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Original article

Area Deprivation Affects Behavioral Problems of Young Adolescents in Mixed Urban and Rural Areas: The TRAILS Study

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Abstract

Purpose: Behavioral problems occur more frequently among adolescents in deprived areas, but most evidence concerns urbanized areas. Our aim was to assess the impact of area deprivation and urbanization on the occurrence and development of behavioral problems among adolescents in a mixed urban and rural area and to examine the contributory factors.

Methods: We obtained data from the first two waves (n = 2,230; mean ages, 11.5 and 13.5 years respectively; response at follow-up, 96.4%) of the TRacking Adolescents' Individual Lives Survey (TRAILS). TRAILS is a prospective study of adolescent mental health in a mixed urban and rural region of the Netherlands. We assessed adolescent behavioral problems using the parent-reported Child Behavior Checklist (CBCL), the adolescent-reported Youth Self-Report (YSR) and the Antisocial Behavior Scale (ABS). Living areas were categorized into tertiles of deprivation. We further collected data on child temperament, perceived rearing style, parental socioeconomic position (education, income and occupation), family composition, and parental mental health history.

Results: At baseline, adolescents living in the most deprived tertile more frequently had elevated behavioral problem scores than those from the least deprived tertile on the CBCL (11.2% against 7.1%), YSR (11.9% against 6.9%), and ASB (11.5% against 7.4%) (all $p < .05$). Socioeconomic position explained half of the differences due to area deprivation. Other familial and parental characteristics did not significantly contribute to the explanation of observed area differences.

Conclusions: As in highly urbanized areas, behavioral problems occur more frequently among adolescents in deprived mixed rural and urban areas. Urbanization has little effect on these area differences.

Keywords: Poverty areas; Behavior problems; Adolescent; Rural population; Socioeconomic factors

Behavioral problems among children occur more frequently in deprived areas [1–7]. In a review of the effects of area deprivation on child health, Sellstrom and Bremberg estimated that area deprivation increases the prevalence rate of behavioral problems by 12% [7]. They conclude that ''behavioral problems may in part be attributed to the child's immediate environment'' [7]. More recent findings from the Netherlands confirm this conclusion [5].

Explanations for the effect of area deprivation on childhood behavioral problems have mostly focused on urbanized areas [1,3,7–11]. Leventhal and Brooks-Gunn have identified three explanatory factors for area differences [1]. First, a lack of institutional resources such as health and daycare in deprived areas could contribute. Second, the difficulties encountered by many parents in deprived areas could lead

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to more child behavioral problems as parents transfer their own economic, social, and health difficulties and the resulting psychological problems to the relationships that they have with their children. Third, the norms and collective efficacy that shape child behavior could be insufficient in deprived areas. More recent findings on the effects of time spent unattended in such areas confirm this [9,12]. In addition to the effects of areas on child behavioral problems, as summarized by Leventhal and Brooks-Gunn [1], selective migration could also be a contributing factor. Better-adapted parents and their children could be more likely to leave deprived areas; conversely, the less behaviorally adapted could be more likely to move into more deprived areas [4].

Evidence related to these explanations is mostly absent regarding less urbanized areas [1,7]. One might assume that social cohesion is stronger in smaller communities, which in turn causes the effects of area deprivation on child behavioral problems to be less pronounced as collective efficacy in rearing is better. In addition, hardly any studies of socioeconomic disparity in adolescent mental health have been performed in rural or less urbanized areas.

The aim of this paper is to assess the impact of area deprivation and urbanization on the occurrence and inception of behavioral problems among young adolescents in a mixed urban and rural area. Furthermore, we evaluate the impact of child and family characteristics such as parenting practices, child temperament, family socioeconomic position, and parental mental health on the occurrence and inception of these behavioral problems in deprived areas. We studied a large sample of adolescents in an age range of 10–14 years, which represents a vulnerable period in the development of behavioral problems [3].

Methods

Sample and procedure

The TRacking Adolescents' Individual Lives Survey (TRAILS) is a prospective cohort study of young Dutch adolescents, designed to examine and explain the progress of mental health and social development from preadolescence into adulthood. The TRAILS target sample comprised both urban and rural areas in the northern Netherlands [11,13,14].

