Relationships between the middle school concept and student demographics

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Abstract

Purpose – This study explored implementation of the middle school concept (MSC) in Illinois middle-level schools, examining relationships between MSC implementation and schools' relative wealth, racial/ethnic composition, and achievement levels.

Design/methodology/approach – This quantitative study utilized a sample of 137 Illinois middle-level schools, defined as containing any combination of grades 5–9, including at least two consecutive grade levels and grade 7. Principals completed an online survey, identifying levels of implementation of advisory, teaming with common planning time (CPT), and a composite of both advisory and teaming with CPT.

Findings – Schools with high advisory implementation had significantly higher rates of Latinx enrollments. Schools with lower operating expenditures per pupil were significantly less likely to implement advisory or advisory and teaming. Teaming had a significant relationship with composite PARCC test scores, but there was no significant effect for advisory and no significant interaction of advisory and teaming together.

Practical implications – MSC is more expensive to implement, and affluent districts may have the financial means to absorb these costs. Although teaming facilitated improved state test scores, advisory programming did not result in significantly improved scores.

Social implications – Lack of access to MSC programming in less affluent communities presents an equity issue for low-income students and students of color.

Originality/value – This study contributes to research examining underlying issues of race and poverty and their effects on academic achievement and the effectiveness of the MSC.

Keywords Advisory, Middle school, Common planning time, Interdisciplinary teaming, Middle grades, Middle school concept

Paper type Research paper

Introduction

Organizational structures of middle-level schools that support the education of young adolescents vary greatly across the United States and have evolved over time, and the research related to these structures is limited (Ellerbrock *et al.*, 2018). Currently, the most common arrangement contains grades 6–8 (Lounsbury, 2013). According to the National Center for Education Statistics (Snyder *et al.*, 2016), there was a 462 percent increase in middle-level schools (schools beginning with grade 4, 5, or 6 and ending with grade 6, 7, or 8) in the United States from 1970 to 2000, and by 2010 middle-level schools totaled about 13,000. As grade configurations shifted, principals promoted changing organizational and programmatic features to support young adolescents' developmental needs, referred to as the middle school concept (MSC; Lounsbury, 2013; Roney *et al.*, 2008). Key MSC features include interdisciplinary teaming, common planning time for teams of teachers, and advisory programing.

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Although researchers have examined MSC implementation levels (McEwin and Greene, 2010, 2011) and MSC's relationship with school effectiveness (Olofson and Knight, 2018), a problem exists: the role that demographics of students and schools play in implementation practices has not been fully explored. If MSC practices are essential to address young adolescents' needs (National Middle School Association [NSMA], 2012; Roney *et al.*, 2008), it is important to discern the extent to which these practices are implemented and consider whether all students, regardless of race or family/community income status, are afforded equitable access. Principals and teachers should make programmatic decisions based upon factors identified as effective in supporting students' academic progress. This study investigated MSC implementation in Illinois public middle-level schools, addressing five research questions (Table I).

Review of the literature

Schools implementing MSC provide organizational and programmatic structures intentionally designed to meet young adolescents' cognitive, social, physical, and emotional needs. Specific to MSC are key systems of support that include advisory programming, grouping students and teachers onto interdisciplinary teams, and providing team teachers with common planning time (Flowers and Mertens, 2013). Although affective

Research question	Analytical strategy
RQ1. How are Illinois middle-level schools clustered with regard to MSC implementation levels?	State-wide survey of middle-grade school principals; statistical analysis resulting in grouping of schools into four clusters of MSC implementation One-way ANOVAs—Are the clusters distinct on the clustering variables? IV: Cluster membership—categorical DVs: Teaming score and Advisory score—continuous
RQ2. What is the relationship between schools' relative wealth and MSC implementation levels?	One-way ANOVAs IV: Cluster membership—categorical DVs[a]: Relative wealth (both rates of qualification for free and reduced-price lunch and school district operational expenditure per pupil were used)—continuous
RQ3. What is the relationship between schools' student racial/ethnic composition and MSC implementation levels?	One-way ANOVAs IV: Cluster membership—categorical DVs: Percent of school population belonging to a specific racial/ethnic group—continuous
RQ4. What is the relationship between schools' academic achievement levels and MSC implementation levels?	Two-way ANOVA IVs: high-Advisory cluster, high-Teaming cluster, and high Advisory cluster × high-Teaming cluster—categorical DV: Composite PARCC score[b]—continuous
RQ5. What is the relationship between schools' academic achievement and MSC implementation levels, after accounting for school demographics and funding?	Two-way ANCOVA IVs: high-Advisory cluster, high-Teaming cluster, and high Advisory cluster × high-Teaming cluster—categorical COVs: Relative wealth AND Race/ethnicity %—continuous DV: Composite PARCC score—continuous

Table I.
Research questions with analytical strategies

Note(s): [a]Separate analyses were conducted for each DV; [b]The composite PARCC score represents the aggregate percentage of students scoring proficient or higher (4 or 5) in a given setting

supports are designed to meet emotional needs, there is an underlying purpose of meeting student needs to promote academic achievement (Jackson and Davis, 2000).

