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Elina Lampi and Katarina Nordblom[¤]

Abstract

We analyze the impacts of birth order and presence/absence of siblings on risk preferences with respect to economic, health/safety, and sport/lifestyle related risks. We study both the answer to a hypothetical lottery question and stated risky behavior and find that middle-borns are consistently less risk averse than others irrespective of the type of risk. Moreover, the answer to the lottery question is strongly correlated with economic and sport/lifestyle related risky behavior.

Keywords: siblings, birth-order, middle-born, different risks, lottery

JEL Classification: D03, D89, J10

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1. Introduction

In this study, we analyze the effects of birth order and presence/absence of siblings on risk preferences with respect to economic, health/safety, and sport/lifestyle related risks. Most previous risk studies have investigated the impact of socio-economic characteristics such as gender, age, education, or income on risk preferences (see, e.g., Donkers et al., 2001; Weber et al., 2002; Eckel and Grossman, 2008; Dohmen at al., forthcoming). The few existing studies on birth order and risk preferences have found that later-borns are less risk averse than first-borns (Yiannakis, 1976 and Nixon, 1981, study risky sports and Jobe et al., 2006, male army personnel). Some studies have also found that older siblings act as role models for younger in terms of risky behavior (Wang et al., 1995; Conger and Reuter, 1996; Argys et al., 2006).[1] Although most researchers only compare first-borns with "later-borns," Saroglou and Fiasse (2003) claim that it is very important to distinguish between middle-borns and last-borns.[2] The first objective of this paper is therefore to investigate whether risk preferences differ among five different birth-order groups: first-, middle-, and last-borns, as well as only-children and those who have siblings but did not grow up with them. The results will increase our understanding of differences in people's preferences stemming from the early childhood years.

One of the surprisingly few studies on whether people's risk preferences depend on type of risk is Dohmen et al. (forthcoming), who find that risk attitudes are strongly but not perfectly correlated across different risks (they investigate car driving, financial matters, sports and leisure, career, and health), indicating that it is important to study both general and more context-specific risk attitudes. Another is Weber et al. (2002), who compared risk preferences with respect to financial, health/safety, recreational, ethical, and social risks and found that degree of risk-taking depends strongly on the type of risk. Also, Anderson and Mellor (2008) found in their laboratory experiment that those who were more risk averse according to a lottery experiment were also more risk averse in terms of, e.g., smoking, heavy drinking, being overweight, and seatbelt use. As a contribution to the literature in this area, the second

[1] Argys et al. (2006) found that younger siblings are likely to take after older siblings' risky behavior concerning smoking, drinking alcohol, and belonging to a gang. Conger and Reuter (1996) found that siblings' drinking behavior is an important risk factor for adolescents' drinking habits. Wang et al. (1995) show that one is more affected by older siblings of the same gender, e.g., young males are affected by their older brothers' smoking behavior, while older sisters' and parents' smoking behavior have only little effect.

[2] They find that middle-borns are the rebels of the family: they are less conscientious (particularly considering dutifulness), and that they are low in competence and self-discipline but high in impulsiveness and having fantasy compared to their siblings.

objective of the present study is to analyze attitudes to different context-specific risks, namely economic, health/safety, and sport/lifestyle. We focus on six risks: The first one is a conventional hypothetical lottery question to investigate general stated risk preferences (see, e.g., Holt and Laury, 2002). Then the respondents answer how likely or unlikely it is that they would invest in high-risk stocks, often eat high-cholesterol foods, regularly check the fire alarm, go bungee jumping, and move to a city where one does not know anyone, respectively.

The only previous studies we are aware of that look at risk attitudes in several different contexts, as well as sibship variables, are Cook and Bellis (2001) and Dohmen et al. (2006). Cook and Bellis (2001) found no significant birth-order effects on risk-taking behavior, but since the definitions of their birth order categories are unclear, it is hard to compare our result with theirs. In their pioneering work, Dohmen et al. (2006) found that first-borns and children from smaller families are more influenced than others by their parents' risk attitudes. However, while Dohmen et al. (2006) investigate intergenerational transmission of risk attitudes from parents to children, we study how risk attitudes may depend on a person's birth order and absence/presence of siblings.