Enrolment started in 2001. Children were included if they were aged 10–11 years and attending schools that were willing and able to participate ($N = 2{,}935$ children). Of these, 2,230 provided informed consent to participate from both parent and child (76.0%). The mean age of the participating children was 11.1 (SD = .55); 50.8% were female; 10.3% had at least one parent born in a non-Western country; and 32.6% of children had a father and 37.9% a mother with a low educational level (defined as having graduated from a lower level secondary school at most). Boys, children from lower social strata, and children with poorer school performance were slightly more likely to belong to the nonresponse group [13]. Of the 2,230 baseline participants, 96.4% (N = 2,149; 51.0% girls) participated at T2. Mean age at T2 was 13.6 years (SD = .53). The sample and sample selection at T1 has been described more extensively elsewhere [13–15].

For the first measurement wave, well-trained interviewers visited one of the parents (preferably the mother, 95.6%) at their homes to administer an interview covering the child's developmental history and somatic health, parental psychopathology, and care use. The parent was also asked to fill out a questionnaire. The children filled out questionnaires at school in class under the supervision of one or more TRAILS assistants. During the second wave, children and parents filled out questionnaires at home. The design of each wave of the study was separately approved by the Dutch national Medical Ethics Committee, including the written informed consent by both child and parents.

Measures

Area deprivation was measured by the national area deprivation score per neighborhood as published by the Dutch Social and Cultural Planning Office [16]. This score is based on unemployment, mean income, and educational level per area [17]. For the current study we used the 1998 values for the summary factor. Urbanization was assessed by the number of residential addresses per 3.14 square kilometers (i.e., by drawing a circle with a radius of one kilometer from each point) [18]. Following the guidelines of Statistics Netherlands, it was dichotomized as less than 1,000 for rural and against 1,000 and more for urban (http://www.rivm.nl/vtv/object_map/o2617n21780.html).

Behavioral problems were assessed using the Child Behavior Checklist (CBCL), the Youth Self-Report (YSR) and the Antisocial Behavior Scale (ABS) in both waves. The CBCL and YSR are highly reliable and valid measures of behavioral and emotional problems over the preceding 6 months [19–22]. They are filled out by parents and adolescents or preadolescents respectively, but in other respects contain similar items. For the current study we used the Externalising Problems broad-band scale that focuses on behavioral problems, that is, the Delinquent and Aggressive Behavior syndrome scales. Children were allocated either to a normal or clinical (elevated) range, using the 90th percentiles of the Dutch normative sample as the cut-off [23].

The ABS consists of 23 items from the ''self-reported delinquency scale'' of Moffitt and Silva [24]. Children were asked if they had committed any of these delinquent offenses and how often (frequency value: 0 = never; 1 = once; 2 = two to three times; 3 = four to six times; and 4 = seven times or more). The offense questions referred to a period of 6 months. Sum scores were dichotomized at the 90th percentile, similar to the CBCL and YSR.

Parenting practices were measured using the EMBU-C, a Swedish acronym for ''My Memories of Upbringing'' [25]. It examines a child's perception of his/her upbringing

and the parents' rearing practices. The EMBU-C consists of 47 items examining aspects of parental rearing practices (rejection, overprotection, and emotional warmth). Each item, scored on a four-point scale (1 = never; 2 = sometimes; 3 = often; 4 = yes, almost always), is rated by children for their fathers and mothers [26]. Rejection is characterized by hostility, punishment (physical or otherwise, abusive or otherwise), derogation, and blaming of subject (12 items, Cronbach alpha, $\alpha = .84$ for both fathers and mothers). Overprotection is characterized by fearfulness and anxiety for the child's safety, guilt engendering, and intrusiveness (12 items, $\alpha = .70$ for fathers, and $\alpha = .71$ for mothers). Emotional warmth measures giving special attention, praise for approved behavior, unconditional love, and being supportive and affectionately demonstrative (18 items, $\alpha = .91$ for both fathers and mothers). The answers for both parents were highly correlated ($R^2 = .67$ for rejection, .81 for overprotection, and .79 for emotional warmth), so for each aspect, we used the mean values across both parents.

Family socioeconomic status (SES) was measured by family income, highest maternal educational level attained, and paternal occupational level based on the International Standard Classification for Occupations [27].

