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Restrictive educational placements increase adolescent risks for students with early-starting conduct problems

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Abstract

Background—Students with early-starting conduct problems often do poorly in school; they are disproportionately placed in restrictive educational placements outside of mainstream classrooms. Although intended to benefit students, research suggests that restrictive placements may exacerbate the maladjustment of youth with conduct problems. Mixed findings, small samples, and flawed designs limit the utility of existing research.

Methods—This study examined the impact of restrictive educational placements on three adolescent outcomes (high-school non-completion, conduct disorder, depressive symptoms) in a sample of 861 students with early-starting conduct problems followed longitudinally from kindergarten (**age 5-6**). Causal modeling with propensity scores was used to adjust for confounding factors associated with restrictive placements. Analyses explored the timing of placement (elementary vs. secondary school) and moderation of impact by initial problem severity.

Results—Restrictive educational placement in secondary school (but not in elementary school) was iatrogenic, increasing the risk of high-school non-completion and the severity of adolescent conduct disorder. Negative effects were amplified for students with conduct-problem behavior with less cognitive impairment.

Conclusions—To avoid harm to students and to society, schools must find alternatives to restrictive placements for students with conduct problems in secondary school, particularly when these students do not have cognitive impairments that might warrant specialized educational supports.

Keywords

Aggression; special education; adolescent maladjustment

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Supporting information

Additional supporting information is provided along with the online version of this article.

Appendix S1: Flow diagram of educational placement and assessment times

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Introduction

Children who enter school exhibiting high rates of conduct problems often experience chronic difficulties in both academic and social domains (Farmer, Farmer, Estell, & Hutchins, 2007). Many of these students come from a background of early adversity (poverty, family instability, parenting difficulties, violence exposure) and have co-occurring cognitive impairments, including low IQ and attention deficits (Reid, Gonzalez, Nordness, Trout, & Epstein, 2004). Early conduct problems instigate teacher-student conflict and peer rejection, often setting into motion a negative cascade of coercive interactions with school authorities (Dodge, Greenberg, Malone, & Conduct Problems Prevention Research Group [CPPRG], 2008; Lane, Barton-Arwood, Nelson, & Wehby, 2008), and they represent the primary reason for school suspensions and expulsions (Jull, 2008). The high rates of school failure and dropout experienced by students with conduct problems, compared with other students with disabilities, underscores the difficulties schools face in serving these children effectively (Wagner & Cameto, 2004).

One way that schools frequently attempt to address the needs of these high-risk children is to educate them in separate special education or alternative settings, collectively described as restrictive educational placements [REPs]. Although many countries, including the U.S. and U.K., prioritize inclusive mainstreamed education for all students, there is a recognition that some students may require and benefit from REPs (Lindsay, 2007). The goal of REPs is to provide a more structured and nurturing environment, with specially trained teachers and small student: teacher ratios that allow for individualized instruction and well-implemented behavioral interventions (Fuchs & Fuchs, 1995; Jull, 2008). Indeed, some research suggests that students with early-starting conduct problems in REPs experience more support from teachers and show improved behavior (Rafferty, Piscitelli, & Boettcher, 2003), have higher grades, and are less likely to drop out relative to mainstreamed classrooms (Myklebust, 2006; Wagner & Cameto, 2004).

In contrast, a host of studies suggest that REPs, relative to mainstream placements, are associated with lower levels of school attendance (Rea et al., 2002) and lower levels of academic achievement (Myklebust, 2006; Peetsma, Vergeer, Roeleveld, & Karsten, 2001; Rafferty et al., 2003; Wagner & Cameto, 2004). In addition, Wiener and Tardif (2004) found that students placed in REPs were less accepted by peers and had more behavior problems than comparable peers in a mainstream setting. Meta-analyses generally find negative (but small) overall effects of REPs (Baker, 1994; Carlberg & Kavale, 1980; Elbaum, 2002).

Despite a significant body of research on the effects of REPs, mixed and inconclusive findings reflect limitations of the existing research base (Lindsay, 2007). Reviews reveal small samples in studies of REPs (average $N = 26$, range 4 – 120, Elbaum, 2002; average $N = 7$, range = 1-42, Mooney, Epstein, Reid, & Nelson, 2003), reflecting limited statistical power and questionable reliability. In addition, these studies struggle to account adequately for confounders that bias REP vs. mainstream comparisons. Children in REPs typically have more severe problems than children in mainstream classrooms, and differ on a host of demographic and background characteristics (Reid et al., 2004). Studies that do not control adequately for these confounders will, in almost all cases, bias results against REPs.

Researchers are beginning to use larger samples and more advanced statistical analyses to address the problem of sample bias. For example, Morgan, Frisco, Farkas, and Hibel (2010) used propensity scoring matching to examine the effects of special education services, finding small to non-significant negative effects on learning and behavior, but small positive effects on learning-related behaviors. Propensity score matching may similarly enable an unbiased assessment of the effects of REPs for students with conduct problems.

The present study

This study assessed the impact of REPs on three outcomes: high school completion, adolescent conduct disorder, and depressive symptomatology. Addressing the major shortcomings of existing research, this study employed a large, longitudinal data set of conduct problem students and used causal modeling with propensity scores to adjust for confounders associated with REP.

