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The Power of Family?
The Change in Academic Achievement after Breakdown of the Biological Family

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Abstract

There is fairly broad consensus among scholars that divorce damages pupils' academic achievement. However, further clarification is necessary concerning the role of pupil characteristics immediately prior to this unpleasant event, and the extent to which the changing circumstances are reflected in the decline in school achievement. In this regard, more insight is provided into the social-status gradient of the test-score gap. The empirical analysis is based on a unique Hungarian administrative educational panel dataset covering three entire school cohorts. The sample contains 88,000 pupils who experienced biological family breakdown between the 6th and the 8th grade. Classroom fixed-effect regressions reveal that it is largely derived characteristics that account for the drop in test scores, rather than the changing material environment. Ruling out individual and classroom-level differences in test scores, the remaining test-score gap between those from intact and broken biological families is interpreted as a sign of damaged emotional stability. Emotional factors are known to have an effect on pupils' academic achievement, but without some exogenous variance (like the breakdown of the biological family) it would be hard to demonstrate empirically its impact on academic achievement.

Highlights

- Focuses on the academic achievement gap between those from intact and broken biological families
- Examines initial and acquired differences between the two groups
- Employs lagged variable classroom fixed-effect models and Blinder–Oaxaca-type decomposition
- Argues that the residual test-score difference between the two groups is connected to the decline in emotional stability
- Concludes that breakdown of biological family provides an opportunity to estimate the impact of families' emotional stability on academic achievement

Keywords: Breakdown of biological family, Academic achievement, Emotional stability

JEL classification: I21, I24, J12

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A család ereje? Az iskolai teljesítmény változása a biológia család szétesését követően

Keller Tamás

Összefoglaló

A különböző szakértők nagymértékben egyetértenek abban, hogy a diákok iskolai teljesítménye csökken biológiai család széthullását – így többek között a szülők elválást – követően. Ugyanakkor további mélyebb vizsgálatok szükségesek annak tisztázást illetően, hogy vajon ezt a teljesítménycsökkenést mennyiben okozzák a diákok már a válást megelőző jellemzői, illetve mennyiben tulajdonítható az a változás következtében kialakult körülményeknek. Ebben a kérdéskörben elsősorban a társadalmi státus szerinti tesztpontszám-lejtő magyarázatára vállalkozik a tanulmány. A kutatás az Országos Kompetenciamérés adatait használja és egy olyan mintán dolgozik, amelyben három teljes iskolai kohorsz adatai szerepelnek, kihasználva a kutatás panel jellegét. Összesen tehát körülbelül 88 ezer diák adatait elemzi a tanulmány, olyanokét, akik hatodik és nyolcadik osztály között élték át biológiai családjuk valamilyen szintű széthullását. Az elemzés során alkalmazott osztály fix hatásokat tartalmazó dinamikus panel modellek eredményei megerősítik a korábbi vizsgálatok által is megállapított iskolai teljesítménycsökkenést. Az egyéni és osztályszintű különbségek kiszűrése után fennmaradó teszt-pontszám különbséget a biológiai család széthullását követő érzelmi biztonságban bekövetkezett negatív hatásoknak tulajdonítja a tanulmány. Ezeknek az érzelmi jellemzőknek általában lényeges hatást tulajdonítanak az iskolai teljesítmény fokozásában, ugyanakkor hatásuk kimutatása meglehetősen körülményes olyan exogén jellemzők ismerete nélkül, mint amilyennek a biológia család széthullása tekinthető.

Tárgyszavak: biológiai család széthullása, iskolai teljesítmény, érzelmi biztonság, Országos Kompetenciamérés

JEL kódok: I21, I24, J12

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1. INTRODUCTION

In Hungary, six in ten marriages end in divorce (HCSO, 2012). It is also known that the mean duration of marriage to divorce is approximately 14 years across the OECD countries (OECD, 2014), though there has been a slight increase in recent decades (OECD, 2005). Given the age profile of marriage and the age of women at the time of the birth of their first child across European countries (Testa, 2006), 12–14-year-old children could be those who are particularly exposed to the negative consequences of the breakdown of the biological family.*

Previous research into the consequences of divorce have been especially interested in negative outcomes, including in terms of academic achievement (Anthony et al., 2014; Mulholland et al., 1991). Much less attention has been paid to examining the extent to which the drop in academic achievement could be attributed to factors that already existed prior to the divorce (Cherlin et al., 1991). This paper aims to broaden understanding by introducing classroom-level fixed effects (Burke and Sass, 2013; Sacerdote, 2011), since prior differences in school environment might be translated into different test scores, irrespective of divorce. Furthermore, the role of changing material circumstances will be examined as a new contribution to previous analysis. These exercises will be performed with a focus on clarifying the social-status gradient of the drop in test scores.

1.1. DIVORCE AND THE DROP IN ACADEMIC ACHIEVEMENT

Children in intact families who experience divorce perform worse after their biological family breaks down. The extent to which divorce decreased academic achievement, measured on a standardized scale, ranged from -0.25 to -0.09 between 1960 and 2000 and describes a curvilinear pattern over time (Amato, 2001).

However, a closer look reveals much more uncertainty. Some analyses have found the drop in test scores to be larger among boys (Cherlin és mtsai., 1991), while others have established that girls are more vulnerable (Anthony és mtsai., 2014). There are papers that have found only short-term adverse effects on test scores following divorce (Kaye, 1989), while some other investigations report long-lasting consequences (Mulholland és mtsai., 1991). Kaye (1989) also found that it is test scores, rather than grade-point averages, that are sensitive to the deleterious consequences of divorce: teachers may take the changed circumstances into consideration, or provide extra help for pupils whose parents have

* This term is used instead of divorce. More clarification comes in section 2.3.1.

divorced, whereas centralized tests offer much less scope for a teacher to express sympathy. However, again Mulholland et al. (1991) report that grades are also sensitive to divorce.

This paper therefore aims to contribute to this debate and to clarify who suffers more from the breakdown of the biological family, with a special focus on social status differences.

1.2. WHY ACADEMIC ACHIEVEMENT DECREASES AFTER DIVORCE

Divorce is basically explained as having a deleterious effect on test scores through psychological distress, which arises mainly from the vulnerability that children feel if their parents are in conflict (Grych and Fincham, 1990; Dadds et al., 1999). Moreover, children may feel abandoned, or anxious and guilty about being the cause of the divorce (Wallerstein and Kelly, 1996). Emotional stress is usually seen as undermining academic achievement because it blocks motivation and the willingness to address long-term goals. It has also been established that children who have experienced disruption in the family show a decline in their cognitive self-efficacy compared to their peers in intact families (Kurtz and Derevensky, 1994).

Part of the post-divorce achievement gap can be predicted by *derived* factors, which existed before the separation. Families that experience later divorce could be seriously dysfunctional, which – even without divorce – would threaten the normal development of the children. Cherlin et al. (1991) tried to rule out these effects by controlling for prior achievement and social status (and some other pre-divorce characteristics), and found that these attributes explain the bulk of the test-score gap among boys; however, even among girls they have significant predictive power.

Furthermore, marital conflict might be present before a couple separates. The emotional stability of a household is likely to begin to decline even before such an unpleasant event (the literature is reviewed in Hetherington and Stanley-Hagan, 1999; Kelly, 2000), especially if the reasons reported as causing divorce are considered (Amato and Previti, 2003).

A missing element in this vein of research is consideration of classroom-level heterogeneity, which is known to be a strong predictor of school outcomes (Bryk and Raudenbush, 1988). However, in analyzing test-score differences after divorce, few researchers have focused either on the fact that – irrespective of whether they experience divorce – different pupils will attend different classrooms, or on the extent to which this initial difference may contribute to their later academic achievement.