Parental mental health history was assessed using the TRAILS Family History Interview at T1. This was administered during the parent interview at T1 to the parental informant (normally the child's mother), who was interviewed about personal history and about the child's other biological parent. Five dimensions of parental psychopathology were assessed: depression, anxiety (jointly: internalizing problems), substance abuse, persistent antisocial behavior (jointly: externalizing behavior), and psychosis. A description of the symptoms that the DSM-IV uses to characterize each of these dimensions was presented to the parental informant through a vignette. The parent was then asked about lifetime occurrence, professional treatment and medication. Based on the interview, parents could be allocated to one of three categories for each dimension: 0 = probably never had an episode, 1 = probably yes; and 2 = probably yes with treatment and/or medication (or police contact in the case of antisocial behavior) [28]. In the analyses, we used the lifetime rates for internalizing and externalizing behavior from both parents.

Data analyses

In the analyses, we first assessed differences according to area deprivation in the occurrence of parent- and adolescent-reported behavioral problems, based on the CBCL and YSR respectively, and of adolescent-reported antisocial behavior based on the ABS, at T1 and T2. We further denote these jointly as "behavioral problems." For this purpose, we divided area deprivation into three tertiles. Next, we assessed to what degree family SES, or parental mental health history and parenting practices contributed to area differences at T1. We then assessed the degree to which additional differences existed because of the urbanization of the area, and whether urbanization modified the effect of area deprivation. We repeated these analyses to consider changes between T1 and T2 by constructing a model that used T2 outcomes with adjustment for T1 outcomes. Subsequently, we added the same variables as in the above-mentioned analysis. Because of the potential clustering of outcomes by area, we used multilevel techniques to assess the degree to which clustering by area occurred, using MLWin2.02 [29,30]. We computed two measures of area level variance and clustering, the intraclass correlation (ICC), and the median odds ratio (MOR) [31]. The ICC concerns the proportion of variance in the outcome that is attributable to the area. Its meaning in multilevel logistic regression is limited, however, because its value then also depends on the prevalence of the outcome. The MOR is the median value of the odds ratio between the area with the highest risk and the area with the lowest risk when randomly picking out two areas. It shows the extent to which the individual probability of having externalizing problems is determined by residential area. It thus quantifies contextual effects at an odds ratio scale.

Results

Adolescents lived in 211 neighborhoods; the mean population size was 4,103 (standard deviation [SD] 3,121; range 40–13,250), mean country surface 1.46 square kilometers (SD 2.57; range .07–49.39). The socioeconomic position of the study area is less favorable than that for the remainder of the Netherlands. Mean area deprivation in the study region was .48 (SD 1.19) compared with .00 (SD 1.00) for the entire Netherlands. As a consequence, the tertiles of adolescents in our sample with unfavorable and intermediate deprivation scores actually had deprivation scores above the national average (i.e., they were above 0); only one-third scored below (i.e., favorable). Of the sample, 25.2% came from rural areas and the remainder from moderately to highly urbanized areas (Table 1).

The proportion of adolescents with an elevated score on the CBCL, the YSR or the ABS was lowest in the most favorable tertile. All differences, except for the CBCL at age 13–14 years, were statistically significant (Table 2).

Multilevel logistic regression analyses showed that family SES explains almost half of the increased prevalence of problems in the more deprived areas at age 10–11 years, somewhat more for parent- and child-reported behavioral and emotional problems than for child-reported antisocial behavior (Table 3). After adjustment for family SES, the relationships of CBCL and YSR to area deprivation lost statistical significance. Adjustment for parenting style and family history of mental health problems barely affected the size of the differences by area deprivation. The same holds true for the urbanization of the area. Urbanization did not modify the effects of area deprivation (data not shown); that is, the associations of area deprivation with the outcomes are similar in urban and rural areas. In all of the models,

Table 1
Urbanization of areas (number of inhabitants per square kilometer) by area deprivation

	Very urbanized (>2,500)	Urbanized (1,500–2,499)	Mixed (1,000–1,499)	Rural (500–999)	Very rural (0–499)
Number	273	408	793	297	229
Most favorable	.0%	9.3%	56.0%	45.8%	23.1%
Intermediate	28.6%	62.7%	22.4%	31.0%	43.7%
Least favorable	71.4%	27.9%	21.6%	23.2%	33.2%

differences based on area deprivation mostly concern the most favorable tertile compared with the other two tertiles. Differences between the intermediate and unfavorable tertiles are fairly small.

