

Childhood Sporting Activities and Adult Labour-Market Outcomes

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Practising sport favours labour-market success.

- Human capital : higher level of individual productivity ;
- Positive signal (on a Curriculum vitae) ;
- Networking effect ;

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- Networking effect ;

Human capital : higher level of individual productivity :

- 1 health : Lechner (2009), Felfe et al. (2011)
- 2 non-cognitive skills endowment :
 - specific personal traits : experimental economics Celse (2011), Eber (2002) ;
 - greater non-cognitive skills endowment : Barron et al. (2000), Ewing (1998), Felfe et al. (2011), Lechner (2009), Long & Caudill (1991), Pfeifer & Corneliessen (2010), Fuchs & Osikominu (2012), Stevenson (2010).

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- Networking effect ;

Positive signal (on a CV) :

- 1 Spence understanding - ability : Long & Caudill (1991), Barron et al. (2000), Ewing (1998) ;
- 2 signalling effect in a broad sense : Rooth (2010), Lechner (2009), Corneliessen & Pfeifer (2008), American studies ;

Practising sport favours labour-market success.

- Human capital : higher level of individual productivity ;
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- **Networking effect** ;

Networking effect :

- sport is a way to enlarge and diversify networks.

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Research question

Does childhood sports participation impacts adults labour-market outcomes ?

Contributions of our paper

- ① Sample :
 - *representative* and younger sample ;
- ② Information on sporting practice :
 - frequency of sport participation (per week) in middle or high school,
 - type of sport,
 - sports' club membership at school (effective or scheduled) ;
- ③ Various labour-market outcomes (13 years after) :
 - yearly wage, job satisfaction, autonomy, managerial responsibilities ;
- ④ Treatment of the endogeneity :
 - siblings comparison.

Results

- Team (individual) sports practised by high school boys (girls) is related to adult labour market success 13 years later ;
- Controlling for other extra-curricular activities does not cancel the existence of these correlations ;
- The effect is gender specific and higher for older (and more educated) schoolchildren ;
- No evidence of the existence of a threshold or a zero-sum game.

Within siblings :

- positive and significant impact for boys,
- negative and significant impact on wage and level of satisfaction at work for twin girls.

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Data : National Longitudinal Study of Adolescent Health

Add Health data is a nationally representative sample of adolescents in grades 7 – 12 in the United States during the 1994 – 95 school year.

Our sample :

- Wave 1 (1994 – 1995) : 7 to 12 grade, 144 schools, 4 questionnaires, 20,745 students, information on sports participation ;
- Wave 4 (2008 – 2009) : aged 24 to 32 years old, one questionnaire, 15,701 adults.

⇒ 10,500 individuals, schoolchildren in wave 1, currently working adults in wave 4.

Information on sport - Wave 1

- 1 *"During the past week, how many times did you*
 - *play an active sport, such as baseball, softball, basketball, soccer, swimming, or football?"*
⇒ "team sport"
 - *did you do exercise, such as jogging, walking, karate, jumping rope, gymnastics or dancing?"*
⇒ "individual sport"
- 2 *"Here is a list of clubs, organizations, and teams found at many schools. Darken the oval next to any of them that you are participating in this year, or that you plan to participate in later in the school year."*

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Stylized facts :

- more than the half participate at least 3 times in sports, weekly (except girls, only one third in team sports),
- sporty children are younger, more likely to be boys, with more educated parents, with higher grades and then, with more success in the labour market.

Four labour-market outcomes

Is childhood sport participation related to :

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① wage :

- yearly wage (information on the hours worked),
- yearly mean : women - 32452\$, men - 43214\$,
- *log of the yearly wage* (weighted by the nb of hours worked)..

Four labour-market outcomes

Is childhood sport participation related to :

- 1 wage :
 - yearly wage (information on the hours worked),
 - yearly mean : women - 32452\$, men - 43214\$,
 - *log of the yearly wage* (weighted by the nb of hours worked)..<
- 2 managerial responsibilities :
 - the individuals supervises at least one employee,
 - 41% of the men are manager, 32% of the women,
 - *dummy variable*;

Four labour-market outcomes - contd

3 freedom to make important decisions in one's job (autonomy)

autonomy	0	1	2	3	Total
Men	8.6	24	32.4	35	100
Women	9.6	27	35.7	27.7	100

- *ordered variable*;

4 satisfaction at work :

- scale : 0 = extremely dissatisfied to 4 = extremely satisfied,
- more than 73% of our sample is -at least- very satisfied at work,
- *ordered variable*;

Empirical strategy

★ Simplified version :

- *time consistency* : schoolchildren sports participation in middle/high school (wave 1) i.e. 13 years prior to labour-market integration (wave 4),
- *accounting for intermediary effects* : covariates influenced by sports participation (wave 4) : health status, education (level and type), work experience, number of children ;
- other covariates : *gender*^{*}, ethnicity, age squared, education level of the most educated parent (wave 1) ;

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- other covariates : *gender*^{*}, ethnicity, age squared, education level of the most educated parent (wave 1) ;

Deepening the relationship :

- existence of a threshold ? relative or absolute participation frequency ?
- do other extra-curricular activities matter ?

