The effects of placement and school stability on academic growth trajectories of students in foster care

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ABSTRACT

As a result of the Every Student Succeeds Act and its requirement that students in foster care be included in education report cards, states have a renewed sense of urgency surrounding accountability for the academic achievement of this vulnerable group of students. This study examined the effects of placement and school stability on students' academic growth before, during, and after out-of-home placements. The sample consisted of 7674 youth in 4th through 10th grades from one Mountain region state who were also in foster care at any point between 2008 and 2014. The findings from the current study underscore the importance of: (a) supporting "catch-up" growth when students initially enter the child welfare system; (b) considering the detrimental effects of co-occurring placement changes and school moves in case planning for students in foster care; (c) maintaining academic progress for those students who are meeting grade-level expectations; and, (d) implementing supports and services that extend beyond the duration of time that students are in foster care.

1. Introduction

Students in foster care often have large gaps in academic achievement across subject areas and grade levels and, as a result, may require multiple years of successful interventions to catch-up to grade-level standards (Barrat & Berliner, 2013; Clemens & Tis, 2016). While researchers acknowledge that the experience of being in foster care may disrupt learning, some researchers have also suggested that students often enter the foster care system already exhibiting low levels of academic proficiency. For example, a comparison of performance on state achievement tests indicated that the largest deficits in reading and math achievement are evident in the months immediately preceding removal from the home (Berger, Cancian, Han, Noyes, & Rios-Salas, 2015). It is true that experiences of maltreatment, high mobility, family instability, domestic violence, and poverty, which are prevalent for child welfare-involved youth, are associated with low achievement (Berger et al., 2015; Herbers et al., 2012; Romano, Babchishin, Marquis, & Fréchette, 2015). It is unclear, however, how academic growth year after year is affected when students enter into foster care.

In recent years, researchers and policymakers have demonstrated dramatically increased awareness of the gap in academic achievement for students in foster care. In 2015, the Every Student Succeeds Act (ESSA) introduced a new requirement that this population of students be included in education agency state report cards (Section 1111.h.1.C.ii;

Section 1111.h.1.C.iii.II). Inclusion in state report cards means that the educational outcomes of students in foster care must be disaggregated and visible in the same way as outcomes are tracked for other populations of students. Prior to ESSA, relatively few states tracked educational outcomes for students in foster care (Data Quality Campaign, 2017). As a result, the population of students in foster care was described as having an "invisible achievement gap" (Barrat and Berliner, 2013, p. 1). With the passage of ESSA, we can expect that in the coming years increased attention will be paid to the academic achievement of students in foster care with an eye toward closing this chasm.

The current study elucidates how academic growth is related to factors such as the timing of the first removal from the home and the length of time in the child welfare placement, issues contributing to school instability. The investigation is motivated by the need for child welfare and education agencies to collaborate on improving the educational stability of students in foster care in order to encourage their academic success. This research helps to identify key points in time during which public policies can deliberately support students in foster care to mitigate the adverse impact of mobility events on academic growth. The actionable variables of interest include school moves associated with a home placement change, duration of time in care, and age at first removal. The implications of this study are framed in terms of opportunities for child welfare and education agencies to improve the academic growth of students in foster care.

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1.1. Academic achievement, proficiency, and growth

Academic achievement is typically reported for groups of students based on their level of proficiency using descriptors such as *unsatisfactory, partially proficient, proficient,* and *advanced.* The distribution of proficiency levels provides insight into how far a subgroup is from meeting grade-level standards. For students in foster care, the distributions are positively skewed compared to their non-foster care peers, meaning that across subject areas and grade level, there are high percentages of foster care students scoring in the lowest proficiency categories and fewer students scoring in the highest proficiency categories (Barrat & Berliner, 2013; Clemens & Tis, 2016). This distributional pattern is particularly pronounced in math (Clemens & Tis, 2016).

Achievement gaps are typically defined as the difference between the percentage of students in a subgroup who score at or above grade level on end-of-grade assessments (i.e., meeting or exceeding proficiency standards) versus the scores of students in the state as a whole. According to statewide research studies comparing students in foster care and their non-foster care peers, there is at least a 20 percentage point gap between these groups in math, reading, and writing (Barrat & Berliner, 2013; Clemens & Tis, 2016). Similarly, the Washington State accountability data also showed 20+ percentage point gaps across many years, grade levels, and assessment categories (Office of Superintendent of Public Instruction, 2017). Washington State is the only state that includes academic achievement data in its state education report cards (Data Quality Campaign, 2017). The size of the gap may serve as a call to action, but does not necessarily inform educators and policymakers on how to approach the problem.

Students with particularly low levels of proficiency in a subject area may require multiple years of successful interventions to catch-up to grade-level standards. For this reason, one promising focal point in these efforts involves analyzing academic growth trajectories. Academic growth describes the amount of progress students make in a given subject area (e.g., math, reading, writing) in the span of a year. Academic growth scores can be considered a leading indicator of progress toward grade-level standards for populations of students who tend to score well below their peers on achievement tests. The current study will analyze and describe longitudinal academic growth trajectories for students in foster care, which can be used by child welfare and education agencies to set targets for interventions aimed at accelerating students' academic growth in reading, writing, and/or math.