Regarding clustering at the area level, ICCs were generally small, but MOR indices showed a relatively large clustering by residential area compared with the effects of area deprivation. In particular for the CBCL, the MORs were in the same range as the ORs for area deprivation, and MORs decreased relatively little when factors at the individual level were added.

Regarding changes between ages 10–11 and 13–14 years, Table 4 shows that having an elevated score at age 10–11 was strongly associated with having one at age 13–14, odds ratios being in the range of 10 (ABS) to 20 (CBCL). However, after this adjustment for behavioral problems at age 10–11, some differences resulting from area deprivation remained. This effect of area deprivation on the inception of problems only reached statistical significance for self-reported behavioral problems, in particular on the ABS, and not for parent-reported ones. Parental SES only slightly affected the inception of behavioral problems; however all but one of the differences due to area deprivation (YSR, intermediate deprivation) lost statistical significance after their introduction to the model. The same held true for parenting style and family history of mental health problems. Adding urbanization to the models did not affect the differences in inception of behavioral problems as seen on the basis of area deprivation. Urbanization also did not modify the effect of area deprivation on changes in the outcomes (data not shown); that is, the associations of area deprivation with the inception of behavioral problems did not vary between urban and rural areas.

Regarding clustering at the area level, intraclass correlations were mostly close to zero. The MOR indices showed that clustering by area was smaller than at baseline, and their values reduced largely by adding baseline problems and (other) factors at the individual and family level.

Regarding urbanization, we repeated all analyses with different cut-offs, using cumulative dichotomizations for all of the five categories that Statistics Netherlands provides (ranging from not urban, slightly urban, moderately urban, urban, to very urban). We found very similar results for all cut-offs; neither did we find any statistically significant effect of urbanization if it was included in the model as a continuous-level variable (not shown).

Discussion

Our study showed that behavioral problems occur more frequently among young adolescents in deprived areas than in favorable areas in a mixed rural and urban region, but that this does not vary on the basis of urbanization. About half of this higher prevalence can be explained by family SES. Other family characteristics such as parental mental health history and parenting style did not play significant roles. The inception of behavioral problems was also more likely in deprived areas, in addition to their already higher prevalence, but only for adolescent-reported problems, not for those reported by parents. Family SES and other family characteristics explained only a small part of the differences due to area deprivation in the inception of behavioral problems between ages 10–11 and 13–14 years. Urbanization had no effects.

Pivotal to our findings is the absence of a differential effect of area deprivation due to urbanization. Until now, by far the most studies have examined urbanized or highly urbanized areas with respect to the effects of area deprivation on public health, starting from the often-implicit assumption that effects are most prominent in large cities [1–7]. Our findings challenge this assumption, demonstrating that such a differential effect of the level of area deprivation due to urbanization does not hold true for the north of the Netherlands.

This lack of a differential effect on area deprivation due to urbanization is likely to be generalizable. The study area has

Table 2
Prevalence rates (percentages) of elevated scores for externalizing (CBCL and YSR) and antisocial behavior (ABS)

	Baseline				Follow-up		
	N	CBCL	YSR	ABS	CBCL	YSR	ABS
Most favorable (-2.0 to 0)	677	7.1%	6.7%	7.4%	8.0%	7.0%	8.0%
Intermediate (0 to 1)	710	10.3%	10.2%	12.5%	11.1%	12.0%	12.9%
Least favorable (1 to 3.92)	636	11.2%	11.9%	11.5%	10.1%	11.6%	13.0%
p Value [a]		.028	.005	.004	.14	.004	.003

[a] Chi-square tests.

