Journal of Epidemiology and Community Health 1992; 46: 71–74

Childhood environment, intergenerational mobility, and adult health—evidence from Swedish data

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Abstract

***Study objective*—The aim was to examine whether body height is associated with intergenerational social mobility, and to determine the importance of intergenerational mobility for adult health.**

***Design*—Information from a survey conducted by Statistics Sweden on a randomly selected sample was supplemented with mortality data during a six year follow up.**

***Participants*—The sample was identified in 1980–81 and comprised 14 757 persons aged 16–74 years. The non-response rate was 14%. In the current study a subsample of 9203 persons aged 30–74 years at the time of the interview was used.**

***Measurements and main results*—Information on adult height, socioeconomic status during childhood and in adult life, self perceived general health, and self reported longstanding illness at the time of the interview was supplemented with mortality data during the follow up period. The direction of the intergenerational mobility was defined as upward mobility, downward mobility, and no intergenerational mobility. The chances of falling into each of these three groups for tall, medium, and short persons were compared. The three mobility groups were also compared with regard to general health, longstanding illness and early death. The tall third of the sample was upwardly mobile to a larger extent than the short third, while the short third was more likely to be downwardly mobile. The upwardly mobile group perceived their health as bad much less than was expected. It also included a smaller number of persons with longstanding illness. Mortality, however, was not lower in this group.**

***Conclusions*—Childhood environment influences height, height is linked to upward mobility, and upward mobility is linked to better health. This is one way in which childhood environment has an impact on adult health.**

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Accepted for publication February 1991

The long term effects of the socioeconomic environment in childhood on health have increasingly come into focus. It seems clear that intergenerational mobility in this context should be taken into account. In this study new evidence is presented on the relation between childhood environment, intergenerational mobility, and adult health. For this purpose we used the socioeconomic group of the father, derived from his occupation, as an indicator of the childhood environment. Another indicator of the childhood experiences, suggested by Floud,[1] for example, is height.

Height differences between socioeconomic groups were demonstrated earlier in a sample drawn from the Swedish population.[2] People whose fathers were classified into the higher socioeconomic groups were significantly taller than those whose fathers had a lower status. We then asked whether these differences were linked to differences in adult health. Evidence suggesting that height is connected to adult health in the Swedish population was given in another paper.[3] The shortest third of the sample had about a 20% excess risk of dying during a six year follow up period, compared with the tallest third. The differences between the groups was larger for cardiovascular diseases in general and for coronary heart diseases in particular. Such specific effects of childhood experiences on adult health have also been discussed by, for example, Forsdahl[4] and Barker *et al*.[5] The latter found that men with a low weight at birth and at one year of age had a higher death rate from ischaemic heart disease than those with a higher weight. In our study the people in the shortest group were also more likely to classify their general health as bad. These differences were slightly reduced when childhood socioeconomic group was taken into account.

The connection between height and adult health could indicate that childhood experience has an effect on general health in adult life.[6 7] However, this connection could also be a result of mobility. If, for example, tall people are more likely to be upwardly mobile and more likely to enter occupations with better prospects and which are more beneficial to health, we might end up with results such as those we presented in an earlier paper.[3] The reduction in health differences between height groups after controlling for both father's and own socioeconomic group suggests that this is one possible explanation. Support for the thesis that tall people are more likely to be upwardly mobile has been given by, for example, Marmot,[8] Power *et al*,[9] and in an early paper by Illsley.[10] However, it has not yet been shown in data from Sweden.

The purpose of this paper is to examine whether this could be done. Thus we wished to study the connection between firstly, height and intergenerational mobility, and secondly, intergenerational mobility on the one hand and adult health and risk of early death on the other. If tall people were more likely to be upwardly mobile, independent of socioeconomic background, this

would suggest a selective mobility connected to health related factors, of which height is one. This factor is also largely unaffected by adult experiences.

A connection between mobility and adult health and/or risk of early death, once again controlling for childhood socioeconomic group, would point in the same direction, but in this case one could not exclude the effect of adult experiences, determined by, for example, the achieved social position.

Methods

We have described the sample in previous publications.[2 3] In brief, this is a sample drawn from the Swedish population and interviewed in 1980–81. The interviews were carried out by Statistics Sweden as part of an annual study of living conditions in Sweden.

The register of those who consented to the interview was linked to the Cause of Death Register for the period 1980–86. In the current study, which is concerned with mobility, only those who were 30 years of age or over at the time of interview have been included. This was in order to exclude most of those who, because of their youth, had not yet established a career pattern. Thus the subsample included 9203 individuals aged 30–74 years at the time of the interview, of whom 332 men and 196 women died during the follow up period.