2. Placement and school instability

The existing literature base regarding students in foster care tends to highlight the negative consequences of either placement instability or school instability (Fawley-King, Trask, Zhang, & Aarons, 2017). However, less is known about the combined effect of these changes on students' academic progress (Berger et al., 2015). Recently, researchers have begun to investigate the connection between placement changes and school moves (e.g., Clemens, Klopfenstein, Tis, & Lalonde, 2017). Some scholars have suggested that adjusting to new caregivers and home-based routines may stifle academic progress, even when students remain in their school of origin, due to the stress and disruption of the placement (Berger et al., 2015). Only once these combined effects are understood can effective solutions be further developed and clear expectations set for measuring progress.

Researchers have argued that placement instability is among the greatest threats to the well-being of child-welfare-involved youth (Moore, McDonald, & Cronbaugh-Auld, 2016; Waid, Kothari, Bank, & McBeath, 2016). The initial removal is a highly stressful and potentially traumatic event (Baugerud & Melinder, 2012) that may "disrupt children's emotional, relational, psychological, and cognitive development" (Conners-Burrow et al., 2013, p. 1830). Once part of the foster care system, studies have shown, anywhere from 22% to 70% of youth

experience a placement disruption each year (Blakey et al., 2012). Findings also suggest that lack of integration into the new out-of-home placement increases the likelihood of further placement disruption in the future (Leathers, 2006). The anticipation of a child welfare placement change, as well as uncertainty about the duration of a placement, can be constant sources of distress and fear for youth (Unrau, Chambers, Seita, & Putney, 2010). Researchers studying the effect of placement instability describe emotional consequences, which include feelings of rejection, lack of control, and insecurity (Hébert, Lanctôt, & Turcotte, 2016; Munford & Sanders, 2015).

Placement instability can sometimes translate into school instability. In one Mountain state, 31% of initial home removals resulted in a school move (Clemens, Klopfenstein, et al., 2017). When a subsequent placement change occurred, school moves occurred for 42% of transitions between family-like settings, and they occurred 50% of the time when the transition was from congregate care to a family-like setting (Clemens, Klopfenstein, et al., 2017). When a change in child welfare placement is associated with a school move, youth are faced with the difficult challenge of simultaneously adjusting to a new living situation and a new school.

Regardless of whether the school move is associated with a placement change, educational researchers acknowledge that students who move schools during an academic year may experience discontinuity of course content, variations in teachers' instructional styles, and differences in school culture, all of which may disrupt student learning (Cutuli et al., 2013; Herbers et al., 2012; Lash & Kirkpatrick, 1990; Mehana & Reynolds, 2004; Temple & Reynolds, 1999). Theorists suggest that each time a child experiences a school move, the school-based relationships that support learning may also be disrupted (Coleman, 1988). In a qualitative study, youth described the need for educational stability, a sentiment captured in a poignant statement by one participant:

> Stability is the biggest issue, because that's your main issue in life and that's the biggest [thing] that you desire. And school is like the most normal it gets for stability… (Clemens, Helm, Myers, Thomas, & Tis, 2017, p. 72)

Additional research is needed to determine how the interplay between child welfare placement changes and school moves relate to academic growth.

3. Child welfare placement type and length of time in care

The types of placement and length of time students are in out-of-home care are particularly relevant to academic growth trajectories. According to the U.S. Department of Health and Human Services (2016), appropriateness of placement involves consideration of both placement stability (i.e., "two or fewer placement settings in a single foster care episode") and types of placement settings (p. 27). Family-like settings, rather than congregate care settings with more than six children, are typically considered the most appropriate placements, especially for children age 12 or younger (U.S. Department of Health and Human Services, 2012; U.S. Department of Health and Human Services, 2016).

Like appropriateness of placement, shortening the time it takes to achieve permanency for children in out-of-home-care (e.g., reunification, living with other relatives, legal adoption, etc.) is supported by research and federal policy (U.S. Department of Health and Human Services, 2016). The national data demonstrate that length of time in care is associated with differing amounts of placement and school stability. According to a recent report to Congress regarding nationwide child welfare outcomes, in 2014 the majority of children (median = 85.4%) in out-of-home care for < 12 months had no more than two placements (Children's Bureau, 2017). However, only 66% of youth in care for 12–24 months and 35.3% in care for > 24 months experienced no more than two placements. These national statistics

display the dramatic reduction in placement stability as length of time in care increases. Given that states are not required to track placement stability for youth who are in care for less than six months, it is unknown how much placement instability occurs during short-term care. Researchers found that students in out-of-home placements for less than six months experienced fewer school moves per placement change than those in longer-term out-of-home placements (Clemens, Klopfenstein, et al., 2017).

4. Purpose of the study

This study describes reading, writing, and math academic growth trajectories by testing the predictive power of age at first removal, duration of time in care, and the annual numbers of placement changes unassociated with a school change, school changes unassociated with a placement change, and school changes associated with a placement change. The purpose of this study is to identify key points in time during which public policies can deliberately support students in foster care to mitigate the adverse impact of mobility events on academic growth. The actionable variables of interest include school changes associated with a placement change, duration of time in care, and age at first removal.

