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LEFT BEHIND: ASSOCIATING SCHOOL-LEVEL VARIABLES WITH OPPORTUNITIES FOR GLOBAL EDUCATION

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Abstract

This study examines associations between school-level proportions of poverty and underserved student populations, as well as geographic locale on schools' likelihood of offering any of the four International Baccalaureate (IB) programmes. I matched each of 1,420 U.S. public IB schools with comparison schools (N = 2,840) on three bases: state, grade span (e.g., K-3, 6-8, 9-12, etc.), and student enrollment. Despite IB's reputation of being an elite club, descriptive statistics and logistic regressions showed rurality as having far more negative associations than poverty or underserved populations with schools' likelihood to offer IB. Urban schools held a decided advantage. As the first empirical study to examine opportunity to learn in the context of the full IB continuum, I address implications for privileging opportunities to access global education and make policy recommendations to address disparities.

Keywords*: global education, International Baccalaureate, opportunity to learn, rural schools, urban schools*

Introduction

Opportunity to learn (OTL) has evolved considerably since Carroll (1963) introduced the term. He sought to compare the amount of time students engaged in a given topic with the amount of time they'd need to learn in order to generate sufficient test scores. Instead, McDonnell (1995) conceptualized OTL as a social contract between schools and communities. Porter (2002) used OTL to differentiate the content of instruction that groups received. Herman (2014) framed effective curriculum and instruction that enables students to achieve rigorous learning at OTL's core. Within the context of OTL as McDonnell, Porter, and Herman have described it, students' lack of access to any rigorous learning outcome creates an OTL gap.

International Baccalaureate (IB) is one rigorous learning opportunity that OTL scholars have given little attention. Few studies have examined students' OTL with respect to IB (e.g., Perna et al., 2013; Shaunessy, Suldo, Hardesty, & Shaffer, 2006). Casting IB as elite (Bunnell, 2008; Doherty, 2009; Doherty, Luke, Shield, & Hincksman, 2012), researchers often define the program narrowly, stereotyping it as existing to serve "the cognitive and affective needs of academically and intellectually advanced students" (Shaunessy et al., 2006, p. 76). This non-exhaustive characterization stems from researchers

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aligning the IB's Diploma Programme (DP) with Advanced Placement (AP) as "credit-based transition programs" (Bailey & Karp, 2003). Though the DP is IB's longest-running, best-known programme, three other IB programmes share its focus on international-mindedness (IM), an essential 21st-century skill that incorporates multilingualism, intercultural understanding, and global engagement (Castro, Lundgren, & Woodin, 2013). Unlike the high school-only AP, IB offers a Primary Years Programme for students in pre-K to U.S. Grade 5, Middle Years Programme for U.S. Grades 6-10, as well as the DP and recently adopted IB Career-Related Programme for U.S. Grades 11-12.

Despite IB's programmatic variety, OTL researchers typically conflate IB and AP (e.g., Darity, Castellino, Tyson, Cobb, & McMillen, 2001; Hertberg-Davis & Callahan, 2008; Kyburg, Hertberg-Davis, & Callahan, 2007), even though IB distinguishes itself from AP with its four programmes that focus on international mindedness, which is a rigorous outcome independent of college readiness. Dr. Kedra Ishop, the University of Texas vice provost and director of admissions, described the IBDP as

> very specifically designed to engage students with the broader community. It's an academic program, but very much a part of that academic program is helping those students see the world in a much bigger context." (IBO, 2010, p. 5)

Still, IB researchers emphasize academic benefits (e.g., Bailey & Karp, 2003; Caspary & Bland, 2011; Coca et al., 2012; Conley & Ward, 2009; Foust, Hertberg-Davis, & Callahan, 2009; Halic, 2013; Shah, Dean, & Chen, 2010). Perna et al. (2013) are among the IB researchers who have focused exclusively on the DP and its potential to improve high school students' postsecondary outcomes. However, they distinguished themselves from previous researchers by providing the first large-scale analyses of OTL with respect to any IB programme. They examined data across high schools nationwide and data within DP schools in Florida. Within DP schools, they found student participation to depend disproportionately on students' socioeconomic status and race/ethnicity. However, they provided evidence that suggests schools with majorities of affluent students had begun to loosen their grip on DP access even before the U.S. Department of Education began funding grants to implement the DP in Title I schools in 2006 and the Gates Foundation invested $2.4 million to increase IB access nationally in 2009. Examining

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longitudinal data from 1995 to 2008, they also found schools with large Hispanic populations had closed nationwide access gaps, though schools with large proportions of black students had not.

Though the Perna et al. study made important contributions to a limited literature base, they approached IB as “arguably the most academically demanding type of credit-based transition program” (p. 403), ignoring its most unique feature. With its mission “to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world,” IB is the world’ most prominent approach to global education. IB has served more than 1.2 million students aged 3 to 19 in 147 countries (IBO, 2015). Schools seeking authorization to implement IB must meet rigorous philosophical, structural, financial, and curricular requirements, indicating a commitment to globalizing their students’ educational experience. Therefore, research should examine IB as more than a university steppingstone. Its international focus is especially atypical in the US, where IM has been crowded out of public schools—like other 21st century skills—during the 15-year surge of standardized testing of basic literacy and numeracy (Berliner, 2009; Conley & Darling-Hammond, 2013; Zhao, in press). The U.S. context is also interesting because 90.3% of its IB schools are state-funded (i.e., public). In the 146 other nations with IB, 65.8% of authorized schools are private. The current study is the first to examine OTL across the IB programmatic spectrum, approximating global education access for U.S. public-school students. Perna et al. (2013) set the standard for OTL research around IB, so I adopted several of their methodological choices. However, I defined schools as having IB if it offered any of the four programmes. I asked,

- RQ1: Do IB and non-IB public schools in the US differ on the basis of school proportion of students living in poverty?
- RQ2: Do IB and non-IB public schools in the US differ on the basis of school proportions of students from historically underserved populations?
- RQ3: Do IB and non-IB public schools in the US differ on the basis of geographic locale?
- RQ4: To what extent do these demographic factors associate with a school’s likelihood of offering IB?
- RQ5: To what extent do the interactions of these demographic factors associate with a school’s likelihood of offering IB?

