Is exam hell the cause of high academic achievement in East Asia? The case of Japan and the case for transcending stereotypes

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High student achievement across East Asia is often explained as an outcome of highly competitive, stress-inducing college entrance exams across the region. This ‘exam hell’ drives students to study longer and harder than their peers worldwide, a race that leads — unsurprisingly — to higher marks in international comparisons such as the Programme for International Student Assessment (PISA). Yet, the race comes at a considerable cost: psychological pressure, forfeited childhoods, regimes of rote memorisation, lack of creativity and private outlays for cram schools. In this article, we seek to refute this outdated narrative by focusing on changes in Japanese education over the past three decades. We first analyse quantitative data for learning time based on three longitudinal surveys conducted by researchers in Japan to show that learning time for Japanese upper secondary students declined during 1980–2000 (Study 1). We then turn to analyse PISA 2015 data to show that now Japanese students study less than their peers in major Anglo-American countries: the USA, the UK and Australia (Study 2). These findings run counter to well-worn images frequently rehearsed in both the academic and popular literature. In helping to remove one of the most persistent stereotypes about East Asian education, we seek to help make visible other explanations for East Asian student achievement.

Keywords: Anglo-American countries; high performance; learning time; PISA

Introduction: Is entrance exam competition driving East Asian achievement?

East Asian countries consistently dominate league tables of international student achievement, including both the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS). East Asian superiority is particularly apparent in mathematics and science. In PISA 2015, the top five countries in mathematics were all located in East Asia: Singapore, Hong Kong, Macau, Taiwan and Japan (OECD, 2016a). And this high performance is not simply a recent phenomenon: in the First International Mathematics Study (FIMS) conducted in 1964, Japan (the only participant from East Asia) outscored all Western countries including the USA, UK and Australia (Postlethwaite, 1967). In recent years, the gap between East Asia and other countries has expanded (TIMSS International Study Center, 2016).

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The high academic achievement of East Asian countries has frequently been explained by observers and analysts as a result of the longer time East Asian students spend learning, both inside and outside school. This differential in learning time is purportedly induced by highly competitive learning environments, those primarily aimed at success on a single high-stakes test: the college entrance exam. One dominant image of East Asian education is national systems wholly structured around these high-stakes entrance exams, systems that purportedly generate a whole range of negative effects: inordinate amounts of external pressure on students, severe psychological strain, cramming-style instruction and the concomitant loss of creativity-turned-joy of learning. The same forces are envisaged at work, albeit more indirectly, in a booming cram school industry, deviant school behaviour, the lack of curricular diversity, homogenisation of student identities and even political conformity. One American assessment of Japanese education from the late 1980s captures the general flavour: ‘Many aspects of... the school in Japan strike the outside observer as positive. However, there is a darker side to Japanese education... rooted in the brutal examination system’ (Shields & James, 1989, p. 99).

The consistency and persistence of these portrayals are striking. Consider one classic formulation from the 1970s by prominent British sociologist Ronald Dore. Dore admitted the higher achievements of the Japanese system but warned of the price and power dynamics involved:

It works; provided one thinks of it as an enormously elaborated, very expensive intelligence testing system with some educational spin-off, rather than the other way around... The examination hell sorts the sheep from the goats; a man who can’t take psychological strain would be of no use anyway. (Dore, 1976, p. 50)

A strikingly similar picture emerges from a recent attempt to find The Smartest Kids in the World (Ripley, 2013), which argued that South Korea’s overheated exam competition long ago ossified into a brutal ‘iron kid competition’:

This competition followed very explicit rules: Score above a certain number on the college exam, and you were automatically admitted to a top university. Forever after, you would be paid more than others, even for doing the same work. The system was as predictable as it was brutal. It sent a very clear message to children about what mattered: University admissions based on students’ skills measured by the test. Full stop... the fixation on rankings and test scores was crushing their spirit, depriving them of not just sleep but sanity. (Ripley, 2013, pp. 59–61)

These accounts, separated by almost 40 years, are representative of a whole body of writing. Under intense competition with peers and the demands of anxious parents, the story goes, East Asian students endure a ‘brutal’ schooling experience, characterised by long hours and intense psychological strain. Is it any wonder then why Japanese, Korean and other students across East Asia score so high in international comparisons?