5. Method

5.1. Setting

The study was conducted in Colorado using state-level child welfare and education data. Facilitating data collection, each county uses the same child welfare data system and the state human service agency has direct access to data entered at the county level. In this county-administered child welfare state, there are a total of 178 school districts that utilize a variety of information management systems. Each school district reports core information about each student to the state education agency. Using this combined state-level data allowed the research team to track child welfare placement changes, school moves, and academic achievement measures for students who moved across county and school district boundaries.

The state human service agency and education agency have a data sharing agreement such that annually, state human service agency data are used to create a flag in the education data set indicating a child was in out-of-home care between July 1 and June 30th of that year. In addition to creating a flag in the education agency data set, the human services agency provides a standard set of additional information (e.g., placement dates, placement types, reasons for placement changes) for research purposes. In this study, the match rate for these records was approximately 93%, meaning that approximately 7% of the human services records for school age children do not have a match in the education dataset. If a student is attending a private school or is not enrolled in school that year (i.e., has dropped out), then they may show unmatched records. It is also possible that some of these unmatched records are attributable to errors in data entry.

5.2. Sample

The sample (n ~21,000 observations on ~7600 students depending on the subject area) in the current study consisted of a statewide sample of students who were first removed from the home between July 1, 2007, and June 30, 2014, were enrolled in grades 4–10 in a public school at any point in the same window, and had valid reading, writing, or math growth scores on one or more end of year assessments (excluding alternative assessments). This sample was inclusive of all grade levels for which end of year academic growth data were available, requiring students to be tested in consecutive years. During the time period examined, mandatory testing occurred in grades 3–10, so growth data are available for grades 4–10. Colorado implemented the

Table 1
Student-level descriptive statistics for time-invariant characteristics.

During first removal from home	Mean	SD
Age at first removal	12.66	3.49
N of placements during first removal[a]	2.03	2.09
N of school changes during first removal[a]	0.82	1.19
N of school changes associated with placements during first removal[a]	0.38	0.49
Length of first removal episode in months[a]	9.79	12.69
Total length of time in care in months	11.99	13.70
Categorical variables 2008–2015		
Experienced more than one removal episode	21.03	
Family-like settings only (relative and non-relative foster homes)	51.03	
One or more congregate care placements (group home or institution)	48.07	
English language learner services eligible ever between 2008 and 2015	10.66	
Special education services eligible ever between 2008 and 2015	40.41	
Female	47.83	
Underrepresented racial minority (not White or Asian)	52.10	
N	7674	

Note. Sample includes all students appearing in any of the reading, writing, and/or math samples.
[a] Sample size for all variables related to first removal is 7499 due to missing detailed data on first removal episode for 175 youth.

Partnership for Assessment of Readiness for College and Careers (PARCC) assessment starting in Spring 2015. The PARCC tests are sufficiently different from prior assessment instruments that growth scores from 2014 to 15 were not calculated. Hence, analysis stops in 2014.

Decisions regarding describing the demographic characteristics of the sample were based upon how local education agencies reported the data to the state education agency. Some cases had discrepancies across school records, and those were resolved by first identifying the most frequently reported characteristic; if multiple modes were identified, the most recently reported mode was used. Table 1 presents time-invariant, student-level descriptive statistics for the sample.

The first portion of Table 1 is a snapshot in time during the year of first removal and is not representative of all youth in foster care (i.e., age 0–21) because students in the sample are limited to grades 4–10 (i.e., when growth data based on standardized testing are available). In this sample, the mean and standard deviation of age at first removal suggests that the majority of these students were first removed from the home as school-aged children. There was substantial variation in the length of time students were in out-of-home care. On average, students in this sample experienced more placement instability than school instability.

The second portion of Table 1 displays the categorical child welfare and education variables, which may inform alignment of public policies and implementation of targeted support. The finding that nearly half of students experienced one or more out-of-home placement in a congregate care setting suggests that efforts to improve academic growth of students during out-of-home placements need to consider all types of out-of-home settings, not just family-like foster homes. Alignment to special education policy, such as transition planning, and procedures is also relevant, given that 40% of the sample was eligible for special education services.

5.3. Measures

5.3.1. Academic growth outcomes

Academic growth is the subject-specific comparison of a student's achievement test score compared to the previous year test score. Growth scores were calculated by the state education agency using a quantile regression model.

The student growth percentile tells us how a student's current test

score compares with that of other similar students (students across the state whose previous test scores are similar). This process can be understood as a comparison to members of a student's academic peer group. So, Colorado's measure of growth is a normative rather than an absolute one. (Colorado Department of Education, 2016, para. 3).

By definition, the median growth percentile among students in every grade across the state is 50. In other words, policymakers consider a student with a growth score of 50 to be making exactly one year of growth in one year's time. Students with growth scores < 50 are considered to be falling behind (or failing to maintain earlier gains) while students with growth scores > 50 are considered to be catching up (or building on earlier gains). The model was estimated separately for math, reading, and writing using subject-specific student-level growth percentiles in time t.

5.3.2. Stability measures

5.3.2.1. Child welfare placements.
Placement counts were defined as an initial child welfare placement or subsequent child welfare placements that are counted as a *change* in placement under AFCAR rules. Placement counts were inclusive of family-like, congregate care, or other settings.