In the analysis we have used seven of the approximately 150 questions asked during the interview. One question asked the respondent's height and another the father's occupation during the respondent's childhood. Two questions concerning position and tasks at place of work were used to establish the occupation of the respondent. Persons not employed at the time of the interview were coded according to earlier work experience.

Three questions about the health of the interviewee were used: "How do you consider your own health in general? Good, bad or something in between?", "Do you suffer from any longstanding illness or handicap?" and "Do you take any medication regularly?". The latter two were used together to measure the presence of any longstanding illness.

The occupation of the respondent's father was classified into a socioeconomic group according to a classification system which has been used by Statistics Sweden since 1974.[11] For 0·9% no code could be given. The occupation of the respondent her/himself was coded according to the same system. Students formed a separate group. Non-classifiable person, eg, those never employed, also constituted a separate group (5·0% of the sample).

Three mobility groups were defined; those upwardly mobile, those downwardly mobile, and those with no intergenerational mobility (ie, father's and own socioeconomic group the same or equivalent). As there is no obvious overall principle according to which we could rank the socioeconomic groups we chose to include only those cells in the mobility matrix where the direction of the mobility was thought to be reasonably clear. This classification included 71·0% of the men and 67·2% of the women aged 30 years or more. How the classification into mobility groups was carried out and the proportion of men and women falling into each group is shown in table I. For each combination of father's and son's/daughter's socioeconomic group there is a cell in the table. The mobility direction, if any, is given. Also given is the proportion of men and women over 30 years of age and of a specific socioeconomic group of origin falling into that cell. As an example we can mention that 34% of the sons and 50% of the daughters of unskilled manual workers were unskilled manual workers themselves at the time of interview. These were classified into the non-mobile group.

Three height groups were defined in such a way that each included one third of the male or female sample. For each height group the observed

Table I Mobility direction (up, down, non-mobility, and not classified) from father's to son's/daughter's socioeconomic group. Proportion (%) of sons/daughters entering each socioeconomic group by father's socioeconomic group

Father's socioeconomic group		*Son's/daughter's socioeconomic group*											
		1	*2*	*3*	*4*	*5*	*6*	*7(<10) (employees)*	*7(10≥)*	*8*	*9*	*10[a]*	*Total(n)*
Manual workers													
Unskilled (1)		non	up	–	up	up	up	up	up	–	up	–	
	(%)	34/50	25/10	10/17	13/8	8/4	4/2	2/1	1/0	2/2	0/1	1/5	1246/1261
Unskilled (2)		down	non	–	–	up	–	up	up	–	up	–	
	(%)	19/40	26/8	9/20	22/15	11/6	7/3	3/1	0/0	1/1	0/1	2/5	759/806
Non-manual employees													
Assistant (3)		–	–	non	up	up	up	up	up	–	up	–	
	(%)	20/27	15/8	12/28	22/15	25/13	4/2	1/1	0/0	0/1	0/0	0/5	228/253
Intermediate (4)		down	–	down	non	up	–	–	up	–	–	–	
	(%)	8/23	15/9	10/24	25/22	30/13	5/2	2/1	2/1	0/1	0/0	3/5	318/302
Higher (5)		down	down	down	down	non	down	–	–	–	down	–	
	(%)	8/10	6/5	8/28	20/20	49/27	4/2	2/2	1/1	0/1	0/0	1/4	207/203
Self employed													
Without employees (6)		down	–	down	–	up	non	up	up	–	up	–	
	(%)	26/34	20/9	6/24	15/12	11/7	11/3	4/3	5/0	1/1	0/1	2/6	249/276
With employees (7)		down	down	down	down	–	down	non	non	down	–	–	
	(%)	15/26	17/7	8/21	17/19	18/14	11/3	8/3	5/1	0/1	1/1	1/6	362/398
Farmers													
With small farms (8)		–	–	–	–	up	–	up	up	non	up	–	
	(%)	32/48	19/7	5/11	8/9	5/2	7/2	4/1	1/0	14/12	4/3	2/5	494/326
With larger farms (9)		down	down	down	–	–	down	–	–	down	non	–	
	(%)	25/40	17/9	7/11	11/10	9/4	5/2	3/2	2/1	8/9	13/7	0/6	630/646
Unspecified (10		–	–	–	–	–	–	–	–	–	–	–	41/444
Total	(%)	24/39	21/8	8/18	16/13	14/7	6/2	3/2	1/1	3/3	2/2	2/5	4435/46155

[a]Including students

number of upwardly mobile, downwardly mobile, and non-mobile was compared to the expected number. The expected numbers were based on the total number in each mobility group in the subsample used in the mobility analyses. They were calculated separately for men and women and were specified for each five year age group, and, in some of the analyses, by father's socioeconomic group. The total expected number was obtained by summarising over strata. Thus a "standardised mobility ratio" could be calculated as the ratio of observed and expected numbers in each mobility direction for each gender and height group.