Prior research has also devoted less attention to how circumstances that clearly differ between pupils with intact and broken biological families actually change after divorce, and

the extent to which *acquired* circumstances contribute to pupils' later school outcomes. Since the level of these status-related characteristics (like parent education or household income) is strongly associated with the educational achievement of pupils (OECD, 2010), any change may also explain part of the test-score gap after experience of divorce. To the best of my knowledge, no previous analysis has focused on the changing material status and the drop in test scores after divorce; it may be worth looking in this direction as well.

Drawing on the evidence from prior research and going one step further, there is a need to introduce classroom-level differences, since initial differences may already be bound up with the change in test scores between those who experience divorce and those who do not. In addition to this, the impact of the changing situation after the breakdown of the biological family calls for more research, especially into how this changes the test-score gap.

1.3. DIVORCE AS AN INDICATOR OF THE IMPORTANCE OF EMOTIONAL STABILITY

There is an increasing body of research arguing the importance of family and the role of parental background in explaining differences in educational outcomes (Blanden et al., 2012; Erikson et al., 2005; Schnabel et al., 2002; Stocké et al., 2011). It is, however, much less clear to what these differences should be attributed (Breen and Goldthorpe, 1997). In simple, cross-sectional analysis, scholars usually report a lower level of educational achievement among those of lower status (OECD, 2010). But does that mean that the offspring of lower-status families have poorer school performance because of their lower status? Recent analyses show that the picture is more complicated. Tamm (2007), for example, found that using sibling fixed-effect models, parental income does not have a positive influence on educational attainment. He also reported that after German child benefit (and thus household income) was increased, this gain did not influence the school track choice of children.

Similarly, trying to maintain the exogeneity assumption, scholars have found no evidence that children from larger families (and therefore with fewer material resources available) have a lower educational level. Using parental preferences for mixed sibling-sex composition (Angrist and Evans, 1998) and relaxations in China's one-child policy (Qian, 2009) as exogenous changes in family size, it was established that, if the number of children increases, the educational attainment of siblings does not decrease. These contributions indicate that financial considerations may not be the only important factor in why educational level and achievement differ from family to family.

There are numerous possible channels by which the power of the family could be operating and influencing pupils' educational outcomes. One is clearly emotional stability,

which might be destroyed when children experience a divorce or some other unpleasant change (bereavement, for example) in their intact biological family. As has been argued, the breakdown of the intact biological family could herald a stressful situation, which might hinder academic performance. Hence, the disintegration of the biological family could offer more insight into the importance of emotional stability in school achievement. Without finding exogenous variance in data – like divorce – it would be hard to analyze its impact, since both emotional stability and test scores are influenced by unobserved family factors.

So the residual test-score gap – after controlling for initial and acquired differences between those from intact and broken biological families – would be interpreted as the power of family, which manifests itself mainly in emotional factors. Put differently, it is the direct effect (Alwin and Hauser, 1975) of breakdown in the biological family or of its effect not being mediated (Muller, Judd and Yzerbyt, 2005) through derived and acquired characteristics.

1.4. THE PURPOSE OF THE STUDY

Building on the already established association between divorce and the gap in test scores, this study aims to explain the extent to which this gap can be attributed to the already existing difference between those with a broken and those with an intact biological family, and the extent to which changing circumstances account for this gap. Taking into consideration differences before the breakdown of an intact biological family, both individual and classroom-level heterogeneity is accounted for. The focus will be on the age group that is especially threatened by divorce – those coming up to the transition to secondary education. The empirical analysis takes full advantage of the large (88,000) administrative data source, which covers three entire Hungarian school cohorts.

This vein of research is important, since the remaining unexplained test-score gap could be interpreted as the emotional threat emerging after breakdown of the biological family. The results could therefore shed light on how important emotional stability is in explaining test-score differences. Such differences would be hard to analyze without a situation where emotional stress factors are likely emerge – such as after parental divorce, for example.

2. METHOD

2.1. DATA

The data are derived from the Hungarian National Assessment of Basic Competences (NABC), which is an individual-level administrative educational panel dataset, focusing on pupils' educational achievement and assessed by a PISA-like test in math and reading comprehension. All pupils in Hungary are first asked in 6th grade, and then again in 8th and 10th grade. Data with at least two observations about the same individual are available from 2008. In the main analysis three cohorts were used (6th graders in 2008, 2009, and 2010), the median year of birth in the cohorts being 1995, 1996, and 1997, respectively.

2.2. SAMPLE

The merged data of 6th and 8th graders is used, in order to have data on more than one cohort. Note that the merging was implemented only for those who completed two grades within two school years; in other words, dropouts and grade-repeaters are not included in the sample. The possibility must be considered that being a dropout/repeater could be related to the breakdown of the biological family. Moreover, since being a dropout/repeater is a consequence of poor academic achievement, the true effect of broken families might be underestimated. However, repeating a grade also means that pupils have a new classroom, with new teachers, and new classmates. It would thus be a Herculean task to determine how much the new classroom-level unobserved heterogeneity lies behind the change in academic achievement.

The same reason motivates the decision to restrict the sample to those who did not change school class over time. This means that pupils in this sample have to have the same peers, and probably also the same teachers, between 6th and 8th grade. Obviously the breakdown of a biological family sometimes means a change of classroom, especially if someone's place of residence changes. Therefore this restriction again means possible underestimation of the change in academic test scores.

Concentrating on pupils who did not change classroom also means that pupils who have chosen an early secondary track (after the 6th grade)[†] are excluded from the analysis (in Hungary, it is basically up to pupils – and their parents – whether they move onto the secondary track after the 4th, 6th, or 8th grade of elementary education). This restriction

[†] Those who have chosen early secondary track after the 4th grade are also excluded, in order to have a more homogeneous sample containing only pupils in elementary education.

leads in the opposite direction – towards an overestimate of the true effect of having a broken biological family, since the choice of an early secondary track is associated with higher status (Horn, 2013), and higher-status pupils are more likely to have intact biological families (as is shown later).

To allow analysis of change in initially intact biological families, the sample is restricted to those who reported an intact biological family at the beginning of the observed time frame (6th grade). Those pupils whose biological mother or father had died or whose parents had divorced or separated before that time are excluded from the sample. Missing information about biological parents is not imputed, and therefore pupils could also be excluded from the sample for that reason.

Further restriction is used to reduce the sample to those without special educational needs, since pupils belonging to that group did not have a math test score and had a different type of reading assessment. The sample for analysis therefore contains observations about elementary school pupils in an intact biological family in the 6th grade, who remained in the same classroom between 6th and 8th grade, and do not have special educational needs. These restrictions resulted in a sample of 88,002 individuals.

2.3. MEASURES

The following sections will discuss the variables used later in the empirical analysis.

2.3.1. Broken biological family

NABC asked pupils who they were living with in the same household, and particularly whether they lived with their biological mother and biological father. The expression *intact biological family* is used if pupils lived together with their biological mother and father.[‡] Since the same questions were asked in 8th grade, the change in the status of an intact biological family could be calculated. The expression *broken biological family* is used if someone in 8th grade reports not living together (in the same household) with his biological mother or father, and instead mentions only one of the two biological parents. This definition shows the change between 6th and 8th grade; however, it was not possible to determine when exactly the change occurred.

[‡] Stepmothers and stepfathers are asked in different questions, but not together with biological parents.