5.3.2.2. School moves.
School moves were counted if students entered a

date of the new placement. *Note*: For a new placement that begins during the first week of December, school move is considered to be associated with the placement if school entry date occurs between 3 days prior to the placement start date and January 10. (Clemens, Klopfenstein, et al., 2017, p. 212).

In the summer months, different business rules were used to identify when a child welfare placement change likely triggered a school move:

Initial or new placements beginning in the summer (May 1–August 9): school move is considered to be associated with the placement if school entry date occurs between 3 days prior to the start date of the new placement and August 31. (Clemens, Klopfenstein, et al., 2017, p. 212).

5.4. The regression model

The predictive power of child welfare placement changes and school moves on student growth for math, reading and writing was modeled as follows:

$$G_{ist} = \beta_0 + \beta_1 X_i + \beta_2 W_{it} + \beta_3 A_{is(t-1)} + \beta_4 F_{it} + \beta_5 H_{it} + \beta_6 N_{it} + \beta_7 P_{it} + \beta_8 M_{it} + \beta_9 R_{it} + \varepsilon_{ist}$$

where

G_{ist} = growth percentile in subject s (reading, writing or math) in year t

X_i = vector of female, underserved minority, ever English Language Learner, ever special education, age at first removal

W_{it} = grade in school

$A_{is(t-1)}$ = 1 if tested proficient or advanced in subject s in year t-1

F_{it} = 1 if first removal from home started in t (May 1-April 30)

H_{it} = 1 if second+ removal from home started in t (May 1-April 30)

N_{it} = number of months in out of home care in year t (May 1-April 30)

P_{it} = number of child welfare placements without an associated school move in year t

M_{it} = number of school moves without an associated child welfare placement in year t

R_{it} = number of school moves and child welfare placements occurring together (associated) in year t

Colorado public school outside of the typical academic progression as defined by Colorado Department of Education (2017). The total number of school moves referred to all such non-normative school moves occurring during the sample window regardless of whether students were removed from the home at the time. The count was inclusive of public schools (including on-line and charter schools), but did not include transitions into private schools or facility schools. An entry into a public school from a private school was counted. The count included school entries for students in kindergarten through 12th grade.

5.3.2.3. School moves associated with child welfare placements.
The operational definition for identifying school moves that are associated with child welfare placements was based on prior work by Clemens and colleagues. School moves were considered to be associated with a child welfare placement change during the academic year according to the following description:

Initial or new placements beginning during the academic year (August 10–April 30, excluding the first week of December): school move is considered to be associated with the placement if school entry dates occurs between 3 days prior to and 21 days after the start

and t ran from 7/1-6/30 each year unless otherwise indicated.

The variables of primary interest were: P_{it}, the number of child welfare placements in year t without an associated school change; M_{it}, the number of school changes without an associated child welfare placement in year t; and R_{it}, the number of school moves and child welfare placements that occur together in year t. It was hypothesized that average student growth in reading, math, and writing would all be negatively impacted by both child welfare placements and school moves, while holding other variables in the model constant ($\beta_7 < 0$ and $\beta_8 < 0$). It was expected that students experiencing child welfare placement and school changes simultaneously would experience additional adverse effects ($\beta_9 < 0$).

Model coefficients were estimated while controlling for a removal episode starting during the testing year with impacts allowed to differ for first removal (F_{it}) and subsequent removals (H_{it}). Both were expected to be negative ($\beta_4 < 0$ and $\beta_5 < 0$). The number of months a student was out of the home from May–April in year t was also controlled for with N_{it}. β_6 was expected to be positive because longer spells out-of-home while holding the number of placement changes constant reflected greater stability.

A time-varying student-level variable $A_{is(t-1)}$ was included as an

Table 2
Descriptive statistics for all observations in regression sample.

Variable name	Mean	SD
Growth percentile in *t*, Reading	43.39	29.93
Growth percentile in *t*, Writing	43.31	29.74
Growth percentile in *t*, Math	42.86	29.63
Proficient or advanced in *t*-1, Reading	46.06	
Proficient or advanced in *t*-1, Writing	30.48	
Proficient or advanced in *t*-1, Math	32.97	
Removed for first time in May–April before testing	13.35	
Removed for second + time in May–April before testing	2.68	
Months in out-of-home care in May–April before testing	1.37	3.18
Grade in school when tested	6.99	1.93

Note. Mean and standard deviation (for continuous variable) based on the Math sample, N = 21,063. Reading and writing achievement variables are based on slightly smaller samples: 20,884 and 20,929 respectively. These descriptive statistics reflect one observation for each year a student was enrolled in Colorado public schools and had a valid growth score in reading, writing, or math. Thus, the sample contains multiple observations for the same students, but not necessarily the same number of observations for each student.

indicator for whether a student scored proficient or advanced (relative to partially proficient/unsatisfactory) on the prior year assessment in the same subject. If foster students on a strong academic path continue to do well, on average, it can be expected that $\beta_3 > 0$. However, if supports decline once students reach the proficiency threshold, then it would likely be $\beta_3 < 0$. Regression to the mean would also result in $\beta_3 < 0$. On net, the expected sign of β_3 was ambiguous.

