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The State of the Instructional Materials Market: 2018 Report

Appendix on Evaluation of Available Data

Spring 2019

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Background

EdReports' theory of action posits an improvement of K-12 instructional materials by identifying high-quality, standards-aligned materials and increasing demand for such materials. For the benefit of the broader public interest and in service of our organizational mission, EdReports seeks to expand our understanding on the state of the instructional materials market and whether, how, and why it is changing.

Problem Statement

To evaluate the efficacy of efforts prescribed in the EdReports theory of action, it is necessary to have a baseline measure of the market share of materials currently adopted across the United States. With few exceptions, data on school and district curriculum adoption are not systematically collected and archived for public access. To the extent that information on curriculum adoption is available, sources are predominantly market-based research firms, industry organizations, and academic researchers who estimate market share based on surveys of school- and district-level educators or derive adoption or procurement data via a campaign of FOIA requests.

At present, information available on the instructional materials market share vary in level of detail. Whereas some sources provide information on specific curriculum series and edition, others provide information on series without supplying the edition and still others only offer the publisher. Sources can vary in the unit of observation, level of aggregation and scale of measurement. Also, discrepancies may exist across multiple sources, attributable to sampling error or valid differences in status due to adoption activity that occurred between windows of data collection by respective sources. The challenge is to combine these data into a coherent frame that allows for analyses.

Purpose Statement

Our research aims, as reported in this appendix, were to evaluate the available data on instructional materials market share in order to determine the data's suitability for answering the following research questions:

- What is the market share for each ELA and math curriculum series?
- Which curriculum series are increasing or decreasing in market share?
- Has market share by EdReports standards-alignment rating changed over time?

To evaluate the suitability of the data to answer these questions, the following steps to our analyses were undertaken:

- Assemble and organize available information on ELA and math curriculum adoption/use across the U.S. into a single data frame.
- Adjudicate curriculum series titles and editions to link across data sources.
- Generate descriptive plots to determine adoption/use per curriculum series disaggregated by relevant year.
- Compare market share estimates from across data sources and time frames.
- Determine compatibility of the data for conducting analyses that pool across multiple sources and years.

Method

Data Sources

We evaluated the instructional materials market through a data frame that combined 13 data sources on curriculum series adoption and/or use. Full citations for the data sources are listed in the References section and a description of each source is provided in Table 1.

In total, over 10,000 observations of market share were assembled, varying by grade band, content area, series, time frame of adoption/use and level of aggregation. The number of observations and associated titles per grade band and content area was as follows:

- Elementary ELA market: 1,407 observations across 48 titles.
- Middle grades ELA market: 1,663 observations across 37 titles.
- High school ELA market: 563 observations across 12 titles.
- Elementary math market: 2,135 observations across 39 titles.
- Middle grades math market: 2,390 observations across 49 titles.
- High school math market: 2,516 observations across 51 titles.

Data for market share on specified publisher but unspecified series (e.g., a Pearson product, but unknown series title) were excluded from the current analyses. Series edition was not provided by the data source in every case. Accordingly, data were adjudicated to specific editions when necessary or designated as unspecified edition when the edition could not be reasonably determined.

Each grade-band/content-area combination comprises data that represented time frames 2011-2012, 2013-2014, 2015-2016, 2016-2017 and 2017-2018. Year spans beginning in 2011 and ending in 2016 were collapsed into a single category due to having comparatively few observations for the corresponding data sources. Accordingly, analyses were conducted within the time frames for 2011-2016, 2016-2017 and 2017-2018.

Several data sources provide estimates for the overall sample and a disaggregation by subsample. Six sources provide disaggregated estimates by state, and one provides disaggregated estimates by high-minority, high-poverty district status.

Not every source comprised data for all grade bands or both content areas. The most robust data sources in the data frame come from the American Teacher Panel and American School Leader Panel (ATP and ASLP; RAND Corporation, 2017, 2018). These are nationally representative samples that provided estimates for the K-5, 6-8 and 9-12 ELA and math markets, based on teacher and school leader responses. Weighted estimates were provided for the national sample and for the sample disaggregated by the more than 20 states, including standard errors for all point estimates.