The literature discusses aspects of schooling that are developmentally appropriate for young adolescents (Balfanz *et al.*, 2007; McEwin and Greene, 2010), and a picture emerges of schools fostering a sense of smallness, community, and attention to the affective while maintaining a strong academic program (NMSA, 2012). In recent years, some have recommended combining elementary and middle grades into a K-8 structure, advocating for grade-level configurations to promote academic effectiveness rather than the implementation of MSC components (Schwartz *et al.*, 2011). However, K-8 grade structures do not evidence significantly improved learning outcomes over middle-grade schools (Carolan *et al.*, 2015). Additionally, recent research has examined issues of race, poverty, and/or teacher quality that may affect middle-level school achievement, but research does not explicitly consider structures related to MSC (Goldhaber *et al.*, 2015; Mickelson, 2015). This review addresses research related to advisory programming and interdisciplinary teaming, as well as previous national studies of middle-level practices.

Advisory programming

Advisory is an organizational structure enabling adult teachers/advisors to meet regularly with small student groups during the school day (Shulkind and Foote, 2009); the purpose is to promote positive, supportive relationships among teachers and students. Advisory is a distinctive MSC feature that is implemented with greater frequency in academically successful middle-grade schools (McEwin and Greene, 2010). Advisory is common but not prevalent in middle-level schools: Valentine *et al.* (2002) reported that 57 percent of their national sample was implementing some advisory programming. In 1985, 93 percent of "exemplary" middle schools included advisory programs (George and Oldaker, 1985), although a 2010 study of Highly Successful Middle Schools found 65 percent included advisory programming (McEwin and Greene, 2010). McEwin and Greene (2010) found advisory program implementation was higher in Highly Successful Middle Schools (65 percent) when compared to a random sample of middle-level schools (53 percent). Beyond affective supports offered in advisory settings, there is evidence in high-poverty schools that providing structures that ensure students are known by educators within the school promotes better academic results (Picucci *et al.*, 2004).

Advisory groups are recommended to have 10–15 students per teacher (NMSA, 2012). Burns *et al.* (2012) reported that effective advisories meet 4–5 days weekly for 15–24 min daily, while Felner *et al.* (1997) found that schools in which advisory met 4–5 times weekly for 30–45 min had higher levels of student achievement and lower student stress levels. Although daily advisory meetings are considered essential, this outcome is dependent on curricular structures, administrative support, and a clearly defined advisory purpose. In a qualitative study, principals perceived that advisory programs promoted healthy and trusting relationships, focused on student needs, and facilitated transitions from the elementary school and into high school (Moore, 2015). Although citing the importance of an advisory curriculum, generally principals reported advisory appeared to address students' personal skills development (e.g. problem solving, goal setting) and were not perceived as directly promoting academic growth.

Interdisciplinary teaming with common planning time

Interdisciplinary teaming is a structure through which "teachers share the same students, the same schedule, the same part of the building, and the responsibility to share in the planning of major academic subjects that students encounter during the school day" (George *et al.*, 1998, p. 226). Teams typically include teachers from core disciplines (math, science, social studies,

English language arts) and support services such as special education. Teaming is intended to "foster purposeful learning and meaningful relationships" (NMSA, 2010, p. 31) through smaller communities of learning, and students receive all or most of their core instruction from team teachers. Teaming has been termed a "signature practice" (Valentine *et al.*, 1993, p. 49) of MSC and is recommended by the Association for Middle Level Education (formerly called the National Middle School Association). McEwin and Greene (2013) reported that 90 percent of Highly Successful Middle Schools in their study implemented teaming compared to 72 percent of middle-grade schools in general.

Common planning time for team teachers is essential to the development of interdisciplinary instruction (Crow and Pounder, 2000), and teachers also should be provided with individual planning time within the school day (Hackmann *et al.*, 2002). The mere existence of teaming does not guarantee interdisciplinary instructional practices (Applebee *et al.*, 2007), as teams may direct their attention to student behavioral concerns rather than on interdisciplinary instruction and student learning (Crow and Pounder, 2000). Thus, principals must carefully monitor teachers' use of common planning time (Mertens *et al.*, 2013). Focused common planning time is reported to result in higher levels of student achievement, teacher job satisfaction (Flowers *et al.*, 1999), and more positive collegial interactions (Flowers *et al.*, 2000). Mertens *et al.* (2010) found that high functioning middle-school interdisciplinary teams met at least four times weekly for at least 30 min per meeting.