X_i was included as a vector of theoretically important time-invariant variables for student *i*, including: age at first removal from the home; ever identified as eligible for English language learner services; ever identified as eligible for special education services; female; and, traditionally underserved racial minority (not White or Asian). Students who have ever been identified as English language learners or as eligible for special education services typically struggle on standardized assessments. Female students tend to perform better on standardized achievement tests than males in reading and writing, and recently the gender gap has closed in math (Institute of Education Sciences, 2017). Students from underrepresented racial minority groups tend not to perform as well across all subjects (Institute of Education Sciences, 2017). Age at first removal was also included in this vector because there was not sufficient foster care literature to anticipate if initial removal from the home would have a greater disruption in academic growth for younger or older students.

A linear grade-level variable was included to account for differences

in the relative difficulty of tested subject matter, as well as a academic year trend to account for variation in test items over time. Students appeared multiple times in the sample, so standard errors were clustered at the student level.

6. Results

The results of this study describe the academic growth trajectories of students who experienced foster care between 2008 and 2014. The findings are not limited to the time spent in out-of-home care, but instead provide insight into patterns in academic growth before, during, and after foster care. Many students are removed from the home prior to having completed the two consecutive years of testing necessary to generate a growth percentile, so the entire sampling time frame must be considered to examine these variables. The proficiency and growth statistics and regression model for the full sample are presented. In these statistics some, but not all students have available academic data before, during, and after out-of-home care. Then, descriptive statistics for the subsample of foster students with valid academic growth data for at least one year before, during, and after a single removal episode between 2008 and 2014 are reported.

6.1. Proficiency and growth descriptive results

Students' growth scores indicate how students' achievement test scores in a given year compare to students who scored similarly in the prior year (Colorado Department of Education, 2016). Table 2 shows that 30–42% of students in a given year were proficient or advanced in reading, writing, or math in the previous year and that student growth percentiles in all subjects hovered around the 43rd percentile. Although the 43rd percentile is within the range of "typical growth" as defined by CDE, it is below the 50th percentile that indicates making exactly one full year's progress in a year's time (Colorado Department of Education, 2016, para. 9). Thus, on average, child-welfare-involved youth started each school year below grade level and then continued to fall further behind year-over-year.

6.2. Regression model results

Three separate regression models were used to estimate academic growth in reading, writing, and math (see Table 3). Across all three models, and as expected, placement changes and school moves had a statistically significant negative relationship with student academic growth, which was exacerbated when child welfare placement and school instability occurred together. One child welfare placement

Table 3
Predictions of academic growth based on placement changes and school moves.

Variable name	Reading	Writing	Math
Proficient or advanced in *t*-1, same subject	−4.58*** (0.43)	−4.26*** (0.45)	−3.46*** (0.45)
Removed for first time in May–April before testing	1.54** (0.78)	0.41 (0.78)	0.43 (0.75)
Removed for second + time in May–April before testing	0.05 (1.37)	0.24 (1.35)	1.15 (1.35)
Months in out-of-home care May–April before testing	0.57*** (0.08)	0.58*** (0.08)	0.73*** (0.08)
N of placement changes in year *t*	−2.52*** (0.48)	−2.01*** (0.48)	−2.36*** (0.45)
N of school moves without an associated placement change in year *t*	−1.94*** (0.24)	−1.68*** (0.24)	−2.47*** (0.24)
N of school moves occurring with a placement in year *t*	−1.18* (0.65)	−0.91 (0.68)	−1.81*** (0.66)
Age at first removal	−0.68*** (0.10)	−0.64*** (0.10)	−0.80*** (0.10)
English language learner services eligible ever between 2008 and 2015	0.75 (0.68)	0.58 (0.67)	0.19 (0.66)
Special education services eligible ever between 2008 and 2015	−3.18*** (0.45)	−3.53*** (0.43)	−2.76*** (0.43)
Female	3.28*** (0.42)	3.64*** (0.41)	1.34*** (0.41)
Underrepresented racial minority (not White or Asian)	−1.22*** (0.44)	−0.76* (0.43)	−0.93** (0.42)
N of observations	20,884	20,929	21,063
N of students	7581	7590	7607

Note. All models include the grade level tested and a time trend. Coefficients with standard errors robust to clustering at the student level are displayed.

* p < 0.10.
** p < 0.05.
*** p < 0.01.

change, holding school moves constant, was associated with a 2.52 percentile point reduction in academic growth in reading. Each move that occurred separately from a child welfare placement was associated with a 1.94 percentile point reduction in growth. When a student experienced a single child welfare placement change accompanied by an associated school move, the adverse impact on reading academic growth was $-2.52 + -1.18$, totaling -3.7 percentile points or an effect size (ES) of approximately 0.12 A single child welfare placement change coupled with a school move took the average foster student from the 43rd growth percentile in reading to the 39th percentile. The magnitude of the relationship was slightly smaller for writing (ES = 0.10) and similar for math (ES = 0.12). These findings are substantive in the context of education research, where effect sizes of these magnitudes are considered medium (Lipsey et al., 2012; Sink, 2006).

The child welfare placement and school stability coefficients were estimated while controlling for the disruption of a removal episode starting during the testing year. The only statistically significant association was positive in reading for the first removal episode. This finding was counter to expectations and this result did not replicate in the subjects of writing or math. Thus, this result presents an area for future research and may have been a Type I error.

