Papers

Financial cost of social exclusion: follow up study of antisocial children into adulthood

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Abstract

Objectives To compare the cumulative costs of public services used through to adulthood by individuals with three levels of antisocial behaviour in childhood.
Design Costs applied to data of 10 year old children from the inner London longitudinal study selectively followed up to adulthood.
Setting Inner London borough.
Participants 142 individuals divided into three groups in childhood: no problems, conduct problems, and conduct disorder.
Main outcome measures Costs in 1998 prices for public services (excluding private, voluntary agency, indirect, and personal costs) used over and above basic universal provision.
Results By age 28, costs for individuals with conduct disorder were 10.0 times higher than for those with no problems (95% confidence interval of bootstrap ratio 3.6 to 20.9) and 3.5 times higher than for those with conduct problems (1.7 to 6.2). Mean individual total costs were £70 019 for the conduct disorder group (bootstrap mean difference from no problem group £62 898; £22 692 to £117 896) and £24 324 (£16 707; £6594 to £28 149) for the conduct problem group, compared with £7423 for the no problem group. In all groups crime incurred the greatest cost, followed by extra educational provision, foster and residential care, and state benefits; health costs were smaller. Parental social class had a relatively small effect on antisocial behaviour, and although substantial independent contributions came from being male, having a low reading age, and attending more than two primary schools, conduct disorder still predicted the greatest cost.
Conclusions Antisocial behaviour in childhood is a major predictor of how much an individual will cost society. The cost is large and falls on many agencies, yet few agencies contribute to prevention, which could be cost effective.

Introduction

The term "conduct disorder" refers to a persistent and pervasive pattern of antisocial behaviour in childhood or adolescence.[1] Typical behaviours include disobedience, tantrums, fighting, destructiveness, lying, and stealing. Conduct disorder is the commonest psychiatric disorder in childhood, with a prevalence of 7% in boys and 3% in girls[2]; it is also the commonest reason for referral of children and adolescents to mental health services.[3]

Conduct disorder is strongly associated with social and educational disadvantage. It occurs four times more often in families with unskilled occupations than in professional families[2]; reading difficulties are common, and many children leave school without qualifications or are permanently excluded.[4 5] The antisocial behaviour tends to persist—40% of 8 year olds with conduct disorder are repeatedly convicted of crimes such as theft, vandalism, and assault in adolescence.[6] The misuse of drugs and alcohol is widespread. Looking back, the continuity is even stronger, as 90% of repeating juvenile offenders had conduct disorder in childhood.[6] In adulthood these individuals continue offending and have erratic employment patterns in unskilled jobs, violent relationships with partners, and few friends.[5] They do not participate in mainstream society and remain socially excluded.

Few direct studies have looked at the economic costs of conduct disorder or its consequences.[7] Related studies suggest that costs are high. In the United States the cost for crimes committed by a typical juvenile delinquent (under 18) was estimated at $80 000-$325 000 (£56 000-£232 000).[8] Between ages 19 and 24 a typical adult criminal costs a further $1.2m. Victim costs were by the far the greatest part of this total. Dropping out early from school added $243 000-$388 000 to age 24, heavy drug use a further $150 000-$360 000. Rescuing a high risk youth from this typical life path was estimated to save $1.7m-$2.3m.[8]

In the United Kingdom the Audit Commission reported the expenditure incurred by young offenders. Identifying them costs the police £1200 and successful prosecution a further £2500. A week in a local authority secure unit costs £3450.[9] Our own pilot study, of children aged 4-8 referred with conduct disorder, found that the mean extra cost was £15 282 a year (range £5411-£40 896). Of this, 31% was borne by families, 31% by education services, 16% by the NHS, 15% by state benefit agencies, 6% by social services, and less than 1% by the voluntary sector.[10]

In the United Kingdom there has been growing recognition of the costs of antisocial behaviour and social exclusion originating in childhood. A parliamentary select committee and a major independent inquiry

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Table 1 Study groups, defining three levels of antisocial behaviour at age 10 years