Previous national studies on middle-level schools

An important consideration for this study was whether schools implementing MSC promote improved academic achievement. Additionally, the intent was to discern if MSC implementation correlates with higher academic performance, including whether schools with higher proportions of marginalized student groups have access to MSC. Two major strands of national studies of middle-level schools have been conducted: the first strand explored MSC in terms of organization (Alexander, 1968; Alexander and McEwin, 1989; McEwin *et al.*, 1996, 2003; McEwin and Greene, 2011) and the second, sponsored by the National Association of Secondary School Principals (NASSP), examined MSC through a leadership lens, addressing the principal's role in advocating for and implementing middle-school practices (Valentine *et al.*, 1981, 1993, 2002, 2004). Neither strand applied statistical methods to explore relationships among race, poverty, MSC implementation, and academic achievement. The most recent study (McEwin and Greene, 2011) compared a random national sample to a subset of 186 Highly Successful Middle Schools, concluding that these schools implemented middle-grade practices at higher frequency and with greater fidelity, but the study did not consider differences in student populations between the two sample groups. The NASSP series provided insights into the MSC and by 2002 contained extensive exploration of interdisciplinary teaming and common planning time but little attention to advisory programming (Valentine *et al.*, 2002).

Conceptual framework

Folk belief theory, which presents a rational model for why less-advantaged students may be disadvantaged by the organizational systems into which they are placed, was the conceptual framework applied in this study. Torff (2014) presented folk belief theory as a way of understanding culturally and systematically held beliefs about student learners and the appropriateness of particular instructional techniques. At the heart of Torff's theory is the concept that it is a culturally constructed belief among educators that a more academically challenging curriculum typically is provided to high-advantaged students. His work relates

to other research finding educators who believed less-advantaged students (e.g. students from low-income families) were less likely to be exposed to higher-level or critical thinking activities because educators assumed that these students needed additional basic skills instruction (Warburton and Torff, 2005).

Folk belief theory includes several assumptions that can lead to a persistent achievement gap (Torff, 2014). First is the pedagogical belief that students must know and understand basic content before being able to apply information. Second, teachers and educators assume that less-advantaged students have not mastered basic skills. Third, because less-advantaged students are perceived not to have mastery of basic information, they need a more remedial instructional program. Finally, because these assumptions are embedded culturally and collectively in teachers' beliefs, it is difficult to change these beliefs, resulting in an inability to influence the achievement gap.

Folk belief theory, applied in the MSC context, suggests that students historically viewed as low-advantaged or less-advantaged (e.g. low-income, non-White) may systematically be denied access to better a pedagogical framework, in favor of an "impoverished pedagogy" (Torff, 2014, p. 175). That is, if MSC is a better framework for educating students, but it is assumed that framework is not focused on remedial instruction, then low-advantaged students are less likely to experience high MSC implementation levels. Likewise, access to a rigorous curriculum may also be an equity issue (Darling-Hammond, 2010; Noguera, 2009) and acknowledges what Torff theorized is a systematically and culturally established belief system of low expectations for less-advantaged students. Examining this argument requires consideration of three factors: levels of MSC implementation, academic outcomes of schools at various levels of MSC implementation, and whether students from less-advantaged groups have access to schools implementing MSC. Folk belief theory suggests that students in higher minority, higher poverty communities are likely to have less access to schools implementing MSC.

Research methods

Illinois is the fifth most populous state in the United States and contains 852 public school districts. It is a diverse state that closely parallels national demographic public school enrollment patterns, in terms of percentage enrollment by race/ethnicity, eligibility for free and reduced-price lunch, and per pupil spending (Table II). Although Illinois enrollments are demographically reflective of national averages, students in Illinois public schools are more segregated than is the case in most states (Fahle and Reardon, 2018), and we take this into consideration in our analysis by looking at each of these within-school variables separately. The Partnership for Assessment of Readiness for College and Careers (PARCC) test is

Demographic indicators	Illinois	United States
Percentage enrollment by racial/ethnic group[a]		
Asian	5%	6%
Black	18%	15%
Latinx	25%	29%
Multiracial	3%	4%
White	49%	50%
Percentage enrollment eligible for free or reduced-price lunch[b]	46.7%	48.1%
Average public school per pupil expenditure[c]	$13,077	$11,009

Note(s): [a]Illinois data from Illinois Interactive Report Card (2016); U.S. data from Kena *et al.* (2016); [b]National Center for Education Statistics (2012); [c]U.S. Census Bureau (2016)

Table II. Comparison of Illinois and National Public School demographic indicators

administered annually in mathematics and literacy to all Illinois public school students in grades 3–8. Schools receive a score in both subject areas and a composite score. The PARCC score used throughout this study is the composite score percentage of students in a given setting or student group scoring meets (4 out of 5) or exceeds (5 out of 5) on the Spring 2015 test.

This study utilized a single-stage sample of Illinois public middle-level schools, defined as containing any combination of grades 5–9 that included at least two consecutive grade levels and must include grade 7 (Valentine *et al.*, 2002). Of the 3,301 schools containing grades 5–9, 610 met this definition (5–7, $n = 2$; 5–8, $n = 96$; 6–7, $n = 2$; 6–8, $n = 382$; 7–8, $n = 127$; 7–9, $n = 1$), and all 610 principals were emailed and invited to participate. A power analysis for an analysis of covariance (ANCOVA, using expenditure per pupil as a covariate) using G Power Version 3 was conducted using an R^2 of 0.15, and it was determined that at least 73 respondents were needed for this study (Faul *et al.*, 2007). In total, 149 principals (24.4 percent) provided some useable responses to the online questionnaire, with 137 completing the entire questionnaire. The responding schools resulted in somewhat oversampling Illinois sixth and ninth graders and somewhat undersampling fifth, seventh, and eighth graders.