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Though free-or-reduced lunch percentage is a commonly used, yet imperfect, proxy for poverty (Harwell & LeBeau, 2010), I followed Perna et al. and modeled the same variable in the absence of a better alternative. I hypothesized no meaningful difference between schools on the basis of poverty (H1). Also like Perna and colleagues, I examined schools on the basis of their proportions of Black and Hispanic students. However, those researchers noted a limitation of not incorporating "difficult to examine" underserved groups in their models (p. 422), so I included students who identified as American Indian/Alaska Native and Hawaiian in this study. I hypothesized IB and non-IB schools would differ on the basis of their proportions of students from historically underserved populations (H2). I expected IB schools to cluster in urban areas—where cosmopolitan attitudes that align with international mindedeness might be more common—so I included geographic locale in my models, expecting observable differences on that basis (H3). Without extant IB literature in this area, I anchored this hypothesis in OTL studies of AP, which have shown disproportions favoring students in urban schools (Anderson & Chang, 2011; Gagnon & Mattingly, 2015; Jeong, 2009; Klopfenstein, 2004; Thier, Beach, Todd, & Coleman, forthcoming). Ultimately, based on the trends that Perna et al. (2013) reported, I hypothesized that a school's geographic locale would play a greater role in its likelihood to offer IB than its proportions of students in poverty or students from historically underserved groups in my more recent data (H4). However, due to the exploratory nature of this study, I expected significant interactions among the school-level variables (H5), but did not predict their direction. Also, I expected an unbalanced design, which occurs often in examinations that account for geographic locale (see Meece, Hutchins, Byun, Farmer, Irvin, & Weiss, 2013; Petrin, Schafft, & Meece, 2014). As a result, I chose the most robust analytical procedures available to facilitate the strongest possible associative inferences between the three school-level demographic variables and the likelihood of offering IB (see Analysis).

Methods

Using a quasi-experimental design, I analyzed a matched, nonrandom sample of U.S. public schools to examine relations between three school-level demographic variables (poverty, proportion of students from historically underserved populations, and geographic locale) and the presence of IB as a proxy for students' opportunity to experience global education. I selected binomial logistic regression to explain variation in a dichotomous outcome (Pampel, 2000).

Data Sources and Sampling

I merged data from two public sources: IB's listing of its World Schools and the most recent data year (2013-14) in the National Center for Education Statistics' (NCES) Public Elementary/Secondary School Universe Survey of the Common Core of Data (CCD). As of July 2015, IB had authorized 1,644 U.S. schools to offer one or more of its four programmes. First, I excluded 161 private schools, which are not subject to hortatory requirements by which U.S. public schools must report aggregated students' free or reduced-price lunch (FRPL) status and race/ethnicity. Also, whether families can afford, or opt to pay, private school tuition might confound understanding of students' OTL. Second, I excluded 9 public IB schools in the District of Columbia (DC) because the NCES codes 221 of 222 DC schools (99.5%) as large urban, rendering too little variance to model for geographic locale effects. Third, I excluded another 37 IB schools after I was unable to identify them in the CCD. Fourth, I excluded 17 IB schools because no comparison schools existed to match them on all three variables (see Matching). After exclusions, I retained a sample of public IB schools (n = 1,420) from 46 U.S. states. Rhode Island and Vermont each have one private school offering IB; North Dakota and South Dakota have no IB schools. In total, the sample allowed me to analyze 86.4% of all IB schools (95.8% of public IB schools) in the US. There were no missing data for any variables except poverty, which had 10 cases of missingness (0.7%). Therefore, I did not impute data.

Matching

NCES lists 99,344 public schools in the CCD, meaning IB occupies less than 1.5% of the public education market. The low incidence of IB schools in the US required the use of a matching procedure. I matched each IB school with a comparison non-IB school, yielding an analytical sample of N = 2,840. I matched schools based on common (a) state, (b) grade span from lowest to highest served, and (c) student

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enrollment, all selected to control for categorical differences between schools. I chose state as a matching variable under the assumption that states' policies would facilitate and constrain IB adoption differentially. I chose grade span due to an assumption that IB's four programmes across the preK-12 continuum might have differential likelihoods of adoption due to varying district-level priorities and resource allocations. Finally, I chose student enrollment due to an assumption that number of students served might influence program adoption or implementation decisions for schools and/or districts. A national data set of this size could mask these potential influences. To match each IB school, I sorted every U.S. public school in the CCD by state. Then, I delimited schools within states based on grade span (e.g., Nebraska public schools serving students in Grades 6-8). Next, I identified a comparison school as that which had the closest number of students to the IB school under consideration. If an IB school existed within a state and grade span that matched multiple potential comparison schools with either (a) the same total number of students as the other comparison school(s) or (b) an equal difference in total number of students between the IB school and two or more comparison schools, I selected the comparison school buy using a random number generator (Hedges, 2008). Of the 1,420 matches, 266 required generation of a random number (18.73 %).

Variables

This study examined associations between a dichotomous outcome variable (IB presence) and three independent variables. Two were continuous and used to make between-school comparisons (proportion of students living poverty and proportion of students from historically underserved populations). One was categorical (geographic locale). In Table 1, I reported descriptive statistics for each continuous independent variable. I also reported amount and proportion for geographic locale for both IB and non-IB schools. The CCD provided data for all three independent variables.

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Table 1

Descriptive Statistics of IB and Non-IB Schools in the United States (N = 2,840)

Variables	IB	Non-IB	Total
Poverty			
M	0.49	0.48	0.49
SE	0.01	0.01	0.00
SD	0.26	0.27	0.26
Range	0.00 to 1.00	0.00 to 1.00	0.00 to 1.00
Skewness	0.01	0.12	0.07
Kurtosis	-0.93	-1.02	-0.98
Underserved populations			
M	0.52	0.44	0.48
SE	0.01	0.01	0.01
SD	0.29	0.30	0.30
Range	0.00 to 1.00	0.00 to 1.00	0.00 to 1.00
Skewness	0.04	0.47	0.24
Kurtosis	-1.19	-1.04	-1.19
Geographic locale			
Urban (reference) *n*	697	446	1,143
Suburban *n*	549	609	1,158
Town *n*	67	137	204
Rural *n*	107	228	335
Urban %	24.5	15.7	40.2
Suburban %	19.3	21.4	40.8
Town %	2.4	4.8	7.2
Rural %	3.8	8.0	11.8

Note. IB = International Baccalaureate. Not all percentages sum to 100 due to rounding.

