The Effect of Being the Only Child on Friendship Nominations

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Abstract

The literature on sociability stresses that contact with siblings may endow children with the competences needed for interacting with peers. In this paper I examine the effect of the number of siblings at home on friendship nominations at school. I use data for three countries (Germany, Netherlands, and Sweden) from the first wave of the Children of Immigrants Longitudinal Survey in Four European Countries, which targeted 18,716 pupils aged 15 years old in 480 secondary schools over England, Sweden, Germany, and the Netherlands.

I employ the exponential random graph model to explore the effect of having siblings on being nominated as a friend, aggregating the estimates from individual classroom networks using meta-analysis.

The estimated average effect of being the only child on forming a network tie is negative, albeit small, suggesting that some children benefit from having siblings when it comes to sociability. However, our models show that there is significant variability in the effect size across classrooms, an indication that this effect may be context dependent and that the average effect size is not a good representation the effect for all networks studied. Moreover, this effect is only marginally significant once other covariates are controlled for. I conclude that there is only weak support for social learning theory, and that there is a need to study the contextual factors mediating the effect of having siblings on sociability.

Keywords: friendship, social networks, siblings, social learning

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CONTENTS

I. MOTIVATION

A network of friends and colleagues is a resource that plays a very important role for status achievement across the individual life course. Studies show that the social relationships at school are associated with educational outcomes such as graduation (Risi et al. 2010) and dropout (Staff and Kreager 2008; Carbonaro and Workman 2013). In adulthood, social ties may reduce the risk of long-term unemployment (Bramoullé and Saint-Paul 2010), improve chances for finding a well paid job at elite employers (Tholen et al. 2013; Aguilera 2008). Hence, gaining more in-depth insight into the determinants of development of social networks is one of the key questions in research on social stratification. In this paper my aim is to assess what is the role having siblings at home in fostering a child's development of a network of friends and colleagues.

II. THEORETICAL BACKGROUND

Growing up in a large family has been shown to be associated with many disadvantages for children. Due to dilution of parental resources (Blake, 1981, 1989; Downey, 1995, 2001), children with many siblings tend to spend fewer years at school (Steelman, Powell, Werum, & Carter, 2002), they have less private space at home (Goux and Marin 2005) and they are at higher risk of experiencing health problems (Mucci et al., 2004; Solari & Mare, 2012). In adulthood they tend to face more difficulties in finding jobs and receive lower wages (Black, Devereux, & Salvanes, 2005).

While many studies emphasize sibling rivalry and resource dissolution, there are arguments for seeing siblings as a resource. According to social learning theory, children with siblings have opportunities to learn skills that may be helpful in their relationships outside the family (Kitzmann, Cohen, & Lockwood, 2002). The interactions with siblings provide them with options to gain social competences such as self-control or conflict resolution techniques and these skills may raise their ability to interact efficiently with peers (Brody, 1998; Bryant & DeMorris, 1992; Parke & Buriel, 1998). As a result, having siblings may be more beneficial from

the point of view of opportunities to develop a social network compared to being raised as an only child (Downey, Condron, & Yucel, 2013; Whiteman, McHale, & Soli, 2011). If not having any siblings is associated with a lower likelihood of developing friendships; this may be an important part of the process by which family structure affects one's life chances.

Very few studies show whether being an only child really offers an advantage, especially when it comes to the development of non-cognitive skills and maintaining social ties. Polit and Falbo (1987) identified 21 studies that examined personality characteristics of only children and based on this review concluded that only children do not differ from their peers who have siblings. A number of more recent studies question this view, however (Downey & Condron, 2004; Downey et al., 2013; Trent & Spitze, 2011;Bobbitt-Zeher & Downey, 2013). Of these, only the studies conducted by Trent and Spitze (2011) and by Bobbitt-Zeher and Downey (2013) examine actual sociability behavior (i.e. having friends and engaging in social behaviors), while most focus on personality traits. One may argue that it is the ability to translate personality traits into the formation of social relationships that is important here, and thus argue that it is necessary to look at outcomes such as friendship formation.