In order to analyze the birth-order effects, we need a large sample. We therefore conducted a mail survey, from which we gathered more than 2,000 answers. The resulting unique and rich dataset enabled us to investigate the impact of several birth-order categories in more detail than previous studies. Since the large data set needed rules out the possibility of an experimental study, all the questions in the study have to be hypothetical. The hypothetical approach should nevertheless be appropriate for our purpose since we merely compare attitudes towards different risks and do not aim at estimating any specific degrees of risk aversion.[3] Moreover, since we control for several childhood family variables, the results of our study can also shed some light on the impact of family background on risk attitudes in a broader perspective.[4]

[3] Although there is no unambiguous evidence about the effects of monetary incentives in general (Camerer and Hogarth, 1999), hypothetical risk questions have shown to be quite reliable predictors of actual behavior: Beattie and Loomes (1997), Donkers at al. (2001), and Dohmen at al. (forthcoming) all report that hypothetical lottery questions give reliable answers. Holt and Laury (2002) show that there are no significant differences between *real low-payoff* treatments and *hypothetical high-payoff* treatments, but that people are more risk-averse when payoffs are high in real-payment treatments than in hypothetical ones. Hence, our hypothetical approach should be appropriate for our purpose, i.e., to compare who are more or less risk averse, especially since we do not aim at estimating any specific degrees of risk aversion

[4] Other studies that have investigated the relationship between risk and family background include Hartog et al. (2002), who find no significant explanatory power of family background characteristics, such as being an asocial

Our main result is that middle-borns are consistently more likely to choose more risky alternatives regardless of type of risk. Moreover, we find that the impact of several socio-economic variables on risk attitudes varies across the different risk types, but that stated risk aversion based on the conventional lottery game question has a strong effect in the economic and sport/lifestyle related risk regressions. Hence, this kind of standardized question predicts risk attitudes well for a variety of different risks, although it has no explanatory power for health and safety-related risks.

The remainder of the paper is organized as follows. Section 2 describes our survey and presents our descriptive statistics. Section 3 presents the results concerning risk attitudes, and Section 4 concludes the paper.

2. Design of the survey and descriptive statistics

We conducted a survey in March 2007 by sending out a mail questionnaire to a random sample of 6,000 individuals in Sweden – men and women, with and without siblings. Three thousand were born in 1967 and the rest in 1982.[5] A single reminder was sent out three weeks after the main survey. The net response rate was 42 percent and in all, 2,159 answers were available for analysis. By focusing on two distinct age groups rather than having respondents of various ages, we minimize the disturbance from unobserved societal variables, while still being able to analyze age or cohort effects. When looking at two specific cohorts, we can keep variations in societal factors at a minimum.

In order to capture a person's general risk preferences, we used a standard lottery game question (similar to the experiments by Holt and Laury, 2002), where respondents were asked to make a hypothetical choice among five different lotteries.[6] More precisely, we asked them to pick the lottery they preferred out of the five lotteries. In each of the lotteries, one has an equal chance of winning Prize A and Prize B. Both the expected payoff and the difference

family (according to the child's teacher), and father's job, on risk preferences, and that having a highly educated mother reduces the degree of risk aversion. Dohmen et al. (forthcoming) report that father´s education has a positive impact on all kinds of risk taking, while mother´s education increases risk taking only in sports/leisure and career domains. Miles et al. (2001) also show, in a twin study, that family background affects, e.g., seat belt, bicycle helmet, and birth control use, while genetic factors influence risk-taking attitudes rather than actual behavior.

[5] The main questionnaire was revised after we had analyzed the answers from the pilot survey conducted in December 2006.

[6] We decided to include five lotteries only because we wanted to keep the question simple and avoid possible fatigue effects. The fact that only a handful of the respondents answered in an inconclusive way (these respondents are excluded from the analysis) indicates that the question was easy to understand.

between the two prizes increase with each lottery as shown in Box 1 below. Hence, the lower the number of the preferred lottery, the more risk averse the respondent.