As Table A1 in the Appendix reports, approximately 5% of pupils from an intact biological family experienced a breakdown sometime between 6th and 8th grade, and this figure shows an increasing pattern across the three cohorts. There are no available benchmark statistics on the incidence of divorce among the parents of pupils between 12 and 14 years of age. The divorce rate for every thousand individuals is approximately 2.5 in the observed time period.[§]

Basically three different possible scenarios behind the changes in the intact biological family: one of the parents could have died; one of the parents could have moved abroad to work; or the couple could have separated or divorced.[**] These scenarios are possible, but not equally likely. Based on census data, in the population aged 35–49 years (the most likely age group for the parents of pupils in the sample) the chances of being divorced were 13–16% in 2001,[††] whereas the likelihood of someone in that age band dying in that year was around 0.2–1.2% (Radnóti, 2003: 568). Unfortunately no statistics were available on (international) mobility for potential parents of pupils; however, within-country mobility is also very low in Hungary, ranging from 2% to 2.5% of total population in the years 2001–14.[‡‡] It will be assumed that the major component behind the breakdown of an intact biological family is divorce; however, since that is manifestly not the only possibility, throughout the analysis the term broken biological family (or BBF) is used.

2.3.2. Test scores

Pupils' achievement is measured using the standardized test scores in math and reading comprehension. The test is compiled and organized by the Hungarian Educational Authority. This is apparently a more objective measure of pupils' academic achievement than local school-based assessments of ability. Measurement is organized at the end of the academic year, usually in May. Test scores will be the independent variables in this analysis, and will also appear on the left-hand side, as lagged variables. Previous test scores are used to control for every individual factor that is stable over time and that has an effect on academic achievement, like parental background or motivation, for example. Test scores are standardized with zero mean and 1 unit standard deviation (see the variables used in the analysis in Table A2 in the Appendix).

[§] Statistics about divorces per thousand individuals:
http://www.ksh.hu/docs/eng/xstadat/xstadat_annual/i_wnt001b.html

[**] Obviously these are very different scenarios; however, since the argument here is that BBF has both material and psychological consequences, death and divorce are not so very different, since they both lead to a drop in the household's material resources, and could both have serious emotional consequences. If someone works abroad, the material consequences could be different; however, the size of this group should be lower than in the two other scenarios.

[††] http://www.ksh.hu/nepszamlalas/docs/tables/regional/00/00_1_1_3_1_en.xls

[‡‡] https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_wnv001.html

2.3.3. Social status

Parental status is based on parents' highest educational attainment. It has three discrete categories: maximum vocational education, high-school final exam, and tertiary education. This variable is based on the status in 6th grade, and is reported by the child. Status gap is known to be underestimated if parental education is reported by the child, rather than by the parents (Jerrim and Micklewright, 2014). Since in 6th grade everybody in this sample lived with both biological parents, if the mother and the father had different educational status the higher of the two scores was used.

Parental education level is quite stable over time (at least it does not change within two years). However, after the breakdown of the biological family, children could also experience a change in status, especially if their mother and father have different levels of education. Therefore the difference in the educational status between the parents is calculated and used as a possible component of changes after BBF. Pupils usually (in the sample) stay with their mother after experiencing a change in the biological family.

2.3.4. Material resources

The educational status of parents does not necessarily correspond to the material resources available in the household. Household income is unfortunately not available in the data, but data were collected about some indicators that could be used as a proxy, such as the number of books and computers in the household or the number of living rooms. These data are used separately as a proxy for status and, via principal component analysis (hereafter referred to as PCA, details about the analysis are in Table A3), a composite status-indicator measure is created. Since these data are available for both time points, the change in the indicators could also be calculated.

2.3.5. Classroom fixed effects

Unlike most of the earlier analysis examining the change in test scores after BBF, this analysis controls for influences on academic achievement that are hard to assess, like classmates, teachers, or textbooks, using classroom fixed effects. Since pupils in the sample did not change classroom over time, classrooms are the same in the 6th and 8th grades.

Using classroom fixed effects, there was no need to control for the cohort, since classrooms were different across the three cohorts analyzed.

2.3.6. Other controls

There is no need to use much individual control, since lagged test scores capture individual factors that are stable over time and that influence academic achievement. However, since previous studies pointed out the importance of gender and age (Anthony és mtsai., 2014), these variables will be included among the controls. Year and month of birth are available from the survey. Age will be measured as the number of months elapsed from January 1960.

2.4. SOME DESCRIPTIVE STATISTICS

Concentrating on derived and acquired characteristics, this section provides some descriptive statistics about pupils with and without an intact biological family.

2.4.1. Derived characteristics

It is known that divorce is more likely among parents of low status (Haskey, 1984). Lower status, on the other hand, is also associated with lower academic performance (Van Laar and Sidanius, 2001). Hence pupils who experience BBF might have lower status and lower test scores; moreover they might attend worse schools. These characteristics could all be translated into smaller growth in academic achievement.

As the data show, pupils who experience breakdown of the intact biological family are 4 percentage points more likely to come from low-status families, and are about 2.5 percentage points less likely to be from high-status families. These differences are significant at the 0.1% level (see Table 1). It is also shown (Table 2) that there is an approximately 5% initial difference in the test scores of pupils from different family types, and pupils who experienced change later in their family already had lower test scores. This difference indicates that not all the test-score difference can be attributed to BBF.

Table 1

Status differences according to type of family

	Social status			Total
Type of family	Low	Middle	High	
Intact Biological Family	39.18	35.27	25.55	100
Broken Biological Family	43.3	33.56	23.15	100
Total	39.38	35.19	25.43	100

Pearson chi2(2) = 30.5643; Pr.: = 0.000

Table 2

Prior (6th grade) test-point differences according to type of family

	Lagged math test score	Lagged reading test score
Intact Biological Family	0.00	0.00
Broken Biological Family	-0.06	-0.05
Two-sample t test	3.91***	3.28***

*** p<0.001, ** p<0.01, * p<0.05

As Table 3 reveals, approximately 10% (1-(-0.046/-0.051)) of differences in lagged reading test scores between pupils with and without an intact biological family could be attributed to unobserved classroom-level characteristics. This means that pupils who experience BBF later attended a classroom which reinforced the gain in test scores less (probably classrooms with less-talented peers, a poorer teacher, larger class numbers, etc.), and these (unobserved) factors could also explain why, after experiencing the breakdown of their biological family, these pupils made less progress in reading. The test-score gap after BBF, however, is much less sensitive to unobserved classroom-level factors in the case of math test scores.

Table 3

Initial differences in test scores in empty models, and after controlling for classroom fixed effect

	(1)	(2)	(3)	(4)
	Math 6th grade		Reading 6th grade	
Broken Biological Family	-0.061***	-0.062***	-0.051**	-0.046**
	(0.016)	(0.014)	(0.016)	(0.015)
Constant	0.003	0.003	0.003	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Observations	88,002	88,002	88,002	88,002
R-squared	0.000	0.372	0.000	0.331
Classroom FE	NO	YES	NO	YES
p	0	0	0.001	0.002
F	15.27	19.05	10.79	10.00

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

2.4.2. Acquired characteristics

If change is experienced in an intact biological family, an already poor situation could become even worse, since there are certain acquired characteristics that are more likely to emerge after BBF. Pupils might experience a drop in status (Kelly, 2000) as a natural consequence of staying with only one of the two parents. Moreover, after separation, for example, parents might employ different strategies to divide up their assets, and this could mean a decline in the status goods possessed by households.

Then again, after BBF children stay with one of the biological parents, generally the mother (Pearson and Thoennes, 1990). This parent could have a lower level of educational attainment. The lower educational attainment of that parent might be translated into less motivation for pupils to achieve higher academic status (i.e. they are less motivated to achieve better school performance). Pupils usually strive to attain the same educational level as their parents, since they assume that by having the same level they will end up in the same social position and will thus avoid loss of status (Breen and Goldthorpe, 1997).