	No problems (n=65)	Conduct problems (n=61)	Conduct disorder (n=16)
No (%) of original screened sample (n=1689) represented by group*	1368 (81.0)	155 (9.2)	47 (2.8)
Screen positive for teacher rated emotional and behavioural problems	No	Yes†	Yes†
Diagnosis of conduct disorder by clinician on parent interview	No	No	Yes

*Conduct groups oversampled; children with emotional problems and no antisocial behaviour were excluded.
†With predominance of antisocial problems.

concluded that unless there were adequate specialised services for the mental health needs of children, the economic and social costs would be considerable later on.[11] [12] The Audit Commission has called for better information on resources spent on children's mental health and has recommended that agencies commission children's services jointly.[3] To plan services effectively, however, information is necessary on the long term costs of disorders, the range of agencies involved, and how costs vary according to the severity of problems. We aimed to determine the costs to the public sector incurred to age 28 in dealing with children with different levels of antisocial behaviour and to examine childhood predictors of long term cost; in particular, we aimed to discover how much antisocial behaviour adds to cost once personal characteristics have been taken into account.

Participants and methods

Inner London longitudinal study
We applied costs to data from the inner London longitudinal study, an epidemiological study of psychiatric problems and attainment in people from a disadvantaged inner London borough.[13] The study began in 1970 when the children were 10 and tracked their progress to their late 20s. All 10 year olds (n=2281) attending state primary schools in the borough were screened using the Rutter teacher questionnaire.[14] Two subsamples were selected for intensive study: a random 1 in 12 sample of the total population and a 1 in 2 sample of children who had screened positive for emotional and behavioural problems. Among the 1689 non-immigrant children screened, 228 of the 249 selected were successfully assessed. Parental interviews covered 33 child behaviours, and diagnoses were assigned by clinicians. Children were tested individually with the Neale reading test.[15]

Individuals who had emotional problems when screened at age 10 (119 children, 7% of original sample) were excluded as this study concerned antisocial behaviour. The remaining participants were divided into three mutually exclusive subgroups, reflecting different levels of severity of childhood antisocial behaviour: no behavioural or emotional problems on screening or parental interview; high scores on screening, with a predominance of antisocial problems but no disorder on parental interview; and high scores on screening, with a diagnosis of conduct disorder on parental interview (table 1). At follow up in 1986-8 data were available on 65 of 80 (81%), 61 of 73 (84%), and 16 of 22 (73%) participants, respectively. The participants' mean age was 27.7 (SD 1.27) years.

Investigator based follow up interviews included measures of housing; educational history; psychosocial functioning as an adult, including work and marital history (adult personality functioning assessment)[16];

psychiatric history as an adult and service contacts (past history schedule of present state examination)[17]; and alcohol problems (schedule for affective disorders and schizophrenia—lifetime version).[18] The period covered for special educational provision, foster and residential care, and hospital contacts included childhood before age 10. Estimation of service use was based on these retrospective accounts, the reliability of which is good for factual information.[19] Official criminal records were searched.

Costing methods
We calculated costs for each individual across six domains: foster and residential care in childhood, special educational provision, state benefits received in adulthood, breakdown of relationship (domestic violence and divorce), health, and crime. We allocated costs for every service reported as used above the basic provision prevailing at the time, whether or not utilisation seemed to arise from antisocial behaviour. For example, extra remedial teaching was costed but basic schooling was not. Table 2 gives further examples of services used and costs applied. We applied costs only if there was good quality information about the use of services. We applied 1998 price levels for services as they would have been provided in 1998, using the best approximations to long run marginal opportunity costs. We took unit costs from national sources for health and social care services, criminal justice, and benefit receipts.[20–22] We calculated other costs from first principles using agencies' data, ensuring that their coverage (for example, of travel, supervision, and overheads) was consistent with the national sources.