Another issue concerning the literature on the topic is methodological: friendships are examined in isolation, even though it is well known that structural effects are important drivers of network tie formation. For example, Bobbitt-Zeher and Downey (2013) analyze the number of friendship nominations using conventional linear models that do not deal with structural effects such as transitivity and reciprocity. There is evidence that estimates of the effects of dyadic attributes on tie formation are overestimated when not controlling for network structural effects (Lubbers & Snjiders, 2007), and therefore it is important to apply the correct type of statistical model.

Given the limited evidence, the mixed findings in the literature, and the methodological shortcomings of previous studies, . In order to test how being an only child affects opportunities

to develop social network in such context, I use methods that are particularly suitable to examine social network data.

III.   DATA AND METHODS

Data

Data for this study come from the first wave of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU), which targeted pupils attending secondary school in England, Sweden, Germany, and the Netherlands. I use data for Germany, Sweden, and the Netherlands, which were the countries for which response rates were better and samples are more equivalent.[2]

Classroom network and individual attribute data were collected from a sample of schools stratifying according to the proportion of students with an immigrant background. After removing classes for which model convergence was problematic (i.e. classes with less than 10 pupils, classes with more than 80% of missing network ties, classes with no variation in the explanatory variables), the sample I use contains 449 classes from 247 schools in the three countries selected, amounting to a total of 8,608 pupils.

Because there was a substantial amount of missing values for the node-level covariates, we use multiple imputation through chained equations (Raghunathan et al. 2001), using the mi package for R (Su et al., 2011). The class-level models are estimated using 20 imputed datasets, with coefficients and standard errors being aggregated following Rubin's rules (Rubin, 1987). Simulation studies show that 20 imputations are enough to keep the loss of statistical power at 1% relative to using a full-information maximum likelihood approach (Graham et al., 2007).

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[2] : English schools in that survey had only 52% participation rate even after the inclusion of all replacement schools, compared to 78.9% for Germany and 78.4 for the Netherlands, which also used replacement samples, and 65.3% for Sweden, which did not need to use replacement samples. Moreover, The English sample is not completely comparable to the other samples; independent schools in that country do not provide information on student ethnicity, a variable used for stratifying the sample (CILS4EU, 2014).

Network Measurement

Data on several social relations were collected for that study, and I chose to use friendship nomination for its comparability to previous studies on the subject (i.e. Bobbit-Zeher & Downey, 2013). Students were asked to nominate up to five friends within the class, and these nominations are used to build friendship networks for all classes in the sample. Students were not allowed to nominate friends outside of their classes, and the resulting networks must be seen as capturing the in-class friendship networks.

Subject and dyadic covariates

I model the ability to develop in-class friendship ties as an outcome of being an only child or not. The main variable of interest is the absence of siblings living with the subject. Thus, I use a variable indicating whether or not the children are the only child or if there are other siblings living with them.

The models control for a range of other factors such as similarity in gender, immigrant background, parental socioeconomic status, and academic competence.

Gender similarity is a dichotomous variable with indicating if two nodes in a given dyad have the same sex. Similarity in terms of immigrant background is operationalized through a similar indicator showing whether the two nodes in the dyad have the same immigrant background. Having an immigrant background is defined as being born abroad or having at least one parent who was born abroad, excluding foreign-born natives to the country (which are considered as having no immigrant background).

Similarity terms for household socio-economic status and in academic ability are introduced in the model as the absolute difference of these variables for the nodes in a dyad.