These mechanisms (status loss; staying with a less-educated parent) could include both material and psychological stress factors: it is hard to establish, for example, whether it is the move to a less comfortable flat *per se* or the psychological cost of the loss (new neighborhood) that contributes more to the decline in academic achievement.

Table 4 shows a considerable drop in status indicators (number of books, living rooms and computers) among pupils experiencing BBF. It is also established (Table 5) that pupils

whose intact biological family has broken down are more likely to have a mother who is less well qualified than her (ex-)husband. Though the difference is not significant at the significance levels commonly used, the difference could nevertheless be important, since pupils with BBF usually stay with their mother, and therefore their loss in status could be significant compared to those who remain in the same intact biological family.

Table 4

Change in some status indicators between 6th and 8th grade according to type of family

	Number of books	Number of living rooms	Number of computers	Status indicator index PCA
Intact Biological Family	0.01	0.01	0.01	0.01
Broken Biological Family	-0.13	-0.12	-0.14	-0.21
Two-sample t test	8.95***	7.96***	9.55***	14.27***

*** p<0.001, ** p<0.01, * p<0.05

Table 5

Differences in qualifications of biological parents according to type of family

	Mother less qualified	Same qualification	Father less qualified	Total
Intact Biological Family	10.8	61.92	27.27	100
Broken Biological Family	11.22	62.04	26.75	100
Total	10.82	61.93	27.25	100

Pearson chi2(2) = 1.0680; Pr.: = 0.586

2.5. ESTIMATION STRATEGY

2.5.1. Test-score gap after BBF and derived characteristics

In the main part of the analysis the following fixed-effect linear regression is estimated, where in the fixed part classroom-level unobserved heterogeneity is controlled for:

$$score_{ijt} = \alpha + \beta_1 \times CBF_{ij} + \beta_2 \times status_{ijt-1} + \beta_3 \times score_{ijt-1} + \beta_4 \times control_{ij} + \delta \times class_{ij} + \varepsilon_{ij}$$
(Eq.1)

Test scores for *i*th individual in *j*th classroom in time *t* (8th grade) are explained by the change in the intact biological family status (BBF), social status and test scores in time *t-1* (6th grade) and control variables which do not vary between the two waves (gender and month and year of birth[§§]). Using classroom-level fixed effects, every classroom-level characteristic that could influence academic achievement and that is stable within the classroom is controlled for (teachers, textbooks, peers, school quality, etc.). Including the lagged test scores, every individual characteristic is controlled for that is stable over time and that could influence (prior) academic achievement (motivation, ambitions, future educational plans, and the unmeasured dimension of social status). Eq.1 traces BBF to derived characteristics, since both status and test scores were measured prior to the change in the family circumstances.

2.5.2. Test-score gap after BBF and acquired characteristics

As argued earlier, status could change with the breakdown of the intact biological family if a pupil's parents had different educational attainments (mother's education is used as a proxy) and also if some status indicators changed. The change in Eq.2 always refers to those between the 6th and 8th grades.

$$score_{ijt} = \alpha + \beta_1 \times CBF_{ij} + \beta_2 \times status_{ijt-1} + \beta_3 \times score_{ijt-1} + \beta_4 \times mother_{ijt-1} + \beta_5 \times ch.mother_{ij} + \beta_6 \times status\_ind_{ijt-1} + \beta_7 \times ch.status\_ind_{ij} + \beta_8 \times control_{ij} + \delta \times class_{ij} + \varepsilon_{ij}$$
(Eq.2)

[§§] As a continuous variable, counting together the numbers of months spent from January 1960.

2.5.3. Decomposing the effect of BBF

The impact of BBF was also decomposed, to find out how much of the derived and the acquired characteristics is accounted for in the total test-score gap. Blinder–Oaxaca-type decomposition is performed, which is practically equivalent to models with a full set of interactions between the variable identifying BBF and all the other variables in the models (Jann, 2008). The total effect of BBF on test scores is interpreted as the sum of the difference in observable characteristics (endowment effect) between those with intact and broken biological families, plus the difference in coefficients between the two groups (coefficient effect), and the interaction (interaction effect) between the endowment and the coefficient effects.

An endowment effect is basically the hypothetical change in the gap between those with an intact and a broken biological family, if, for example, those with a broken biological family had the same observable characteristics (mean values) as those with an intact biological family. The logic here is that if the observable characteristics of the two groups were similar, the gap in outcomes would also be smaller. The aim of the analysis is to point out how much the differences in observable characteristics are responsible for the total test-score gap between the two groups.

However, it is possible that the difference between the two groups is not a function of their observable characteristics, but a result of the fact that a teacher, for example, appreciates the unpleasant situation in a pupil's family and provides more help. This would be positive discrimination; but negative discrimination is also possible. The difference in the slope between the two groups is attributed to some kind of positive or negative discrimination operating between the two groups. Here again the question is to what extent the difference in the slope between the two groups can be attributed to the total slope differences between them in terms of all the other effects in the equation.

3. RESULTS

3.1. THE MAIN RESULTS

The main results are plotted in Table 6. As Column 1 (math) and 6 (reading) indicate, the differences in test scores between those with BBF and intact biological family are some 11% ($b = -0.110$, $p < 0.001$) and 8.8% ($b = -0.088$, $p < 0.001$) of total variation in math and reading comprehension, respectively. This means that the initial difference in test scores for math ($b = -0.06$, $p < 0.001$) and for reading ($b = -0.05$, $p < 0.001$) (Table 2) rose by approximately 80%.

In Columns 2 and 6, classroom fixed effects are added to control for unobserved classroom-level differences, which were found to be a significant predictor of school performance (Rivkin, Hanushek and Kain, 2005). Even though R^2 statistics increase dramatically, the gap in BBF decreases significantly only in the case of reading test scores (b = -0.080, p < 0.001), and not in math scores (b = -0.105, p < 0.001). This indicates particularly that the observed difference in reading test scores is a byproduct of the fact that those with and without intact biological family visited classrooms of varying quality.

As status and other controls are included (Columns 3 and 7), the total difference decreases by approximately 50% (b = -0.053, p < 0.001 and b = -0.042, p < 0.001 for math and reading comprehension, respectively). This means that mostly individual-level, and particularly status-related differences (approximately half of the test-score gap according to BBF), explain the overall test-score gap between those with intact and those with broken biological families.

In the case of math test scores, status can moderate the effect of the drop in test scores. BBF has more negative consequences for higher-status pupils. The relative decline in test scores between pupils with an intact and a broken biological family is found to be larger if pupils are of higher status than if they are of lower status (Column 4). Basically the logic is the same if there is interaction between BBF and prior achievement (Column 5). After the breakdown of an intact biological family, the loss among better-performing pupils is larger than the loss among their worse-performing peers.

The finding that the interaction effects are only significant in the case of math, and not in the case of reading test scores, might be connected to the fact that math test scores are known to be more sensitive to divorce than are reading test scores (Anthony és mtsai., 2014). In line with this, the analysis revealed (Columns 2 and 6) the classroom peer effect to be higher in the case of reading test scores. It could be that everything which is individual status-related in math achievement is determined by classroom unobserved heterogeneity in the case of reading. This would mean that high-status parents are much better able to secure advantages (choose a good school) for their offspring in arts than in science. This also means that individual-level contributions to progress in math (presumably captured in a status variable) are much more important elements of math than of reading performance.