We could not assess many costs because the original survey was not designed for an economic study. No costs were allocated for use of social services, voluntary organisations, primary health care, lost employment, divorce (other than public legal costs), undetected crime (which is several times more common than detected crime),[5] the costs to victims of crime (which can also be large),[8] [22] parents' or partners' use of services arising from the participant's behaviour, indirect costs to families, or psychological impact, such as the distress and lack of friends of individuals with antisocial behaviour or the unhappiness of their siblings. For some events the dataset did not include frequency, so only one episode was costed (foster care, residential child care, exclusion from school, divorce, recipient of domestic violence, abortion). Abortion and domestic violence were only costed for index female participants, not partners of male participants. No assessment was made of economic contributions such as paying income tax.

Analysis strategy
As the data for costs were highly skewed, in addition to *t* tests of differences not assuming equality of variances,

we used bootstrap estimation to derive 95% confidence intervals of differences and ratios between groups. We used bootstrap multiple regression to determine childhood predictors of total cost,[23] applying inverse probability sampling weights to allow for the original two phase sample design and effects of attrition at the interviewing stages in childhood and adulthood. We used Stata software.

Results

Costs of each domain—Table 3 shows the mean individual costs for each domain; the total individual cost ranged from £0 to £379 292. Crime was the costliest domain in all the groups and constituted almost two thirds of the total cost in the conduct disorder group. For the two conduct groups the next three costliest domains were education, foster and residential care, and benefits. For all the groups health service costs were the fifth largest and relationship costs the smallest.

Cost differences between groups—The conduct disorder group cost 10 times more than the no problems group and the conduct problem group over three times more (table 4). The extra costs of both conduct groups were not only due to crime but also to higher use of services across all domains (except relationships in the conduct disorder group, where there were only two female participants, so the costs for domestic violence were lower).

Personal characteristics and educational attainment in childhood in relation to cost—Other childhood characteristics were also associated with variations in cost (table 5). Being male led to higher costs. Being from a family of lower socioeconomic status, having a low reading age, and attending more than two primary schools led to significantly higher costs with *t* tests but just missed significance using bootstrap tests, where lower values for confidence intervals were negative.

Childhood predictors of total cost—After allowance for personal characteristics and educational variables in childhood, multiple regression analysis showed that conduct disorder and not group membership predicted most cost (table 6). Conduct problems, sex, reading age, and number of primary schools attended made substantial independent contributions and parental socioeconomic status a smaller contribution. The extra cost of individuals who attended more than two primary schools was unrelated to antisocial behaviour in childhood and came almost entirely from crime. Costs for extra educational provision were lower.

Discussion

Antisocial behaviour at age 10 was a powerful predictor of the total cost of public services used by age

Table 2 Numbers (percentages) of participants in each group using main services, and costs applied

Service*	No problems (n=65)	Conduct problems (n=61)	Conduct disorder (n=16)	Cost applied (£ at 1998 prices)
Type of care				
Foster	2 (3)	2 (3)	0 (0)	408/week × 26
Residential home	1(2)	4 (7)	3 (19)	1461/week × 26
Education services				
Remedial help at primary school	4 (6)	11 (18)	1 (6)	9936/year × 1
Remedial help at secondary school	3 (5)	8 (13)	4 (25)	9936/year × 1
Permanently excluded	0 (0)	3 (5)	1 (6)	7232 × 1
Social worker for truancy	3 (5)	4 (7)	2 (13)	340 × 1
Adult literacy classes	0 (0)	5 (8)	1 (6)	91 × 1
Benefits				
Unemployment ≥5 months	1 (2)	21 (34)	4 (16)	Variable
Single parent with children	3 (5)	4 (7)	0 (0)	Variable
Relationships				
Violence from partner	5 (8)	7 (11)	2 (13)	610 × 1
Divorce (legal aid)	10 (15)	12 (20)	1 (6)	851 × 1
Health services				
Hospital inpatient (child)	8 (12)	18 (30)	7 (44)	1366 × 1 or 2
Psychiatric outpatient (child)	0 (0)	3 (5)	3 (19)	2150 × 1
Psychiatric outpatient (adult)	0 (0)	4 (7)	3 (19)	582 × 1
Psychiatric inpatient (adult)	6 (9)	5 (8)	0 (0)	7560 × 1
Abortion or miscarriage	13 (20)	11 (18)	0 (0)	371 × 1
Justice system				
Convicted	12 (18)	19 (31)	9 (56)	Variable
In prison	1 (2)	3 (5)	4 (25)	641/week

*Non-comprehensive list.