A broad approach was taken to identifying possible confounders, given the wide array of factors that might increase the likelihood of REP and also predict poor academic and mental health outcomes (Harry & Anderson, 1994). Students from low socio-economic backgrounds, racial minorities (particularly African American youth), and males are more likely to experience REPs (Oswald, Coutinho, Best, & Singh, 1999), and their adolescent outcomes may be affected by multiple early developmental experiences and social, family, and neighborhood contexts, as well as their cognitive ability and behavior at school entry (Dodge et al., 2008). Correspondingly, 33 confounders were included in the propensity model used in this study, representing five domains: child cognitive functioning, behavioral characteristics, demographics, family and neighborhood characteristics, and family support for education. By using propensity scores to weight the mainstream sample, a comparison group was generated that was equivalent to the group who experienced REPs on a large number of variables.

In addition, the longitudinal sample used in the present study enabled an examination of the impact of the timing of REPs on adolescent outcomes. Most children placed in REPs in elementary school continue in REPs in secondary school, and in addition, a number of aggressive children who were in mainstreamed placements in elementary school are placed into REPs during middle or high school (U.S. Department of Education, 2008). The reasons for placement may vary developmentally, with cognitive factors playing a greater role in elementary school and behavioral factors playing a greater role in secondary school (Bierman et al., 2013). Hence, the student characteristics, classroom composition, and the educational priorities and instructional strategies used in REPs may vary in the elementary vs. secondary grades, potentially changing the impact on adolescent outcomes.

Finally, this study also examined the severity of youth aggression and cognitive impairment as two factors that might moderate the impact of REPs on adolescent outcomes. Conceptually, more severe behavioral or academic needs should undermine the effectiveness of mainstreamed placements and increase the likelihood that students benefit from the specialized educational supports in REPs (Fuchs & Fuchs, 1995).

Based on existing research, it was hypothesized that REPs would be iatrogenic for students with early-starting conduct problems, increasing high-school non-completion, conduct disorder symptoms, and depressive symptoms, even after accounting for the confounders associated with REPs. It was further hypothesized that iatrogenic effects would be amplified for students placed in REPs in secondary school. Finally, it was hypothesized that the effects of REPs would be moderated by the severity of student cognitive impairments and behavior problems at school entry, with greater benefits and less iatrogenic impact for students with more severe problems.

Methods

Participants

This study included children participating in the Fast Track project, a multi-site, longitudinal and prevention study of children at risk for conduct problems (CPPRG, 1992). They were recruited from 55 schools within four diverse sites (Durham, NC; Nashville, TN; Seattle, WA; and rural PA). A two-stage screening process included teacher ratings on a 10-item conduct problem scale (TOCA-R Authority Acceptance; Werthamer-Larsson, Kellam, & Wheeler, 1991), and then parent-ratings of conduct problems at home using 24 items from the Child Behavior Checklist (Achenbach, 1991). The current study utilized data from the high-risk intervention and control groups, including 891 participants (48% European American, 49% African American, 3% other; 63% male) with a mean age at recruitment of 6.5 years ($SD = .48$). Of these participants, 117 experienced a restrictive educational placement in elementary school and 272 experienced a restrictive placement in secondary school. A flow diagram detailing the sample history and assessment time points is included in the Appendix S1 (available online).

Measures

Outcomes—Conduct-disorder and depressive symptoms were assessed when youth were in 12th grade (age 17-18) using the Diagnostic Interview Schedule for Children (DISC; Schafer & Fischer, 1997). Parents and youth were interviewed separately, and symptoms were counted if either reporter endorsed them. The possible symptom count ranged from 0-15 for conduct disorder and 0-9 for depression.

To assess high school non-completion, school records were searched through year 15 of the study -- two years after a student who had never been retained or dropped out of school would have received a diploma. If school records were missing, participant and parent interviews were used to assess high school graduation. Youth who passed a high school graduation equivalency test (GED) were considered high-school completers.

Restrictive educational placement—Based on school records, children were considered to be in an REP if they spent more than 750 minutes per week in a special education setting outside of the mainstream classroom or if they were formally assigned to a self-contained classroom or alternative school environment (e.g., residential facility, day treatment program, alternative school). Children's placements were determined each year, and then scored to reflect any REP in the elementary grades (grade 1-4, ages 6-10) or

secondary grades (grades 7-10, ages 12-16). This coding scheme was used because there were insufficient numbers of students entering restrictive placements each year to reliably estimate the impact of one or several years of placement. Grades 5 and 6 were excluded from these analyses because students in different schools transitioned to secondary school at different times, creating a lack of comparability across schools in terms of whether 5th and 6th grade placements were considered ‘elementary’ or ‘secondary.’

Moderators—The TOCA-R Authority Acceptance scale (e.g., fights, breaks rules, argues, takes others’ property, harms others; $\alpha = .95$; Werthamer-Larsson et al., 1991) assessed the severity of conduct problems at the entry to elementary school. A composite of IQ (WISC-R Vocabulary and Block Design) and attention problems rated by kindergarten teachers on the Child Behavior Checklist- TRF ($\alpha = .95$; Achenbach, 1991) assessed the severity of cognitive impairment. These scores were standardized and averaged to create the moderator.

Confounding variables—Five categories of confounders were included, as follows. Child demographics included age, gender, and race. Academic achievement was assessed in kindergarten (age 5-6) and fifth grade (age 10-11) with the Woodcock-Johnson Letter-Word Identification and Calculation subtests (Woodcock, 1989). Child behavior problems were assessed in kindergarten and fifth grade using the internalizing and externalizing scales of the Child Behavior Checklist- TRF ($\alpha = .97$ and $.85$, respectively; Achenbach, 1991), and peer acceptance was assessed in first grade with sociometric play ratings made on a 3-point scale. Family and neighborhood characteristics included ratings made by research assistants after completing the kindergarten and fifth grade home visit assessments, including harsh discipline, parental warmth, ‘child-friendly’ home (clean, safe, toys and books) and neighborhood safety (all described in more detail on the project website www.fasttrackproject.org). In addition, mothers reported on the family socioeconomic status, as well as their substance use and depressive symptoms (CES-D). Family support for education was indexed by maternal education level, child preschool attendance, and teacher-rated parent involvement at school. In total, there were 24 confounding variables that were measured in Kindergarten. Because some of the demographic variables did not change and many of the family variables other than SES and parent-teacher relationship were only assessed in Kindergarten, only 9 of the 24 confounding variables were reassessed in 5th grade. A complete list of the variables is shown in Table 1.