Table 6

Main regression results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Math test scores, 8th grade					Reading test scores, 8th grade				
Broken Biological Family	-0.110***	-0.105***	-0.053***	-0.030*	-0.054***	-0.088***	-0.080***	-0.042***	-0.031*	-0.043***
	(0.016)	(0.014)	(0.009)	(0.014)	(0.009)	(0.016)	(0.014)	(0.009)	(0.014)	(0.009)
Status: Middle (ref: Low)			0.092***	0.093***	0.092***			0.112***	0.113***	0.112***
			(0.005)	(0.005)	(0.005)			(0.005)	(0.005)	(0.005)
Status: High (ref: Low)			0.177***	0.180***	0.177***			0.193***	0.194***	0.192***
			(0.006)	(0.006)	(0.006)			(0.006)	(0.006)	(0.006)
BBF * Status (Middle)				-0.019					-0.020	
				(0.021)					(0.021)	
BBF * Status (High)				-0.069**					-0.021	
				(0.023)					(0.024)	
Lagged math test scores, 6th grade			0.726***	0.726***	0.727***					
			(0.002)	(0.002)	(0.002)					
Lagged reading test scores, 6th grade								0.712***	0.712***	0.712***
								(0.002)	(0.002)	(0.002)
BBF * Lagged math scores, 6th grade					-0.019*					-0.010
					(0.009)					(0.010)
BBF * Lagged reading scores, 6th grade										
Female			-0.029***	-0.029***	-0.029***			0.090***	0.090***	0.090***
			(0.004)	(0.004)	(0.004)			(0.004)	(0.004)	(0.004)
Birth (Month and Year)			0.011***	0.011***	0.011***			0.011***	0.011***	0.011***
			(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
Constant	0.005	0.005	-4.895***	-4.897***	-4.897***	0.004		-4.943***	-4.944***	-4.943***
	(0.003)	(0.003)	(0.173)	(0.173)	(0.173)	(0.003)		(0.180)	(0.180)	(0.180)
Observations	88,002	88,002	88,002	88,002	88,002	88,002	88,002	88,002	88,002	88,002

R-squared	0.001	0.384	0.749	0.749	0.749	0.000	0.345	0.729	0.729	0.729
Classroom FE	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
p	0	0	0	0	0	0	0	0	0	0
F	50.19	56.01	18761	14073	16082	31.55	30.11	18215	13661	15613

tandard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05

3.2. THE CHANGING STATUS AFTER BBF

Table 7 deals with the possible consequences of status loss after the breakdown of the biological family. Since children usually stay with their mothers after BBF, the mother's status is used as a proxy of changing status. Since social status is defined on the basis of the highest educational level of the couple, the mother's status shows the possible deviation from this baseline.

Table 7

Modelling the impact of changing status after BBF

VARIABLES	(1) Math test scores, 8th grade	(3) Reading test scores, 8th grade
Broken Biological Family	-0.039*** (0.011)	-0.039** (0.012)
Status: Middle (ref: Low)	0.129*** (0.006)	0.156*** (0.006)
Status: High (ref: Low)	0.217*** (0.007)	0.240*** (0.007)
Lagged math test scores, 6th grade	0.724*** (0.002)	
Lagged reading test scores, 6th grade		0.709*** (0.002)
Mother less qualified (ref: Equal qual.)	-0.059*** (0.007)	-0.069*** (0.008)
Father less qualified (ref: Equal qual.)	-0.050*** (0.006)	-0.063*** (0.006)
BBF * Mother less qualified	-0.098*** (0.029)	-0.007 (0.030)
BBF * Father less qualified	-0.004 (0.021)	-0.004 (0.021)
Female	-0.028*** (0.004)	0.091*** (0.004)
Birth (Month and Year)	0.011*** (0.000)	0.011*** (0.000)
Constant	-4.889*** (0.173)	-4.932*** (0.180)
Observations	88,002	88,002
R-squared	0.750	0.729
Classroom FE	YES	YES
r2	0.750	0.729
p	0	0
F	11287	10964

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Here, compared to the situation if the parents' educational level is the same, there is a decline in the test scores if either of the parents has a lower educational level. This is quite obvious, since, compared to the situation if parents have the same status, the family has "less status" altogether if either of the parents is less well educated.

However, after BBF, pupils experience a larger drop in their test scores if their mother had less education. The negative interaction coefficient supports the hypothesis that a less well-educated mother might be less able to support her offspring's achievement: partly because of her lower educational level, she is less able to provide help if the child needs it. The results are also consistent with the earlier finding that math scores are more independent of classroom-level factors. If school-based factors are less able to support math performance than reading ability, individual-level – mostly family-based – factors should be more important, and the lack of these could have larger negative consequences. Earlier analysis also found that math scores are more sensitive to the changing status after BBF, especially the absence of the father from the family (Nord, Brimhall and West, 1997). Other research also shows that divorce has a greater negative effect on the educational attainment of those of higher status (Bernardi and Radl, 2014).

3.3. THE CHANGING MATERIAL CIRCUMSTANCES AFTER BBF

Table 8 shows the change in the material indicator after BBF, used as a proxy for changing material circumstances. The number of books, living rooms, and computers is used first in different models, and is then also combined in a composite measure (status indicator). As one might assume, both the level and the change of status indicator increase the gain in test scores. Pupils with better living conditions, and those whose living conditions have changed for the better, perform better. However, none of the interaction effects are found to be significant. Contrary to the finding that pupils experience a decline in their living conditions after BBF (Table 4), this decrease does not contribute to the test-score differences between those with intact and with broken biological families. This finding is a new contribution, since to the best of my knowledge no earlier research has found similar results.

Table 8

Modelling the impact of changing material circumstances after BBF

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Math test scores, 8th grade				Reading test scores, 8th grade			
Broken Biological Family	-0.047***	-0.052***	-0.053***	-0.049***	-0.035***	-0.041***	-0.041***	-0.035***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Status: Middle (ref: Low)	0.064***	0.089***	0.087***	0.072***	0.076***	0.109***	0.104***	0.086***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Status: High (ref: Low)	0.119***	0.171***	0.166***	0.135***	0.116***	0.185***	0.174***	0.134***
	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)
Lagged math test scores, 6th grade	0.717***	0.726***	0.725***	0.721***				
	(0.002)	(0.002)	(0.002)	(0.002)				
Lagged reading test scores, 6th grade					0.699***	0.711***	0.710***	0.705***
					(0.002)	(0.002)	(0.002)	(0.002)
Number of books, 6th grade	0.055***				0.074***			
	(0.003)				(0.003)			
Number of living rooms, 6th grade		0.010***				0.013***		
		(0.002)				(0.002)		
Number of computers, 6th grade			0.018***				0.028***	
			(0.002)				(0.003)	
Status indicators, 6th grade				0.041***				0.056***
				(0.003)				(0.003)
Change in number of books	0.023***				0.028***			
	(0.002)				(0.002)			
BBF * Change in number of books	-0.007				-0.008			
	(0.008)				(0.008)			
Change in number of living rooms		0.005*				0.005*		
		(0.002)				(0.002)		
BBF * Change in number of living rooms		-0.008				-0.010		
		(0.008)				(0.008)		
Change in number of computers			0.006**				0.011***	
			(0.002)				(0.002)	

BBF * Change in number of computers			-0.010				-0.002	
			(0.008)				(0.008)	
Change in status indicator PCA				0.015***				0.019***
				(0.002)				(0.002)
BBF * Change in status indicator PCA				-0.013				-0.010
				(0.008)				(0.008)
Female	-0.032***	-0.029***	-0.028***	-0.029***	0.090***	0.090***	0.092***	0.092***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Birth (Month and Year)	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-4.776***	-4.889***	-4.854***	-4.796***	-4.776***	-4.934***	-4.866***	-4.793***
	(0.173)	(0.173)	(0.173)	(0.173)	(0.179)	(0.180)	(0.180)	(0.179)
Observations	88,002	88,002	88,002	88,002	88,002	88,002	88,002	88,002
R-squared	0.751	0.749	0.750	0.750	0.731	0.729	0.729	0.730
Classroom FE	YES	YES	YES	YES	YES	YES	YES	YES
r2	0.751	0.749	0.750	0.750	0.731	0.729	0.729	0.730
p	0	0	0	0	0	0	0	0
F	12618	12513	12522	12569	12321	12151	12175	12250

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

3.4. BLINDER–OAXACA-TYPE DECOMPOSITION

In Blinder–Oaxaca-type decomposition, the aim is basically to decompose the gap in test scores between intact and broken biological families. This gap appears in Columns 1 and 5 of Table 5, and also in Table 9. This difference should be decomposed to observable characteristics (endowment effect), discrimination (coefficient effect), and the interaction between them. The method used to decompose the test-score gap is not capable of handling as many dummy variables as there are classrooms are in the sample, hence the results are not equivalent to a classroom fixed-effect estimator. If classroom-level information is left out, that leads to an overestimate of the unexplained gap in BBF (especially in the case of reading test scores). To mitigate this bias somewhat, average classroom test score is controlled for as a possible indicator of classroom quality.