An increasing number of Western political and popular discourses on education now invoke comparisons with the ‘high performers’ of East Asia (Sellar & Lingard, 2013). Many of these accounts are founded, sometimes quite explicitly, on the well-worn ‘exam hell’ stereotype of East Asian education. The major point of divergence is not the ‘truth’ of exam hell, but the subsequent appraisal of the situation as either
positive or negative. Proponents, on the one hand, view East Asian education as successful in inculcating a strong core of basic knowledge and see more student time learning as positive (e.g. Barrett, 1990), thus recommending increasing learning time in the home context to close the achievement gap (Bennett, 1987; US Congress, 1999). Opponents, on the other hand, charge that East Asian education is dominated by this test pressure, forcing students to rely heavily on memorisation and rote learning, a process they argue eventually suffocates students’ creativity (Chakrabartti, 2013; Ripley, 2013; Koo, 2014). Importantly, negative appraisals of East Asian education are not only prevalent in policy and popular discourse, but also found widely across recent academic discussions (e.g. Yelland, 2012; Calonge, 2015). The point here is not which camp is right, but how both sides continue to assume that exam hell defines East Asian education.

The case of Japan

Although Singapore and Shanghai have displaced Japan as the central reference points in East Asia (Willis & Rappleye, 2011), Japan is arguably the one country that contributed the most to forming the stereotypical images of East Asia. It was the first East Asian country perceived to have achieved political, economic and educational parity with major Western powers (Vogel, 1979). Some seasoned readers may even recall that the phrase ‘exam hell’ originated in direct reference to Japan: a shorthand for the fierce competition for university entrance exams coined around the early 1970s (e.g. Foster, 1973; Ishisada, 1974; Haberman, 1988). At the same time, Japan had consistently demonstrated superior academic achievement over the long history of international comparative testing. Following Japan’s world-leading performance in the FIMS (Postlethwaite, 1967) highlighted above, the same results were confirmed a few decades later in the Second International Mathematics Study (SIMS), conducted in 1980–1982: Japan again outscored all Western participant countries/regions (13) (Westbury & Travers, 1990).

Researchers in the West, particularly those in the USA in the wake of A nation at risk (1984) and the UK in the lead up to the 1988 Education Reform Act (Goodman, 1992), came to view Japan’s high achievement in international tests as a central driver of Japan’s rapid economic ‘catch-up’ with the Western countries (e.g. Leestma & Walberg, 1992). This led, in part, to a close study of Japanese education in the 1980s (Rohlen, 1983; Duke, 1986; White, 1987; Tobin et al., 1989). The booming outside interest in Japanese education peaked in the late 1980s, coinciding with a period when Japanese university entrance exams were extraordinarily competitive and there was widespread social belief that students’ life courses were strongly affected by the university they entered. In this master frame of a juggernaut Japanese economy undergirded by world-leading educational achievement, Western observers consistently found that Japanese secondary school students were ‘obsessed’ with college entrance exam success and consistently spent longer hours on learning than their American peers (e.g. Juster & Stafford, 1991; Fuligni & Stevenson, 1995; Rohlen, 1995). At some point, these linkages came to be seen as causal: few doubted that exams and learning time explained high achievement.
To be sure, in the 1980s, when Western interest in Japanese education peaked, the intensity of exam competition did reflect the surface empirical realities of Japanese secondary education. Yet, not only did the purported causal links between exams, learning time and achievement remain untested, but when the Japanese asset bubble burst (in 1990), interest in Japanese education by Western observers slowed sharply (Rappleye, 2007). What remained then was not an accurate picture of Japanese education or the changes since the 1980s, but a widely held, fixed and oversimplified image—a stereotype.

It is this stereotype, we argue, that has long prevented a richer assessment of achievement and learning in East Asia. Our contribution in this and another complementary article (Rappleye & Komatsu, 2018) is to show empirically that the stereotypical image of East Asian exam hell does not match reality. We focus on contemporary Japanese education but conclude by extending the argument to the entire East Asia region. In the present piece, we will demonstrate that the time spent on learning by Japanese upper secondary students has declined since the 1980s to such an extent that it is now less than the time spent on learning by American, British and Australian students (hereafter Anglo-American students). In the complementary piece (Rappleye & Komatsu, 2018), we have already shown that the competition over university entrance exams has become less significant and pressure has become less intense: stress on Japanese students over exams has now reached approximately the same level as that on Anglo-American students. A general schematic representation of our overall argument is found in Figure 1a,b.