Box 1. The lottery question.

In this table we present five different lotteries (1 to 5). All lotteries are free and have two outcomes: Prize A and Prize B. In each game, you have a 50 % chance of winning A and a 50 % chance of winning B. In the column "Your choice," we ask you to mark **the lottery** you prefer. You should mark only **one** of the lotteries (1-5).			
Lottery	Prize A (50 % chance)	Prize B (50 % chance)	Your choice
1	SEK 16,000	SEK 16,000	□
2	SEK 24,000	SEK 12,000	□
3	SEK 32,000	SEK 8,000	□
4	SEK 40,000	SEK 4,000	□
5	SEK 48,000	SEK 0	□

* In March 2007, the exchange rate was 1 EUR=9.47 SEK and 1 USD=7.23 SEK.

To be able to answer the context-specific risk questions, our survey included different kinds of economic, health/safety and sport/lifestyle related risk statements. As in Weber et al. (2002), the respondents were asked to state on a five-degree scale how likely it is that s/he would behave according to the statements of risky behavior presented in the survey (1= very unlikely, 5= very likely). Although these questions are hypothetical, they should allow us to identify tendencies and relative differences among respondents and issues.

Box 2. The context-specific risk questions

Mark the box that is closest to the likelihood that you would behave according to the statement. Number 1 means Very unlikely and number 5 means Very likely.					
	1	2	3	4	5
1. Invest money in high-risk stocks	□	□	□	□	□
2. Often eat high-cholesterol foods	□	□	□	□	□
3. Regularly make sure the fire alarm is in working order	□	□	□	□	□
4. Go bungee jumping	□	□	□	□	□
5. Move to a city where you do not know anyone	□	□	□	□	□

The focus of this paper is the impact of birth order and siblings; hence the respondents were asked to state whether they were only-children or had siblings, and if they did have siblings, when they were born. We also asked which of the siblings the respondent shared at least half their childhood with and whether the siblings were full-, half-, or step-siblings. In our analysis, we then define birth order in relation to the siblings with whom one shared at least

half of one's childhood, because these are the most likely to affect preferences and behavior.[7] In order to disentangle birth-order effects from other family effects, we asked the respondents about several family-specific characteristics, e.g., economic standard during childhood[8] and whether their parents lived together at least until the respondent turned 15. We also asked for the age of the mother. E.g., Kantarivic and Mechouln (2006) found that not controlling for mother's age likely biases the birth-order effects, since first-borns tend to have younger mothers than later-borns. Table 1 presents descriptive statistics for the explanatory variables used in all regression analyses.

[7] We asked about the respondents' subjective perception of their birth order, i.e., whether they *felt* like an oldest-, a middle-, or an only-child, etc., and found that the distribution of those siblings a person grew up with (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 only biological and adopted siblings.

[8] The question about the family's economic standard during childhood reads: "As a child, how did you perceive your childhood family's economic standard compared to that of an average family?" There were five alternatives from one to five, where one meant *Much worse than average* and five meant *Much better than average*. Although the perception of childhood economic standard is a subjective measure, we believe that it is fairly accurate; 23 percent of our respondents perceived that their economic standard was below average during childhood, 28 percent perceived that it was above average, and 49 percent perceived that their childhood family had an average economic standard.

Table 1. Descriptive statistics of the explanatory variables.