Table 3 Arithmetic mean of total costs of services (in £ at 1998 prices) used by individuals to age 28 according to group at age 10

Domains	No problems All (n=65)	Females (n=30)	Males (n=35)	Conduct problems All (n=61)	Females (n=23)	Males (n=38)	Conduct disorder All (n=16)	Females (n=2)	Males (n=14)
Education	1508	1107	1 851	7 524	6 377	8 219	12 478	7243	13 226
Health	247	219	270	1 237	881	1 453	2 178	994	2 347
Foster and residential care	1320	0	2 451	3 412	6 625	1 468	7 647	0	8 740
Relationships	97	122	75	156	211	122	63	0	73
Benefits	1710	821	2 471	3 391	3 293	3 450	2 832	0	3 237
Crime	2541	53	4 674	8 604	5 627	10 406	44 821	0	51 224
Total cost	7423	2322	11 792	24 324	23 014	25 118	70 019	8237	78 847

Table 4 Mean differences and ratios between total individual costs (in £ at 1998 prices) by age 28 according to group membership at age 10

Group	Mean difference	*t* test (significance)	Bootstrap mean difference (95% CI)	Bootstrap ratio (95% CI)
Conduct disorder versus no problem	62 597	4.31 (P<0.001)	62 898 (22 692 to 117 896)	9.95 (3.56 to 20.88)
Conduct problem versus no problem	16 903	5.2 (P<0.001)	16 707 (6 594 to 28 149)	3.45 (1.69 to 6.17)
Conduct disorder versus conduct problem	45 695	3.07 (P=0.003)	46 193 (3 830 to 102 510)	3.04 (1.14 to 6.06)

Bootstrap estimation using 2000 repetitions, bias corrected.

Table 5 Mean differences and ratios of total individual costs (in £ at 1998 prices) by age 28 according to personal characteristics and educational factors at age 10*

	No	Mean difference	*t* test (significance)	Bootstrap mean difference (95% CI)	Bootstrap ratio (95% CI)
Sex					
Male	873	12 297	9.78 (P<0.00 1)	12 339 (6 440 to 19 057)	4.37 (2.17 to 8.32)
Female	695				
Parental social class					
Low	612	6 218	4.00 (P<0.00 1)	6 341 (−980 to 14 820)	1.83 (0.85 to 3.28)
High†	955				
Reading age					
<7.5 years	120	8 235	2.99 (P=0.00 3)	8 525 (−1 577 to 26 457)	1.96 (0.87 to 3.93)
≥7.5 years‡	1426				
No of primary school attended					
≥3	144	11 977	4.39 (P<0.00 1)	12 486 (−2 818 to 30 859)	2.48 (0.71 to 4.80)
1 or 2	1402				

Bootstrap estimation using 2000 repetitions, bias corrected.
*Irrespective of conduct group. Sample reweighted to represent screened population studied (n= 1567); numbers vary due to missing data.
†Registrar general's social classes I, II, and III non-manual versus III manual, IV, V, and unknown.
‡Neale reading comprehension.

28. This remained true after allowing for being male, a poor reader, and raised in a family of lower socioeconomic status. Total costs increased steeply with increasing antisocial behaviour: individuals with conduct problems as rated by a teacher cost over three times as much and individuals with conduct disorder cost 10 times as much as those without conduct problems.

The extra costs in the antisocial groups fell on a wide range of agencies dealing with social exclusion. Criminal justice costs were by far the highest and could be higher today, as crime rates have increased.[5] Education costs were second highest and could be higher now, as more children receive specialist services. Care costs were third highest but might be lower now because residential homes are used less, although unit costs are now higher and there has been an increase in specialist placements for foster care. Benefit costs were fourth highest. Health costs were low because only a small proportion of the children reached the mental health services; this is still true.[2]

Limitations
Several aspects of service use were not costed, and indirect costs were not assessed. Including these might have increased the total cost severalfold and be a better reflection of the "true" cost. Therefore the ratio of costs between groups and domains is an important measure.