Our argument is that, despite the decline in the hours spent on learning, which we illustrate empirically, Japan has continued to perform at the highest levels on international assessments (Figure 1c). The body of the piece is comprised of two original studies. These are based primarily on analysis of longitudinal data that, to the best of our knowledge, has not featured in English-language educational research to date. Details of each data set utilised are provided at the beginning of the corresponding section.

**Study 1: Learning time for Japanese students has declined since 1980**

**Materials and methods**

Results from Study 1 reveal that the learning time for Japanese upper secondary students declined during 1980–2000. Learning time was classified into two types: in-school learning and out-of-school learning. To examine the change in in-school learning time, we examined data for the minimum credits required for upper secondary school graduation derived from Japan’s Ministry of Education, Culture, Sports, Science and Technology (MEXT, 2017).

To examine the change in out-of-school learning time, we used longitudinal data derived from NHK Broadcast Culture Research Institute (2013), among others. NHK is the national broadcasting organ and non-partisan research arm of the Japanese government and is widely recognised as conducting the most robust public surveys, somewhat akin to Pew Survey research in the USA. The primary reason for using these data was that the data set had the longest longitudinal time range...
The secondary reason was that the data would have the smallest systematic bias due to regional variations, because of the NHK sampling methodology. NHK researchers first randomly selected municipal governments, and then visited the same municipal government offices repeatedly, selecting students randomly using the municipal population registry. Repeating these processes, the researchers selected sample students and then visited their homes to conduct interviews. Concerning out-of-school learning hours, sample students were asked to select one from the following options: (1) 0 hours; (2) 0.5 hours (an option unavailable from 1982 to 1992); (3) 1 hour; (4) 2 hours; (5) 3 hours; (6) 4 hours; and (7) 5 hours or longer. These options were formulated to prevent students from reporting implausibly long hours (e.g. 12 hours), which could cause a strong bias for the calculated mean learning hours among the sample students. The sample sizes of upper secondary students were 1,350, 729, 730, 671 and 557 for 1982, 1987, 1992, 2002 and 2012, respectively. The valid response rate was relatively low (63.4%), possibly due to the fact that the survey included an interview component.

In addition to the data derived from NHK Broadcast Culture Research Institute (2013), we also located two additional data sets (Kariya, 2000; Kimura, 2016). We
sought to confirm that our results did not qualitatively change according to data set or sampling strategy, because every data set includes specific errors and biases. The first was created by a leading Japanese educational sociologist; the second as part of the work of a major research institute. Both studies were one part of separate large-scale longitudinal studies of learning in Japan. In the former, Kariya (2000) carried out questionnaire survey of learning time in 1979 and 1997 for 11 upper secondary schools in two prefectures. These 11 schools were selected so as to cover the diverse range of academic achievements among different schools in the prefectures. The data for the mean learning time was determined by selecting 125 samples from all data samples for each school (data for 1,375 students). Note that in calculating the mean learning time, invalid data were excluded. The percentages of the excluded data for 1979 and 1997 were 0.51% and 1.1%, respectively. A major advantage of this data set was that it assesses the relative temporal change in learning time with small amounts of error. This is because the data set used data from exactly the same schools at two different points in time (i.e. 1979 and 1997). That said, a major disadvantage was that the absolute value of the mean learning time calculated using the data set might be different from that of the country as a whole.

In the second survey we located, the Benesse Education Research Institute (Kimura, 2016) conducted a survey of learning time in 1990, 1996, 2001, 2006 and 2015 for upper secondary schools in four different regions (i.e. Tokyo metropolitan area, Tohoku, Shikoku and Kyushu). The institute selected sample schools in each area and surveyed learning time and other components. Note that the sample schools were consistent among surveys for different survey years. The sample sizes were 2,005, 2,615, 3,808, 4,464 and 4,426 for 1990, 1996, 2001, 2006 and 2015, respectively. The valid response rates for the survey years were not reported. A major advantage of this data set was that it used the largest sample size among the three surveys, while the major disadvantage was that it lacked values before 1990.

Results

The minimum credits required for upper secondary school graduation in Japan reduced from 85 to 80 in 1982, and then from 80 to 74 in 2003 (MEXT, 2017). Here, one credit corresponds to 35 regular classes, where a regular class is 50 minutes long. That is, the minimum regular class hours required for graduation has reduced by 13% since 1980.