Empirical strategy - contd.

★ Accounting for endogeneity :

- ① due to omitted variables : use of the maximum of information with respect to individuals' skills and capacities (ability, feelings and reciprocal friendship) ;
- ② due to family education and environment unobservable confounders : compare siblings (Ashenfelter and Krueger 1994).

Empirical strategy - contd.

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Notes :

- Sample selection : individuals who are employed in Wave 4. (downward bias)
- Samples used when accounting for endogeneity dramatically diverge from the one used in the simplified estimations.

Simplest estimation - Basic results

$$Job\ Quality_{i,W4} = \varphi(SPORT_{i,W1}, X_{k,i,W4})$$

with X being a vector of variables of control

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- No evidence of the existence of school fixed effect ;
- No evidence of an impact of the working sector ;
- No need to belong to a school sports club to have her sports participation *rewarded* 13 years later.

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Estimations run by type of school attended in wave I

⇒ positive significant and sizeable correlations on the high school sub-sample :

- different time constraint in high school,
- high school schoolchildren are closer to the labour market (CV, networks),

⇒ From now on we focus on high school sub-sample.

	MANAGER		AUTONOMY	
	MEN	WOMEN	MEN	WOMEN
ind. Sport	-0.005 (0.007)	0.024*** (0.006)	-0.013 (0.021)	0.067** (0.031)
team sport	0.019*** (0.005)	0.006 (0.008)	0.048** (0.024)	0.018 (0.026)
Nb. Obs.	1907	1913	1906	1913

For men, practising active sports once more per week while in high school is significantly associated with an increase :

- in the probability of being a manager of 2%,
- in the probability of having the maximum level of autonomy of 1%,

For women, practising individual sports once more per week is associated with :

- an increase in the probability of being a manager of 2%,
- an increase of the probability of having the maximum level of autonomy of 1.1%.

⇒ Different type of sport by gender.

Deepening the relationship - Specifying sports participation

Threshold in sporting activities frequency?

- use of 4 dummies instead of a continuous variable of frequency

⇒ No sharp pattern : no threshold and even no penalty for non-sporty people.

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Absolute or relative investment ?

- Absolute measure of sports participation versus relative ones (with respect to age, gender and school) :
 - ① Normalized rank within groups,
 - ② Position with respect to the average.

⇒ It is not a zero-sum game, no evidence of the existence of a signaling effect, neither reputation effect.

Deepening the relationship - Other activities

"During the past week, how many times did you...

- *... do hobbies, such as collecting baseball cards, playing a musical instrument, reading, or doing arts and crafts?" = **hobbies***
- *... just hang out with friends?" = **friends***

Deepening the relationship - Other activities

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	MANAGER			
	MEN		WOMEN	
	basic	comparison	basic	comparison
ind. Sport	-0.005 (0.007)	-0.005 (0.007)	0.024*** (0.006)	0.023*** (0.006)
team sport	0.019*** (0.005)	0.019*** (0.005)	0.006 (0.008)	0.005 (0.008)
friends		0.008 (0.006)		0.004 (0.006)
hobbies		-0.006 (0.006)		0.004 (0.007)
tv		0.006 (0.007)		-0.002 (0.007)
Nb. Obs.	1907	1907	1913	1913

Controlling for other activities doesn't cancel neither lower the coefficient associated to sport participation.

Other activities - contd

	AUTONOMY			
	MEN		WOMEN	
	basic	comparison	basic	comparison
ind. Sport	-0.013 (0.021)	-0.015 (0.021)	0.067** (0.031)	0.063** (0.032)
team sport	0.048** (0.024)	0.051* (0.026)	0.018 (0.026)	0.013 (0.026)
friends		0.003 (0.023)		0.049** (0.020)
hobbies		0.022 (0.021)		0.011 (0.029)
tv		-0.045 (0.029)		-0.002 (0.024)
Nb. Obs.	1906	1906	1913	1913

- Men : controlling for other activities doesn't cancel neither lower the impact of sport participation ;
- Women : the coefficient is slightly smaller and active friendship does matter.