Variable	Explanation	Mean	St. Dev.
First-born	= 1 if respondent is an oldest-child	0.350	
Middle-born	= 1 if respondent is a middle-child	0.190	
Last-born (reference category)	= 1 if the respondent is a youngest-child	0.358	
Only child	=1 if respondent is an only-child	0.063	
Did not grow up with their siblings	=1 if respondent had siblings but did not grow up with them	0.038	
No. of siblings	= number of siblings a respondent grew up with	1.568	1.078
Family's economic standard during childhood	= the subjective perception of one's family's economic standard on a scale of 1-5, where 1 means much worse than average and 5 means much better than average.	2.938	
Parents lived together	= 1 if respondent's parents lived together at least until s/he was 15.	0.780	
Mother's age	= age of the mother when respondent was born	27.309	5.456
Lottery risk	=how risk averse a person is on a scale of 0-4, where 0 means no risk at all, and 4 means preference for the highest risk in the lottery game (SEK 48,000 vs. 0).	1.627	
Grew up in big city	=1 if respondent grew up in one of the three biggest cities in Sweden	0.200	
Grew up in small town	=1 if respondents grew up in small town ≤ 20,000 inhabitants/countryside	0.405	
Live in a big city	=1 if respondent lives in one of the three largest cities in Sweden.	0.300	
Live in a small town	=1 if respondents lives in small town ≤ 20,000 inhabitants/countryside	0.289	
Woman	=1 if respondent is female	0.600	
Age group 25	=1 if respondent is 25 years old	0.466	
Earnings	= respondent's personal gross monthly earnings in thousand SEK*	19.764	11.264
University	=1 if respondent has university education ≥ 3 years	0.259	
No. of individuals	2,159		

Our birth-order categories are mutually exclusive. Thirty-five percent of the sample are first-borns and about equally many are last-borns, while 19 percent are middle-borns among the siblings they grew up with. Six percent are only-children and those who have siblings but did not grow up with them are fewer than 4 percent. It is also worth noting that a large majority of the respondents have one or at most two siblings. Our lottery game variable ranges from zero to four and is created from the answers to the question in Box 1. Zero implies that a respondent prefers SEK 16,000 without any risk, and four implies that a respondent prefers the lottery that gives either 48,000 or nothing, both with 50 % probability.

Our sample is fairly representative of the Swedish population in the two cohorts born in 1967 and 1982. The mean incomes of both age groups are equal to the mean income levels of these age groups living in Sweden (Statistics Sweden, 2007a). Similarly, the share of respondents living in one of the three largest cities in Sweden is equal to the share at the national level (Statistics Sweden, 2007b). The share of respondents with a university education corresponds well with the national share in the younger cohort, while the share of older respondents with a university education in our sample (28 %) is larger than at the national level (19 %) (Statistics Sweden, 2007c). The share of women is also disproportionally large and the response rate is slightly higher in the older cohort.[9] Unfortunately, there are no national statistics available regarding the shares of the population who are first-/middle-/last-borns and only-children born in 1967 and 1982 in Sweden. We are therefore unable to test whether our different birth order shares are representative. However, the shares of the respondents who are first- and last-borns are equal in our sample, which suggests that there is no severe selection bias concerning birth order.

[9] All representativity analyses are performed using bootstrapping. One thousand samples were bootstrapped by randomly drawing observations, with replacement, as many times as there are observations in the original sample. By using the percentile method and a 95% confidence interval, it can be shown whether the means significantly differ from those at the national level at the 5% significance level.

3. Results.

3.1 Descriptive risk results

We find some heterogeneity in the answers to the context-specific risk questions in Box 2. Table 2 reports the shares of respondents who rated their likelihood 1 or 2 (unlikely), 3 (neither unlikely nor likely), and 4 or 5 (likely) to each question.

Table 2. The shares of respondents who stated they would be "unlikely", "neither unlikely nor likely", and "likely" to engage in the respective activities.

Type of risk	1 or 2 (Unlikely)	3	4 or 5 (Likely)
Invest money in high-risk stocks	0.618	0.207	0.175
Often eat high-cholesterol foods	0.424	0.346	0.230
Regularly make sure that the fire alarm is in working order*	0.484	0.277	0.239
Go bungee jumping	0.570	0.174	0.256
Move to a city where you do not know anyone	0.316	0.239	0.444

*For this question, alternatives 1 or 2 imply a more risky choice.