Time spent on out-of-school learning by upper secondary students has also decreased since 1980. According to data from the NHK Broadcast Culture Research Institute (2013), more than half of the students spent 2 hours or longer on learning in 1983 (Figure 2). This ratio, however, became lower than 40% in 1987, and reached 26% in 2002. The ratio subsequently increased somewhat (30% in 2012) but did not recover to 1980s levels. The mean (±standard deviation, SD) time spent on learning by the sample students was 99 (±81) minutes in 1983, and then decreased during the 1980s and 1990s and reached 55 (±66) minutes in 2002 according to the NHK Broadcast Culture Research Institute data (Figure 3). The mean time increased somewhat in 2012 (66 minutes), but it was still less than the mean times in the 1980s and 1990s. The two other data sets also show a similar decline in the mean time for
out-of-school learning, despite the differences in the sampling strategy (Figure 3). When pooling all data derived during 1980–2000, the slope of the regression line \( R^2 = 0.759 \) determined using the least-squares method was \(-13.5\) minutes per 10 years with 95% bootstrapping confidence interval (Diadonis & Efron, 1983; Komatsu & Rappleye, 2017a,b) between \(-15.9\) and \(-11.5\) minutes per 10 years. Here, it is valid to conclude that time spent on out-of-school learning by Japanese students has declined since 1980.

But what about intra-national differences? Data found in Kimura (2016, p. 11) have demonstrated that a decline in the time for out-of-school learning was observed for different groups having divergent academic achievement levels, although the decline for the highest achievers was less pronounced. That is, the overall decline in the time for out-of-school learning was not specific to a particular group, but a widespread phenomenon.

**Study 2: Learning time for Japanese students is now shorter than that for Anglo-American students**

**Materials and methods**

Studies conducted in the 1980s by Western observers reported that Japanese upper secondary students spent a longer time on learning in- and out-of-school compared with their American peers (Juster & Stafford, 1991; Fuligni & Stevenson, 1995; Rohlen, 1995). This section demonstrates that the view is now outdated: time spent on learning by Japanese students is now shorter than for their Anglo-American peers.

We compared the composite time of in-school and out-of-school learning for various countries, including Japan and Anglo-America. We also compared in-school learning time and out-of-school learning time separately to examine which was the

![Figure 2](image-url)  

**Figure 2.** Time spent on out-of-school learning by Japanese upper secondary students in 1982, 1987, 1992, 2002 and 2012. The original data were derived from NHK Broadcast Culture Research Institute (2013). Note that a new category (i.e. 0.5 hours) has been introduced since the 2002 survey, in accordance with the decline in out-of-school learning time.
major factor causing the difference in composite learning time between Japan and the three Anglo-American comparative countries. In this analysis, we used data for learning time for all subjects. We confirmed that our results did not change, even when using data on learning time for mathematics and science, which were the focus of TIMSS and PISA. Our comparison included data not only comparing Japan and Anglo-America, but also that between East Asian countries and OECD countries, excluding Japan and Korea.

When comparing difference between two groups, we used Cohen’s $d$. Cohen’s $d$ is an effect size parameter and assesses the magnitude of a difference between two groups (Ellis, 2010). We did not conduct significance testing in our work. The primary reason is that statistical testing is quite often misleading. If we have a sufficiently large sample size, we always find a statistical difference between any two groups at a traditional significance threshold (e.g. 5%). What is actually important is not whether or not there is a difference, but the magnitude of the difference. This problem concerning the use of $p$ values was noted by many statisticians for many years (Berkson, 1938; Bakan, 1966; Cohen, 1994; Thompson, 1996, 2002, 2007; Johnson, 1999; Hubbard & Lindsay, 2008; Lambdin, 2012; Nuzzo, 2014; Komatsu et al., 2015).