Data Adjudication

Others before us have documented the many challenges of assembling textbook adoption and procurement data into a coherent frame for analysis (e.g., Koedel and Polikoff, 2017).

Variation in naming conventions exists within and across data sources. One source of variation stems from mergers that have occurred in the textbook publishing industry over recent years. For example, the Houghton Mifflin Riverdeep Group acquisition of Harcourt Education, Harcourt Trade and Greenwood-Heinemann divisions of Reed Elsevier resulted in the formation the Houghton Mifflin Harcourt (HMH) publishing company. Part of the same restructuring, Harcourt Education's Holt, Rinehart & Winston was merged with Houghton Mifflin's McDougal Littell to form Holt McDougal.

Due to this and other mergers and divestments, identical materials were referenced in the data sources as having different titles or being associated with different publishers. When reasonable, titles were adjudicated to a common title, using the name of the material in its most recent form and referencing the current asset holder as the publisher (not accounting for the February 2019 divestiture of Pearson to Nexus Capital Management or the May 2019 merger between McGraw-Hill and Cengage).

Another source of variation stems from the open education resource (OER) market. Given the various redistributions that exist, titles were combined only when it did not obscure relevant distinctions. For example, for the elementary ELA market, observations for Engage NY, CKLA (Amplify) and EL Education (Open Up Resources) are reported separately, even though Engage NY K-5 is essentially CKLA K-2 and EL Education 3-5.

EdReports ratings were associated with the materials as appropriate, whereby, even though Engage NY K-5 was not formally reviewed by EdReports, it was coded as having met standards-alignment expectations because both CKLA K-2 and EL Education 3-5 were reviewed and met expectations for alignment. Additionally, given the proliferation of digital materials, associating titles with the correct edition was a challenge. Thus, when the edition was ambiguous, the respective series titles were reported separately or combined but designated as an unspecified edition.

Data Evaluation

Within each relevant grade band, we inspected the measure of central tendency and dispersion of market share estimates by series. Our exploratory analyses used box plots as a data visualization technique with separate rows for each time frame grouped by series.[1] Plots were color-coded to correspond with the EdReports standards-alignment rating and review status for the respective series.[2, 3]

As part of our evaluation of the data, we conducted sensitivity analyses to determine the impact of excluding data sources on the distribution and measure of central tendency for estimates of market share. To assist in our interpretation of the results, our evaluation also compared results against estimates for reported use of "other" (i.e., unspecified) materials.

Results

Variability and Measure of Central Tendency

As observed in the example plots in Figure 1, considerable variation in point estimates was present within series, most of which was attributable to variation between states. We evaluated whether a measure of central tendency provided a reasonable characterization for the data. To do so, we compared the mean and median values for the distribution of observations to the ATP national estimate and found the measures to be highly aligned. An example for this comparison using the 2018 ATP K-5 grade band (pooled across ELA and math):

- For the mean, we found a mean difference of 1 percentage point (SD = 3), with values ranging from -3 to 15 and a correlation between measures of r = .97.
- For the median, we found a mean difference of 2 percentage points (SD = 3), with values ranging from -1 to 17 and a correlation between measures of r = .97.

The close concordance between the mean and median values for the distribution of observations and the ATP national estimate bolsters confidence that the box plots provide a reliable representation of the data. However, the similarity in estimates also raised the question as to whether bringing multiple data sources and a multitude of disaggregated estimates to bear provided any more insight than would be rendered from just the ATP national estimate.

Large Values Observed for the 2016-2017 Time Frame

The example plots in Figure 1 also demonstrate a sharp increase in the median market share estimate from the 2011-2016 time frame to the 2016-2017 estimates, followed by a sharp decrease to 2017-2018 time frame. The pattern of

large estimates for 2016-2017 compared to 2017-2018 was surprising given both time frames were composed of data drawing predominantly from a common source: the RAND Corporation (2017, 2018) ATP and ASLP samples.