Study procedures

Measures were drawn from home interviews conducted during the summer following the child’s kindergarten (age 5-6), fifth grade (age 10-11), and twelfth grade (age 17-18). One research assistant interviewed the primary caregiver (usually the mother), and a second assistant interviewed the youth. In the spring of each academic year, classroom teachers received rating scales, which they completed and returned to the project offices. Parents, teachers, and youth were all compensated financially for their participation. All study procedures were reviewed and approved by the Institutional Review Boards of each of the participating universities.

Results

Preliminary analyses

Missing data were imputed using SAS Proc MI (SAS/STAT software, Version 9.2 of the SAS System for Windows, 2002). Of the 891 aggressive-disruptive students followed in this study, 304 (34%) experienced REPs. Of these, 117 (13%) entered REPs in elementary school, with most of them remaining in REPs through secondary school ($N = 85$). Another 187 (22%) children first entered REPs in secondary school (middle or high school).

ANOVAs and Tukey post-hoc tests compared the kindergarten and fifth grade characteristics of students who entered REPs in elementary school and remained through secondary school, students who first entered REPs in secondary school, and students who remained in mainstream classrooms. Only a few students ($N = 32$) experienced REPs in elementary school but not in secondary school, so they were not included in these ANOVAs. Relative to students who remained in mainstream classrooms, students who experienced any REPs had higher levels of risk in all domains (see Table 1). These included the child risks that were the putative cause of restrictive placement (e.g., conduct problems and cognitive impairment), along with demographic risks (male, African American) and family risks (low-SES, living in unsafe neighborhoods, poor-quality home environments, high maternal depression, and low parental warmth). Children first placed in secondary versus elementary school had equivalent levels of conduct problems, but those placed earlier had higher levels of cognitive impairment, poorer peer relations, and more family risks (lower SES, higher maternal depression, lower-quality home environments, and harsher discipline.) Surprisingly, students placed in secondary school did not differ from the mainstream group in fifth grade on measures of academic achievement, suggesting that their conduct problems were the primary reason for REP.

Model testing with propensity scoring

Next, propensity scores were used to create groups that were equivalent on the set of confounding factors associated with REP. The method involves calculating the inverse propensity of placement weights (IPW; Hirano & Imbens, 2001; Robins, Hernan, & Brumback, 2000) which are used to weight and balance the sample, as follows:

$$IPW_{ti} = P(A|a_{(t-1)}, S_i) / (P(A|a_{(t-1)}, S_i, X_i))$$

Where:

IPW_{ti} = inverse propensity for placement weight for a given time point for a given individual

A = 1 if in a REP, 0 if in the mainstream group

$a_{(t-1)}$ = treatment history [vector]

S_i = moderators, if any [vector]

X_i = confounders [vector]

Propensity models for elementary REPs used the 24 confounders measured in kindergarten; models for secondary REPs included the 9 additional confounders measured in 5th grade, prior to secondary school entry. In order to ensure that no individual had an overly large influence on outcomes, a combined weight greater than 4 was set to 4 (i.e., no student ‘counted’ more than four times the average student).

When the weights derived from these propensity score models were applied to evaluate the balance achieved across the groups, 13 of the 33 confounders had a standardized mean difference greater than .25, indicating sample non-equivalence. Histograms revealed an overrepresentation of students in the mainstream condition with a very low probability of being in an elementary REP, and an overrepresentation of students in REPs with a very high probability of being in a secondary REP. To address these very large differences between the groups, students with less than a 3% probability of an elementary REP (316 students) and students with greater than a 90% probability of a secondary REP (17 students) were excluded from further analyses, leaving an N of 558. With this reduced sample, the weighted means for all confounders differed by less than .25 of a standard deviation, thus achieving equivalence between the groups receiving REPs in elementary or secondary school and the group remaining in mainstream classrooms.

Testing the main effects of restricted placement—Marginal Structural Models (MSM; Robins, Hernan, & Brumback, 2000) were used to test differences in the outcomes of students educated in REPs vs. mainstream settings, using the weights calculated by the propensity scores to reduce selection bias and statistically mimic a randomized experiment. Within the MSM framework, weighted Poisson regressions were used to model the symptom counts for adolescent conduct disorder and depression, and weighted logistic regression was used to model high school non-completion. All three models were estimated using the survey package in R (Version 2.12.1, The R Foundation for Statistical Computing, 2010), which provides standard errors appropriate for weighting.

An iatrogenic effect emerged for REPs during secondary school for conduct disorder symptoms, $\beta_2 = .36$, $p < .05$ and high school non-completion, $\beta_2 = .54$, $p < .05$ (see Table 2). No effects emerged on depressive symptoms. Elementary school REPs had no significant effects, nor did they interact with secondary REPs, suggesting no additional impact of a sustained placement across both elementary and secondary school REPs beyond the negative effects of the secondary placement. Adolescent conduct disorder symptoms averaged .68 for students in mainstream placement versus .96 for students in secondary REPs (relative risk = 1.41). The likelihood of high school non-completion was 48% for mainstreamed students versus 62% for students in secondary REPs (relative risk = 1.29).