Individuals' skills, behavior and capacities

3 sets of variables for 3 hypothesis :

Hyp 1 : according to Lévy-Garboua, Lohéac and Fayolle (2006), dissatisfaction at school leads to risky behaviors

Introduction of an indicator of satisfaction at school (subjective information on feelings at school) ;

Hyp 2 : sporty schoolchildren have higher ability

Introduction of an indicator of grades in Mathematics, Science, English and History in wave I ;

Hyp 3 : popularity index network formation

Introduction of an indicator of reciprocity of friendship or best-friendship (subjective information).

Individuals' skills, behavior and capacities - Results

Controlling for happiness at school, ability and popularity :

- Dramatic reduction of the sample size (and selection issue).
- Results remain robust when they were significant before controlling (being a manager for men).
- No significant impact of sports participation for women belonging to this sub-sample.
- Significant control variables :
 - friendship for girls,
 - grades for boys.

Individuals' familial environment

Hyp : by comparing sporty to non-sporty people, we may select people who have a higher endowment in social capital and also a favourable environment.

- Estimation of the difference in labour market outcomes between siblings. (Ashenfelter and Krueger 1994)

Within families

$$\Delta Job\ Quality_{i,j,W4} = \varphi(\Delta SPORT_{i,W1}, \Delta X_{k,i,W4})$$

with X being a vector of variables of control (education, age -being the oldest-, work experience, health).

Note : 5 types of pairs of siblings : all, half and full siblings (H & S), only full siblings (Full), twins, only identical twins (id. twins).

Individuals' familial environment - Siblings sample

The sample of pairs of siblings is significantly different from the original one :

- ① younger people
 - sportier
 - less likely to attend high school in W1
 - (and then lower level in education in W4),
 - ⇒ lower impact of sports participation
- ② larger proportion of black people,
⇒ potential over-investment in sports (Anderson 2000)
- ③ less healthy,
- ④ lower labour-market outcomes.

⇒ Results are expected to be more reliable but less significant, less sizeable and downward biased.

Wage

	Mixed pairs		Girls
	All	Full	id. twins
Dif ind. sport	0.083	0.113*	-0.022
	-0.051	-0.065	-0.19
Dif team sport	-0.070	-0.040	-0.286*
	-0.050	-0.067	-0.153
Obs.	702	458	98
R^2	0,15	0,164	0,138
	Mixed pairs		Girls
	All	Full	id. twins
Dif ind. sport	0.084*	0.114*	-0.058
	-0.050	-0.065	-0.188
Dif team sport	-0.063	-0.036	-0.271*
	-0.051	-0.069	-0.162
Dif friends	-0.065	-0.056	0.053
	-0.060	-0.073	-0.201
Dif hobbies	0.013	-0.003	0.231
	-0.048	-0.066	-0.139
Dif TV	-0.010	0.028	0.233
	-0.063	-0.102	-0.196
Obs.	702	458	98
R^2	0,152	0,166	0,165

Satisfaction

	Mixed pairs		Boys	Girls
	H & F	Full	twins	id. twins
Dif ind. sport	-0.018	-0.042	-0.058	0.012
	-0.027	-0.03	-0.054	-0.090
Dif team sport	0.054**	0.056*	0.179**	-0.154*
	-0.027	-0.034	-0.073	-0.083
Obs.	610	492	176	106

	Mixed pairs		Boys	Girls
	H & F	Full	twins	id. twins
Dif ind. sport	-0.011	-0.033	-0.070	0.012
	-0.028	-0.031	-0.059	-0.090
Dif team sport	0.060**	0.063*	0.192**	-0.152*
	-0.027	-0.036	-0.076	-0.083
Dif friends	-0.003	0.002	-0.113*	-0.056
	-0.033	-0.034	-0.059	-0.078
Dif hobbies	-0.038	-0.050	0.075	0.014
	-0.028	-0.033	-0.054	-0.124
Dif TV	-0.020	-0.009	-0.080	0.002
	-0.035	-0.041	-0.081	-0.098
Obs.	610	492	176	106

Manager

	Same sex		Mixed pairs		Boys
	H & F	Full	H & F	Full	All
Dif ind. sport	0.004	0.004	0.013*	0.014*	0.015*
	-0.006	-0.006	-0.007	-0.009	-0.008
Dif team sport	0.013**	0.013*	-0.005	-0.007	0.015*
	-0.007	-0.008	-0.009	-0.010	-0.009
Obs.	1 032	890	610	492	570