We explored the discrepancy between the 2016-2017 and 2017-2018 time frames with a close inspection of the 2017 and 2018 ATP and ASLP data. We found the percentages for each year to be reasonably well correlated, though the estimates for the 2017 sample generally had much larger point estimates than the 2018 sample. The ATP and ASLP K-5 samples (pooled across ELA and math) illustrate this finding:

- For the ATP sample, we found a mean decrease of 10 percentage points (SD = 11) from 2017 to 2018, with values ranging from a 12-point increase to a 72-point decrease, and a correlation between years of r = .87.
- For the ASLP sample, we found a mean decrease of 12 percentage points (SD = 15) from 2017 to 2018, with values ranging from a 14-point increase to an 89-point decrease, and a correlation between years of r = .71.

For the ATP sample, there was a change between years on the survey response scale.[4] For the ASLP sample, there was a change between years with the calculation method used for the reported estimates.[5]

We conducted sensitivity analyses to investigate whether these scaling changes between years might constitute measurement artifacts that upwardly biased the median of the observations for the 2016-2017 time frame. Figure 2 presents the results for the sensitivity analyses applied to the series with the largest market share among the elementary math market leaders presented in Figure 1.[6]

The sensitivity analyses revealed that, although the greatest cross-year discontinuity was observed with the inclusion of the 2017 ATP and ASLP data, variation in scaling and sampling across the remaining data sources produces year-to-year variation that was not conducive for analysis of changes in market share over time.

We conjectured, if the observed estimate reductions were real, we would expect to see a corresponding increase in market share for materials in the "other" (i.e., unspecified materials) category. Figure 3 presents the market share for unspecified math materials, with separate panels for each grade band, for which we do not find evidence in support of the interpretation that the reduced median from 2016-2017 to 2017-2018 constituted a real reduction in market share by series.

Discussion

We compiled over 10,000 observations of market share from a variety of sources and vetted the resultant data frame for analysis. Our evaluation indicated that inconsistencies in scaling and sampling across data sources were not conducive for the pooled, multiyear analysis that we sought to undertake. Thus, interpreting series market share across time frames was compromised by insufficient measurement continuity. Although we did not find the data to support our aim to identify changes in market share over time, we were able to validate the RAND Corporation 2018 ATP nationally representative survey as a suitable data source to serve as a baseline measure of curriculum market share.

District-level, longitudinal data on curriculum adoption and procurement are needed to gain a robust understanding of the materials market. Work at EdReports is currently underway to build such a database, drawing upon various sources, including SEA use and procurement records, data collected by research partners, and the GovSpend (https://www.govspend.com) national database on procurement of instructional materials by schools and districts. It is our hope that this endeavor will facilitate a detailed understanding of the U.S. K-12 materials market and provide insight on which series are increasing or decreasing in market share and whether market share in standards-aligned materials is changing over time.

References

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Seaman, J. (2017). *The curriculum adoption process among consequential K-12 school districts. Unpublished report.* Babson Park, MA: Babson Survey Research Group.

Student Achievement Partners. (2017, August). *State of our classrooms: Instructional materials questionnaire report.* New York: Author.

Vantage Evaluation (2017, December) Virtual Teacher Panel teacher use of instructional materials survey results. Unpublished reports.

Notes

1 Data points are jittered along the distribution of percentages, with box plots overlaid. Interpret the midline of the box plot as the median of the data, with the upper and lower limits of the box (hinges) being the third and first quartile, respectively. The whiskers extend up to 1.5 times the interquartile range from the top and bottom hinges of the box to the furthest datum within that distance. If there are any data beyond that distance, they are represented as outliers.

2 Green = meets expectations for standards alignment. Yellow = partially meets expectations for standards alignments. Red = does not meet expectations for standards alignment. Light blue = currently under review. Dark blue = not reviewed.

3 For materials to be coded as meets expectations or does not meet expectations, all relevant grades needed to receive that particular rating. Materials were coded as partially meets expectations if there was at least one relevant grade that received a rating higher than does not meet expectations and at least one relevant grade received a rating less than meets expectations. Reports < https://www.edreports.org/reports> and rubrics and evidence guides < https://www.edreports.org/reports/rubrics-evidence> are all available on the EdReports.org website.