The results for the endowment effects show that the larger part of the test-score gap in BBF could be explained by observable characteristics (54.55% and 60.22% for math and reading scores, respectively) – basically initial test score and status indicators (parents' educational level, and the composite index of status indicator). Even though derived characteristics explain the test-score gap quite well, none of the acquired characteristics provide predictive power. This also means that pupils have different test scores because of their original characteristics, and the change in their material situation does not contribute to test-score differences.

After controlling for observable differences, 45.45% and 39.78% of the BBF-related test-score gap remains unexplained in math and reading scores, respectively (this is basically the sum of the coefficient and the interaction effect, divided by the total test-score gap). This could be the part of the test-score gap which is interpreted as the consequence of the lack of emotional stability factors after the breakdown of the intact biological family.

Note that the models discussed in this section are different from the models discussed earlier, since these are virtually equivalent to a full set of interaction effects. The "Coefficient" column of decomposition shows how much the differences in the slopes of particular variables contribute to the total slope differences. Even though differences in slopes (for example, according to social status) were reported in earlier models (Table 7), jointly these interaction effects are not significant. Put differently, the slope differences in the variables included do not moderate jointly the difference in test-score gain between those with an intact and with a broken biological family.

Table 9

Blinder–Oaxaca-type decomposition of test-score gap between those from intact and broken biological family

	Math test scores, 8th grade			Reading test scores, 8th grade		
Intact Biological Family	0.005			0.004		
	(0.003)			(0.003)		
Broken Biological Family	-0.105***			-0.083***		
	(0.015)			(0.015)		
Difference	0.110***			0.088***		
	(0.015)			(0.015)		
	Parameter	% of Difference		Parameter	% of Difference	
Endowments	0.060***	54.55%		0.053***	60.22%	
	(0.012)			(0.012)		
Coefficients	0.046***	41.82%		0.032**	36.36%	
	(0.010)			(0.010)		
Interaction	0.004	3.63%		0.003	3.42%	
	(0.003)			(0.003)		
	Endowments	Coefficients	Interaction	Endowments	Coefficients	Interaction
Lagged math test scores, 6th grade	0.043***	-0.000	0.000			
	(0.011)	(0.001)	(0.001)			
Lagged reading test scores, 6th grade				0.035***	-0.001	0.001
				(0.010)	(0.001)	(0.001)
Classroom av. lagged math test scores, 6th grade	-0.000	-0.000	0.000			
	(0.001)	(0.000)	(0.000)			
Classroom av. lagged reading test scores, 6th grade				0.001	0.000	-0.000
				(0.001)	(0.000)	(0.000)
Status: Middle (ref: Low)	0.002*	0.004	0.000	0.002*	0.013	0.001
	(0.001)	(0.011)	(0.001)	(0.001)	(0.011)	(0.001)
Status: High (ref: Low)	0.004**	0.016	0.002	0.004**	0.014	0.001

	(0.001)	(0.009)	(0.001)	(0.001)	(0.009)	(0.001)
Lagged status indicator, 6th grade	0.009***	0.001	-0.001	0.012***	0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Change in status indicator PCA	0.003	-0.002	0.002	0.005*	-0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Mother less qualified (ref: Equal qual.)	-0.000	-0.002	-0.000	-0.000	-0.005	-0.000
	(0.000)	(0.008)	(0.000)	(0.000)	(0.008)	(0.000)
Father less qualified (ref: Equal qual.)	0.001	0.006	-0.000	0.000	-0.003	0.000
	(0.001)	(0.004)	(0.000)	(0.000)	(0.004)	(0.000)
Female	-0.001	-0.020	0.001	-0.005***	-0.015	0.001
	(0.001)	(0.012)	(0.001)	(0.001)	(0.011)	(0.001)
Birth (Month and Year)	-0.001	0.000	-0.000	-0.000	-0.057	0.000
	(0.001)	(0.418)	(0.000)	(0.000)	(0.398)	(0.000)
Constant		0.042			0.085	
		(0.417)			(0.398)	
Observations	88,002	88,002	88,002	88,002	88,002	88,002

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

4. DISCUSSION

In the analysis, Hungarian administrative data for three entire school cohorts were used. The analysis focused on the sample of those with an intact biological family in 6th grade and identified those who experienced the breakdown of their biological family at the most critical age: between 12 and 14 years. Pupils in Hungary make important educational decisions at this age – decisions that could have a big influence on their later life.

As much previous research has done, the results presented here reveal a drop in test scores after the breakdown of the intact biological family. Empirical evidence is provided showing that the test-score differences between those with and without an intact family background are partly bound up with the circumstances immediately prior to the breakdown, and are partly a consequence of the changed situation (Cherlin és mtsai., 1991). BBF was found to have a significant negative effect on both math and reading test scores (unlike Anthony et al., 2014); but in the case of the reading test score the impact is somewhat lower (0.04) than in the case of math (0.05). Since the outcome variables are standardized with zero mean and 1 unit standard deviation, this change could be interpreted as 4–5% of standard deviation. These results are somewhat lower than many previous results (Amato, 2001), but are similar to Anthony et al. (2014), probably because lagged test scores capture quite well the individual factors contributing to school achievement.

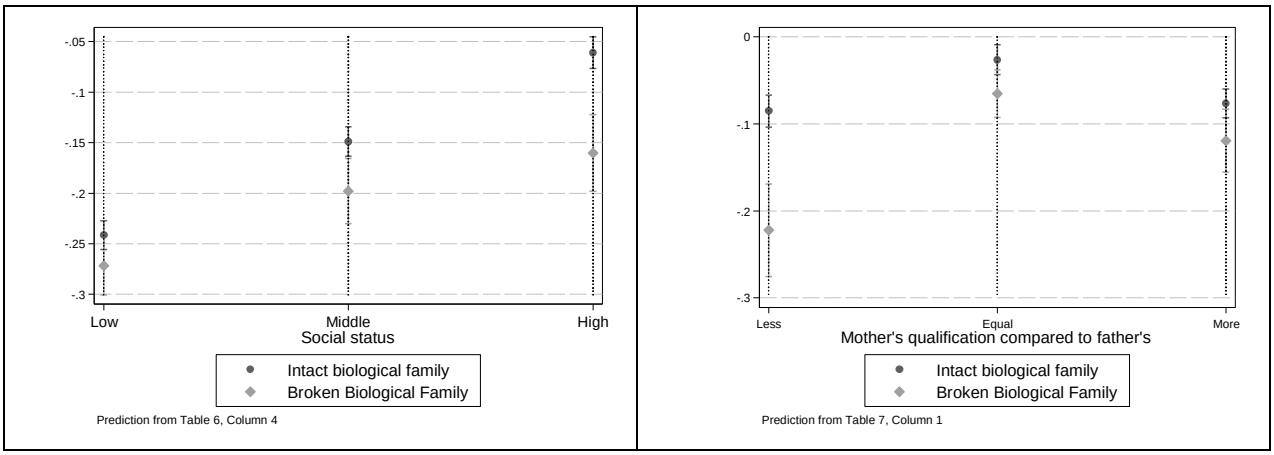
Unlike earlier analysis on the topic, classroom-level unobserved heterogeneity was also considered throughout the analysis. These factors make an especially large contribution (c. 10%) to the reading test-score gap between those with and without an intact biological family. Therefore unobserved classroom-level heterogeneity could explain why the test-score gap after BBF was found to be lower in reading than in math. Moreover, it could give some clue as to why math achievement was found to be much more sensitive to social status-related factors, and partly to their change as well. It was argued that the way in which high-status parents secure the advantageous status of their offspring through the careful selection of the classroom has more influence on pupils' reading than on their math test scores. Therefore math achievement is more vulnerable to changes in individual circumstances, especially those emerging after BBF.