Regularly make sure that the fire alarm is in working order has the largest share of the more risk-seeking answers (48.4 %), followed by *Move to a city where you do not know anyone* (44.4%). A smaller, but still significant share of respondents (around 25 %) are likely to often eat high-cholesterol foods and to go bungee jumping.

Table 3. The shares of respondents who chose the respective lotteries.

Lottery game question	Share of respondents who chose the…..				
	first lottery	second lottery	third lottery	fourth lottery	fifth lottery
	0.216	0.330	0.214	0.092	0.148

Table 3 shows the distribution of the lottery question. We find that about 22 percent of the respondents chose SEK 16,000 with certainty and that almost 15 percent chose the fifth, and the most risky, lottery (50% chance of winning SEK 48,000 and 50% chance of winning nothing). We also investigate the correlations between the answers to the five context-specific risk questions and the lottery game risk question. Table 4 shows the correlation matrix.

Table 4. Correlations between the risk questions:

	Lottery game	Invest in high-risk stocks	Often eat high-cholesterol foods [a]	Regularly make sure the fire alarm is in working order	Go bungee jumping
Lottery game					
Invest money in high-risk stocks	0.221***				
Often eat high-cholesterol foods [a]	0.006	0.111***			
Regularly make sure that the fire alarm is in working order	0.029	0.010	-0.134***		
Go bungee jumping	0.101***	0.146***	0.079***	-0.057***	
Move to a city where you do not know anyone	0.050***	0.113***	0.098***	-0.076***	0.226***

[a] This variable is only considered for the 40-year-olds. *** implies significance at the 1 percent level.

Table 4 shows that the highest correlations are found between the two sport/lifestyle related risks *Go bungee jumping* and *Move to a city where you do not know anyone* ($\rho = 0.226$), and between the two economic risks *Lottery game* and *Invest money in high-risk stocks* ($\rho = 0.221$). Although the other correlations are lower, most of them are significant.

3.2. Econometric analysis on economic, health/safety, and sport/lifestyle related risks

Table 5 shows the results of an ordered probit regression for the lottery question in Box 1. The dependent variable is coded 0-4, where 0 means that a person did not want to take any risk at all (chose to have SEK 16,000 for sure) and 4 means that s/he chose the least risk averse alternative in the lottery game question (chose a lottery that implied a 50 % chance of winning SEK 48,000 and a 50 % chance of winning nothing). Table 5 also reports the results for the five context-specific risks, i.e., the likelihood of 1) investing in high-risk stocks, 2) regularly making sure that the fire alarm is in working order, 3) often eating high-cholesterol foods, 4) going bungee jumping, and 5) moving to a city where one does not know anyone. Since the respondents were asked to state, on a five-degree scale, how likely they would be to engage in these activities, we use an ordered probit model in all regressions.[10] The dependent variables are, in all cases, coded 0-4, where 0 means that is the respondent would be *Very unlikely* to behave according to the question, while 4 means that is the respondent would be *Very likely*. Moreover, all the analyses are based on the whole sample with one exception: the question about high-cholesterol foods includes only the 40-year-old respondents. The reason

[10] All analyses were done using Nlogit 4.0. All regressions were also investigated with the SUR model. However, our results are robust to this change.

for this is that the 25-year-olds are less likely to be affected by the health risks associated with high cholesterol;[11] hence most of our variables of interest turn out insignificant for this group.

In addition to the same explanatory variables as in the lottery game regression, we use the lottery game question as an explanatory variable in all five context-specific risk regressions to see whether the answers to the lottery question predict any general risk preferences with respect to the other risks. Since Table 5 only reports the impacts of birth order compared to a last-born (the reference category), we also compare all the other birth-order categories with each other. The results of these comparisons and the corresponding p-values for all the six regressions are shown in the Appendix.

[11] The coefficient capturing the young age group is significant, large, and positive (0.257***) in the regression for high-cholesterol foods when estimating with the whole sample, showing that the 25-year old respondents are more likely than the 40-year olds to often eat high-cholesterol foods.

Table 5. Economic risks, health/safety risks, and sport/lifestyle risks. Coefficients from six different ordered probit regressions.

Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
	Lottery question	*Invest money in high-risk stocks*	*Regularly make sure that the fire alarm is in working order*[A]	*Often eating high-cholesterol foods, 40-year old respondents*	*Go bungee jumping*	*Move to a city where you do not know anyone*
Constant	0.851***	0.040	1.390***	1.290***	0.170	0.465**
First-born	0.053	0.036	-0.039	-0.100	0.022	0.071
Middle-born	0.136*	0.153*	-0.127*	0.138	0.203**	0.164**
Only-child	-0.074	-0.079	0.245**	-0.019	-0.128	0.045
Did not grow up with his/her siblings	-0.212	0.157	0.207	-0.220	-0.134	0.151
Number of siblings	-0.021	-0.064**	0.035	-0.101**	-0.006	-0.031
Childhood family economy	0.035	0.053**	0.047*	0.036	0.025	-0.021
Parents lived together	-0.022	0.114*	0.067	-0.182**	-0.042	0.015
Mother age	0.002	0.001	-0.006	0.003	0.002	0.009*
Living in a big city	-0.091	0.0002	-0.150**	0.065	-0.021	0.221***
Living in a small city/countryside	-0.073	-0.236***	0.141**	0.069	-0.195***	-0.210***
Grown up in a big city	0.026	0.118	0.074	-0.277***	0.012	-0.232***
Grown up in a small city/countryside	-0.048	0.202***	0.040	0.018	-0.004	0.031
Income in 1,000 SEK	0.013***	0.017***	-0.004*	0.005	0.004	-0.001
University	-0.003	0.222***	-0.057	0.003	-0.022	0.293***
Age group 25	0.006	-0.077	-0.529***		0.586***	0.253***
Woman	-0.279***	-0.396***	0.021	-0.120***	-0.522***	0.060
Lottery risk		0.146***	-0.008	-0.002	0.067***	0.055***
Pseudo R^2	0.016	0.059	0.026	0.011	0.047	0.021
Number of respondents	2155	2141	2151	1142	2150	2147

Superscripts *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.
[A]= For this question, negative sign implies a more risky choice.

Table 5 shows that, compared to last-borns, middle-borns are more likely to choose more risky lotteries, to invest money in high-risk stocks, to jump bungee-jump, and to move to a city where they do not know anyone. In addition, they are less likely than last-borns to regularly make sure their fire alarm is in working order. Thus, middle-borns choose, in five out of the six risk questions, less risk averse alternatives than last-borns. Moreover, when comparing all birth-order categories with each other (results are shown in the Appendix), we find that middle-borns tend to be less risk averse than any other category.[12] The clearest impact is found in the bungee jump question: the middle-borns are significantly more likely to go bungee jumping than all the other four birth-order categories. This is in line with the results by Yiannakis (1976) and Nixon, (1981), who found that later-borns are more risk seeking in dangerous sports. Note that we also control for the general risk aversion measured by the answer to the conventional lottery question. The first column in Table 5 shows that middle-borns chose more risky lotteries than others, meaning that the coefficient of the lottery question captures some indirect effects of middle-borns. Thus, if we were to remove this variable from the regressions, the coefficient for the middle-borns would be even larger and more significant, in particular for the cases of investing in high-risk stocks and go bungee-jumping.[13] The number of siblings one grew up with reduces risky behavior in terms of investing in high-risk stocks and of often eating high-cholesterol foods.

To be able to see whether the effect of being a middle-born has any economic significance we also study the marginal effects (results available on request). We find that the direct effect (after controlling for the indirect effect through the lottery question) on different kinds of risks is substantial in several of the regressions. The strongest marginal effecst are found in the bungee jump and in the moving to a new city regressions. Middle-borns are five percentage points more likely than last-borns to choose the least risk-averse alternative and up to eight percentage points less likely to choose the most risk-averse alternative. However, the magnitude of the marginal effects of being a middle-born are quite small, around two percentage points, in the health and safety-related regressions.