4 For the 2017 ATP sample, teachers rated how often they use given instructional materials along a scale of rarely use (approx. 1X per month or less), occasionally use (approx. 2-3X per month), often use (approx. 1-2X per week), or daily or almost daily (approx. 3-5X per week). Whereas for the 2018 ATP sample, teachers simply selected instructional materials that they use regularly (once a week or more). The metric we used in our analyses for the 2017 sample was the sum of often use and daily or almost daily use, which on the face is identical to the 2018 use regularly; both translate to once a week or more.

5 For the 2017 and 2018 ASLP samples, school leaders selected materials that they use in their school and indicated whether the given material was recommended or required for use in the school. For the 2017 sample the proportion of recommend use and require use summed to 1. Whereas for the 2018 sample, a third category was calculated for neither recommend nor require. Thus, for the 2017 sample, the proportion appeared to be relative only those materials designated as recommend use or required use, but for the 2018 sample, the proportion appeared to be relative to all respondents who selected the material regardless of whether the material was recommended or required for use.

6 Our sensitivity analysis involved fitting box plots to the data under three different conditions: a) including all the data, b) excluding data from the 2017 ASLP sample, and c) excluding data from the 2017 ATP and ASLP samples. Comparison between plots reveals that excluding the 2017 ATP and/or ASLP data does lower the estimated median—bringing the 2016-2017 estimates more in line with those in the other time frames.

Tables and Figures

Table 1. *Data Source and Description*

	Date source	Description
2011–2016	**Simba Information (Resnick & Sanislo, 2014)**	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, CA, TX, FL, NY **Level of aggregation:** Nation, state **Metric:** Percent of educators that use series as a primary teaching resource
	RAND Corporation (Opfer, Kaufman, & Thompson, 2016)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide **Level of aggregation:** Nation **Metric:** Percent of teachers that use series often (1–2x per week) or daily/almost daily (3–5x per week)
2016–2017	**Babson Survey Research Group (Allen & Seaman, 2017)**	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide **Level of aggregation:** Nation **Metric:** Percent of districts that adopted series
	Babson Survey Research Group (Seaman, 2017)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, High-minority/high-poverty (HMHP) districts **Level of aggregation:** Nation, HMHP districts **Metric:** Percent of districts that adopted series
	Center for Education Policy Research (Blazar et al., 2019)	**Grade span:** 4–5 **Subject area:** Math **Location:** Nationwide, CA, LA, MD, NJ, NM, WA **Level of aggregation:** Nation, state **Metric:** Percent of teachers that use series as their primary curriculum
	RAND Corporation (2017)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, AL, AR, CA, CO, DE, FL, GA, IL, KY, LA, MD, MA, MS, NM, NY, NYC, NC, OK, SC, TN, TX, VA, WV **Level of aggregation:** Nation, state (one city) **Metric:** Percent of teachers that use series often (1–2x per week) or daily/almost daily (3–5x per week)

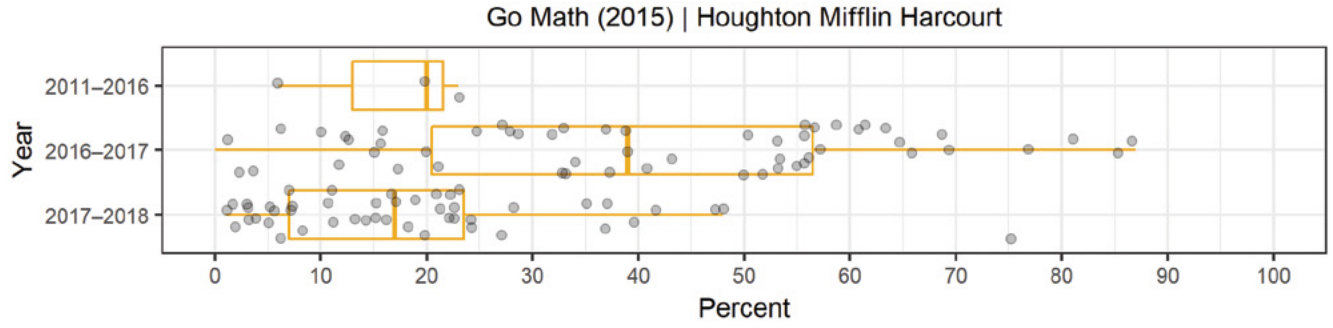
(Continues on next page)