The questionnaire used in this study was developed after an extensive literature review, focusing on key MSC components, with items based on prior national studies. Questionnaire drafts were reviewed in two rounds to establish content validity; the first review was done by five middle-school policy experts from national/state organizations, with the second round conducted by four former Illinois middle-level principals. Revisions were made prior to administering the questionnaire.

Survey items were broadly grouped around the concepts of Advisory, Teaming with Common Planning Time, and a composite of both Advisory and Teaming with Common Planning Time. Since this questionnaire made adaptations to previously used items, an exploratory factor analysis (EFA) approach was used to determine the optimal number of factors. We used principal axis factoring, which assumes measurement error in responses. The EFA on Teaming with Common Planning Time suggested a one-factor solution, explaining 74.9 percent of the variance in responses. This result indicated that it was appropriate to sum the scored survey responses related to teaming because that set of questions essentially tapped one subject. Adding a second factor only explained an additional 6 percent of variance in Teaming, the scree plot showed a strong "kink" after one factor, and the set of items loading on the second factor did not cohere in any reasonable way. We refer to summed answers to these Teaming with Common Planning Time items as the Teaming score. An EFA on Advisory also suggested a single-factor solution, explaining 69.3 percent of the response variance. Adding a second factor only explained an additional 9 percent of variance in Teaming, the scree plot showed a strong "kink" after one factor, and the set of items loading on the second factor did not cohere in any reasonable way. We refer to summed answers to these Advisory items as the Advisory score. A third EFA with oblimin rotation on all Teaming and Advisory items together suggested two distinct factors that together explained 72.0 percent of the variance in the variables[1]. Therefore, the summed Teaming score and Advisory score were analyzed separately.

A scatter plot comparing summed Advisory and Teaming scores showed four distinct subgroups (Figure 1); therefore, we proceeded with a cluster analysis. A Ward's cluster analysis was conducted, and the largest proportional jump in the coefficient suggested four clusters. Schools were statistically assigned to one of four groups (clusters) of MSC implementation used in further analyses. Cluster 1 represented schools with high Teaming and high Advisory implementation ($n = 51$; 37.2 percent), Cluster 2 included schools with low or no levels of Teaming and high levels of Advisory ($n = 18$; 13.1 percent), Cluster 3 included schools with high levels of Teaming and low or no levels of Advisory ($n = 50$; 36.5 percent), and Cluster 4 contained schools with low or no levels of Teaming and low or no levels of

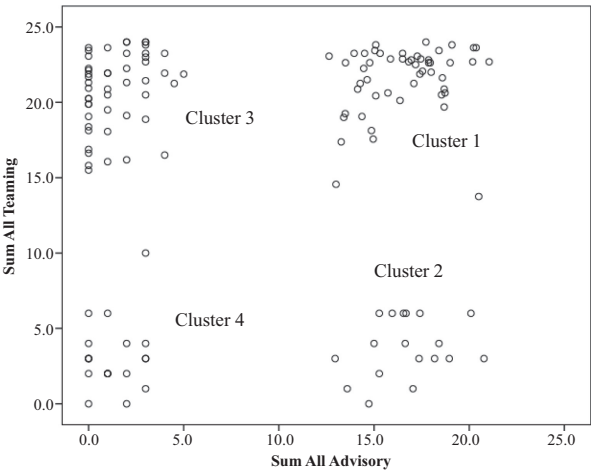

Figure 1.
Scatter plot of advisory and teaming scores with cluster names

Advisory (n = 18; 13.1 percent). Overall, the proportion of schools implementing Teaming was high (73.7 percent), and Advisory implementation was medium (50.3 percent). Theory and prior research would suggest that the 51 schools with high Teaming scores *and* high Advisory scores (i.e. Cluster 1 schools fully implementing MSC according to this study) would prove to be "more effective" than schools not fully implementing MSC.

To verify that the clusters were distinct on the clustering variables, one-way analysis of variance (ANOVA) on Teaming scores by cluster and one-way ANOVA on Advisory scores by cluster were conducted. ANOVA requires meeting the assumptions of normal distribution of scores within each group (bell curve), equal variances between groups, and independence of observations (typically a problem in classroom research). Alternative tests are available if any of these assumptions are not met. Because of unequal variances by groups in our data, the Welch's robust ANOVA[2] was used. Clusters did indeed differ on Teaming scores, $F(352.7) = 697.1$, $p < 0.001$, and on Advisory scores, $F(349.6) = 763.2$, $p < 0.001$. A post hoc Games–Howell test[3] confirmed that, on Advisory scores, clusters 1 and 2 scored higher than clusters 3 and 4, and on the Teaming scores, clusters 1 and 4 scored higher than clusters 3 and 2.