Parental socioeconomic status is operationalized using the ISEI scale (Ganzeboon, De Graaf, Treiman, & Leeuw, 1992), and the value for each child represents the sum of the scores of both parents. If a parent was absent or deceased, the ISEI value for that parent was assumed to be zero and to not contribute to the household's socio-economic status. The scale can, in theory, range from 0, for children with two absent parents, to 200, for children with two parents at the highest ranked occupation. Academic ability is measured through a set of cognitive and verbal tests administered by the survey team. The verbal tests were conducted in the language of the survey country and consisted identifying synonyms and antonyms. The cognitive test was the German CFT-20R (Weiss, 2006), which uses graphical problems and is considered a culturally-fair cognitive test. Because each test was graded in a scale from 0 to 30 and the variable takes the value of their sum, academic ability scores could range from 0 to 60.

Additionally, the model also controls for whether students still live with both parents or not (i.e. if the parents are separated, divorced or if on of them is deceased), and for the effect of having siblings on nominating others as friends (the sender effect).

Model specification

I estimate the effect of being the only child on friendship formation through the exponential random graph model (Robins et al., 2007). I use the R package ERGM (Hunter et al., 2008) to estimate these models using Markov-chain monte carlo maximum likelihood, following evidence that other specifications produce biased estimations (Lubbers & Snijders, 2007).

The models account for network structure through the inclusion of a count of balanced triads – triads 102, and 300 in the Davis and Leinhardt classification (1972) –, as detailed by Morries et al. (2008). These triads are characterized by reciprocity and transitivity, two important aspects of friendship networks. The models also include a term to account for the number of edges (i.e. friendship nominations) within each class.

Meta-analysis

ERGMs yield one coefficient per network, which then need to be summarized through meta-analysis. I use a procedure similar to the one suggested by Lubbers (2003). In this procedure, I partition the coefficients for each individual school class into two parts: the average coefficient and class-dependent deviation from that average, as shown in the formula:.

$$\widehat{\theta}_m = \mu_\theta + U_m + E_m$$

(1)

In (1), μ_θ refers to the average coefficient over all the networks, U_m refers to the class-level random deviation from the average – which has a mean of 0 and variance of σ^2 – and E_m is the standard error of estimation for θ_m. I obtain estimates for μ_θ in order to study the effect sizes of the variables of interest and of E_m for the standard errors. Statistical significance of the effect over all classroom networks studied is assessed using the t-ratio of the average estimates and their standard errors:

$$t_{\mu\theta} = \frac{\mu_\theta}{E_m}$$

(2)

I use the package metafor for R (Viechtbauer, 2010) when estimating the meta-analysis models.

IV.   RESULTS

Table 1 shows descriptive statistics for the sample; means are averages over the 20 imputations, and standard deviations are obtained by combining estimates through Rubin's rules. Pupils are on average 15 years old, although there is some small variation in age.

The average parental SES is about 86, what is low considering that it is the sum of both parents' scores. This may be explained by the fact that the survey oversampled schools with pupils coming from immigrant families. These families may have low employment status and low rates of employment among parents when compared to their native counterparts.

Table 1 Descriptive statistics for the analysis sample

	Mean	sd
Age	14.719	0.746
Parental SES	86.278	33.219
Academic ability scores	32.286	7.184
Percentage who are the only child	20.496%	-
Percentage boy	51.295%	-
Percentage living in an intact home	67.832%	-
Percentage belonging to native majority	51.536%	-
Indegree	3.838	2.072
Indegree of only children	3.582	2.024
Indegree of children with any siblings	3.905	2.079
Outdegree	3.838	1.297
Outdegree of only children	3.717	1.348
Outdegree of children with any siblings	3.869	1.282

Average ability scores are around 32, showing that the average pupil got a little more than half of the questions right in the tests. Again, this may be a consequence of the oversampling of pupils with immigrant background – particularly if we take into account that half of the score comes from a language test.

When it comes to family structure, about 20% of the sample are the only child living at home, which in about 68% of the cases is an intact family with both biological parents living together.

About half of the sample is comprised of boys, and about half of the sample belongs to native majority in each country (Dutch, German, and Swedish natives). The former shows that the sample is representative in terms of sex, while the later testifies to the abovementioned oversampling of immigrant-dense schools.