When the number of months a student was out of the home increased, the expected positive sign for academic growth was identified, likely due to increased stability in the student's life. Each additional month out-of-home was associated with 0.56–0.72 of a percentile point increase in academic growth depending on the subject. Thus, a one standard deviation increase in length of placement by 3 months was associated with up to a 2.1 percentile point (ES = 0.07) increase in academic growth.

As previously noted, the time-varying student-level variable $A_{is(t-1)}$ was included as an indicator of whether a student scored proficient or advanced relative to partially proficient/unsatisfactory on the prior year assessment in the same subject. It was determined that being proficient or advanced in the previous year was associated with a 3.5–4.5 point lower growth percentile in the current year (midpoint ES = 0.13). This result was highly significant and robust across subject areas.

As expected, age at first removal was negatively associated with academic growth from grades 4–10. For every year older a child is at the time of first removal, academic growth falls by 0.64–0.80 percentile points (midpoint ES = 0.024). Other student-level controls behaved similarly as expected. Being eligible for English language learner services had no impact on academic growth after controlling for all the other variables in the model, but eligibility for special education services was associated with substantially lower achievement gains. Overall, female students had higher growth while traditionally underserved minorities experienced lower growth.

6.3. Follow-up descriptive statistics for before during and after out-of-home placement

The previous analysis indicates that child welfare placement and school mobility are indeed important factors associated with the academic growth of foster students while in out-of-home care. However, even prior to their first removal from the home, students in foster care are not representative of the general population in terms of school mobility. Foster youth tend to come from unstable environments and experience more school mobility than average even prior to entering out-of-home care (Clemens, Klopfenstein, et al., 2017; Conger & Finkelstein, 2003). Given that school mobility has been shown to adversely impact student academic growth in a variety of student populations, it was expected that the population of students who ever experienced out-of-home care would have lower than typical growth prior to removal from the home. To understand the extent to which out-of-home care reduced academic growth, it was important to understand where growth levels were prior to the start of out-of-home care.

Table 4
Academic growth levels before, during, and after out-of-home care.

Variable name	Before	During	After
Growth percentile, Reading	43.21 (24.03)	44.67 (26.58)	46.17 (24.74)
Growth percentile, Writing	44.35 (24.02)	44.43 (26.76)	46.36 (24.76)
Growth percentile, Math	41.95 (23.68)	42.87 (26.69)	44.14 (25.19)
Proficiency level, Reading	2.30 (0.76)	2.28 (0.79)	2.27 (0.76)
Proficiency level, Writing	2.26 (0.64)	2.26 (0.63)	2.20 (0.63)
Proficiency level, Math	2.27 (0.86)	1.98 (0.91)	1.72 (0.80)
Grade	5.34 (1.11)	7.05 (1.31)	8.74 (1.10)

Note. n = 795 for non-achievement measures and varies from 777 to 795 for achievement measures. 74% of the sample were in family-like settings only; 26% experienced one or more congregate care placements. Sample is limited to those students with valid growth data for at least one year before, during, and after a single removal episode between 2008 and 2014. Calculations weight each student's average scores equally in each time period.

Table 4 provides descriptive statistics for the subsample of foster students with valid academic growth data for at least one year before, during, and after a single removal episode between 2008 and 2014. Although the subsample represents about 10% of the full analytic sample used to predict academic growth trajectories, this sub-sample size is 795 youth and there is limited information in the literature describing how the same youth performed before, during, and after foster care. In this table, academic growth at the 50th percentile represents one academic year of learning as previously discussed, and proficiency levels are based on a four-point scale with 4 indicating advanced, 3 proficient, 2 partially proficient, and 1 unsatisfactory.

The key result from this subsample analysis is that students enter the foster care system academically behind. Across all three subject areas, average academic growth was lowest prior to removal. Although academic growth increased during and after removal, it remained below the 50th percentile, resulting in a simultaneous decrease in average proficiency. The clearest example of this was in math, where foster students experienced the lowest growth rate and consequently the greatest reduction in proficiency. Thus, although academic growth increased after removal from the home, the increase was insufficient to prevent the average proficiency level from falling over the same time period relative to grade-level expectations.

Tables 5 and 6 present the same before, during, and after removal achievement statistics for the subsamples of foster students who were placed only in family-like settings and those who ever experienced congregate care, respectively. These results should be interpreted and applied to decision-making with caution. Students placed only in family-like settings were overrepresented in the subsample of students with academic growth data available before, during, and after care: three quarters of the subsample in Table 4 were represented in Table 5, while just 51% of students in the full analytic sample were placed only in family-like settings (see Table 1). In contrast, students experiencing congregate care were underrepresented in Table 6 (26% of subsample

Table 5
Academic growth and levels before, during, and after out-of-home care for students only in family-like settings.

Variable name	Before	During	After
Growth percentile, Reading	43.18 (24.22)	46.09 (26.00)	47.19 (2.53)
Growth percentile, Writing	45.21 (24.51)	46.23 (26.53)	46.98 (23.38)
Growth percentile, Math	42.80 (23.81)	44.63 (26.47)	45.63 (24.35)
Proficiency level, Reading	2.35 (0.76)	2.34 (0.77)	2.33 (0.73)
Proficiency level, Writing	2.29 (0.65)	2.31 (0.61)	2.26 (0.57)
Proficiency level, Math	2.34 (0.85)	2.08 (0.90)	1.80 (0.81)
Grade	5.11 (1.02)	6.77 (1.27)	8.53 (1.11)

Note. n = 582 for non-achievement measures and varies from 573 to 582 for achievement measures. Sample is limited to those students with valid growth data for at least one year before, during, and after a single removal episode between 2008 and 2014 who are only placed in family-like settings. Calculations weight each student's average scores equally in each time period.