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To approximate students' opportunity to experience global education, I observed whether schools offered *IB*. I dummy coded each school in the sample (0 = non-IB; 1 = IB). As a matched sample, there are an equal number of non-IB and IB schools. I approximated *poverty* by adding each school's number of students eligible for free lunch to its number of students eligible for reduced-price lunch (FRPL), dividing that sum by the school's enrollment. Schools with higher proportions of FRPL-eligible students indicated more poverty. I calculated each school's proportion of students from historically *underserved populations* by summing its number of students classified as American Indian/Alaska Native, Black, Hawaiian, and Hispanic and dividing by enrollment. *Geographic locale*, a four-level categorical variable, applied NCES' urban-centric categorical system (see Table 2). I dummy coded with urban as the reference group, coding suburban schools as (urban = 0; suburban = 1); town schools as (urban = 0; town = 1); and rural schools as (urban = 0; rural = 1). Coding in this fashion compares each dummy coded group to the omitted group (i.e., urban; Pampel, 2000).

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Table 2

National Center for Education Statistics Urban-Centric Locale Codes

Locale category	Urban-centric subcategory	Descriptor
City	Large	Territory inside urban area; principal city with pop. ≥ 250,000
	Mid	Territory inside urban area; principal city with pop. < 250,000 & ≥ 100,000
	Small	Territory inside urban area; principal city with pop. < 100,000
Sub-urban	Large	Territory outside urban area; principal city with pop. ≥ 250,000
	Mid	Territory outside urban area; principal city with pop. < 250,000 & ≥ 100,000
	Small	Territory outside urban area; principal city with pop. < 100,000
Town	Fringe	Territory inside urban cluster; ≤ 10 miles from urban area
	Distant	Territory inside urban cluster; > 10 miles but ≤ 35 miles from urban area
	Remote	Territory inside urban cluster; > 35 miles from urban area
Rural	Fringe	Rural territory ≤ 5 miles from urban area; ≤ 2.50 miles from urban cluster
	Distant	Rural territory > 5 miles but ≤ 25 miles from urban area; > 2.50 but ≤ 10 miles from urban cluster
	Remote	Rural territory > 25 miles from urban area; > 10 miles from urban cluster

Note. pop. = Population.

Analysis

Using SPSS version 21 (IBM, 2012), I answered RQs 1-3 by segmenting the sample into IB and non-IB schools. Then, I reported descriptive statistics and correlations. For RQs 4 and 5, I returned the data set to its full form and tested regression assumptions (see Fox, 1991). Next, I regressed presence of IB onto poverty, underserved population, and geographic locale using stepwise block entry to provide an additive summary of the influence of these variables on the logged odds (Field, 2013; Pampel, 2000) of a school providing students with the opportunity to experience global education. To evaluate goodness of fit, I used Nagelkerke's R^2 (NR^2) and the Wald test. NR^2, however, provides only a rough guide (Pampel,

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2000). Seeking the most robust indication of model fit, I also examined -2 log likelihood (-2LL), which several researchers consider more precise than the Wald test due to its tendency to inflate standard errors and increase false negatives (i.e., Type II error; Field, 2013; Long, 1997). I strengthened my analyses further by examining chi-square statistics and correct classification percentage for each model. I concluded by modeling all possible two-way interactions between independent variables. Due to a large sample size and the exploratory nature of this study, I set $\alpha = .01$ for all analyses.

Results

I have reported findings stepwise, beginning with descriptive and correlational data (see Table 3) to answer RQs 1-3. Then, I reported assumption testing, the model-building progression, and finally main effects to answer RQ4 and interaction effects for RQ5.

Descriptive Statistics and Correlations

After I matched IB to non-IB schools, descriptive statistics revealed most of the hypothesized differences between the two school types. IB schools and their non-IB counterparts had near-identical poverty proportions and correlations showed no relation between IB and poverty (H1). Underserved populations differed on the basis of whether a school had IB, but not as predicted (H2). IB schools had *larger* proportions of underserved populations (.52) than non-IB schools (.44). As a sensitivity analysis, I modeled for proportion of non-white students to examine school's overall diversity level by including Asian or Asian/Pacific Islander and Multiracial students, which had not been included in the underserved calculation. The non-white difference was even larger when comparing IB schools (.58 non-white) to non-IB schools (.49). The distribution for underserved populations had 15 minor outliers, but its skewness (0.24) and kurtosis (-1.19) fell within acceptable ranges for normality (i.e., -2 to 2; George & Mallery, 2010). IB correlated positively with underserved populations ($r = .14$, $p < .001$). On the basis of geographic locale, urban and suburban schools offered IB far more frequently than town or rural schools (H3). Though IB correlated positively with urban schools ($r = .18$, $p < .001$) and negatively with schools in suburban ($r = -.04$, $p < .05$), town ($r = -.10$, $p < .001$), and rural settings ($r = -.13$, $p < .001$).

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When exploring for potential interactions, I found poverty and underserved populations to correlate highly ($r = .76$, $p < .001$). Also, poverty and underserved populations each correlated positively with urban schools and negatively with schools in suburban and rural settings. Among town schools, poverty did not correlate significantly, though underserved populations correlated negatively. Correlations for IB and non-IB schools in urban and suburban settings varied in strengths of association with poverty and underserved populations, but their patterns of significance remained constant. By contrast, IB and non-IB schools in town and rural settings showed wider variation between school types. Underserved populations correlated negatively with non-IB schools in town settings ($r = -.14$, $p < .001$), but not for IB schools. Poverty correlated negatively with IB schools in rural settings ($r = -.11$, $p < .001$), but not for non-IB schools.