For all models, the standard error was significantly larger for elementary placement than secondary placement, probably indicating a more variable impact of elementary REPs on child outcomes. As a result, although the magnitude of the effect of elementary placement on conduct disordered symptoms ($\beta = -.44$) was larger than the effect for secondary placement ($\beta = .36$), the former effect was not statistically significant. An additional set of models was estimated excluding the subjects with elementary-only placement, comparing the impact of ‘sustained placement’ (elementary plus secondary) with secondary-only or no

placement. The standard errors remained large, suggesting that the ‘true’ effect of elementary restrictive placement is highly variable rather than the large standard error being due to having a small sample of elementary-only students.

Testing the moderators—To determine whether the severity of child difficulties at school entry moderated the impact of REPs on adolescent outcomes, additional MSM models were run, adding kindergarten cognitive impairment and conduct-problem behavior as moderators. As shown in Table 3, students with less cognitive impairment were more negatively affected by secondary REPs on all three outcomes, conduct disorder symptoms, $\beta_6 = .63, p < .01$, high school non-completion, $\beta_6 = .75, p < .05$, and depressive symptoms, $\beta_6 = .67, p < .05$. In contrast, the severity of conduct-problem behavior at school entry did not moderate the impact of REP on any outcome. The moderating impact of cognitive impairment is shown in Figures 1-3. For students who experienced REPs in secondary school, less cognitive impairment was associated with significant elevations in high school non-completion, conduct disorder, and depressive symptoms.

Discussion

As expected, the likelihood that conduct problem students will select into an REP is far from random. Relative to their mainstreamed counterparts, students placed in REPs exhibited more conduct problems and cognitive impairment at school entry. Relative to students placed in elementary school, those placed in secondary school had equivalent levels of conduct problems but higher cognitive functioning. Of note, by fifth grade, students who entered secondary REP had academic achievement scores equivalent to the mainstream group, suggesting that their conduct problems were the primary reason for secondary REP. Without appropriate statistical controls, these selection biases confound attempts to understand the impact of REPs on student outcomes.

This study used a propensity scoring methodology to statistically match students across groups, creating conditions equivalent to a randomized experiment. In these models, conduct problem students in elementary REPs and mainstream placement experienced similar levels of high school completion, adolescent conduct problems, and adolescent depression, although the large standard errors suggest considerable variability in REP impact across individual students. In contrast, secondary REPs were iatrogenic, associated with higher rates of high school non-completion and conduct disorder symptoms relative to mainstream placements. The iatrogenic effects of secondary REPs were amplified for students who entered school with higher levels of cognitive functioning. For example, for students with normative levels of IQ and attention skills, secondary REP was associated with an increase in 1.40 conduct disorder symptoms, 1.10 depressive symptoms, and an increase in the rate of high school non-completion of 35% (73% in a restricted placement versus 38% in a mainstream placement). In contrast, for students with academic aptitudes one standard deviation below the sample average (e.g., IQ of 80, and TRF Attention problems T-score of 72), there was no harm associated with secondary REP.

Conceptually, REPs should provide more individualized instruction and higher levels of positive behavior support than mainstream classrooms, which could be particularly useful to

students with more cognitive impairment. This may explain why youth who were placed in elementary REPs (who, on average, had greater cognitive impairment than youth placed in secondary school) suffered no harm. Unfortunately, the present findings suggest many conduct problem students first enter REPs in secondary school because of their disruptive behavior (and not cognitive impairment); many of these students were harmed behaviorally and educationally by these placements. Consistent with the present findings, the National Longitudinal Transition Study found that lower performing students had higher grades and lower rates of dropout in REPs, whereas students identified for REPs primarily for behavioral reasons had worse grades, poorer attendance and lower graduation rates than their learning-disabled peers (Wagner & Cameto, 2004).

It is not clear why so many youth with conduct problems were placed in REPs in secondary school when they were served effectively in mainstreamed classrooms during elementary school. Perhaps the reduced levels of adult supervision and structure in secondary schools led to a decrease in their classroom functioning or perhaps, by early adolescence, these students had started displaying more serious antisocial behaviors, including truancy and substance use, that mainstream teachers felt unable or unwilling to manage (Dodge et al., 2008). With higher concentrations of aggressive peers than mainstream placements, REPs may exacerbate behavior problems and school disengagement via peer contagion, including peer norms, modeling, and selective reinforcement that supports aggressive and disruptive school behavior (Farmer et al., 2007). In addition, removal from a mainstream classroom in secondary school, particularly for a student who is intellectually capable of success, may convey a message of rejection by the school, leading to decreased academic motivation, stigmatization by and disaffiliation with mainstream peers, and fueling elevated rates of depressed mood and school drop-out (Lane, Wehby, Little, & Cooley, 2005).

Consistent with prior research, students placed in REPs were more likely to be male, African American, and poor -- growing up under conditions of adversity (unsafe neighborhoods, depressed parents, poor-quality home contexts, harsh punishment). At the time that these data were collected, most educators believed that a 'curriculum of control' was necessary in order to educate these youth, making it likely that many experienced punitive or coercive approaches to behavioral management and limited student choice, particularly in secondary school placements (Brendtro & Brokenleg, 1993; Sutherland et al., 2008). There is a shortage of qualified personnel serving emotionally and behaviorally disturbed youth in special education (U.S. Department of Education, 2008), and critics of REPs have pointed out that teachers in these settings are frequently inadequately trained, poorly supported, and highly stressed (Peetsma et al., 2001).