Table 6

Academic growth and levels before, during, and after out-of-home care for students with one or more congregate care placement.

Variable name	Before	During	After
Growth percentile, Reading	42.44 (23.67)	40.57 (27.86)	43.20 (27.52)
Growth percentile, Writing	44.02 (24.10)	38.41 (27.23)	44.97 (29.07)
Growth percentile, Math	40.81 (23.33)	37.24 (27.19)	40.28 (27.04)
Proficiency level, Reading	2.19 (0.76)	2.15 (0.78)	2.09 (0.69)
Proficiency level, Writing	2.19 (0.62)	2.07 (0.64)	2.00 (0.69)
Proficiency level, Math	2.07 (0.86)	1.67 (0.85)	1.45 (0.70)
Grade	6.00 (1.11)	7.84 (1.08)	9.32 (0.81)

Note. n = 207 for non-achievement measures and varies from 196 to 207 for achievement measures. Sample is limited to those students with valid growth data for at least one year before, during, and after a single removal episode between 2008 and 2014 who are placed in a congregate care setting at any point. Calculations weight each student's average scores equally in each time period.

compared to 48% of full analytic sample) because fewer of these students had continuous year-over-year testing data. Because the vast majority of the subsample in Table 4 was also represented in Table 5, descriptive statistics followed the same pattern with academic growth rising after removal from the home (yet insufficiently to prevent proficiency levels from falling). However, in the small sample of students who experienced one or more congregate care placements (n = 207) represented in Table 6, academic growth fell during the removal episode and then bounced back to baseline afterwards.

7. Discussion

This study is the first of its kind and provides a starting point for determining the public policy and supports necessary to mitigate the adverse impact of foster student mobility on academic growth. The foster care achievement gap will become increasingly visible across the nation as states implement the Every Student Succeeds Act requirement to include students in foster care in their state report cards. The findings from the current study underscore the importance of: (a) supporting "catch-up" growth when students initially enter the child welfare system; (b) considering the detrimental effects of placement changes and school moves in case planning for students in foster care; (c) maintaining academic progress for those students who are meeting grade-level expectations; and, (d) implementing supports and services that extend beyond the duration of time that students are in foster care.

7.1. Support growth at entry into child welfare

Students who enter the foster care system are typically behind academically and their growth scores tend to be lowest prior to removal from the home, as illustrated in Tables 5 and 6. Thus, efforts to close the foster care achievement gap ought to begin at entry into the child welfare system, rather than waiting until students are officially "in foster care." For example, involvement in a dependency and neglect case could trigger a system for determining if and what academic supports a child might need to make progress toward or maintain grade-level standards. For many of these students, 'catch-up' growth is needed, meaning that to approach or meet grade-level standards, these students need to make more than a year's progress in a year's time. Investments in math skills may be particularly important, as by the end of middle school only 13% of students in foster care are on grade level in math (Barrat & Berliner, 2013; Clemens & Tis, 2016).

7.2. Foster care case planning

Prior research has found that placement instability and school instability in isolation are detrimental to youth in foster care (e.g., Cutuli et al., 2013; Fawley-King et al., 2017; Herbers et al., 2012; Mehana & Reynolds, 2004; Moore et al., 2016; Waid et al., 2016). Findings from

the current study build on the existing literature by providing initial evidence that placement changes have a greater negative effect on academic growth than school moves, even in a state where curriculum is not standardized across schools and districts. Thus notifying the school when a placement change occurs may be warranted even if the child is remaining in the same school. Placement transition planning and support need to include orienting new caregivers to the child's educational routines, history, and unique needs. In addition new caregivers may benefit from an orientation to the new school and their communication system to ensure they have access to important school information (e.g., events, assignments, etc.).

Findings from the current study extend the literature by considering the effects of child welfare placement and school moves that occur together. Each time these transitions co-occur, academic growth is reduced on average by 3.7 percentile points in reading, 3.0 percentile points in writing, and 3.5 percentile points in math, which in turn reduces the next year's achievement level, which then provides a lower base for future growth. The school mobility aspect of these transitions is particularly actionable because it can be reduced by implementing the educational stability policies outlined in the ESSA and the Fostering Connections to Success and Increasing Adoptions Act (FCA, 2008) – most notably the reciprocal requirement for child welfare and education agencies to maintain children in their school of origin during the time they are in foster care unless a school move would be in a child's best interest. The findings also reinforce the importance of making placement decisions that are most likely to result in longer-term stability for a child.

As discussed above, consider the −3.7 percentile point change in growth in the subject of reading associated with a child welfare placement occurring with a single school move. The lower growth percentile reduces the student's achievement level, which can have implications for years to come. The benefits of growth (and the costs of reductions in that growth) accumulate over time in terms of achievement outcomes. Since foster students start at a lower achievement level on average and then grow at a lower rate, they fall farther and farther behind each year. The data on proficiency levels in Tables 5 and 6 illustrate this point. Across subject areas and placement types students' academic proficiency levels decrease from the start point of the academic year just before entering out-of-home care to the academic year (s) they were in care, and the lowest proficiency scores are found in the year following out-of-home placement.