	Date source	Description
2016–2017	**RAND Corporation (2017)**	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, AL, AR, CA, FL, GA, IL, KY, LA, MD, MA, MS, NM, NY, NYC, NC, OK, SC, TN, TX, VA, WV **Level of aggregation:** Nation, state (one city) **Metric:** Percent of school leaders that use series that are required by the district
	Student Achievement Partners	**Grade span:** K–5 **Subject area:** ELA, math **Location:** Nationwide **Level of aggregation:** Nation **Metric:** Percent of teachers that use series often (1–2x per week) or daily/almost daily (3–5x per week)
	Teacher2Teacher (Vantage Evaluation, 2017)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide **Level of aggregation:** Nation **Metric:** Percent of teachers that use series
2017–2018	**Center for American Progress (Partelow & Shapiro, 2018)**	**Grade span:** 4 and 8 **Subject area:** ELA, math **Location:** Largest 30 school district **Level of aggregation:** Nation (district-level data transformed to sample-level metrics) **Metric:** Percent of districts that recommend or have adopted series; percent of student membership that are in a district that recommends or has adopted series
	EdWeek Market Brief (Kurtz, 2018)	**Grade span:** K–5 **Subject area:** ELA, math **Location:** Nationwide **Level of aggregation:** Nation **Metric:** Percent of district leaders that report series as most frequently used core curriculum in their school district
	RAND Corporation (2018)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, AL, AR, CA, CO, DE, FL, IL, KY, LA, MD, MA, MS, NE, NM, NY, NC, OK, RI, SC, TN, TX, VA, WV, WI **Level of aggregation:** Nation, state **Metric:** Percent of teachers that use series regularly (once a week or more)
	RAND Corporation (2018)	**Grade span:** K–12 **Subject area:** ELA, math **Location:** Nationwide, AL, AR, CA, FL, IL, KY, LA, MD, MA, MS, NM, NY, NC, OK, SC, TN, TX, VA, WV **Level of aggregation:** Nation, state **Metric:** Percent of school leaders that use series that are required by the district

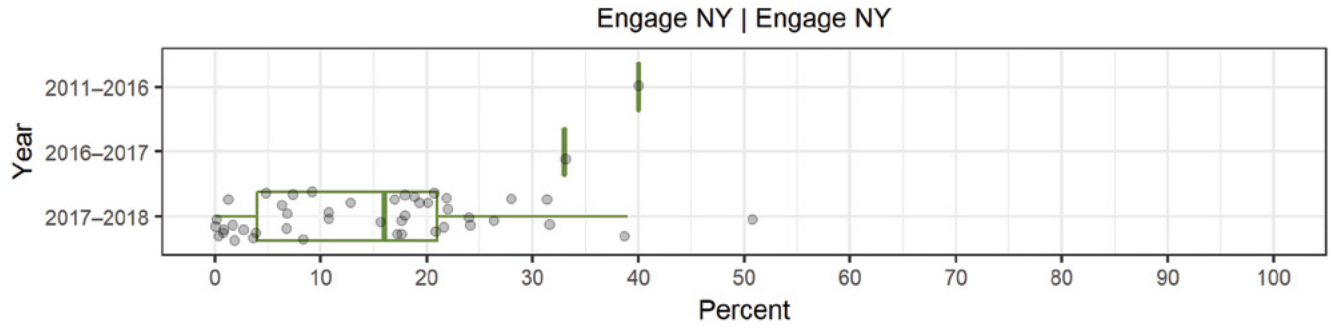
Figure 1.

Elementary math national market leaders (listed descending by 2017–2018 ATP national estimate). Example plot demonstrating year to year variability in market share estimates across data sources.