It is worth noting that students with early conduct problems present unique challenges for schools because their problems affect not only their own school progress and outcomes, but also that of other students. Although this study found no benefits for most of the students who received REPs and some harmful effects, an open question is whether other students benefitted from their mainstream exclusion. In a review of the literature on the impact of inclusion, Rujis and colleagues (2009) found evidence of neutral to positive effects on non-special needs peers when special education students were mainstreamed; however, this

review did not isolate the effects of inclusion for students with early conduct problems. Clearly, this is a question that requires future research.

Implications for policy and practice

The findings have three important implications for policy and practice. First, when students with early conduct problems do not have significant cognitive impairments, placement in REPs in secondary school is contra-indicated. Tiered evidence-based strategies should be employed to improve the school system's capacity to support these students in mainstreamed placements using more intensive behavioral supports, rather than punitive or exclusionary management strategies (Evans, Harden, & Thomas, 2004; Farmer et al., 2007). A recent review identified 12 three-tiered behavioral intervention models with research support, suggesting that there are a number of evidence-based options for schools to choose from, including the widely-diffused School-wide Positive Behavioral Support model (Stewart, Benner, Martella, & Marchand-Martella., 2007). Second, efforts should be made to support the implementation of evidence-based practices shown to improve the outcomes of children placed in REPs, as well as to avoid practices that are known to be ineffective (Simpson, Peterson, & Smith, 2011; Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008). Effective practices including the use of a positive behavior management plan, a low ratio of students to teacher, high-quality academic instruction, and multiple opportunities to respond are associated with fewer management difficulties and improved student outcomes (R. L. Simpson et al., 2011; Sutherland et al, 2008). Third, comprehensive efforts with families as well as teachers to intervene early to prevent behavior problems from escalating to the point of requiring REPs should be evaluated (Dodge et al., 2008).

Limitations

By using propensity scores to create groups that were balanced on a large number of confounders, selection biases were reduced by 73-90%, creating a weighted quasi-experimental comparison group that approximated a randomized controlled trial. However, to create optimal balance in risk factors across groups, it was necessary to drop high-risk children who had no comparable counterparts in the mainstream setting (23% of the sustained placement sample), and similarly to drop low-risk children with no comparable counterparts in the REP sample (47% of the mainstream sample). Even with extensive covariates, including these non-overlapping groups would have biased group comparisons. At the same time, dropping these youth is a conservative approach that potentially underestimates effect sizes because of the restricted range, and may limit the generalizability of the findings. To assess the impact of this method on the results, two additional sets of analyses were conducted. First, propensity models were run including the full sample, and second, traditional (non-propensity scoring) logistic and Poisson models with covariates were calculated. In both cases, the pattern of findings was the same as the propensity score methods, but effect sizes were larger and some additional terms were significant. Given the multiple confounders associated with REPs, the propensity score method is likely the most accurate.

It is also important to note that half of the children studied here participated in the Fast Track prevention program. The intervention did not affect REPs or school outcomes (Bierman et

al. 2013), but it did reduce antisocial activity and arrests in late adolescence and early adulthood (CPPRG, 2015). Intervention status was included as a variable in the propensity models in the present analyses.

Finally, this study used a U.S. sample. US and UK special education policies are similar in a preference for least restrictive placement, using restrictive placements only when deemed necessary (Lindsay, 2007). The prevalence of students identified for learning support is also similar, though in the UK emotional and behavioral problems are more often identified as student special learning needs (Department for Education, 2014; Snyder, Tan, & Hoffman, 2006). However, it is important to note that there is considerable heterogeneity within the special education system both within as well as between countries, which may limit the generalizability of these findings to specific programs within either the US or UK.

Conclusion

REPs are often used to educate students with conduct problems. These programs do not improve the adolescent outcomes of students with early-starting conduct problems; indeed, for students placed in secondary school, REPs appear to produce harm. Those most affected are the nation's most vulnerable students, significantly disadvantaged by high levels of poverty and early adversity. The fact that these expensive special education services are linked with increases in antisocial behavior and high school drop-out is a sobering call to action. Concerted efforts are needed to improve school-based interventions for this challenging student population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key points

- Students with early-starting conduct problems are often educated in restrictive settings
- A small and flawed research base suggests these placements may have neutral or negative effects
- Using causal modeling with propensity scores to adjust for confounding factors provides a more accurate assessment of the impact of restrictive placements on student outcomes
- In this study of 861 students with early-starting conduct problems, causal modeling with propensity scores revealed iatrogenic effects for restrictive educational placements in secondary school (but not in elementary school); they increased the risk of high-school non-completion and the severity of adolescent conduct disorder.
- Negative effects were greatest for students with less cognitive impairment.
- For the benefit of the students and society, schools must find alternatives to restrictive placements for aggressive students in secondary school.