Table 3

Correlating IB to Poverty, Underserved Populations, and Geographic Locale (N = 2,840)

All schools	Poverty	Underserved	Urban	Suburban	Town	Rural
IB	.02	$.14^{***}$	$.18^{***}$	$-.04^{*}$	$-.10^{***}$	$-.13^{***}$
Poverty		$.76^{***}$	$.27^{***}$	$-.24^{***}$	.03	$-.07^{***}$
Underserved			$.34^{***}$	$-.15^{***}$	$-.11^{***}$	$-.21^{***}$
IB		Underserved population	Urban	Suburban	Town	Rural
Poverty		$.79^{***}$	$.29^{***}$	$-.24^{***}$	.02	$-.11^{***}$
Underserved			$.31^{***}$	$-.18^{***}$	-.05	$-.21^{***}$
Non-IB		Underserved population	Urban	Suburban	Town	Rural
Poverty		$.74^{***}$	$.25^{***}$	$-.24^{***}$	.05	-.04
Underserved			$.35^{***}$	$-.10^{***}$	$-.14^{***}$	$-.19^{***}$

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Note. IB = International Baccalaureate.

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Assumption Testing

The models met logistic regression assumptions: (a) the outcome variable was dichotomous, (b) there was at least one independent variable, either continuous (e.g., poverty) or categorical (i.e., geographic locale), (c) observations of the outcome were independent with mutually exclusive and exhaustive categories, and (d) the independent variables exhibited linear relationships with the logit transformation of the outcome (Field, 2013; Lund & Lund, 2013). Assumptions of ordinary least squares regression such as normality, homoscedasticity, and constancy of error, do not typically apply when the outcome is dichotomous (Pampel, 2000), but due to some high correlations, I also modeled the outcome as a linear regression to test multicollinearity assumptions. Collinearity statistics suggested all assumptions had been met for regressing IB onto the independent variables (see Table 4).

Table 4

Diagnostics for Poverty, Underserved Populations, and Geographic Locale

Variable	Tolerance	Variance inflation factor (VIF)
Poverty	.40	2.50
Underserved populations	.38	2.65
Suburban	.77	1.31
Town	.85	1.18
Rural	.79	1.27

Note. No condition index exceeded 8 among these variables; Tolerance > .20 and/or VIF < 4 indicate variables that do not violate assumptions of multicollinearity (see Fox, 1991).

Model Building

In Table 5, I reported betas, standard errors, Wald statistics, exponentiated betas, and 99% confidence intervals for all independent variables in each model that addressed RQ4. In addition, I included four model-fit indices. Model 1 regressed IB presence onto poverty, which was not significant on its own. Model 2 introduced underserved populations, which was significant, $\chi^2(1) = 102.06$, $p < .001$.

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Table 5

Logistic Regressions for Main Effects of IB Presence (N = 2,840 Schools)

	Model 1					Model 2					Model 3				
	B	*SE B*	*Wald*	*Exp*	*CI*	*B*	*SE B*	*Wald*	*Exp*	*CI*	*B*	*SE B*	*Wald*	*Exp*	*CI*
Ref. (urban)	-0.09	0.08	1.25	0.92		-.0.21	0.08	6.47	0.81*		0.36	0.11	10.48	1.43**	
Poverty	0.18	0.14	1.61	1.20	0.83, 1.74	-1.56	0.23	45.17	0.21***	0.12, 0.38	-1.41	0.24	34.09	0.24***	0.13, 0.45
Under.						2.02	0.21	95.26	7.55***	4.43, 12.88	1.51	0.22	47.30	4.51***	2.57, 7.94
Suburb.											-0.52	0.09	34.42	0.59***	0.47, 0.75
Town											-0.90	0.17	28.83	0.41***	0.27, 0.63
Rural											-0.98	0.14	49.86	0.38***	0.26, 0.54
	(df) χ^2		*% C*	*NR*^{2}	*-2LL*	*(df)* χ^2		*% C*	*NR*^{2}	*-2LL*	*(df)* χ^2		*% C*	*NR*^{2}	*-2LL*
	(1) 1.61		51.5	0.1	3,935.46	(2) 103.67***		58.3	4.8	3,833.41	(5) 177.85***		60.3	8.1	3,759.23

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Note. Ref = reference group. Under. = underserved populations. Suburb. = suburban. *B* = unstandardized beta. *SE B* = standard error of unstandardized beta. *Wald* = Wald statistic. *Exp* = exponentiated beta. CI is calculated as a 99% confidence interval. *(df)* χ^2 = degrees of freedom for chi-square deviance test. *% C* = correct classification percentage. *NR*^{2} = Nagelkerke's R^2. *-2LL* = -2 log likelihood.

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When controlling for underserved populations, poverty became a significant contributor to Model 2, $B = -1.56$, $p < .001$. NR^2 showed that underserved populations explained about 4.7% of the pseudo-variance. Model 2 correctly classified 58.3% of cases, considerable improvement from the null model (50.0%) or Model 1 with poverty alone (51.5%). In Model 3, I included geographic locale. Each level was significant, as was the overall model, $\chi^2(5) = 177.85$, $p < .001$. Geographic locale increased pseudo-variance by 3.3% and correct classification by 2.0%. Across models, -2 log likelihood decreased linearly from Model 1 (3,935.46) to Model 3 (3,759.23), suggesting improved fit and supporting H4 partially.

In Table 6, I reported results of the three models that address RQ5. For the three interaction models, I added $\Delta\chi^2$ as an additional indicator of model fit. Model 4 tested the interaction of poverty and underserved populations, which was significant at $\alpha = .05$, but not the a priori level (.01). Overall, the model was significant, $\chi^2(6) = 182.37$, $p < .001$. Model 4 improved the proportion of pseudo-variance explained by 0.2%, but reduced correct classification by 0.4%. Model 5 tested interactions of poverty and three levels of geographic locale. The model was significant overall, $\chi^2(8) = 180.52$, $p < .001$, but the block produced a worse-fitting model on every indicator except correct classification, which improved by 0.3%. Last, Model 6 tested interactions of underserved populations and three levels of geographic locale. Again, the model was significant overall, $\chi^2(8) = 187.37$, $p < .001$, making minor improvement to some model-fit statistics. The final model classified 60.6% of cases correctly, explained 8.5% of the pseudo-variance, and produced the lowest -2LL across all models (3,749.70). However, the interaction models did not support H5.