What is important from the perspective of education research is that these statisticians

![Figure 3. Trend in the mean time spent on out-of-school learning by Japanese upper secondary students. This figure includes data from three different sources. The original data were derived from NHK Broadcast Culture Research Institute (2013), Kariya (2000) and Kimura (2016). An error bar denotes the standard error. For calculating the mean, students who selected an option such as 5 hours or longer were assumed to spend 5 hours. This treatment would not cause considerable underestimates of the mean learning hours because of its small proportion.](image-url)

When comparing the learning time for different countries, we used data derived from PISA 2015. We used data for the percentage of 15-year-old students who spent 60 hours per week or longer, between 40 and 60 hours and less than 40 hours per week on learning (composite of in-school and out-of-school learning). These data were processed by the OECD and presented in Table III.3.6 of OECD (2016a, p. 283). We also used data for in- and out-of-school learning hours presented in Figures II.6.18 and II.6.20 of OECD (2016b, pp. 210, 213). It is important to note here that we did not use the primary data provided by the OECD, but made secondary analyses of data already processed by the OECD. The reason why we used not only the data for learning hours but also the data for the percentage of students was that the data for the percentage of students were less susceptible to outliers.

Data for in- and out-of-school learning hours were derived in the following way. Students were asked to report how many class periods they were required to attend and how many minutes there were in a class period. These data were used to calculate the in-school learning hours of students. To obtain information about out-of-school learning, students were also asked to report how many hours per week they spent learning in addition to their school class requirements.

The data for in- and out-of-school learning hours used in the analysis were based on students’ self-report, suggesting that the data could potentially include errors and biases. However, the data would still be sufficiently accurate to allow between-country comparison. In fact, the OECD (2011, pp. 22–23) examined the relationship between in-school per week learning time reported by students and in-school per year instruction time by teachers for OECD countries and found a strong correlation ($r = 0.94$); this suggests that the errors and biases included in the data would be relatively small.

Here, we do not provide a full description of the sampling design of PISA 2015 and the data processing conducted by the OECD, as this is available in Annex A of OECD (2017a) and OECD (2017b). Instead, we describe the key features of the PISA 2015 survey. In the survey, at least 150 schools for each country were sampled. These sampled schools were selected with probabilities proportional to size (i.e. number of students enrolled). In the sampled schools, typically 42 students were sampled with equal probabilities to collect data. Sample sizes and exclusion rates for participant countries are presented in Tables A2.1–3 of OECD (2017a, pp. 258–263) and Table 11.1 of OECD (2017b, pp. 206–207).

Results

Figure 4 compares the percentage of students whose learning time (the composite of in- and out-of-school learning) was 60 hours or longer. The proportion of students in East Asia who spent 60 hours or longer on learning was higher than the proportion in OECD countries, excluding Japan and Korea. The mean ($±$SD) was 21.6% ($±$9.2%).
Figure 4. Percentage of 15-year-old students who spent 60 hours or longer on learning: (a) OECD countries, excluding Japan and Korea and (b) East Asian countries. The time spent on learning in this figure is the composite of in- and out-of-school learning. An error bar denotes the standard error. The original data were derived from OECD (2017a).
for East Asian countries and 12.9% (±5.7%) for OECD countries, excluding Japan and Korea. Cohen’s $d$ was calculated as 1.53, where we used the SD for OECD countries, excluding Japan and Korea. The higher mean percentage for East Asian countries agrees with the stereotypical view of East Asian education. However, the percentage for the USA (21.8%) was the second highest among OECD countries, as well as much higher than that for Japan (9.3%). Interestingly, the percentage for the USA was comparable to or higher than those for several East Asian countries (i.e. Taiwan, Hong Kong and Macao), as well as nearly double that for Japan. The percentages for the UK and Australia (10.8% and 9.3%, respectively) were higher than that of the USA, but still comparable to that of Japan.

When using the percentage of students whose learning time was less than 40 hours, the differences in learning time between Japan and the three Anglo-American countries became clearer (Figure 5). It is true that the proportion of students in East Asia who spent less than 40 hours on learning was lower than the proportion in OECD countries, excluding Japan and Korea. The mean (±SD) was 37.0% (±11.8%) for East Asian countries and 47.9% (±12.3%) for OECD countries, excluding Japan and Korea. Cohen’s $d$ was calculated as 0.886. The lower mean percentage for East Asian countries agrees with the stereotypical view of East Asian education. However, the stereotypical contrast between East Asia and the West becomes undermined when one recognises the fact that the proportion of US students spending less than 40 hours on learning was one of the lowest among OECD countries, at 33.5% (comparable with the proportion of students in Taiwan, Hong Kong and Macao), and far lower than the proportion in Japan (56.3%). The percentages for the UK and Australia (50.1% and 50.3%, respectively) were higher than that of the USA, but still lower than that of Japan.