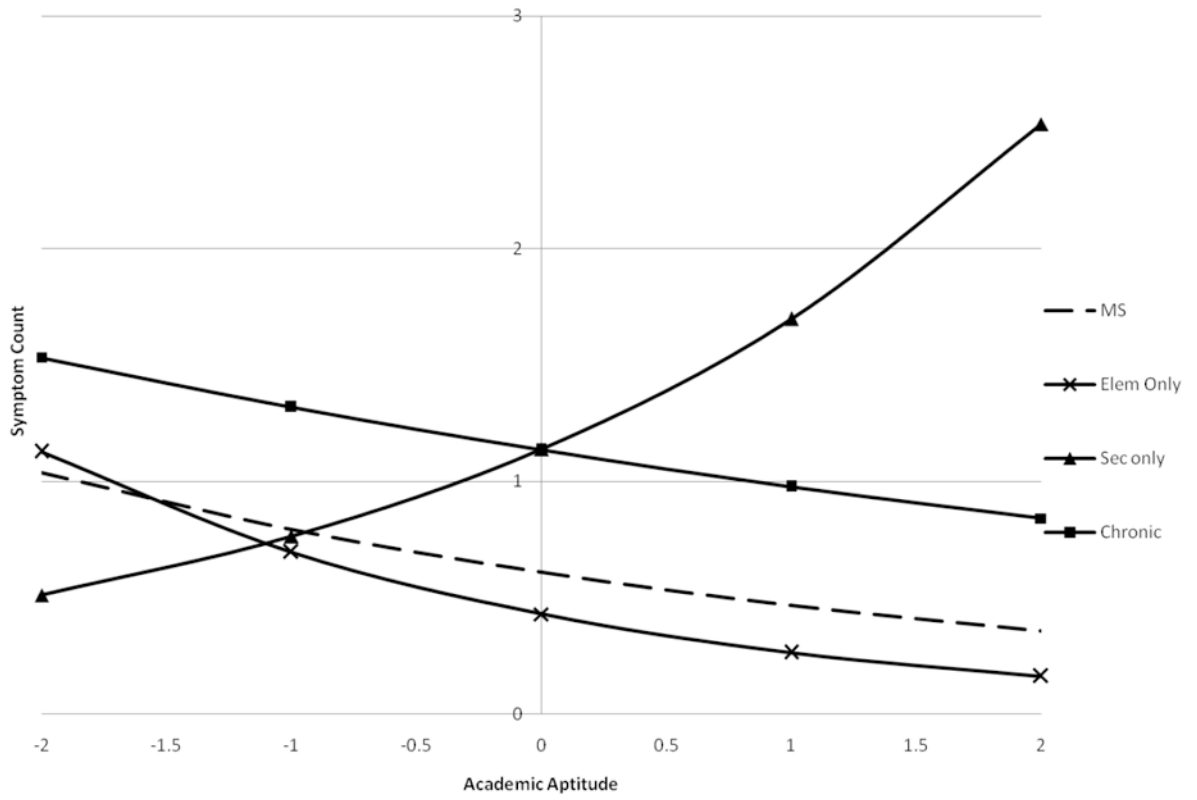


Figure 1. Major Depressive Symptoms

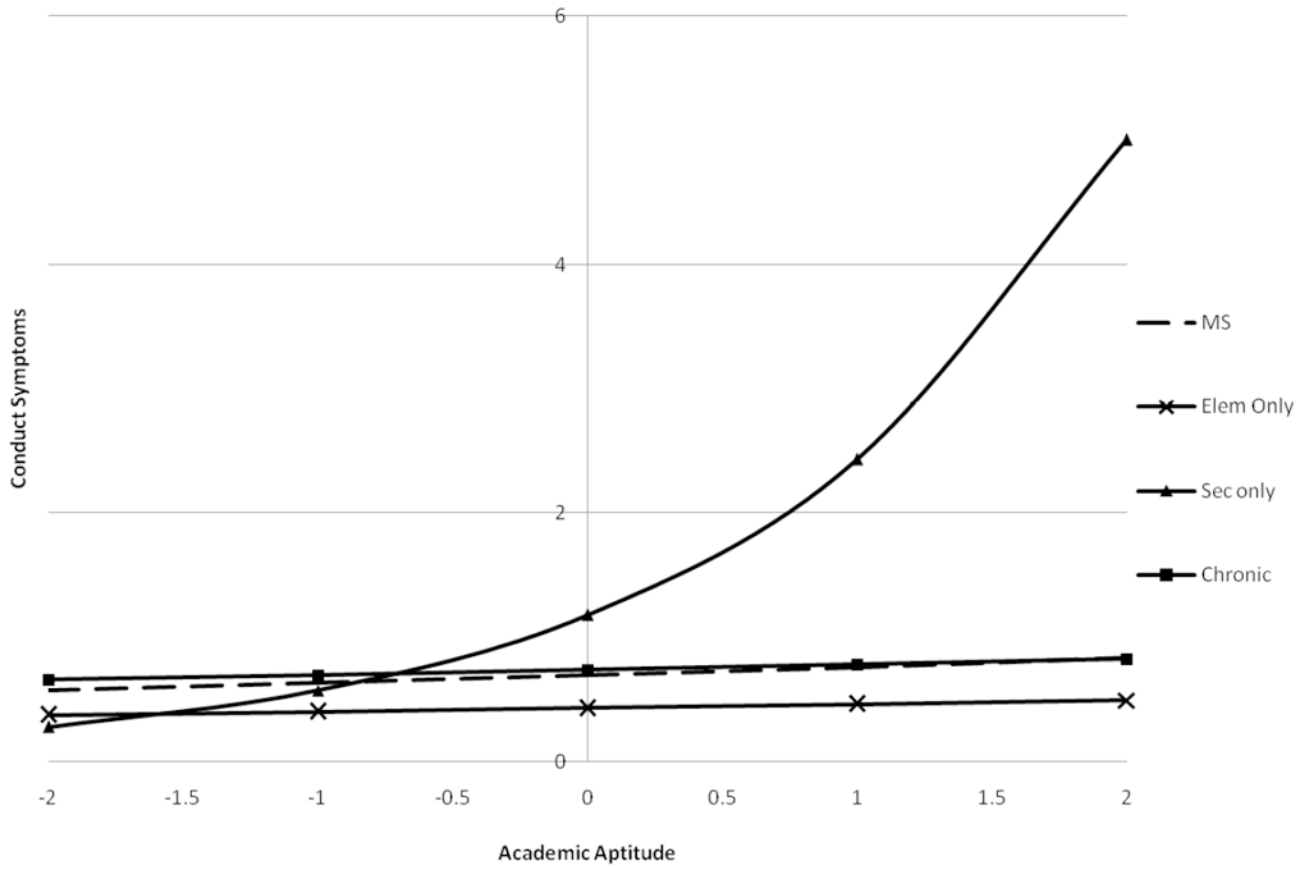


Figure 2. Conduct Symptoms

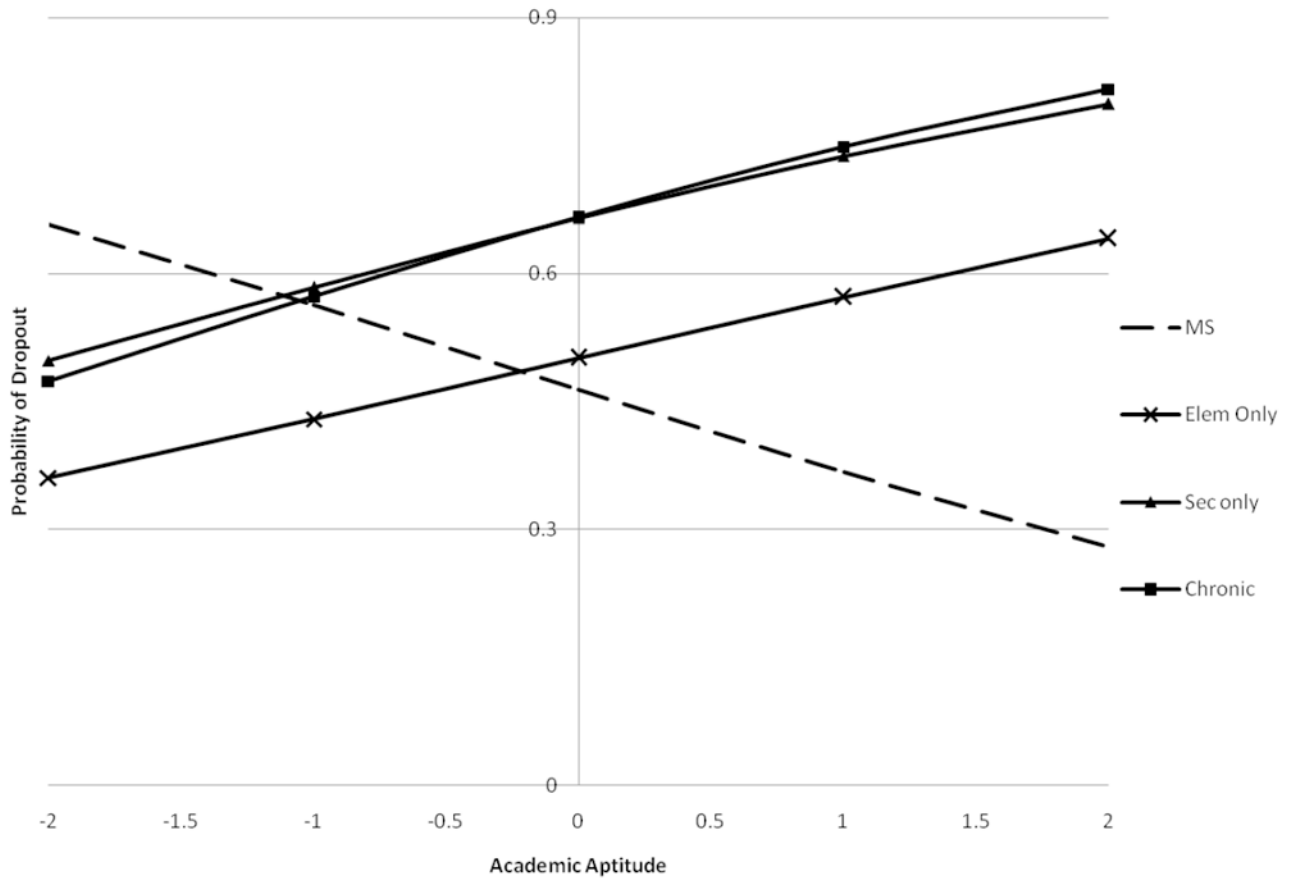


Figure 3. High School Dropout

Table 1

Descriptive statistics: child characteristics and family/neighborhood context

	Kindergarten Measures			5 th Grade Measures		
	Elementary Entry	Secondary Entry	Mainstream	Elementary Entry	Secondary Entry	Mainstream
Female	15% ^a	24% ^a	35% ^b	--	--	--
African American	74% ^a	66% ^a	42% ^b	--	--	--
TOCA-R Aggression	2.45 (1.11) ^a	2.30 (.93) ^a	2.15 (.93) ^b	1.86 (.99) ^a	1.82 (.94) ^a	1.42 (.90) ^b
TRF-Externalizing	69.77 (11) ^a	67.7 (10) ^a	65.14 (10) ^b	66.23 (11) ^a	65.37 (10) ^a	60.27 (10) ^b
IQ	75.34 (16) ^a	83.05 (15) ^b	91.73 (17) ^c	--	--	--
TRF-Inattention	66.28 (8) ^a	63.27 (9) ^b	59.98 (9) ^c	60.34 (8) ^a	61.92 (8) ^a	58.61 (8) ^b
W-J Calculation	-0.51 (.69) ^a	-0.23 (.90) ^b	.09 (1.03) ^c	-1.15 (1.0) ^a	-0.49 (1.0) ^b	-0.46 (1.6) ^b
W-J Letter-word	-0.77 (.75) ^a	-0.3 (.87) ^b	.11 (1.00) ^c	-1.35 (1.0) ^a	-0.5 (1.0) ^b	-0.36 (1.5) ^{bc}
W-J Passage Comp.	--	--	--	-1.33 (1.1) ^a	-0.54 (1.0) ^b	-0.38 (1.5) ^b
TRF-Internalizing	58.42 (10) ^a	57.24 (11) ^{ab}	55.22 (10) ^b	57.74 (11) ^a	57.66 (10) ^a	53.46 (10) ^b
Peer Relations	-0.94 (.98) ^a	-0.68 (.95) ^b	-0.46 (.95) ^c	--	--	--
Family SES	18.61 (10) ^a	22.64 (12) ^b	26.10 (13) ^c	25.48 (11) ^a	29.67 (11) ^b	31.13 (11) ^c
Maternal Depression	19.76 (11) ^a	15.93 (10) ^b	15.84 (10) ^b	--	--	--