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Table 6

Logistic Regressions for Interaction Effects of IB Presence (N = 2,840 Schools)

	Model 4					Model 5					Model 6				
	B	*SE B*	*Wald*	*Exp*	*CI*	*B*	*SE B*	*Wald*	*Exp*	*CI*	*B*	*SE B*	*Wald*	*Exp*	*CI*
Ref. (urban)	0.12	0.16	0.57	1.13		0.34	0.16	4.77	1.40*		0.49	0.15	10.23	1.63**	
Poverty	-0.87	0.35	6.19	0.42*	0.17, 1.03	-1.35	0.30	20.44	0.26***	0.12, 0.56	-1.41	0.24	33.66	0.25***	0.13, 0.46
Under.	2.18	0.39	31.80	8.80***	3.26, 23.77	1.48	0.22	44.93	4.39***	2.49, 7.76	1.28	0.28	20.30	3.59***	1.73, 7.45
Suburb.	-0.51	0.09	32.81	0.60***	0.48, 0.75	-0.56	0.19	8.78	0.57**	0.35, 0.93	-0.72	0.18	15.48	0.49***	0.30, 0.78
Town	-0.90	0.17	29.35	0.41***	0.26, 0.62	-0.77	0.42	3.45	0.46	0.25, 1.07	-1.53	0.31	24.21	0.22***	0.10, 0.48
Rural	-0.98	0.14	49.22	0.38***	0.26, 0.54	-0.66	0.28	5.46	0.52*	0.25, 1.07	-0.89	0.24	13.91	0.41***	0.22, 0.76
Pov. x under.	-1.19	0.56	4.50	0.30*	0.07, 1.29										
Pov. x suburb.						0.11	0.34	0.11	1.12	0.47, 2.66					
x town						-0.24	0.73	0.11	0.79	0.12, 5.15					
x rural						-0.76	0.55	1.91	0.47	0.11, 1.93					
Under. x suburb.											0.38	0.31	1.50	1.46	0.66, 3.21
x town											1.51	0.60	6.28	4.55*	0.96, 21.55
x rural											-0.50	0.52	0.94	0.61	0.61, 2.29
(df) χ^2	(6) 182.37*					(8) 180.52					(8) 187.37*				
$\Delta\ \chi^2$	4.52*					2.67					9.52*				
% C	59.9					60.2					60.6				
NR^2	8.3					8.2					8.5				
-2LL	3,754.71					3,756.55					3,749.70				

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. *Note*. See Table 5.

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Main Effects

No interaction was significant in Models 4-6, so I interpreted the main effects in Model 3. To aid interpretability, I reported exponentiated betas as odds ratios, using Equation 1 (see Pampel, 2000).

$$\% \, \Delta = (e^b - 1) * 100 \qquad (1)$$

Poverty, which was not significant on its own in Model 1, $B = 0.18$, $p > .05$, associated significantly with reduced IB access when underserved populations and/or geographic locale were controlled. Under those conditions, when poverty increased in a school by a standard unit (i.e., 26% in these data), its likelihood of offering IB decreased 76%. By contrast, higher proportions of underserved populations improved schools' odds of offering IB dramatically. When controlling for poverty and geographic locale, a standard unit increase in underserved populations (i.e., 30% in these data) accompanied its likelihood of offering IB *increasing* by 351%. Examining geographic locale, I controlled for poverty and underserved populations. Compared to the urban reference group, schools at every other level had lower odds of offering IB. The decline from urban centers was linear. Suburban schools were 41% less likely than their urban counterparts with town schools being 59% less likely and rural schools 62% less likely than the urban group.

To ensure the most reliable results, I computed the Bayesian information criterion (BIC), which can aid interpretability of significant p values, especially in designs with large sample sizes (Pampel, 2000). I calculated BIC as shown in Equation 2. Field (2013) recommends using the Wald statistic as z^2.

$$BIC = z^2 - \ln n \qquad (2)$$

With 3.45 as the natural log for the sample, all independent variables exceeded the highest level of Raftery's (1999) BIC evaluation rules of thumb (see Table 7) by wide margins. The BIC was

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more than double the highest threshold for even this study's weakest association with IB (i.e., town schools, which produced a BIC of 25.38).

Table 7

Raftery's (1999) Rules of Thumb to Evaluate Bayesian Information Criteria (BIC)

BIC value	Suggested interpretation
< 0	Little support for inclusion
0-2	Weak
2-6	Positive
6-10	Strong
> 10	Very strong

Discussion

As the first empirical IB investigation of OTL across the K-12 spectrum, this study contributes to understanding global education access, a topic that is sparse in literature, but escalating in urgency. Globalization shows no signs of slowing down, and these data associated differential access for global education with some school-level variables. Confirming several findings from Perna et al. (2013), poverty does not seem to be the predictor of school-level access that many IB critics have surmised. Surprisingly, proportion of underserved population no longer seems to limit school-level IB access. In fact, the inverse is true in these data that feature all four IB programmes. However, differences on the basis of geographic locale mean that despite some practitioners' assertions suggesting "IB is good for everyone" (qtd. in Perna et al., 2013, p. 416), students outside urban areas have less access to that commodity. Thier (in press) identified two individual and three societal rationales for global education: (a) enhancing one's employability or engendering one's personal growth and (b) improving diplomacy diplomacy/national security, solving multi-national dilemmas, and establishing a harmonious global village. Denying these benefits to students in rural settings or entire rural communities would be an untenable violation of the social contract embedded in a pursuit of equitable OTL.

Fully supporting 2 of 5 hypotheses and partially supporting 2 others, I found significant gaps that affect U.S. public school student opportunities to experience global education. Furthermore, the convergence of model-fit indices with BIC values, plus a confidence level of 99%, provided very strong evidence for the associative claims I have made here. It is worth noting that this study that examined IB for its global education properties and intentionally disentangled it from analyses of AP found very different relations with poverty and race/ethnicity. OTL researchers whose focus has been AP have found both poverty (Barnard-Brak, McGaha-Garnett, & Burley, 2011; Iatarola, Conger, & Long, 2011; Jeong, 2009; Klopfenstein, 2004; Moore & Slate, 2008) and high proportions of underserved populations (Barnard-Brak et al., 2011; Battey, 2013; Cisneros, Gomez, Powers, Holloway-Libell, & Corley, 2014; Darity et al., 2001; Iatarola et al., 2011; Jeong, 2009; Klugman, 2013; Moore & Slate, 2008) to limit AP access. Neither of those associations bore out in the four-programme IB data of this study.

