	16.0	12.9	4.6	1.5
Middle child	64.3	13.0	15.2	4.8	2.7
Youngest child	64.3	15.4	14.6	4.4	1.3
Twin	63.0	23.9	8.7	0.0	4.4

Appendix C

Table C1. The results of ordinary least square. The dependent variable is a 1-5 scale about how much a respondent perceives he/she is affected by birth order or having been an only child. The standard errors are White-heteroskedasticity adjusted. Full sample.

Variable	Childhood		Today	
	Coefficient	P-value	Coefficient	P-value
Intercept	3.312	0.000	3.766	0.000
Oldest	0.341	0.000	0.410	0.000
Middle	-0.061	0.425	-0.080	0.336
Twin	-0.095	0.619	-0.053	0.773
Only child	-0.412	0.004	0.171	0.208
Lived alone	-0.589	0.000	-0.107	0.497
No. of siblings	0.045	0.149	0.093	0.002
Siblings; grew up/not grew up with	0.041	0.554	0.072	0.321
Space; 2 years	-0.008	0.893	0.041	0.494
Space; 5 years or more	0.081	0.191	0.113	0.081
Step-/half-sibling(s)	-0.019	0.824	0.087	0.346
Woman with only sisters	-0.044	0.578	-0.022	0.800
Woman with only brothers	-0.196	0.013	-0.250	0.003
Man with only sisters	-0.322	0.001	-0.355	0.001
Man with only brothers	-0.219	0.022	-0.257	0.009
Woman	0.117	0.105	0.218	0.003
Age group 25	0.142	0.002	0.099	0.043
Parents income lower than average	0.150	0.008	0.109	0.063
Parents lived together	-0.088	0.153	-0.022	0.732
Mother's age	0.027	0.000	0.019	0.000
Grew up in big city	0.044	0.474	0.060	0.357
Grew up in small town	-0.063	0.220	-0.060	0.252
R^2	0.077		0.074	
No. of individuals	2,283		2,296	

The results in Table C1 show that oldest-children perceive that they have been affected by birth order during both childhood and adulthood significantly more than last-borns do, while the perceptions of middle-borns and twins in this regard do not differ significantly from that of last-borns. Only-children perceive themselves to be less affected by not having had siblings during childhood than the youngest children perceive to be affected by their birth-order. However, we find no differences in terms of how they perceive themselves as adults, as compared to youngest children. The higher the number of siblings a person grew up with, the more the person perceives that he/she has been affected by the birth order as an adult. Thus, being the oldest sister or brother to a large number of younger siblings strengthens the personal perception of having been affected by being a first-born. Women perceive that they are more affected by birth order than men. Those who have not grown up with their siblings feel significantly less affected, which is expected and is an indication that they should be distinguished from those who lived with their brothers and sisters.