	Same sex		Mixed pairs		Boys
	H & F	Full	H & F	Full	All
Dif ind. sport	0.003	0.003	0.011	0.013	0.015*
	-0.006	-0.007	-0.007	-0.009	-0.008
Dif team sport	0.011	0.011	-0.007	-0.011	0.013
	-0.007	-0.008	-0.010	-0.011	-0.010
Dif friends	0.011**	0.016**	0.003	0.001	0.010
	-0.005	-0.007	-0.008	-0.010	-0.008
Dif hobbies	0.012*	0.012*	0.011	0.015	0.002
	-0.006	-0.007	-0.008	-0.010	-0.008
Dif TV	-0.001	0.005	0.013	0.014	0.005
	-0.007	-0.008	-0.009	-0.010	-0.010
Obs.	1 032	890	610	492	570

Autonomy

	Same sex		Boys	
	H & F	Full	H & F	Full
Dif ind. sport	0.009	-0.002	0.022	0.021
	-0.019	-0.021	-0.034	-0.037
Dif team sport	0.042**	0.049**	0.083**	0.078*
	-0.021	-0.023	-0.041	-0.046
Obs.	1 030	888	472	416

	Same sex		Boys	
	H & F	Full	H & F	Full
Dif ind. sport	0.007	-0.006	0.025	0.021
	-0.020	-0.021	-0.035	-0.036
Dif team sport	0.037*	0.046*	0.076*	0.074
	-0.022	-0.024	-0.044	-0.050
Dif friends	-0.003	-0.012	0.018	0.024
	-0.025	-0.028	-0.043	-0.048
Dif hobbies	0.050**	0.060**	0.055*	0.070**
	-0.021	-0.024	-0.032	-0.032
Dif TV	0.048	0.045	0.069	0.069
	-0.033	-0.035	-0.049	-0.050
Obs.	1 030	888	472	416

Conclusion

- 1 Team (individual) sports practised by high school boys (girls) is related to adult labour market success 13 years later ;
- 2 Controlling for other extra-curricular activities does not cancel the existence of these correlations ;
- 3 The effect is gender specific and higher for older (and more educated) schoolchildren ;
- 4 No evidence of the existence of a threshold or a zero-sum game.

Conclusion - contd.

For the sibling who practised the most frequently sport during her childhood, controlling for other activities, the participation in...

- ① team sports has a positive and significant impact :
 - on the level of satisfaction within mixed pairs and **twin** boys pairs,
 - on the level of autonomy within same sex pairs and pairs of boys ;
- ② individual sports has a positive and significant impact :
 - on the wage within mixed pairs,
 - on the probability of being a manager within pairs of boys ;
- ③ team sports has a negative and significant impact on wage and level of satisfaction within pairs of identical **twin** sisters.

Conclusion - contd.

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- ③ team sports has a negative and significant impact on wage and level of satisfaction within pairs of identical **twin** sisters.

⇒ No evidence of a causal relationship between childhood sports participation and adults labour-market outcomes.

Intuition : sportier boys have a greater endowment in non-cognitive skills (prior to sports participation OR thanks to sports participation) which leads them to be more successful on the labour-market.

Thank you very much for your attention !

Appendix

Using instrumental variable **Hyp** : the older sibling bargains with the parents (the sports participation), and her “unobservables” are different from her sibling’s “unobservables”. (Kosteas 2010)

- Instrumented variable : childhood sports’ participation of individual i ,
- Instruments : childhood (individual / active) sports’ participation of individual j , i ’s older sibling,
- Sample : only pairs and no twins, no distinction by gender neither by type of school.

Appendix

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- Sample : only pairs and no twins, no distinction by gender neither by type of school.

	ind. sport	active sport
IV ind. sport	0.712*** (0.019)	-0.207*** (0.016)
IV active sport	-0.179*** (0.019)	0.792*** (0.020)
Observations	1474	1474
R-squared	0.37	0.47

Robust standard errors in parentheses.

* significant at 10% ; ** significant at 5% ; *** significant at 1%

TABLE: Estimates with and without instrumentation.

	WAGE			MANAGER		
	Basic	IV S2	IV S3	Basic	IV S2	IV S3
ind. sport	0.006 (0.025)	-0.002 (0.044)		0.048** (0.021)	0.020 (0.032)	
team sport	-0.038 (0.025)		-0.082** (0.035)	-0.006 (0.020)		-0.024 (0.028)
Observations	1412	1412	1412	1474	1474	1474
R-squared	0.122	0.116	0.115	-945.13	-3694.81	-3674.64

	AUTONOMY			SATISFACTION		
	Basic	IV S2	IV S3	Basic	IV S2	IV S3
ind. Sport	0.020 (0.014)	0.039 (0.022)		0.012 (0.015)	0.010 (0.021)	
team sport	0.021 (0.016)		-0.011 (0.024)	-0.007 (0.015)		-0.026 (0.021)
Observations	1473	1473	1473	1474	1474	1474
R-squared	0.036	0.033	0.027	0.063	0.063	0.060

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%