As a result of this testing, in subsequent analyses the continuous variables for MSC implementation score, Teaming score, and Advisory score were not used. Instead the clusters were used as the variable, with two different cluster groupings: high implementing Advisory schools (clusters 1 and 2) and high implementing Teaming schools (clusters 1 and 3). The purpose of this distinction was to determine if there was a main effect on PARCC scores of high-Teaming cluster, high-Advisory cluster, or a high-Teaming cluster by high-Advisory cluster interaction.

Findings

Our questionnaire data allowed for consideration of research questions related to MSC implementation viewed through the lens of race/ethnicity, relative wealth, and academic performance. RQ1 allowed us to collect state-wide data about MSC implementation in order to answer RQs 2–5. As noted in Figure 1, our analysis of RQ1 identified four distinct clusters or types of schools implementing MSC. For RQ2, there was no statistically significant relationship between MSC implementation cluster membership and percent federal free and

reduced-price lunch at the school, but there was a statistically significant relationship when utilizing school district's operating expenditure per pupil as an indicator of relative wealth. When considering the relationship between race/ethnicity and MSC implementation (RQ3), the only statistically significant relationship was that schools in high-Advisory clusters (clusters 1 and 2) had higher percentages of Latinx students. Schools in high-Teaming clusters had higher composite PARCC scores, accounting for 3 percent of the variance in PARCC scores (RQ4), but that significant relationship disappeared once relative wealth and race/ethnicity were added as covariates (RQ5).

Schools' relative wealth and levels of MSC implementation (RQ2)

Two measures of relative wealth in schools were used: percentage student qualification for free and reduced-price lunch and operating expenditure per pupil. We anticipated that schools with higher free and reduced-price lunch rates would have lower MSC implementation and schools with lower operating expenditure per pupil would have lower MSC implementation. Our first step was to examine the histogram to determine if the percentage free and reduced-price lunch distribution was normal. Histograms by cluster clearly showed nonnormality and unequal variances; thus, a Welch's ANOVA was conducted. A one-way Welch's ANOVA comparing MSC implementation clusters (independent) by free and reduced-price lunch rates (dependent) was conducted, and there was no statistically significant difference among the four groups, $F(3, 50.95) = 1.27$, $p = 0.30$.

The next analysis began with a histogram to determine if the operating expenditure per pupil distribution was normal. Histograms by cluster showed nonnormality and unequal variances; therefore, a Welch's ANOVA was conducted comparing MSC implementation clusters on operating expenditure per pupil; there was a statistically significant difference among the four groups, $F(350.77) = 4.86$, $p = 0.005$. Post hoc tests showed that clusters 1 (M = \$12,182) and 2 (M = \$12,755) were characterized by significantly higher operating expenditure per pupil than cluster 4 (M = \$10,391). This finding indicates that schools with lower operating expenditure per pupil are significantly less likely to implement Advisory or Advisory and Teaming than those with higher operating expenditures.

Racial/ethnic composition and levels of MSC implementation (RQ3)

We anticipated that schools with higher rates of non-White or underrepresented minority groups would have lower MSC implementation. A series of ANOVAs by cluster on percent composition for each racial/ethnic group were conducted (Table III). For Black, Latinx, and Native Hawaiian groups, a Welch's ANOVA was used due to unequal variances between clusters, with a Games–Howell post hoc test. Additional tests were conducted to consider all non-White students and all underrepresented minority students as groups. The significant finding was that schools with high-Advisory (clusters 1 and 2) tended to have a larger percentage of Latinx students; cluster 4 (7.6 percent Latinx) had significantly fewer Latinx students than clusters 1 (19.3 percent) and 2 (28.2 percent). This finding indicates that schools with higher percentages of Latinx students are more likely to have Advisory programming in place. Pairwise comparisons showed no other pairs of means that were significantly different between clusters.

School achievement levels and MSC implementation levels (RQ4)

We anticipated that schools with higher PARCC scores would have higher MSC implementation rates. A two-way ANOVA was completed to investigate the possibility of nonadditive effects of high-Advisory clusters (clusters 1 and 2 vs 3 and 4) and high-Teaming clusters (clusters 1 and 4 vs. 2 and 3) on PARCC scores. Then, in a two-way ANOVA we

considered the interaction effect of high-Teaming cluster and high-Advisory cluster implemented together (i.e. whether the two together provided greater effects than simply adding the effect of teaming to the effect of advisory) (Table IV). There was no significant effect of high-Advisory cluster and no significant interaction of high-Advisory cluster and high-Teaming cluster. The high-Teaming cluster did show a statistically significant main effect on composite PARCC. The partial eta squared of 0.03 indicated that 3 percent of the variance in composite PARCC was due to being in a high-Teaming cluster. The nonsignificant main effect of high-Advisory cluster and the nonsignificant high-Advisory cluster by high-Teaming cluster interaction could be due to the low statistical power of the study.