Foster care case planning that considers educational stability and placement stability as interrelated events creates an opportunity to reduce instability barriers to academic growth. The average effects found in the current study illustrate potential trade-offs for school moves and placement stability. If a placement change can be accomplished without a related school move, the hit to reading growth as previously discussed is 2.52 percentile points. Further, this negative effect of a new placement can be fully offset for students in long-term foster care when the placement lasts for at least four and a half months $(0.56 * 4.5 = 2.52)$. Holding the number of school moves constant, the 2.1 percentile point increase associated with staying in the same placement for a longer period of time is substantial. A two-point increase in growth leads to meaningfully higher achievement levels over time due to the compounding effects on academic achievement. These findings suggest that when school moves or placement changes are necessary to achieve safety and permanency, then a plan mitigating the impact on academic growth is also needed. ESSA and FCA requiring immediate enrollment and transfer of records form a first step toward this goal; however, for many students, additional targeted supports are needed.

7.3. Students on grade level

The academic needs of students who are on grade level when they enter the child welfare system, are removed from the home, or at exit

from the foster care system must not be overlooked. In this study, students who were at or above grade level made less academic growth than those who were below grade level, holding all other variables in the model constant. Growth scores are normed on prior year proficiency, so a 3.5–4.5 percentile decrease in growth scores for students who were at grade level suggests that academic gains are tenuous at best. Even when foster care students are scoring well, they need continual support to maintain their achievement levels.

7.4. Academic support after removal episodes

Students' risk for poor academic outcomes does not end when they return home, are adopted, or exit the foster care system through other avenues (e.g., Courtney & Dworsky, 2006; Pecora, 2012). On average, these students are further behind academically than when they entered the foster care system. As previously described, there is a cumulative negative effect of not making a year's growth in a year's time. In addition, students may be at-risk for high levels of school mobility because the ESSA and FCA educational stability policies only apply for the duration of time students are in foster care (U.S. Department of Education & U.S. Department of Health and Human Services, 2016). The long-term effects of foster care placement on educational attainment are evidenced in high school graduation rates and post-secondary matriculation rates that are well below those of non-foster care peers (Legal Center for Foster Care & Education, 2014). Targeted, long-term educational supports for "former" foster youth are also a critical aspect of improving educational outcomes. Research shows that youth transitioning out of care face significant issues related to educational attainment, which ultimately contributes to disadvantages regarding housing stability, employment, and earning potential as adults (e.g., Dworsky, Smithgall, & Courtney, 2014; Geenen & Powers, 2007; Okpych & Courtney, 2014; Salazar, Roe, Ullrich, & Haggerty, 2016). Providing enhanced services to students currently in foster care is essential, but longer-term supports are needed to facilitate educational success and future economic security.

7.5. Limitations

Students who experience foster care are likely to experience many aspects of instability, but it was only possible to focus on child welfare placement stability and school moves in this study. Residential moves that occurred outside of child welfare placement changes and instability within the home (e.g., changes in caregivers, household composition, etc.) were not taken into account as those data were not available in the state administrative datasets. Similarly, school moves that may have occurred outside of the Colorado public school system (e.g., private school, home school, out-of-state moves) could not be counted.

The students who comprised the sample are those who had at least two consecutive years of valid achievement test scores (grades 3–10) and whose initial removal from the home and case closure date occurred within a seven-year time frame. It is possible that the students with consecutive years of valid test scores are systematically different from those with missing or invalid testing data. For example, students who moved out-of-state or enrolled in private schools may be less likely to have consecutive state testing than those who remained within the Colorado public school system. Similarly, the focus of this study was on students in testing grades; thus, for this sample, the average age at first removal in this study was 12.66 years old, which is higher than for the full population of children in foster care (ages 0–21). The utilized sample of students is reflected in the ESSA definition of "students in foster care," and students in all types of out-of-home placements are included in the study. Researchers and practitioners should consider this information when making decisions about generalizability.

Furthermore, although the sample size for the primary statistical model is robust, the sample size for the follow-up descriptive analysis presented in Section 6.3 is relatively small. The small sample size is

particularly concerning for the sub-population of students who experienced one-or-more congregate care placements. In addition, the descriptive statistics for this category of students are weighted equally across all observations, and as such, the findings cannot be interpreted as growth *while* in congregate care. Thus, the before, during, and after growth statistics that are disaggregated by placement type should primarily be used to inform future research studies and as a rationale to examine placement types more closely.

8. Conclusions

Students in foster care are one of the most educationally vulnerable populations of youth (U.S. Department of Education & U.S. Department of Health and Human Services, 2016). That vulnerability does not begin when they are removed from the home, in fact this study suggests that the first removal episode is associated with an increase in academic growth. Closing the achievement gap is likely to require a long-term approach to supporting these students that begins when they are identified as at-risk for out-of-home placement and continues after they exit the foster care system. Providing educational supports during times of transition are especially critical to students' academic progress, even for those students who are currently performing at or above grade level.

Conflict of interest

The authors have no competing interest to declare.

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