Table 3
Occurrence of externalizing problems according to parent report (CBCL), adolescent report (YSR) and adolescent reported antisocial behavior at baseline (age 10–11): Odds ratios (OR) and 95% confidence intervals (CI) derived using multilevel logistic regression

	Crude			Adjusted for SES			Idem + urbanization			Adjusted for parenting and familial loading			Idem + urbanization		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
CBCL															
Area deprivation															
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.48	.98	2.22	1.24	.82	1.87	1.20	.80	1.80	1.43	.96	2.14	1.39	.93	2.07
Unfavorable	1.68	1.11	2.53	1.19	.78	1.83	1.17	.77	1.78	1.56	1.04	2.33	1.54	1.03	2.30
Rural versus urban							.79	.55	1.14				.86	.59	1.23
Intraclass correlation	.056			.047			.041			.045			.039		
Median OR	1.52			1.47			1.43			1.45			1.41		
YSR															
Area deprivation															
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.53	1.02	2.31	1.31	.88	1.94	1.27	.85	1.89	1.60	1.05	2.42	1.52	1.00	2.31
Unfavorable	1.89	1.26	2.83	1.35	.90	2.03	1.38	.92	2.08	1.85	1.22	2.81	1.86	1.23	2.83
Rural versus urban							1.03	.73	1.45				1.08	.75	1.55
Intraclass correlation	.017			.004			.004			.009			.009		
Median OR	1.26			1.11			1.11			1.18			1.18		
ABS															
Area deprivation															
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.91	1.30	2.81	1.72	1.17	2.54	1.66	1.13	2.43	2.03	1.35	3.06	1.96	1.30	2.95
Unfavorable	1.72	1.16	2.56	1.38	.92	2.08	1.32	.86	2.02	1.69	1.10	2.58	1.61	1.05	2.47
Rural versus urbanized							.93	.66	1.32				.93	.64	1.34
Intraclass correlation	.021			.013			.012			.026			.022		
Median OR	1.29			1.22			1.21			1.33			1.30		

Ref = reference category.

higher rates of unemployment and lower mean incomes than the national average [32]. The lack of economic prospects has led to economic migration out of the most peripheral areas, which may have led to selection effects. Many rural areas worldwide have similar characteristics, which could imply that similar area deprivation effects occur, at least in adolescent behavior [33]. However, future studies are needed to confirm our findings.

The occurrence of behavioral problems was higher in both the intermediate and the unfavorable area tertiles compared with the favorable one, with differences between intermediate and unfavorable being relatively small compared to the favorable. This could be caused by the area's relatively low SES, which might also be quite difficult to measure in rural areas [33]. For instance, unemployment could be more hidden because people have given up looking for jobs, whereas low incomes may be at least partially counterbalanced by lower living costs.

Family SES explained slightly more than half (CBCL and YSR) to about one-third (ABS) of the cross-sectional differences in problem scores based on area deprivation, indicating that much of the area effects are simply caused by a concentration of deprived families in these areas. The remaining area differences could be caused by contextual factors that act in deprived urban and rural areas. In both areas types, area deprivation may capture the nature of these contextual factors, even though their presentation may vary according to the degree of urbanization. Typically, this different presentation could be the contrast between being raised in a highly populated deprived urban area or a relatively empty agricultural area with small-scale rural housing. Social exclusion and low social cohesion can occur in both area types [9,12,33,34]. Another explanation could be a lack of institutional resources, which has been shown to play a role in behavioral problems in urban deprived areas, such as in Chicago, but which might also play a role in deprived rural areas [34]. Further research is apparently needed on this topic in rural areas [33].

Interestingly, adjustment for parenting style and familial mental health history did not affect the size of the differences in area deprivation, either cross-sectionally nor longitudinally. These two groups of factors have been hypothesized to be mediators of the effects of area deprivation on child mental health, in particular on behavioral problems [12,35]. Our findings do not support this assumption. In contrast, the SES of the family explains about half of the area differences. This leaves unanswered which factors other than parenting style or familial loading for behavioral problems, as measured by parental mental health history, could explain the mediating role family SES. One possible explanation is SES differences in obtaining mental health care. However, prior research does not confirm such differences for the Netherlands [36]. This topic therefore needs additional exploration.