Instead, the gaps detected here portend equity issues that could limit lifelong opportunities for some students. In particular, geographic locale wielded greater influence on students' opportunity to experience global education than other variables that researchers traditionally posit as predictors of student access to rigorous and rich educational programs. Contrary to IB's long-held reputation as an elite club, data from both Perna et al. (2015) and the current study revealed school-level poverty to be of little consequence as an independent factor of school-level OTL. In this sample, rurality seemed far more relevant than poverty, which policymakers and practitioners alike often cast as *the* salient factor in making decisions about educational inputs and outcomes. Still, I did not show clearly how all three school-level variables might work in concert.

At this point, historically underserved populations have greater likelihood of attending schools that offer IB. Of course, this study's design could not generate information about the direction of association between underserved populations and IB offering. Is it possible that administrators are more inclined to serve students with IB education if their schools feature many students of color? Certainly, but this study can neither support nor contradict the counter-claim that families from historically underserved populations might seek out schools with IB programs intentionally, creating greater diversity in those

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settings. Perhaps IB schools share some traits that make them attractive to culturally diverse groups. Also, it is important to note that Perna and colleagues (2015) examined student-level data, unlike the current study. They did not examine whether schools offered IB, rather which students took IB classes within schools that did offer IB; students who were Caucasian and affluent enrolled in IB courses disproportionately. Therefore, before providing research and policy implications based on the current study's contributions, I included limitations to prevent one from overgeneralizing from these findings.

Limitations

Though the current study featured a more comprehensive view across all four IB programmes and Perna et al. examined only DPs in Florida to focus on college preparation, their finding remains important for understanding equity implications. For 3 of its 4 programme types, IB does not mandate that all students in an authorized school must be allowed to participate. Only the Primary Years Programme is school-wide, per IB regulations. Otherwise, schools may set their own decision criteria for programme enrollment, potentially creating local policies that might permit or preclude students from reaping any of the benefits that IB might provide. Perna et al. can make claims about that phenomenon, which this study cannot. Another limitation arose from this study's use of the presence of IB to examine conditions for global education by proxy. IB is not the world's lone provider of global education. Other options include the Cambridge Advanced International Certificate of Education (AICE), school accreditation through the Council for International Schools (CIS), or the International Primary and Middle curricula among others. However, AICE and CIS exist in roughly 300 schools in the US, most of which are private. It is not known the extent to which American public schools have purchased the International Primary or Middle curricula. Extra-curricular options (e.g., World Savvy and TakingItGlobal) provide global education, but are not integrated into daily curriculum as is IB, the longest running global education programme.

In addition, these findings do not depict students in IB schools necessarily having higher levels of global competence than their non-IB peers. We do not know if IB programs increase students' global competence (Perry & Southwell, 2011). IB students have outscored non-IB peers on global competence measures (see Hayden & Wong, 1997; Hinrichs, 2003), but selection bias might confound those results.

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Random assignment to IB schools has not been attempted, and students might choose IB programmes to reinforce global competence they acquired prior to participation or outside their school experiences. Furthermore, variable quality of IB programmes' abilities to instill global competence is an unstudied, but necessary, consideration.

Finally, this study's sampling and analytical methods beg some questions. Providing a comparison group for IB schools required a nonrandom matching procedure. With enrollment as one of three matching variables, school differences as small as a single student could have brought very different comparison schools into the analytical pool. Additionally, the unique case of Colorado might have exerted undue influence on the odds ratios by geographic locale. At 5.4%, Colorado has the highest proportion of its public schools offering IB by far. No other state has even 4%. Half of states have less than 1%. Importantly for the current study, Colorado also has 10 IB schools in remote towns and 10 more IB schools in its rural areas. Modeling nationwide data without Colorado would have produced vastly different odds ratios; the Rocky Mountain state provided 9.3% of all the rural IB schools and 38.5% of the remote town IB schools in this sample. Moreover, the use of logistic regression presents challenges to interpreting some effects, particularly among schools with especially high or low levels of the independent variables. At the highest or lowest points of the logit distribution's S-curve, independent variables might require larger changes to display the same effects that they would at corresponding points on a Gaussian, or bell-shaped, curve (Pampel, 2000). Therefore, several results in this study that approached significance might actually be undetected effects (e.g., the interaction between poverty and underserved proportions).

Future Research

Proliferation of global education has garnered much debate, but predominantly in popular journals. Global education must occupy a stronger presence in empirical literature if researchers seek to establish this type of education in a critical mass of schools. Reviewing literature on intercultural competence, Perry and Southwell (2011) called for examinations of programs that develop "intercultural competence" among K-12 children. The CCD has 65 listings with school names that indicate a global

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education focus (e.g., the High School for Global Citizenship in Brooklyn, NY or the Global Scholars Academy, an elementary school in Durham, NC). Unsurprisingly after these analyses, only 3 of those 65 schools (4.6%) are in town or rural settings with 44 (67.7%) in cities. As an additional direction, replicating the current study using other proxy variables (e.g., schools' participation in extra-curricular global education opportunities such as World Savvy and/or TakingItGlobal) could provide evidence to confirm the interpretations of this study. Also, quasi-experimental and experimental methods are needed to answer questions about whether IB students are more globally competent than their non-IB peers. Last, it is important to conduct research internationally to see if rurality and/or school remoteness in non-US contexts associates similarly with IB access. Methods of capturing geographic locale as a school-level variable might differ across nations, but I suspect cosmopolitan areas worldwide have a stranglehold on IB access as they seem to in the US.

Policy Implications

These data suggest that students in schools outside urban areas, particularly rural ones, lack sufficient opportunities to experience global education. Rising demand for global competencies will intensify the need to educate for it. Therefore, any disparities that preclude students from accessing this educational imperative could have dire consequences for equity (Reimers, 2010). Some activist politicians have implemented policies to redress historical gaps in IB access. Chicago mayor Rahm Emanuel invested significant city resources to widen IB access (Karp, 2012). Other cities have adopted similar approaches. But no such policy has been offered to curb disadvantages facing students in rural areas. Also, suburban areas should not be ignored. The data in the current study counter the theory of suburban advantage, which revealed systematic patterns of exclusion that enable suburban schools to hoard educational opportunities (Rury & Saatcioglu, 2011). These data reflect a rare instance in which suburban students lack an educational resource that their urban peers seem to have in abundance. The further advantage students have in experiencing the cosmopolitan nature of most cities, combined with an expectation that non-urban areas feature less cultural diversity, reinforce a need for global education programs outside of city centers.