[12] Middle-borns are more likely to choose a more risky lottery than people who have siblings but did not grow up with them, and also more likely than only-children to invest in high-risk stocks. They are less likely than only-children and those who did not grew up with their siblings to regularly make sure the fire alarm is in working order, and also less risk averse than first-borns and those who did not grow up with their siblings with respect to high-cholesterol foods.

[13] None of the other coefficients of interest change significantly, however. These regression results are available on request.

Dohmen et al. (forthcoming) find that hypothetical lottery questions are good predictors of other financial decisions such as investing in stocks, but that they do not predict self-employment or smoking, making the lottery question less suitable for measuring risk preferences outside the financial sector.[14] Our findings confirm their results. We find that the riskier the choice made in the lottery question, the more likely it is that the respondent would invest money in high-risk stocks. We also find that the answer to the lottery question significantly predicts sport/lifestyle related risks such as bungee jumping and moving to a new city where one does not know anyone. Yet, the impact of the lottery question on health and safety risks is insignificant.

Results for socio-economic variables

Previous research has found that females are more risk averse than men (see, e.g., Powell and Ansic, 1997; Weber et al., 2002; Eckel and Grossman, 2008, and Dohmen et al., forthcoming). We also find that women are significantly more risk averse than men with respect to the economic issues, high-cholesterol foods, and bungee jumping. Looking at the magnitudes (results available on request), we find that being a female has the largest effect in the high-risk stock and in the lottery regressions. For example, the likelihood of choosing the most risk averse lottery increases by 8 percentage points if the respondent is a female. However, we do not find any gender differences in the safety-related risks and in the risk of moving to a town where one does not know anyone, indicating that people's preferences actually differ across different types of risks and that the gender stereotype is not always confirmed.

It is a standard finding that risk aversion is decreasing in earnings (Donkers at el., 2001; Hartog et al., 2002). We can, however, only corroborate this for the economic risks (and slightly for the fire alarm). Hence, for risks not related to income, earnings do not seem to have any effect on risky behavior. We also find that young people are more likely to make more risky decisions in both health and sport/lifestyle related questions. However, interestingly, the younger respondents are not significantly different from the older considering the two economic risks. While Cook and Bellis (2001) and Dohmen et al. (forthcoming) found that young people are less risk averse, Hartog et al. (2002) found that age

[14] These are unreported results discussed in Dohmen et al. (fortcoming).

has a different impact in different domains. Thus, it seems that the impacts of socio-economic characteristics differ depending on the risk considered. Where the respondents live and grew up have no consistent effect on risk attitudes. One may argue that the current residence is itself endogenous in the "Move to a new city where you do not know anyone" regression. We therefore rerun this regression without these variables, but find that none of our variables of interest change.

4. Conclusions

The aim of this study was to investigate whether childhood family and especially a person's birth order and presence/absence of siblings have any explanatory power on a hypothetical lottery question and five different context-specific risks, namely, the likelihood to invest in high-risk stocks, to regularly check the fire alarm, to often eat high-cholesterol foods, to go bungee jumping, and to move to a city where one does not know anyone. Moreover, we wanted to study whether the answers to the lottery game question have any correlation with the context-specific risks. The study was based on a survey in Sweden answered by both women and men who were either 40 or 25 years old. We find that, after controlling for several family background and socio-economic variables, one birth-order category clearly distinguishes itself from the others: In all studied risks, middle-borns were significantly less risk averse than others. That middle-borns are the least risk averse is clearest in the bungee jump case; they are significantly more likely than all other birth-order categories to go bungee jumping. Moreover, the results indicate that the more siblings one grew up with, the more risk averse a person is. However, the effect is significant only in terms of investing in high-risk stocks and of often eating high-cholesterol foods.

A possible explanation for our findings considering middle-borns is that since parents tend to give the least attention to middle-borns (middle-borns are seldom, contrary to first- and last-borns, the only child in the family during a period), they become different (Sulloway, 1996). Saroglou and Fiasse (2003) find that middle-borns are the "rebels" of the family and have higher levels of impulsiveness than their siblings. Moreover, Lampi and Nordblom (2009) find that middle-borns are clearly less patient than other birth-order categories measured by stated time preferences, a kind of preferences that could be seen quite closely related to risk preferences.