This difference in learning time between Japanese and these three Anglo-American countries’ students was primarily due to the shorter out-of-school learning time of students in Japan. East Asian students tended to spend longer hours per week on regular classes than students in OECD countries, excluding Japan and Korea (Figure 6). The mean in-school learning hours (±SD) was 29.3 (±1.3) for East Asian countries and 26.8 (±1.3) for OECD countries, excluding Japan and Korea. Cohen’s $d$ was 1.92. This too partially supports the stereotypical view of East Asian education. Nevertheless, the in-school learning hours for the USA (27.7) was the fifth highest among OECD countries, and the hours for the USA were comparable to those for Japan (27.5). On the other hand, the in-school learning hours for the UK and Australia (26.5 and 25.7, respectively) were slightly shorter than for Japan.

As for out-of-school learning, East Asian students tended to spend longer hours per week than students in OECD countries, excluding Japan and Korea (Figure 7). The mean out-of-school learning hours (±SD) was 19.0 (±4.2) for East Asian countries and 16.8 (±3.1) for OECD countries, excluding Japan and Korea (Figure 7). Cohen’s $d$ was 0.710, where we used the SD for OECD countries, excluding Japan and Korea. This agrees with the stereotypical view of East Asian education. However, here again the out-of-school learning hours for the USA (20.4) was the fourth highest among OECD countries, and the out-of-school learning hours for the USA was much longer than that for Japan (13.6). The out-of-school learning hours for the USA was comparable to or longer than that for Korea, Hong Kong,
Figure 5. Percentage of students who spent less than 40 hours on learning: (a) OECD countries, excluding Japan and Korea and (b) East Asian countries. An error bar denotes the standard error.
Figure 6. In-school learning hours (i.e. regular class hours) per week for (a) OECD countries, excluding Japan and Korea and (b) East Asian countries. Information about the variation in in-school learning hours was unavailable from the original OECD report (OECD, 2017a, p. 210).
Taiwan and Macao. The findings described in this section have thus underscored the invalidity of the stereotype that Japanese students spend longer hours on learning than American students. The out-of-school learning hours for the UK and Australia (17.0 and 16.8, respectively) were lower than for the USA but higher than for Japan. These differences in out-of-school learning time between Japan and the three Anglo-American countries were even more pronounced than those for in-school learning time.

Despite the shorter hours spent on learning by Japanese students compared with their Anglo-American counterparts, readers might still argue that Japanese students allocate the limited learning time specifically for mathematics and science and, therefore, mathematics and science scores for Japanese students are higher than those for Anglo-American students. However, the data do not support this case either. When analysing the time spent on mathematics and science learning, our results did not change. Indeed, the mean hours per week spent on regular classes in mathematics and science was 6.9 for Japan (Figure 8) and 8.0, 8.6 and 7.5, respectively, for the USA, the UK and Australia. These in-school math/science hours were longer than those for Japan. The mean hours per week spent on out-of-school mathematics and science learning was 5.9 for Japan (Figure 9) and 9.0, 7.3 and 7.5, respectively, for the USA, the UK and Australia. These out-of-school math/science hours were longer than those for Japan. Here, we observed not only a difference in time spent on out-of-school learning, but also a difference in time spent on in-school learning. The difference in time spent on learning between Japan and the Anglo-American countries in this comparison thus became more pronounced when we focused on the time spent on mathematics and science learning. Similar to Japan, Korea and Taiwan allocated lower ratios of time for mathematics and science learning. For example, regular class time spent on all subjects was 30.3 and 31.8 hours for Korea and Taiwan, respectively. These hours were longer than those for the Anglo-American countries used for comparison (i.e. 27.7 hours for the USA, 26.5 hours for the UK and 25.7 hours for Australia). However, regular class hours spent on mathematics and science learning was 6.4 and 6.8 for Korea and Taiwan, respectively. These math/science hours were shorter than those for the Anglo-American countries (i.e. 8.0 hours for the USA, 8.6 hours for the UK and 7.5 hours for Australia). These results can also be confirmed when using data from PISA 2006 (OECD, 2011, pp. 30–31) instead of PISA 2015.