Table 4
Occurrence of externalizing problems according to parent report (CBCL), adolescent report (YSR) and occurrence of adolescent reported antisocial behavior at follow-up (age 13–14), by area deprivation – odds ratios (OR) and 95% confidence intervals (CI) derived using multilevel logistic regression

	Area deprivation, crude			Area deprivation + baseline			Idem + SES			Idem + urbanization			Area deprivation + baseline + parenting + familial loading			Idem + urbanization		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
CBCL																		
Area deprivation																		
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.51	1.00	2.30	1.24	.80	1.94	1.30	.83	2.04	1.26	.80	1.98	1.18	.76	1.84	1.14	.73	1.78
Unfavorable	1.36	.88	2.10	.99	.61	1.58	1.04	.63	1.70	1.05	.64	1.72	.93	.57	1.50	.93	.57	1.51
Baseline CBCL				19.57	13.38	28.62	21.39	14.26	32.10	20.97	13.98	31.46	16.63	11.15	24.80	16.38	10.96	24.48
Rural versus urban										.89	.58	1.35				.98	.64	1.48
Intraclass correlation	.021			.013			.007			.007			.002			.001		
Median OR	1.28			1.22			1.15			1.15			1.08			1.06		
YSR																		
Area deprivation																		
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.90	1.26	2.87	1.57	1.03	2.38	1.58	1.02	2.45	1.57	1.02	2.41	1.54	1.00	2.36	1.52	.99	2.33
Unfavorable	1.86	1.21	2.84	1.36	.87	2.12	1.36	.85	2.17	1.34	.84	2.14	1.25	.79	1.97	1.24	.79	1.97
Baseline YSR				11.55	7.95	16.80	11.68	7.91	17.25	11.54	7.80	17.08	9.61	6.47	14.28	9.44	6.34	14.05
Rural versus urban										.82	.55	1.22				.85	.57	1.27
Intraclass correlation	.023			.003			.006			.0027			.002			.000		
Median OR	1.30			1.10			1.15			1.09			1.07			1.00		
ABS																		
Area deprivation																		
Favorable	1	Ref		1	Ref		1	Ref		1	Ref		1	Ref		1	Ref	
Intermediate	1.66	1.17	2.34	1.48	1.02	2.14	1.43	.98	2.10	1.41	.96	2.06	1.42	.97	2.07	1.38	.95	2.02
Unfavorable	1.67	1.18	2.38	1.56	1.07	2.28	1.41	.95	2.10	1.32	.88	1.97	1.39	.95	2.05	1.31	.89	1.94
Baseline ABS				9.51	6.87	13.16	9.06	6.49	12.64	9.33	6.66	13.07	9.92	6.96	14.15	10.08	7.05	14.44
Rural versus urban										.73	.51	1.04				.73	.51	1.06
Intraclass correlation	.000			.000			.002			.000			.002			.000		
Median OR	1.00			1.00			1.09			1.03			1.07			1.03		

Ref = reference category.

Finally, the effects of area deprivation on antisocial behaviors seem to increase somewhat in the age period that we assessed, in particular those reported by adolescents. This fits with the observations of Ingoldsby and Shaw in their review of neighborhood contextual factors and antisocial pathways, which revealed that childhood and early adolescence (6–14 years) may represent a particularly vulnerable period for adverse neighborhood effects [3]. Apparently, externalizing problems at age 10–11 years continues in later life and does not fade through the exposure to a wider living context when the child moves into secondary school. Regarding antisocial behavior, differences based on area deprivation increase even from age 10 to 14. Based on the mechanisms proposed by Leventhal and Brooks-Gunn [1], an explanation could be that, during this period, adolescents partially escape the tight social control of the rural area in which they live. The fact that only adolescent-reported behavioral problems increase could be because parents become less well informed of the behavior of their children at this age.

Study strengths and limitations

The major strengths of this study are its large sample size, high response rate, and low attrition at follow-up (limiting the likelihood of response bias), the use of several outcome measures based on two sources (adolescent and parent), and the information that we had on potential mediating factors. A limitation is that we did not have information on mediating factors at the level of neighborhoods. Future studies should include information on, for instance, social coherence and available resources, and on the number of hours spent unattended in the area [1,3,9].

Study implications

Our results show that area deprivation affects adolescent behavior in mixed and rural areas in a similarly negative way as it does in urban areas. Public policies aiming at the reduction of such negative area effects should therefore similarly include rural areas, in particular collinear with the local economic situation. However, they should be attuned to the characteristics of rural areas. In particular, the lower population density of rural areas may make it more difficult to reach adolescents with problematic behavior or may at least necessitate other approaches to reach them. This may imply an adjustment of current policies in many countries that mostly focus on deprived areas in highly urbanized regions [7,8,10]. Much may be gained in adolescent mental health here.

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