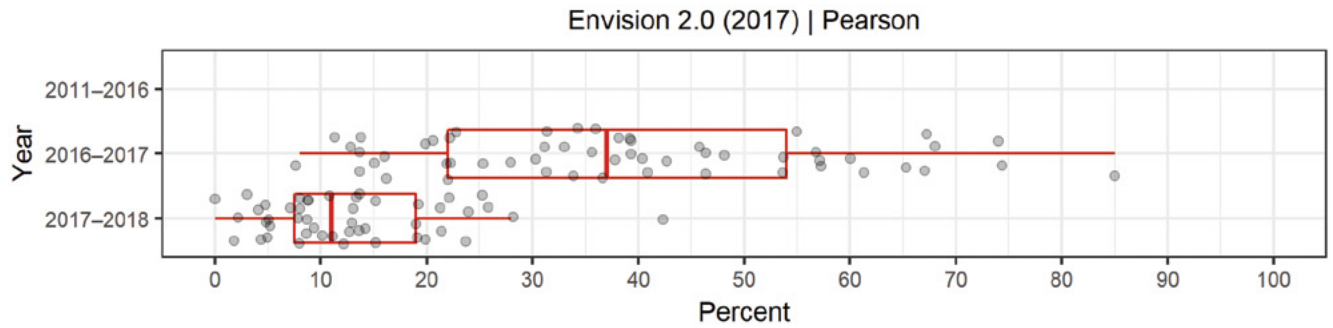
1a.



1b.



1c.



1d.

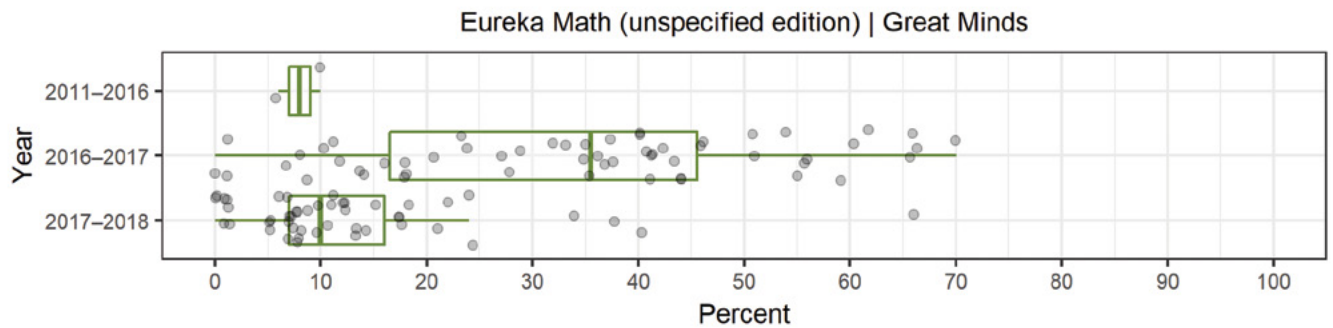
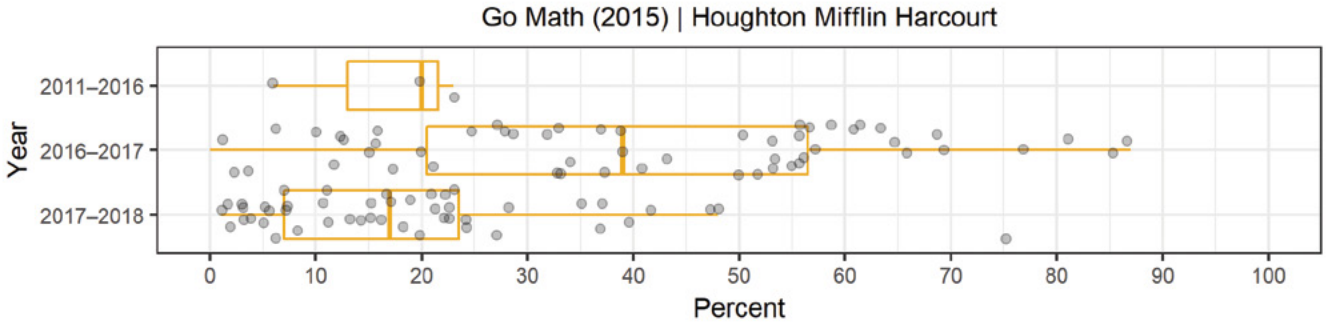
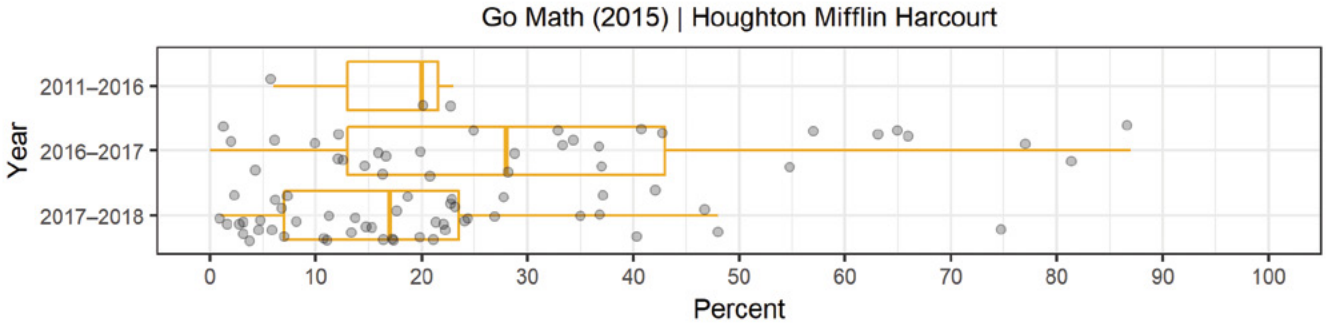