The observed number of deaths and persons with reduced health in each mobility group was compared with the expected number, calculated in the same way as described above.

An alternative method for analysing the association between height and mobility, based on odds ratios in a mobility matrix, was also applied. In this, the odds of falling into each mobility group were calculated for the tall and the short group respectively. The ratio between the odds for these two groups was then calculated within each childhood socioeconomic group. This was done with a broader age standardisation, three age groups, giving equal weight to each age group.

Table II Height and intergenerational mobility. Observed (O) number of upwardly and downwardly mobile persons and mobility ratios (SMobR), standardised for age and childhood socioeconomic group simultaneously

Height group	Upwardly mobile			Downwardly mobile		
	n	*SMobR*	*95% CI*	*n*	*SMobR*	*95% CI*
			Men			
Short	348	91	(82–101)	377	106	(96–118)
Medium	414	103	(93–113)	342	97	(87–107)
Tall	321	108	(97–120)	285	96	(86–108)
			Women			
Short	186	85	(74–98)	593	105	(97–114)
Medium	200	107	(93–123)	515	100	(91–109)
Tall	186	111	(96–129)	396	93	(85–103)

CI = confidence interval

Table III Mobility odds ratios. The odds of the tallest third compared to the shortest third with regard to mobility direction. By father's socioeconomic group. Men and women.

Father's socioeconomic group	Men				Women			
		Mobility direction				Mobility direction		
	n	*Non*	*Up*	*Down*	*n*	*Non*	*Up*	*Down*
Unskilled workers	819	0·81	1·40	–	858	1·13	1·18	–
Skilled workers	495	1·40	1·50	0·76	542	1·50	1·97	0·71
Assistant non-manual employees	137	1·96	1·69	–	164	1·54	1·68	–
Intermediate	184	0·75	4·82	1·96	201	2·29	3·15	0·74
Higher non-manual employees	141	0·52	–	1·69	138	1·46	–	0·85
Self employed without employees	158	1·32	2·43	0·92	188	0·76	2·06	0·83
Self employed with employees	230	1·69	–	0·55	262	3·53	–	0·47
Farmers with small farms	249	0·27	1·48	–	263	1·22	1·71	–
Farmers with larger farms	400	1·16	–	0·57	405	1·37	–	0·63
Total	2843				3048			
Weighted average*		1·04	1·32	0·52		1·52	1·26	0·39

*Weighted by size of father's socioeconomic group

Table IV Intergenerational mobility and mortality. Observed (O) number of deaths and mortality ratios standardised for age (SMR1) and for age and childhood socioeconomic group simultaneously (SMR2)

Mobility group	*O*	*SMR1*	*95% CI*	*SMR2*	*95% CI*
			Men		
Upward	73	109	(71–137)	98	(78–123)
Downward	74	95	(76–119)	108	(86–135)
Non-mobile	86	98	(79–121)	96	(78–119)
			Women		
Upward	23	118	(79–178)	109	(73–164)
Downward	65	98	(77–125)	107	(84–136)
Non-mobile	42	95	(70–129)	88	(65–119)

CI = confidence interval

Results

Table II shows the observed/expected ratio of upward and downward mobility in the three height groups, when standardising for age and childhood socioeconomic group. Tall men and, to a somewhat greater extent, tall women were more upwardly mobile than expected. The opposite was true for the short third, ie, the number of downwardly mobile persons was larger than expected in this group.

Table III examines the same issue using a different method. For each childhood socioeconomic group and for each gender the tallest third of the sample had a larger proportion of upwardly mobile than the shortest third. With the exception of sons of intermediate and higher non-manual employees, downward mobility was more common among the shortest. Upward mobility is thus more uniformly linked to height than is downward mobility.

To give an idea of the size of the differences in body height between mobility groups, the sons and daughters of unskilled manual workers who themselves have become higher non-manual employees were compared with those who, like their fathers, have become unskilled manual workers. The differences in mean height are estimated at 2·6 cm for men and 1 cm for women (data not shown).

The need for, and effect of, standardisation for childhood socioeconomic group is evident when it comes to the connection between mobility and mortality (table IV). Men whose socioeconomic position was higher in adulthood than in childhood had a higher mortality than expected when the effect of childhood socioeconomic group was ignored. After standardisation for childhood socioeconomic group it seems that those with a lower position than their fathers were at greater risk. For women there seems to be no difference in risk of early death between upwardly and downwardly mobile individuals. It should be pointed out that the precision in these estimates is low.