Safe Neighborhood	27.91 (14) ^a	29.02 (12) ^a	33.54 (11) ^b	--	--	--
Home Quality	8.29 (2.32) ^a	9.08 (1.91) ^b	9.55 (1.73) ^c	--	--	--
Harsh discipline	0.41 (0.49) ^a	0.27 (0.44) ^b	0.24 (0.43) ^b	--	--	--
Parental Warmth	7.14 (1.53) ^a	7.33 (1.53) ^a	7.83 (1.36) ^b	--	--	--
Maternal Education	3.68 (0.8) ^a	3.81 (1.04) ^a	3.98 (1.08) ^b	--	--	--
Parent-school Inv.	1.37 (0.5) ^a	1.47 (0.6) ^{ab}	1.53 (0.57) ^b	1.34 (0.62)	1.4 (0.63)	1.4 (0.6)

Note: Standard deviations are in parentheses. Means with different superscripts within grade level are different at $p < .05$. TRF = Teacher Report Form; W-J = Woodcock Johnson

Table 2

Impact of restrictive educational placements

Predictor	Coefficients	(SE)
<u>Conduct Disorder Symptoms</u>		
Intercept	-0.38**	(0.11)
Restricted Placement, Elementary	-0.44	(0.50)
Restricted Placement, Secondary	0.36*	(0.16)
Restricted Placement, Elementary X Secondary	0.18	(0.57)
<u>High-school Non-completion</u>		
Intercept	-0.07	(0.13)
Restricted Placement, Elementary	-0.04	(0.51)
Restricted Placement, Secondary	0.54*	(0.22)
Restricted Placement, Elementary X Secondary	0.06	(.64)
<u>Depressive Symptoms</u>		
Intercept	-0.39**	(0.14)
Restricted Placement, Elementary	-0.29	(0.53)
Restricted Placement, Secondary	0.35	(0.22)
Restricted Placement, Elementary X Secondary	0.42	(0.62)

SE = standard error.

*
 $p < .05$.**
 $p < .01$.

Table 3

Moderation of restrictive placement impact by cognitive impairment and aggression

Predictor	Cognitive Impairment		Aggression	