School academic achievement level, based on standardized tests and demographics when using MSC implementation as a mediator variable (RQ5)

We anticipated that MSC implementation has an effect on academic outcomes. Since a statistically significant effect of high-Teaming cluster and academic performance on PARCC testing was found, it was necessary to discern whether issues of race and relative wealth were significant contributing factors. As such, two indicators of a school's race/ethnicity and two indicators of relative wealth along with MSC implementation were considered, to examine the effect on academic achievement as measured by one indicator (composite proficiency score on PARCC). A series of two-way ANCOVAs were conducted with the Teaming, Advisory, and Teaming by Advisory factors and various indicators of relative wealth and race. If the effect of Teaming disappeared in these analyses, this effect was due to wealth and/or race differences in the implementation of Teaming. For each ANCOVA, Table V shows the outcomes from the test of a variable from the race/ethnicity indicators with a relative wealth indicator. Whether underrepresented minority or non-White was used as the indicator of race/ethnicity, race/ethnicity had a significant effect on the composite PARCC scores. Likewise, whether operating expenditure per pupil or free and reduced-price lunch was used

Model	Racial/ethnic group %	dfw	*F*	*p*	Eta squared
1	American Indian %	133	0.54	0.66	0.01
2	Asian %	133	0.17	0.91	< 0.01
3	Black[a] %	45.3	1.63	0.20	0.03
4	Latinx[a] %	54.5	5.32*	< 0.01	0.06
5	Native Hawaiian[a] %	52.0	2.72*	0.05	0.04
6	Multiracial %	133	0.76	0.52	0.02
7	White %	133	2.2	0.09	0.05
8	All underrepresented minority[b] %	133	2.05	0.11	0.04
9	All non-White %	133	2.22	0.09	0.05

Note(s): [a]Groups using Welch's ANOVA; [b]Underrepresented minority includes all racial/ethnic groups except White and Asian; *$p < 0.05$

Table III. ANOVAs on percentage racial/ethnic groups between MSC clusters

Factor	*F**	Sig.	Partial eta squared	Observed power
High-teaming cluster	3.84	0.05	0.03	0.49
High-advisory cluster	0.04	0.84	0.00	0.05
High-teaming cluster × High-advisory cluster	0.07	0.80	0.00	0.06

Note(s): *$p < 0.05$; all df are 1, 133

Table IV. Two-way ANOVA on composite PARCC

		Indicators of race			
		URM[c]		*Non-White*	
Indicators of relative wealth	OEPP[a]	F_{URM}	46.782	$F_{Non\text{-}White}$	23.137
		F_{OEPP}	52.217	F_{OEPP}	45.558
		$F_{high\text{-}Teaming\ cluster}$	2.677	$F_{high\text{-}Teaming\ cluster}$	2.457
		$F_{high\text{-}Advisory\ cluster}$	0.325	$F_{high\text{-}Advisory\ cluster}$	0.717
		$F_{high\text{-}Teaming\ cluster}$ *high-Advisory cluster	0.373	$F_{high\text{-}Teaming\ cluster}$ *high-Advisory cluster	0.463
		R^2	0.411	R^2	0.320
	FRL[b]	F_{URM}	8.760	$F_{Non\text{-}White}$	21.761
		F_{FRL}	219.260	F_{FRL}	294.525
		$F_{high\text{-}Teaming\ cluster}$	1.442	$F_{high\text{-}Teaming\ cluster}$	1.644
		$F_{high\text{-}Advisory\ cluster}$	0.989	$F_{high\text{-}Advisory\ cluster}$	0.555
		$F_{high\text{-}Teaming\ cluster}$ *high-Advisory cluster	1.497	$F_{high\text{-}Teaming\ cluster}$ *high-Advisory cluster	1.550
		R^2	0.692	R^2	0.718

Table V.
Two-way ANCOVAs on PARCC scores by cluster with various indicators of wealth and race as covariates

Note(s): [a]Operating expenditure per pupil; [b]Free and reduced-price lunch; [c]Underrepresented minority; $F > 3.91$ is statistically significant

as the indicator of relative wealth, relative wealth had a significant effect on composite PARCC scores. Regardless of which race/wealth combination was used, high-Teaming cluster was no longer significant.

Discussion

This section discusses the limitations and findings, relative to the status and effectiveness of MSC implementation. Overall, MSC effectiveness in Illinois middle-level schools is mixed.

Limitations

There are several limitations of this study, including that it is narrowly focused on three fundamental components of MSC. MSC advocates claim this concept is not merely a checklist of functions or structures but is a much broader pedagogical approach to educating young adolescents (Jackson and Davis, 2000; NMSA, 2012). This study did not consider instructional practices, curriculum, school climate, social and emotional services, discipline practices, or family outreach, which are often associated with more effective schools (NMSA, 2012). Additional limitations include that only middle-level principals were surveyed, and these individuals may not have been serving as principals in the same schools at the time demographic and academic achievement data were collected; demographic data from the state was assumed to be reported accurately; and operating expenditure per pupil as a data point captures insight into school district-wide expenditure and not necessarily the funding to administer the specific schools in question. This study did not consider middle-grade students enrolled outside of schools considered to be serving the middle grades only or students enrolled in special education-only school settings, nonpublic, or home-schooled settings. Finally, interviews would likely be necessary to discern why schools seem to gravitate toward quite high or quite low implementation of Teaming and Advisory, but seem to not fall into medium levels of implementation. This was true on individual questionnaire items, not just on the summed scores, contrary to what is usually found with survey research (i.e. usually answers tend toward the middle of a scale). This is a limitation of the questionnaire-based methods used in the study, which could be addressed by collecting in-person, open-ended data.