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IB access that differs on the basis of geography might be a surprising finding in the 21st century, which Zhao (2010) characterized as witnessing the death of distance. Proximity should no longer predict access, but these data suggest that it does. In the case of IB, only students in authorized schools have access to its online options. Accordingly, schools, districts, and states should collaborate to develop policies that facilitate implementation of global education. These policies should focus on communities with the greatest likelihoods of suffering opportunity-to-learn disadvantages. However, implementing new programs can carry significant expenses, so policy solutions should be approached cautiously. Districts and schools that commit to IB, and some other global competence programmes, expend considerable resources to do so (Conley, Thier, Beach, Collins, & Chadwick, 2014).

Neumann (1926) admonished that new technologies would shrink distances between cultures. He described our world as “international” 90 years ago and he characterized youth as

> being conditioned by many influences so that they come to hold certain attitudes toward other nations and races. The question is, are these results such as prepare the students to live in this world, increasingly international in character, in a manner that will bring maximum satisfaction to themselves and to others, or in a manner that will sooner or later demonstrate that their educations as a whole, school and extra-school has led to maladjustment? (p. 12)

Scholars since Neumann have devoted a considerable body of conceptual writing to global education, but have not sufficiently influenced policy to produce programs that instill it among K-12 schools in the US. Rural areas, often ignored by reform efforts or accounted for only by mandates, are particularly overlooked (Manna, 2011). Simply stated, students should not be denied opportunities to learn 21st-century skills based on where they live.

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References

Anderson, R., & Chang, B. (2011). Mathematics course-taking in rural high schools. *Journal of Research in Rural Education*, *26*(1), 1-10.

Bailey, T. R., & Karp, M. J. M. (2003). Promoting college access and success: A review of credit-based transition programs. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education.

Barnard-Brak, L., McGaha-Garnett, V., & Burley, H. (2011). Advanced Placement course enrollment and school-level characteristics. *NASSP Bulletin*, *95*, 165–174.

Battey, D. (2013). Access to mathematics: A possessive investment in whiteness. *Curriculum Inquiry*, *43*, 332–359.

Berliner, D. C. (2009). MCLB (Much Curriculum Left Behind): A U.S. calamity in the making. *The Educational Forum*, *73*. 284-296.

Brustein, W. (2009). It takes an entire institution: A blueprint for the global university. *The handbook of practice and research in study abroad: Higher education and the quest for global citizenship*, 249-265.

Bunnell, T. (2008). The exporting and franchising of elite English private schools: the emerging "second wave." *Asia Pacific Journal of Education*, *28*, 383-393.

Carroll, J. (1963). A model of school learning. *The Teachers College Record*,*64*, 723.

Caspary, K., & Bland, J. (2011). *Research brief: First college courses taken by Florida IB students*. Menlo Park, CA: SRI International.

Castro, P., Lundgren, U., & Woodin, J. (2013). Conceptualizing and assessing International Mindedness (IM): An exploratory study. Cardiff, Wales: International Baccalaureate Organisation.

Cisneros, J., Gomez, L. M., Powers, J. M., Holloway-Libell, J., & Corley, K. M. (2014). The Advanced Placement opportunity gap in Arizona: Access, participation, and success. *AASA Journal of Scholarship & Practice*, *11*(2), 20–33.

Coca, V., Johnson, D., Kelley-Kemple, T., Roderick, M., Moeller, E., Williams, N., & Moragne, K. (2012). *Working to my potential: The postsecondary experiences of CPS students in the International Baccalaureate Diploma Programme.* Consortium on Chicago School Research.

Conley, D. T., Beach, P., Thier, M., Lench, S. C., & Chadwick, K. L. (2014, June). *Measures for a college and career indicator: Advanced coursework*. Eugene, OR: Educational Policy Improvement Center.

Conley, D. T., & Darling-Hammond, L. (2013). *Creating systems of assessment for deeper learning*. Palo Alto, CA: Stanford Center for Opportunity Policy in Education.

Conley, D. T., & Ward, T. (2009). *Summary brief: International Baccalaureate standards development and alignment project*. Eugene, OR: Educational Policy Improvement Center.

Darity, Jr., W., Castellino, D., Tyson, K., Cobb, C., & McMillen, B. (2001). *Increasing opportunity to learn via access to rigorous courses and programs: One strategy for closing the achievement gap for at-risk and ethnic minority students*. Raleigh, NC: Division of Accountability, North Carolina State Department of Public Instruction.

Doherty, C. (2009). The appeal of the International Baccalaureate in Australia's educational market: A curriculum of choice for mobile futures. *Discourse: Studies in the Cultural Politics of Education*, *30*(1), 73-89.

Doherty, C., Luke, A., Shield, P., & Hincksman, C. (2012). Choosing your niche: The social ecology of the International Baccalaureate Diploma in Australia. *International Studies in Sociology of Education*, *22*, 311-332.

Field, A. (2013). *Discovering statistics using IBM SPSS*. Newbury Park, CA: Sage.

Foust, R. C., Hertberg-Davis, H., & Callahan, C. M. (2009). Students' perceptions of the non-academic advantages and disadvantages of participation in Advanced Placement courses and International Baccalaureate programs. *Adolescence*, *44*, 289.

Fox, J. (1991). *Regression Diagnostics.* Newbury Park, CA: Sage.

Gagnon, D., & Mattingly, M. (2015). *Limited access to AP courses for students in smaller and more isolated rural school districts*. Retrieved on August 20, 2015 from http://scholars.unh.edu/carsey/235.

George, D., & Mallery, M. (2010). SPSS for Windows step by step: A simple guide and reference, 17.0 update (10a ed.) Boston, MA: Pearson.

Halic, O. (2013). *Postsecondary educational attainment of IB Diploma Programme candidates from US high schools*. Geneva, Switzerland: International Baccalaureate Organization.

Harwell, M., & LeBeau, B. (2010). Student eligibility for a free lunch as an SES measure in education research. *Educational Researcher*, *39*(2), 120-131.

Hayden, M. C., & Wong, C. S. (1997). The International Baccalaureate: International education and cultural preservation. *Educational Studies*, *23*, 349-361.

Hedges, A. (2008). *Truly random number generator*. Retrieved on Aug. 21, 2015 from http://andrew.hedges.name/experiments/random/.