	Coefficient	(SE)	Coefficient	(SE)
<u>Conduct Disordered Symptoms</u>				
Intercept	-0.36 **	(.11)	-0.65 **	(.27) **
Elementary Restricted Placement	-0.48	(.51)	-0.76	(.67)
Secondary Restricted Placement	0.53 **	(.17)	0.36	(.19)
Elementary X Secondary Placement	0.01	(.65)	0.36	(.77)
Kindergarten Moderator	0.09	(.13)	0.11	(.10)
Elementary Placement X Moderator	-0.02	(.64)	0.35	(.51)
Secondary Placement X Moderator	0.63 **	(.24)	0.02	(.16)
Elementary X Secondary X Moderator	-0.64	(.80)	-0.23	(.60)
<u>High-school Non-completion</u>				
Intercept	-0.15	(.13)	-0.39	(.35)
Elementary Restricted Placement	0.15	(.57)	0.08	(.64)
Secondary Restricted Placement	0.83 **	(.27)	0.48	(.26)
Elementary X Secondary Placement	-0.14	(.83)	-0.20	(.78)
Kindergarten Moderator	-0.40 *	(.20)	0.14	(.14)
Elementary Placement X Moderator	0.69	(.76)	-0.20	(.56)
Secondary Placement X Moderator	0.75 *	(.36)	0.19	(.25)
Elementary X Secondary X Moderator	-0.64	(.96)	0.37	(.73)
<u>Depressive Symptoms</u>				
Intercept	-0.50 **	(.15)	-0.03	(.37)
Elementary Restricted Placement	-0.35	(.65)	-0.68	(.71)
Secondary Restricted Placement	0.63 **	(.24)	-0.26	(.25)
Elementary X Secondary Placement	0.35	(.78)	0.88	(.78)
Kindergarten Moderator	-0.27	(.22)	-0.16	(.14)
Elementary Placement X Moderator	-0.22	(.71)	0.58	(.52)
Secondary Placement X Moderator	0.67 *	(.33)	0.20	(.23)
Elementary X Secondary X Moderator	-0.33	(.82)	-0.72	(.61)

Note: Separate models examined each moderator.

*
 $p < .05$.**
 $p < .01$.