Discussion of findings

This section connects the findings to the conceptual framework and extant research related to the MSC. Ideally, for middle-level proponents, MSC would result in strong academic performance with access to MSC for all students regardless of relative wealth or demographic factors. If there is a lack of access, then, as Torff's (2014) folk belief theory suggested, it may be representative, in part, of a systematically and culturally established belief system of low expectations for less-advantaged students. To determine MSC access, it was necessary to consider whether MSC programming was available regardless of race/ethnicity, family income, or school district wealth. Achievement was measured through the percentage of students in a school, or within a demographic group, scoring that meets or exceeds on the composite score of the PARCC test.

MSC clusters did show significant differences in relative wealth as measured by operating expenditure per pupil, but did not show differences in student qualification for free and reduced-price lunch. The Illinois school district funding structure relies heavily on local property wealth and local taxation rates (Murphy, 2012), and it appears likely that, although students within a district may reside in low-income households, the community's overall property wealth or taxation effort may result in increased per pupil spending and yields of higher MSC implementation. This statistically significant relationship between operating expenditure per pupil and MSC cluster demonstrated that schools within districts with higher per pupil expenditures were most likely to implement MSC fully as evidenced through high implementation of both Advisory and Advisory with Teaming. This finding suggests, when relative wealth is not high, school districts are less likely to implement advisory or not implement MSC. This relationship between relative wealth and MSC cluster may suggest, if MSC is essential for young adolescents, then districts with wealth have the financial means to absorb these implementation costs. This supposition is supported by previous studies concluding that as district funding increases MSC implementation increases (Shockley and Irvin, 1995), and funding declines result in reduction or elimination of MSC (Scalia, 2011). This finding, however, did not indicate that there was a statistically significant pattern of students from low-income households, as measured by free and reduced-price lunch, having systematic denial of access to MSC programming. Stated simply, MSC is more expensive to implement (Scalia, 2011). Lack of access to MSC programming for students in lower property wealth communities is consistent with folk belief theory and may be an equity issue, regardless of whether MSC yields increased academic performance (Noguera, 2009).

This study also considered MSC cluster differences in relative proportions of various race/ethnicity groups, and this series of tests did not support folk belief theory's prediction that less-advantaged students would systematically not have access to MSC programs based on race/ethnicity. The significant finding was that schools with higher percentages of Latinx students (the largest non-White student subgroup) were more likely to have advisory programming. This finding does not imply that the students did not have access to teaming, but Latinx students were more likely than their peers to have advisory. Why then, do schools with higher Latinx student populations have advisory programming at a higher rate? Perhaps this finding relates to a need (real or perceived) to address behavior concerns that disproportionately affect Latinx students (Rocque, 2010). Yet, principals in schools with higher Latinx enrollments may implement advisory because of a perceived cultural deficit for Latinx students and/or a determination to instruct students on social emotional learning and character education due to that perceived deficit (Yosso, 2005). This study did not explore questions related to advisory's purpose in a given school, and additional research is needed to determine why there is a relationship between higher rates of Latinx enrollments and higher rates of advisory.

Based upon previous research (McEwin and Greene, 2010, 2013), we anticipated that MSC clusters might have different percentages of students from lower-income communities and/or

from non-White student subgroups. Our findings confirmed that schools with higher relative wealth did have higher access to MSC programming in advisory, but this finding related to school district spending and not students' relative wealth. Likewise, there was no clear evidence that White students were more likely to have access to MSC programming. The only significant finding related to race suggests the opposite in only one area of MSC programming (Advisory), and this study did not explain why this may be the case. There appears to be no overall predictable pattern regarding why principals implement MSC programming, other than district per pupil expenditure correlating with the high-Advisory or high-Advisory with high-Teaming clusters. This is consistent with the notion that Advisory is not believed to be essential programming but an add-on program to deliver if principals and their teachers are able to implement it. Yet, it is possible that principals' concerns about equity and access may be driving the higher implementation of Advisory in schools with higher rates of Latinx students. This finding aligns with previous research associating positive academic outcomes related to affective structures and school connectedness for schools with higher rates of poverty (Picucci *et al.*, 2004; Shulkind and Foote, 2009). In Illinois, the poverty rate for Latinx children under age 17 is 27 percent compared to 11 percent for their White peers (Pew Research Center, 2014).