Herman, J. (2014). Opportunity to Learn. *Encyclopedia of Science Education.* DOI 10.1007/978-94-007-6165-0_78-2

Hertberg-Davis, H., & Callahan, C. M. (2008). A narrow escape gifted students' perceptions of Advanced Placement and International Baccalaureate programs. *Gifted Child Quarterly*, *52*, 199-216.

Hinrichs, J. (2003). A comparison of levels of international understanding among students of the International Baccalaureate Diploma and advanced placement programs in the USA. *Journal of Research in International Education*, *2*, 331-348.

Iatarola, P., Conger, D., & Long, M. C. (2011). Determinants of high schools' advanced course offerings. *Educational Evaluation and Policy Analysis, 33*, 340–359.

IBM (2012). *IBM SPSS statistics for Windows* (version 21.0). Armonk, NY: IBM Corp.

International Baccalaureate Organisation (2010). *Increasing access for diverse schools and students*. Geneva, Switzerland: Author.

International Baccalaureate Organisation (2015). *About the IB's programmes*. Retrieved on Aug. 20, 2015 from http://www.ibo.org/.

Jeong, D. W. (2009). Student participation and performance on Advanced Placement exams: Do state-sponsored incentives make a difference? *Educational Evaluation and Policy Analysis*, *31*, 346–366.

Karp, S. (2012, March 23). CPS to expand International Baccalaureate program. *Catalyst Chicago*. Retrieved on August 20, 2015 from http://catalyst-chicago.org/2012/03/cps-expand-international-baccalaureate-program/.

Klopfenstein, K. (2004). The Advanced Placement expansion of the 1990s: How did traditionally underserved students fare? *Education Policy Analysis Archives*, *12*(68), 1–15.

Klugman, J. (2013). The Advanced Placement arms race and the reproduction of educational inequality. *Teachers College Record*, *115*, 1–34.

Kyburg, R. M., Hertberg-Davis, H., & Callahan, C. M. (2007). Advanced Placement and International Baccalaureate programs: Optimal learning environments for talented minorities? *Journal of Advanced Academics, 18*, 172–215.

Long, J. S. (1997). *Regression models for categorical and limited dependent variables: Analysis and interpretation*. Thousand Oaks, CA: Sage.

Lund, A. & Lund, M. (2013). Binomial logistic regression using SPSS. *Laerd Statistics*. Retrieved on August 20, 2015 from https://statistics.laerd.com/spss-tutorials/binomial-logistic-regression-using-spss-statistics.php.

Manna, P. (2011). *Collision Course: Federal Education Policy Meets State and Local Realities*. Washington, DC: CQ Press.

McDonnell, L. M. (1995). Opportunity to learn as a research concept and a policy instrument. *Educational Evaluation and Policy Analysis*, *17*, 305-322.

Meece, J. L., Hutchins, B. C., Byun, S. Y., Farmer, T. W., Irvin, M. J., & Weiss, M. (2013). Preparing for adulthood: A recent examination of the alignment of rural youth's future educational and vocational aspirations. *Journal of Educational and Developmental Psychology, 3,* 175-192. doi: 10.5539/jedp.v3n2p175

Moore, G. W., & Slate, J. R. (2008). Who's taking the Advanced Placement courses and how are they doing: A statewide two-year study. *The High School Journal*, *92*(1), 56–67.

National Center for Education Statistics. (n.d.) *NAEP state comparisons.* [Data set]. Retrieved from http://nces.ed.gov/nationsreportcard/statecomparisons/

Neumann, G. B. (1926). *A study of international attitudes of high school students*. Teachers College, Columbia University, NY, Contributions to Education, No. 239.

Pampel, F. C. (2000). *Logistic regression: A primer*. Newbury Park, CA: Sage.

Perna, L. W., May, H., Yee, A., Ransom, T., Rodriguez, A., & Fester, R. (2013). Unequal access to rigorous high school curricula: An exploration of the opportunity to benefit from the International Baccalaureate Diploma Programme (IBDP). *Educational Policy*, *29*, 402-425.

Perry, L. B., & Southwell, L. (2011). Developing intercultural understanding and skills: Models and approaches. *Intercultural Education*, *22*, 453-466.

Petrin, R. A., Schafft, K. A., & Meece, J. L. (2014). Educational sorting and residential aspirations among rural high school students: What are the contributions of schools and educators to rural brain drain? *American Educational Research Journal*, doi: 0002831214527493.

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher*, *31*(7), 3-14.

Raftery, A. E. (1999). Bayes factors and BIC. *Sociological Methods & Research*, *27*, 411-417.

Reimers, F. (2010). Educating for global competency. In J. E. Cohen & M. B. Malin (Eds.), *International perspectives on the goals of universal basic and secondary education*. Cambridge, MA: Routlege.

Rury, J. L., & Saatcioglu, A. (2011). Suburban advantage: Opportunity hoarding and secondary attainment in the postwar metropolitan North. *American Journal of Education*, *117*, 307-342.

Shah, S, Dean, M & Chen, Y. C. 2010. *Academic performance of IB students entering the University of California System from 2000-2002*. Geneva, Switzerland: International Baccalaureate Organisation

Shaunessy, E., Suldo, S. M., Hardesty, R. B., & Shaffer, E. J. (2006). School functioning and psychological well-being of International Baccalaureate and general education students: A preliminary examination. *Prufrock Journal*, *17*(2), 76-89.

Tarc, P. (2009). *Global dreams, enduring tensions: International Baccalaureate in a changing world*. New York: Peter Lang.

Thier, M. (in press). Globally speaking: Cultural intelligences and cross-cultural competencies. In Y. Zhao (Ed.), *Counting what counts: Reframing educational evaluation*. Bloomington, IN: Solution Tree.

Thier, M., Beach, P., Todd, J., & Coleman, M. (forthcoming). Places, poverty, and pupils: Exploring key predictors of Advanced Placement access. Under review for the Annual conference of the *American Education Research Association.*

Zhao, Y. (2010). Preparing globally competent teachers: A new imperative for teacher education. *Journal of Teacher Education*, *61*, 422-431.

Zhao, Y. (in press). *Counting what counts: Reframing educational evaluation*. Bloomington, IN: Solution Tree.