The borough studied was relatively socially deprived, with high levels of antisocial behaviour[13]; however, rates of antisocial behaviour in youths in the United Kingdom have since risen to comparable levels.[5]

Implications
Antisocial behaviour in childhood often leads to lifelong social exclusion.[5] It imposes considerable costs in childhood[10] and high public expenditure and personal distress by adulthood. The impact on public spending is substantial. In our sample 2.8% of the population was classified with conduct disorder and a further 9.2% with conduct problems, values that are typical for the United Kingdom and United States.[5] This 12% of the population accounted for around half of the public expenditure assessed.

There are effective interventions for antisocial behaviour in children, but they are seldom routinely available. Parent training programmes have been shown to have large effects in many university trials in the United States,[24] and our own study showed they can be equally effective in routine clinical practice in the United Kingdom.[25] Typical programmes cost £600 per child and are likely to save money in the longer term.[25 26] Complementing a family based approach, there are effective behaviour management and social skills programmes for primary schools.[27] In contrast, interventions for serious antisocial behaviour in teenagers are much less effective.[5] Therefore there is a case for implementing effective early interventions with families and with children at school.

The current UK government has launched several initiatives to reduce antisocial behaviour and social

Table 6 Factors at age 10 predicting total cost (in £ at 1998 prices) by age 28, determined by multiple linear regression analysis

Variable	Regression coefficient	Standardised regression coefficient β	*t* test (significance)	Bootstrap regression coefficient (95% CI)
Sex	12 406	0.29	12.2 (P<0.001)	12 076 (6 022 to 20 808)
Parental social class*	3 092	0.14	6.0 (P<0.001)	3 035 (408 to 6 458)
Reading age†	6 730	0.19	7.2 (P<0.001)	6 829 (1 757 to 12 076)
No of primary schools attended	14 902	0.21	9.08 (P<0.001)	15 226 (1 818 to 34 049)
Conduct problems	13 090	0.18	7.8 (P<0.001)	12 987 (3 263 to 25 449)
Conduct disorder	31 372	0.23	10.3 (P<0.001)	31 253 (7 803 to 65 334)
Residual constant	7 422		2.8 (P=0.003)	7 905 (−5 696 to 21 035)

Ordinary least squares regression adjusted R^2=0.26. Bootstrap regression with 2000 repetitions, bias corrected.
*Registrar general's social classes I, II, and III non-manual; III skilled manual; IV and V; unknown.
†Neale reading comprehension above 130 months, 90-130, below 90.

> ### What is already known on this topic
>
> Children who show substantial antisocial behaviour have poor social functioning as adults and are at high risk of social exclusion
>
> Costs are available for particular items of public service such as receiving remedial education or appearing in court
>
> ### What this study adds
>
> Costs of antisocial behaviour incurred by individuals from childhood to adulthood were 10 times greater for those who were seriously antisocial in childhood than for those who were not
>
> The costs fell on a wide range of agencies
>
> Reduction of antisocial behaviour in childhood could result in large cost savings

exclusion in high risk areas. The "surestart" programme targets children aged 0-3 years with "one stop shop" services for their parents. The "on-track" programme aims to prevent antisocial behaviour in 4-12 year olds and avoid crime later on. The "health action zones" have goals such as reducing exclusions in school, drug misuse, and early pregnancy. They are, however, confined to specific areas, often do not use proved interventions, and are short term.

Organisational barriers prevent effective service organisation. Many agencies are simply not aware that antisocial behaviour in childhood leads to high costs for them. Among agencies working with children (health, education, social services, and voluntary agencies) none is primarily responsible for antisocial behaviour, and few consistently use evidence based interventions. Health commissioners have little direct financial incentive to give priority to effective intervention because their service bears little of the long term cost. Mental health services for children in the United Kingdom lack the resources to oversee widespread implementation of effective interventions; spending was £9 per child in 1997-8.[3] A well coordinated multi-agency approach that used interventions of proved effectiveness could considerably reduce the costs of antisocial children when they are grown up.

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