Figure 2.

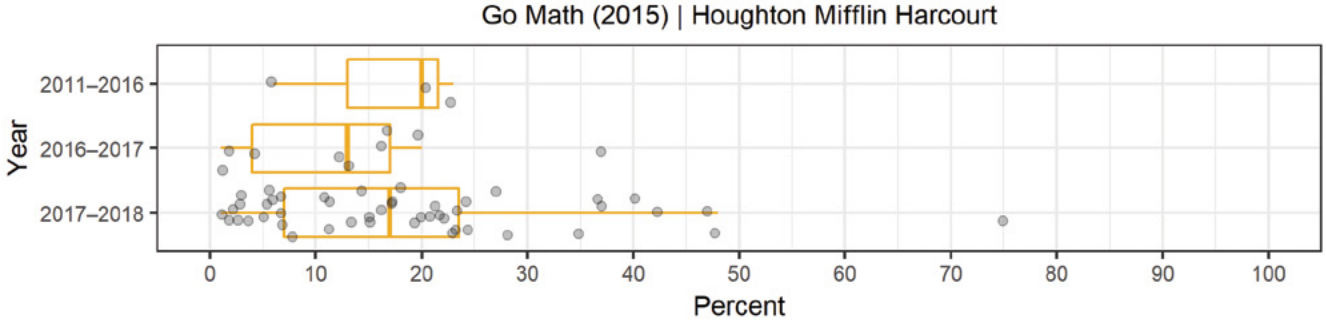
Sensitivity of median estimate to inclusion of data sources, applied to elementary math market observations for Go Math, Houghton Mifflin Harcourt.