Our results suggest that we should be careful when talking about risk attitudes as such, since risk attitudes differ with different risks and since many socio-economic characteristics have different effects in different risk regressions. The answer in the lottery game question has explanatory power in economic and sport/lifestyle related risk regressions. Hence, this kind of standardized question indeed reveals something about people's general risk preferences. However, it is not complete, as it does not at all explain our investigated health/safety related risks.

In summary, family-related variables have strong explanatory power for various risks. Thus, the early childhood years do matter for risk preferences, maybe more than previously thought. The most pronounced result is that middle-borns consistently seem to be less risk-averse than others with respect to all kinds of studied risks, while there is no such persistent pattern for any other birth-order category. In this paper, we have thus answered some of the questions about what explains why people differ so much in terms of risk attitudes. This is important, since risk preferences certainly affect several economic real-life decisions such as choosing an education, a job, or a partner, as well as timing for family building or taking a loan. However, more research is needed on this topic to explain how risk attitudes toward several specific risks are connected and why middle-borns are less risk averse than others.

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Appendix: Comparisons between all birth-order categories. P-values of the t-tests within parentheses. Bold numbers indicate that the difference between the two sibling categories is significant.

Compared birth-order categories	Difference between the coefficients	Difference between the coefficients	Difference between the coefficients	Difference between the coefficients	Difference between the coefficients	Difference between the coefficients
	Lottery game	*Invest money in high-risk stocks*	*Regularly make sure the fire alarm is in working order*	*Often eating high-cholesterol foods (40-years old respondents)*	*Go bungee jumping*	*Move to a city where you do not know anyone*
First-born vs. Last-born	0.053	0.036	-0.039	-0.100	0.022	0.071
	(0.386)	(0.570)	(0.526)	(0.229)	(0.730)	(0.249)
Middle-born vs. Last-born	**0.136**	**0.153**	**-0.127**	0.138	**0.203**	**0.164**
	(0.080)	**(0.058)**	**(0.101)**	(0.202)	**(0.013)**	**(0.036)**
Only-child vs. Last-born	-0.074	-0.079	**0.245**	0.019	-0.128	0.045
	(0.496)	(0.482)	**(0.022)**	(0.891)	(0.269)	(0.675)
Those who did not grow up with their siblings vs. Last-born	-0.212	0.157	0.207	-0.220	-0.134	0.151
	(0.105)	(0.243)	(0.111)	(0.231)	(0.342)	(0.251)
First-born vs. Middle-born	-0.083	-0.117	0.093	**-0.238**	**-0.181**	-0.093
	(0.272)	(0.133)	(0.381)	**(0.028)**	**(0.022)**	(0.220)
Only-child vs. Middle-born	-0.210	**-0.232**	**0.431**	-0.158	**-0.331**	-0.118
	(0.115)	**(0.093)**	**(0.034)**	(0.376)	**(0.019)**	(0.376)
Those who did not grow up with their siblings vs. Middle-born	**-0.348**	0.004	**0.498**	**-0.358**	**-0.337**	-0.013
	(0.023)	(0.982)	**(0.024)**	**(0.095)**	**(0.040)**	(0.934)
Those who did not grow up with their siblings vs. First-born	**-0.265**	0.121	**0.405**	-0.120	-0.156	0.080
	(0.048)	(0.383)	**(0.038)**	(0.521)	(0.281)	(0.552)
Only-children vs. First-born	-0.127	-0.115	**0.338**	0.081	-0.150	-0.025
	(0.252)	(0.317)	**(0.055)**	(0.566)	(0.204)	(0.820)
Only-children vs. Those who did not grow up with their siblings	0.138	-0.136	-0.067	0.201	0.007	-0.106
	(0.354)	(0.124)	(0.767)	(0.317)	(0.968)	(0.481)