Furthermore, a fresh contribution to the literature is the finding that in terms of math test scores, pupils with high social status lose more if they experience BBF. This finding could be in connection with a previous conclusion – that someone whose mother is less well qualified makes less progress. This is important, since pupils usually stay with their mothers

after experiencing change in the family situation. Thus, the relatively large test-score difference among high-status pupils may be due to the fact that after BBF they generally stay with their mothers, who may be less well educated. The interactional effect between BBF and status versus mother's education is illustrated in Figure 1.

Figure 1

Illustration of the interaction effect in the case of math scores



Marginal effects were calculated for boys, born in April 1995 and with average lagged math performance.

The analysis also focused on estimating the impact of changed material circumstances after BBF, and especially on the extent to which these factors mediate its impact. However, the change in the number of books, computers, or living rooms in the accommodation – even though they decreased significantly after BBF – does not explain significantly the test-score difference between those with an intact and those with a broken biological family.

After controlling for derived and acquired characteristics, the remaining test-score difference between those from an intact and a broken biological family was attributed to changing emotional stability after BBF. In line with the results of decomposition, this unexplained part of the BBF-related test-score gap is approximately 40% of the total test-score differences between those with an intact and those with a broken biological family.

4.1. LIMITATIONS

The limitations of the analysis militate against generalizing the results. The definition of BBF is not detailed enough to distinguish between divorced and separated couples. Also it was not possible to rule out either death or a move abroad as possible scenarios if pupils reported that they were not living with one of their biological parents. The exact date of BBF is also a factor

which could presumably lead to underestimated results. If the impact of BBF weakens as time elapses after the family breakdown, the impact of BBF on test scores is probably underestimated, since the definition focuses on a two-year period in which the breakdown could emerge. Moreover, the emotional stability of the family, which is the focus of this analysis, might have begun to decrease even before the breakdown. That said, the established 4–5% impact of BBF (expressed in the standard deviation of the dependent variable) is regarded as an important lower-bound estimation.

4.2. CONCLUSION

Previous research found the academic achievement of pupils to be significantly different according to social status (Sirin, 2005). However, the source of these differences needs more clarification. An increasing part of economic research argues that status differences in education might not be a clear function of material circumstance (Angrist and Evans, 1998; Qian, 2009; Tamm, 2007). Research in educational psychology has tried to explain the differences in children's academic achievement, mostly concentrating on specific skills (Sénéchal and Lefevre, 2002) or regulations (Keith et al., 1986); but much less attention has been paid to emotional factors.

This paper has argued that a focus on those who have experienced a change in their intact biological family presents a unique opportunity to study the power of the family to enhance academic achievement. After the exclusion of ex-ante differences and of post-hoc changes in material and status-related circumstances between the two groups, a significant unexplained part in the effect of BBF on academic achievement was found. This unexplained gap was interpreted as being driven by the emotional stability of the family, which is clearly damaged after BBF.

More profound research should investigate whether the emotional climate of the family only decreases pupils' achievement if it does not exist (or exists at a somewhat lower level), or whether these emotional factors can also *enhance* academic achievement in families where such factors are especially dominant. To find a "natural" situation, where the possible positive "deviation" in these emotional factors could be investigated, would be very welcome for future research. This vein of research could have practical consequences both for those from an intact and for those from a broken biological family.

LITERATURE

Alwin, D. F., & Hauser, R. M. (1975). The Decomposition of Effects in Path Analysis. *American Sociological Review*, *40*(1), 37–47.

Amato, P. R. (2001). Children of divorce in the 1990s: an update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology*, *15*(3), 355–370. doi:10.1037/0893-3200.15.3.355

Amato, P. R., & Previti, D. (2003). People's Reasons for Divorcing: Gender, Social Class, the Life Course, and Adjustment. *Journal of Family Issues*, *24*(5), 602–626. doi:10.1177/0192513X03254507

Angrist, J. D., & Evans, W. (1998). Children and Their Parent'S Labor Supply-Evidence From Exogenous Variation in Family Size. *The American Economic Review*, *88*(3), 450–477.

Anthony, C. J., DiPerna, J. C., & Amato, P. R. (2014). Divorce, approaches to learning, and children's academic achievement: a longitudinal analysis of mediated and moderated effects. *Journal of school psychology*, *52*(3), 249–61. doi:10.1016/j.jsp.2014.03.003

Bernardi, F. and Radl, J. (2014). The long-term consequences of parental divorce for children's educational attainment. *Demographic Research*, *30*(1), 1653–1680. doi:10.4054/DemRes.2014.30.61

Blanden, J., Katz, I., & Redmond, G. (2012). Family Background and Child Outcomes. In J. Ermisch, M. Jäntti, & T. Smeeding (Szerk.), *From Parents to Children: The Intergenerational Transmission of Advantage* (o. 140–163). New York: Russell Sage Foundation.

Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: towards a formal rational action theory. *Rationality and Society*, *9*(3), 275–305. doi:10.1177/104346397009003002

Bryk, A. S., & Raudenbush, S. W. (1988). Toward a More Appropriate Conceptualization of Research on School Effects: A Three-Level Hierarchical Linear Model. *American Journal of Education*, *97*(1), 65. doi:10.1086/443913

Burke, M. A., & Sass, T. R. (2013). Classroom Peer Effects and Student Achievement. *Journal of Labor Economics*, *31*(1), 51–82.

Cherlin, A., Furstenberg, F., Chase-Lansdale, L., Kiernan, K., Robins, P., Morrison, D., & Teitler, J. (1991). Longitudinal studies of effects of divorce on children in Great Britain and the United States. *Science*. doi:10.1126/science.2047851

Dadds, M. R., Atkinson, E., Turner, C., Blums, G. J., & Lendich, B. (1999). Family conflict and child adjustment: Evidence for a cognitive-contextual model of intergenerational transmission. *Journal of Family Psychology*, *13*(2), 194–208. doi:10.1037/0893-3200.13.2.194

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M., & Cox, D. R. (2005). On class differentials in educational attainment. *Proceedings of the National Academy of Sciences of the United States of America*, *102*(27), 9730–3. doi:10.1073/pnas.0502433102

Grych, J. H., & Fincham, F. D. (1990). Marital Conflict and Children' s Adjustment: A Cognitive-Contextual Framework. *Psychological Bulletin*, *108*(2), 267–290.