The children in the sample were nominated as friends, on average, by around 3.8 other pupils in the classroom. Only children were nominated by slightly less peers (about 3.6 incoming nominations), while children who had any siblings at home were nominated by slightly more peers (around 3.9 peers).

Naturally, pupils also nominated on average about 3.8 other pupils, but the differences between only-children and those with siblings are much smaller: the former nominated about 3.7 friends while the later nominated about 3.9.

Results from the meta-analysis of coefficients from the ERGMs are shown on table 2. The model includes nodal and dyadic covariates, as well as network structural effects.

Table 2 Meta-analysis of ERGM parameter estimates

	μ	SE	σ^2
Edges	-2.691**	0.046	0.424**
Balanced triads	0.218**	0.003	0.003**
Only child (receiver)	-0.073†	0.040	0.251**
Only child (sender)	0.008	0.029	0.054**
Intact home (receiver)	0.007	0.029	0.133**
Absolute difference in ability	-0.014**	0.002	0.000**
Absolute difference in age	-0.060**	0.011	0.004*
Absolute difference in SES	-0.001**	0.000	0.000
Same sex	1.033**	0.035	0.315**
Same immigrant background	0.110**	0.015	0.020**

Notes: μ – average estimated effect; SE – standard error of the estimated average effect size; σ^2 –

estimated variance of the effect size between networks

**p<0.01; *p<0.05; †p<0.1

There is a strong negative effect of the edges term, showing that networks with larger number of friendships are less common. The term is significant, but its variance σ^2 is substantial and also significant. This indicates that these networks vary in how sparse they are across the sample.

The term for balanced triads is positive and significant, showing that triads all nodes are connected are more common than triads where a node shares connections with two other nodes that do not share a connection between themselves (forming an unbalanced triad). Although the variance term is significant, its dimension is extremely small, showing that this tendency differs very little across the sample.

The effects of the dyadic covariates are intuitive: networks with connections between nodes with larger differences in academic ability, socio-economic status, and age are less common. Although these terms have statistically significant variances terms, these are very small.

On the other hand, networks with more connections between nodes of the same sex and same immigrant background are more likely. For these two last terms, particularly sex-similarity, there are sizable and statistically significant variances across the classrooms.

The effects of nodal covariates are also as expected. The effect of living with both parents is positive, albeit very small and not statistically significant. Its large variance term shows that the effect is not uniform across the classes.

The effect of having no siblings on nominating others as friends is not significant across all classrooms, but the significant variance shows that it differs from classroom to classroom.

Unlike the sender effect, the receiver effect of having no siblings is negative. However, it is small and only marginally significant. The variance for this term is significant indicating that

the effect differs across classrooms. Nonetheless, there is weak evidence that only-children are less likely to be chosen as friends.

V. DISCUSSION OF KEY FINDINGS

The results show that being the only child is negatively related to the number of friendship nominations a student receives. This is consistent with the idea that children with siblings may learn social skills at home through interactions with their brothers and sisters.

However, the effect was small and only marginally significant, constituting at best weak support for social learning theory. Given that the children in the sample were already adolescents, it may be possible that they have had enough time to learn their social skills through interaction with peers at school over the years. A study with younger children might have shown a stronger effect, and further studies may be needed to better test hypotheses derived from social learning theory.

Moreover, the effect is not consistent over the sample, as the significant variance term shows. This means that whether only-children are less likely to be nominated by their peers as friends may depend on contextual factors at the class, school, and country level[3]. It is possible that social skills learned at home are only useful under certain circumstances. These interactions between resources and context are of theoretical interest and could be further explored. Future studies could gather more information on contextual factors if one wants to explain this variation. Unfortunately, further explorations of this effect is not easily done with the data at hand.

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[3] Indeed, an analysis with country as a factor explaining variance (not shown here) shows that country has some explanatory power over the variance in that coefficient, but even so the sigma coefficient remains large and significant.

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