When we studied the number of persons perceiving their health as bad (table V), we found that after standardisation for father's socioeconomic group, the group with a higher socioeconomic position than their fathers had a smaller proportion than expected of individuals who perceived their health as bad. This was true for both genders, but in particular for men. The upwardly mobile were also less likely to report a longstanding illness. The non-mobile group also had a larger proportion than expected of men with poor general health and reported longstanding illness to a larger extent than could be accounted for by age and socioeconomic group in childhood (table VI).

Discussion

In the introduction we asked whether tall people were more likely to be upwardly mobile than short

people. From tables II and III we must draw the conclusion that this is so. The different mobility chances for short and tall people demonstrated by the odds ratios in table III can hardly be explained by experiences in adulthood. The probability of being upwardly mobile, as described by the numbers in table II, may be less convincing but is nevertheless still present. That height is linked to social mobility has not earlier been shown by Swedish data.

The importance of mobility for adult health and the risk of early death is, however, more difficult to assess. When it comes to longstanding illness, the downwardly mobile group has no increased risk, even though the risk is probably lower for the upwardly mobile group. The largest differences are found in perceptions of one's own general health. Here we find, particularly clearly among the men, that those who have been upwardly mobile perceive their health as better. Thus it is upward social mobility that is most clearly associated with health, in particular self perceived health. We could not rule out an association with mortality, but precision in our estimates is low, due to a relatively small number of deaths.

There seems to be a slightly weaker relation between mobility and health among women than among men. We can only speculate about why this is the case. One explanation could be the principles applied to the classification into socioeconomic groups here. In the sociological literature there has been a discussion about the best socioeconomic classification of married women, whether one should use the woman's own occupation, the husband's occupation, or a household classification. There have been arguments for both approaches.[eg12–16] In this study we used the woman's own occupation to define achieved socioeconomic status for all women except for housewives, who have been classified according to their husbands' occupation. This might be a less informative classification for married women than for married men.

In our study on height and adult health[3] we found that tall people fared better with regard to the risk of early death and general health. Based on the present study we would now conclude, as others before us have done,[eg8 9] that tall people are more likely to move upwards in the social hierarchy and that those who are upwardly mobile are much less likely to perceive their health as bad. From this, we must draw the conclusion that the differences between height groups in perceiving one's health as bad might at least in part be an effect of social mobility. A beneficial childhood environment may in other words promote tall stature as well as upward mobility and may be demonstrated in better health in adulthood.

The connection between mobility and adult health could also be influenced by present socioeconomic group. In particular, we could expect a person who moved to a higher socioeconomic group long ago to benefit from that group's better health prospects. For obvious reasons we could not control for childhood and present socioeconomic group simultaneously in the analyses of mobility, as was done with the analyses of height.

The childhood environment influences height, height is linked to upward mobility, and upward mobility is linked to better health. We suggest that this is one (although not the only) way in which childhood environment has an impact on adult health.

Table V Intergenerational mobility and general health. Observed (O) number of persons perceiving bad health and morbidity ratios, standardised for age (SMorbR1) and for age and childhood socioeconomic group simultaneously (SMorbR2)

Mobility group	O	SMorbR1	95% CI	SMorbR2	95% CI
			Men		
Upward	38	61	(44–83)	63	(46–87)
Downward	76	119	(95–149)	115	(92–144)
Non-mobile	80	118	(95–148)	118	(95–147)
			Women		
Upward	37	107	(78–148)	91	(66–125)
Downward	92	90	(73–110)	108	(88–132)
Non-mobile	76	111	(89–139)	96	(77–121)

CI = confidence interval

Table VI Intergenerational mobility and longstanding illness. Observed (O) number of persons with a longstanding illness or who take medication. Morbidity ratios, standardised for age (SMorbR1) and for age and childhood socioeconomic group simultaneously (SMorbR2)

Mobility group	O	SMorbR1	95% CI	SMorbR2	95% CI
			Men		
Upward	413	92	(84–102)	92	(84–102)
Downward	454	102	(93–112)	101	(92–111)
Non-mobile	500	105	(96–115)	106	(97–116)
			Women		
Upward	229	89	(78–101)	88	(77–100)
Downward	739	100	(93–107)	101	(94–109)
Non-mobile	533	106	(98–116)	105	(96–114)

CI = confidence interval

This study was supported by the Swedish Council for Social Research in the form of research grants (F 87/122, 90–0116).
I would especially like to thank my tutor Dr Denny Vågerö at the Swedish Institute of Social Research, Stockholm University, for guidance and support.

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