Haskey, J. (1984). Social class and socio-economic differentials in divorce in England and Wales. *Population Studies*, *38*, 419–438. doi:10.1080/00324728.1984.10410301

HCSO. (2012). *Magyarország társadalmi atlasza*. Budapest: Hungarian Central Statistical Office (HCSO). Elérés forrás https://www.ksh.hu/docs/hun/xftp/idoszaki/pdf/tarsatlasz.pdf

Hetherington, E. M., & Stanley-Hagan, M. (1999). The Adjustment of Children with Divorced Parents: A Risk and Resiliency Perspective. *Journal of Child Psychology and Psychiatry*, *40*(1), 129–140. doi:10.1111/1469-7610.00427

Horn, D. (2013). Diverging performances: the detrimental effects of early educational selection on equality of opportunity in Hungary. *Research in Social Stratification and Mobility*, *32*, 25–43. doi:http://dx.doi.org/10.1016/j.rssm.2013.01.002

Jann, B. (2008). A Stata implementation of the Blinder-Oaxaca decomposition. *Stata Journal*, *8*(4), 453–749.

Jerrim, J., & Micklewright, J. (2014). Socio-economic Gradients in Children's Cognitive Skills: Are Cross-Country Comparisons Robust to Who Reports Family Background? *European Sociological Review*, *30*(6), 766–781. doi:10.1093/esr/jcu072

Kaye, S. H. (1989). The Impact of Divorce on Children's Academic Performance. *Journal of Divorce*, *12*(2-3), 283–298. doi:10.1300/J279v12n02_16

Keith, T. Z., Reimers, T. M., Fehrmann, P. G., Pottebaum, S. M., & Aubey, L. W. (1986). Parental involvement, homework, and TV time: Direct and indirect effects on high school achievement. *Journal of Educational Psychology*, *78*, 373–380. doi:10.1037/0022-0663.78.5.373

Kelly, J. B. (2000). Children's adjustment in conflicted marriage and divorce: a decade review of research. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*(8), 963–973. doi:10.1097/00004583-200008000-00007

Kurtz, L., & Derevensky, J. L. (1994). The Effects of Divorce on Perceived Self-Efficacy and Behavioral Control in Elementary School Children. *Journal of Divorce & Remarriage*, *20*, 75–94. doi:10.1300/J087v20n03_06

Mulholland, D. J., Watt, N. F., Philpott, A., & Sarlin, N. (1991). Academic Performance in Children of Divorce: Psychological Resilience and Vulnerability. *Psychiatry: journal of the biology and the pathology of interpersonal relations*, *54*(3), 268–280. doi:10.1521/00332747.1991.11024556

Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology*, *89*(6), 852–63. doi:10.1037/0022-3514.89.6.852

Nord, C. W., Brimhall, D. B., & West, J. (1997). *Fathers' Involvement in Their Children's Schools*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. Elérés forrás http://nces.ed.gov/pubs98/98091.pdf

OECD. (2005). *Society at a Glance 2005 OECD Social Indicators*. doi:10.1787/soc_glance-2005-en

OECD. (2010). *PISA 2009 Results: Overcoming Social Background: Equity in Learning Opportunities and Outcomes (Volume II)*. OECD Publishing. doi:10.1787/9789264091504-en

OECD. (2014). *OECD Family Database*. Paris: OECD. Elérés forrás http://www.oecd.org/social/family/database.htm

Pearson, J., & Thoennes, N. (1990). Custody after divorce: demographic and attitudinal patterns. *The American Journal of Orthopsychiatry*, *60*(2), 233–249. doi:10.1037/h0079166

Qian, N. (2009). Quantity-quality and the one child policy: the only-child disadvantage in school enrollment in rural China. *NBER Working Paper Series*, (Working Paper 14973). Elérés forrás http://www.nber.org/papers/w14973

Radnóti, L. (2003). Az élettartamok statisztikája. *Statisztikai Szemle*, *81*(7), 559–570.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, Schools, and Academic Achievement. *Econometrica*, *73*(2), 417–458. Elérés forrás http://www.nber.org/papers/w6691.pdf

Sacerdote, B. (2011). Chapter 4 – Peer Effects in Education: How Might They Work, How Big Are They and How Much Do We Know Thus Far? In *Handbook of the Economics of Education* (Köt. 3, o. 249–277). doi:10.1016/B978-0-444-53429-3.00004-1

Schnabel, K. U., Alfeld, C., Eccles, J. S., Köller, O., & Baumert, J. (2002). Parental Influence on Students' Educational Choices in the United States and Germany: Different Ramifications—Same Effect? *Journal of Vocational Behavior*, *60*(2), 178–198. doi:10.1006/jvbe.2001.1863

Sénéchal, M., & Lefevre, J. (2002). Parental involvement in the development of children ' s reading Skill : A five-Year longitudinal study. *Child development*, *73*, 445–460. doi:10.1111/1467-8624.00417

Sirin, S. R. (2005). Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research. *Review of Educational Research*. doi:10.3102/00346543075003417

Stocké, V., Blossfeld, H.-P., Hoenig, K., & Sixt, M. (2011). Social inequality and educational decisions in the life course. *Zeitschrift für Erziehungswissenschaft*, *14*(S2), 103–119. doi:10.1007/s11618-011-0193-4

Tamm, M. (2007). *Does Money Buy Higher Schooling? Evidence from Secondary School Track Choice in Germany* (No. 55). Essen.

Testa, M. R. (2006). *Childbearing Preferences and Family Issues in Europe. Special Eurobarometer 253 / Wave 65.1*. Brussels: European Commission.

Van Laar, C., & Sidanius, J. (2001). Social status and the academic achievement gap: A social dominance perspective. *Social Psychology of Education*, *4*(3-4), 235–258. doi:10.1023/A:1011302418327

Wallerstein, J. S., & Kelly, J. B. (1996). *Surviving The Breakup: How Children And Parents Cope With Divorce*. Basic Books.

APPENDIX

Table A1

Different family types in the three cohorts of the analysis

Cohort *(6th graders in)*:	Intact biological family	Broken biological family	Total
2008	95.31	4.69	100
2009	95.11	4.89	100
2010	94.79	5.21	100
Total	95.08	4.92	100 (N=88,002)

Pearson chi2(2) = 8.3741; Pr.: = 0.015

Table A2

Means and standard deviation of variables used in the analysis

		N	Mean	Std. Dev.	Min	Max
	Math test scores, 8th grade	88002	0.00	1.00	-3.82	3.44
	Reading test scores, 8th grade	88002	0.00	1.00	-4.16	3.36
	Broken Biological Family	88002	0.05	0.22	0.00	1.00
Derived	Lagged math test scores, 6th grade	88002	0.00	1.00	-3.59	3.78
	Lagged reading test scores, 6th grade	88002	0.00	1.00	-4.21	3.37
	Status	88002	1.86	0.79	1.00	3.00
	Number of books, 6th grade	88002	0.00	1.00	-1.55	1.97
	Number of living rooms, 6th grade	88002	0.00	1.00	-2.06	8.58
	Number of computers, 6th grade	88002	0.00	1.00	-1.81	2.14
	Status indicators PCA, 6th grade	88002	0.00	1.00	-2.46	5.38
	Female	88002	0.53	0.50	0.00	1.00
	Birth (year and month)	88002	439.41	10.86	378.00	467.00
Acquire	Change in number of books	88002	0.00	1.00	-5.43	5.33
	Change in number of living rooms	88002	0.00	1.00	-12.07	11.86
	Change in number of computers	88002	0.00	1.00	-4.94	4.27
	Change in status indicator PCA	88002	0.00	1.00	-7.62	8.82

Table A3

Correlation coefficients between status indicator PCA and the primary indices

	Sample of 6th graders in		
Number of …	2008	2009	2010
…living rooms	0.690	0.699	0.707
…computers	0.758	0.760	0.768
…books	0.756	0.759	0.766
N	30248	30363	27391

All the correlation coefficients are significant at $p < 0.001$ level