In the United States, state and federal accountability mandates pressure principals and teachers to improve standardized test scores, and it is important to determine the extent to which initiatives such as MSC have an effect on student learning. We found that the high-Teaming cluster did show a statistically significant main effect on composite PARCC. The partial eta squared of 0.03 indicates that 3 percent of the variance in composite PARCC is due to teaming, suggesting a substantial added value to academic performance that relates to interdisciplinary teaming, which is consistent with previous research (Cook *et al.*, 2013; Faulkner and Cook, 2013). This result was not unexpected, because Teaming with Common Planning Time is intended to provide direct supports for students and help coordinate academic services. In many schools, the intent of advisory programming often is affective and relational, and advisory activities are not designed to directly affect student academic performance (Galassi *et al.*, 1997b; NMSA, 2012). Therefore, anticipating advisory as being related significantly to higher test scores may be a false assumption. However, we predicted that advisory plus teaming (full MSC implementation according to this study) should result in higher overall school academic performance. Galassi *et al.* (1997a) concluded that middle-grade schools implementing MSC practices with fidelity may have a diminishing need to continue to implement advisory, suggesting that schools with higher academic performance may eliminate advisory. There may be an academic value to teaming that does not exist for advisory, and it is important for principals to carefully consider reasons for implementing advisory.

The relationship between high-Teaming cluster and academic performance is important, but the strength of this finding was diminished when considering the role of race/ethnicity and a school's relative wealth. Because the effect of high-Teaming cluster disappeared when considering these variables, the overall positive effect of high-Teaming cluster on academic performance becomes less clear. Research has shown, when controlling for these variables, the net effect of the school on certain types of academic performance becomes less apparent or nonexistent (Lubienski and Lubienski, 2014). This finding is significant to the study of academic achievement and MSC. It appears that, although high-Teaming cluster alone is significant, the effects of high-Teaming cluster may be a result of privileges associated with Whiteness and affluence rather than the advantages of a programming model. This connection may point to in-school curricular structures that affect less-advantaged students, as indicated by folk belief theory. For instance, it is possible that structures principals have implemented that are not measured in this study, such as tracking into remedial or advanced courses, overidentification of students for special education, or disproportionate disciplinary

practices, may persist regardless of MSC implementation. According to folk belief theory, these practices would more likely negatively affect less-advantaged students. Although prior research has shown that MSC implementation may result in academic gains in high-poverty schools (Picucci *et al.*, 2004), the findings suggest that race and poverty together have an effect on academic performance. Ultimately, a school's demographics and relative wealth may negate the positive effect of MSC implementation, and Highly Successful Middle Schools (McEwin and Greene, 2013) may be labeled as such because they are less non-White and more affluent, leading researchers and practitioners to question the applicability of MSC as a school reform.

Implications for policy, practice, and further research

This study adds to a growing body of research examining issues of race and poverty and their effects on academic achievement. The Illinois school funding model negatively affects many public schools through inadequate funding levels in some higher-need communities (Murphy, 2012), which affects principals' abilities to offer MSC programming. Although we did not identify a clear relationship between full MSC implementation and higher academic achievement, we found that schools implementing teaming do have higher academic performance. Funding efforts that decrease disparate funding levels in Illinois school districts will minimize the lack of access to MSC programming, and targeted funding to promote teaming as a key part in MSC implementation in less-advantaged communities may result in improved academic performance.

One interpretation from this study could be that MSC does not matter because, when controlling for race/ethnicity and relative wealth, there is not a statistically significant relationship between academic performance and MSC. However, more research is needed before principals and district administrators propose significant programmatic changes. Likewise, teaming and advisory have beneficial effects for students in addition to their academic performance (Flowers *et al.*, 1999, 2000; Shulkind and Foote, 2009). Continued investment in interdisciplinary teaming may promote improved academic performance, but, as a result of the negating of academic performance due to issues of race/ethnicity and relative wealth, school leaders should also focus their energies and resources to reduce inequities within schools and across the state. Additionally, because principals generally do not state a purpose of advisory is to promote student learning (Moore, 2015), additional research should be conducted to more fully explore principals' and teachers' understandings of advisory programming and its role in promoting young adolescents' development. Advocacy efforts to address school funding reforms may result in more students having access to MSC programming, and alleviating discrepancies among students of color compared to White peers arguably is essential. Principals should consider their students' unique needs, as well as school and community factors influencing their ability to implement MSC.

Our study indicates the need for additional research, particularly in the area of advisory programming. Although policymakers may wish to tie reforms to student learning, academic performance as measured by standardized tests is not the sole way to measure student progress, and the primary goal of advisory programming may not be to improve academic performance.

Notes

1. Factor scores were calculated and the cluster analysis was repeated with the factor scores rather than summed scores. Cluster analysis results were exactly the same; every district was placed into the same factor-score-based cluster as they had been placed using the summed-score-based cluster.
2. Welch's ANOVA adjusts for unequal variances.

3. Games–Howell is a post hoc (post-ANOVA) test for comparing group means when the variance or standard deviation differs between groups.

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