2a. **Including all data.**



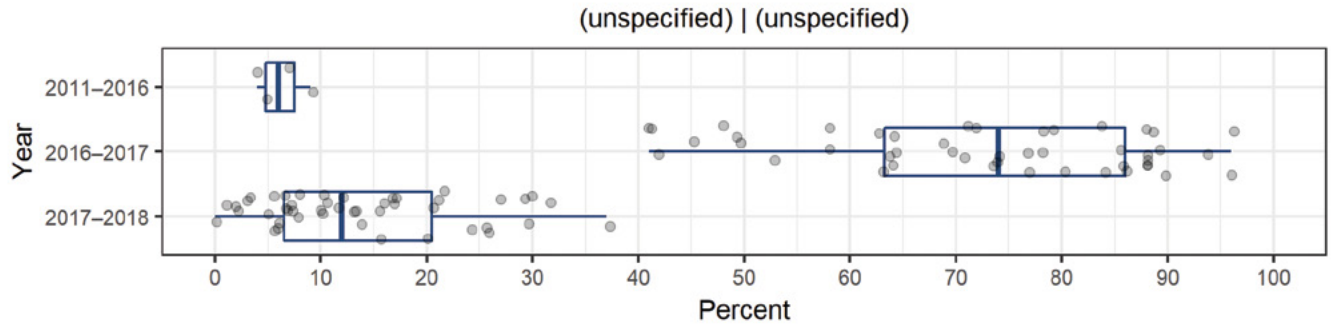
2b. **Excluding data from the 2017 ASLP sample (RAND Corporation, 2017).**



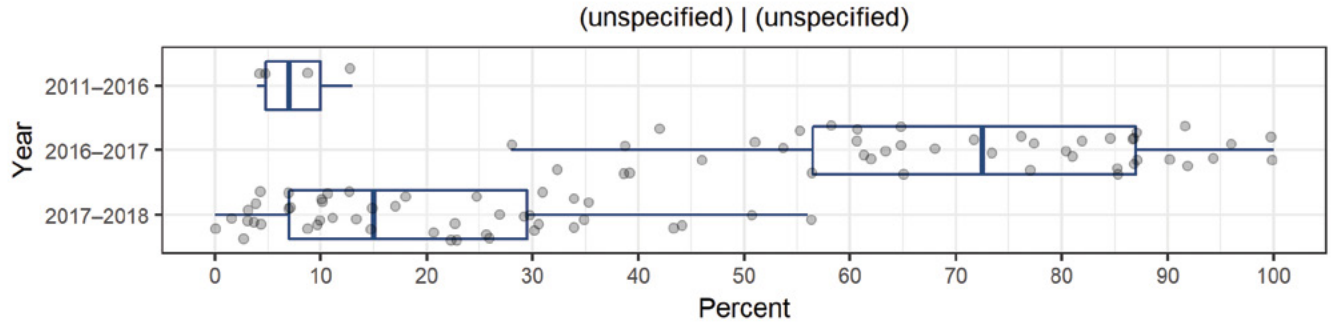
2c. **Excluding data from the 2017 ATP and ASLP samples (RAND Corporation, 2017).**

Figure 3.

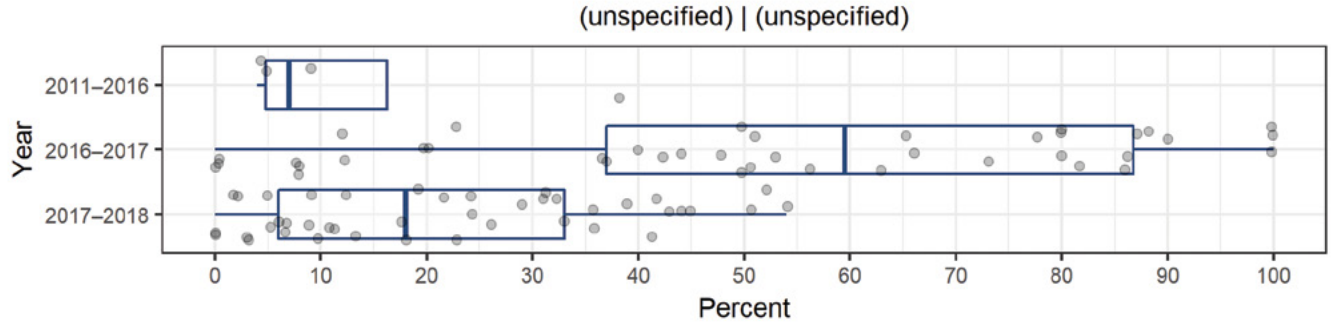
Instructional materials market share for "other" (i.e., unspecified) math materials.



3a. **Elementary math market.**



3b. **Middle grades math market.**



3c. **High school math market.**