Discussion

Japanese students spent less time on out-of-school learning than Anglo-American students. These results will surely be at odds with the impression of most Western readers. East Asian students are believed to quite often take out-of-school lessons in cram schools (e.g. juku) (Barrett, 1990; Goya, 1993; Education Commission of the States, 1994). Is it really true that Japanese students now spend less time on out-of-school learning than their Anglo-American peers, despite Japan’s famed jukus? Indeed, the shorter time spent by Japanese upper secondary students on out-of-school learning than their American peers is confirmed by another survey conducted by a Japanese national institute (National Institute for Youth Education, 2017). This survey
selected 16 and 18 upper secondary schools for the USA and Japan, respectively, to cover the diversity among regions. The survey lacked data for the UK and Australia, making comparison impossible. This institute examined the time spent on homework
Figure 8. In-school mathematics and science learning hours (i.e. regular mathematics and science class hours) per week for (a) OECD countries, excluding Japan and Korea and (b) East Asian countries.
and on other forms of out-of-school learning, based on student questionnaires. The mean hours per day spent on homework was longer for the USA than for Japan. The mean hours (±SD) per day was 1.75 (±1.15) and 0.95 (±0.78) for the USA and Japan, respectively, where the valid sample sizes were 1,540 and 2,015, respectively.

![Figure 9. Out-of-school mathematics and science learning hours per week for (a) OECD countries, excluding Japan and Korea and (b) East Asian countries.](image)

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Cohen’s $d$ was calculated as 0.696, where we used the SD for the USA. The mean hours spent per day on other out-of-school learning was shorter for the USA than for Japan. The mean hours (±SD) per day was 0.92 (±0.90) and 1.20 (±1.19) for the USA and Japan, respectively, and Cohen’s $d$ was 0.311. However, the shorter hours spent on other out-of-school learning by American students did not offset the longer hours spent on homework by American students. That is, the finding of the shorter time spent on learning by Japanese students was not specific to the PISA 2015 data.

In addition, the stereotype that many East Asian students take out-of-school lessons in cram schools does not fit the reality of Japanese upper secondary students. PISA 2006 examined the percentage of students taking out-of-school lessons with non-school teachers for participant countries. For all three categories of out-of-school lessons (i.e. one-to-one, small-group and large-group lessons), the percentage for Japanese 15-year-olds was less than 10% (OECD, 2011, p. 33). These percentages were lower than those for American 15-year-olds, whose percentages ranged between 10% and 20%. The percentages for one-to-one lessons for Japanese were lower than those for British and Australians (i.e. higher than 15%), although the percentages for small-group and large-group lessons for Japanese were comparable to those for British and Australians (OECD, 2011, p. 33).

Japanese domestic surveys also confirm the relatively low percentages of Japanese upper secondary students who take out-of-school lessons. For example, a Japanese national survey reported that the percentage of upper secondary students taking out-of-school lessons (including both one-to-one and group lessons) was 18% in 2002 (Cabinet Office, 2017). Another survey conducted by Benesse, a well-known private educational research institute, reported that the percentage of students regularly attending cram school lessons was 18.7% in 2006 (Benesse, 2015). Interestingly, these percentages were even lower in the 1980s and 1990s, when the competition for university enrolment was more severe (Benesse, 2015; Cabinet Office, 2017). PISA 2006 data further underscore that the cram-school stereotype does not fit realities in Japan (OECD, 2011, p. 33).

**Conclusion**

Our analysis in this article has shown that learning time among Japanese upper secondary students has declined since the 1980s, and is now less than for their Anglo-American counterparts (Figure 1a). Our analysis in the complementary article (Rappleye & Komatsu, 2018) has already shown that both the competition for university enrolment and the pressure of learning on upper secondary students have become less significant, reaching a level roughly the same level as for Anglo-American students (Figure 1b). These findings indicate that the stereotype of ‘exam hell’ does not match the current realities of Japanese education. At the same time, Japanese achievement levels remain among the highest in the world, thus making it impossible to attribute Japanese ‘high performance’ to extraordinarily competitive schooling environments. To explain Japan’s high performance, we argue that we now need to shift the focus of our discussion from the hours spent on learning to the methods of teaching and learning, as well as the onto-cultural background which makes this form of teaching and learning possible (see also Komatsu & Rappleye, 2017a).
Do Japanese study more in primary schools?

Some critical readers might argue that even in conceding that Japanese upper secondary students spend less hours in learning than their Anglo-American peers, Japan’s high achievement is a result of longer hours spent learning at primary level. Unfortunately, we cannot fully examine the validity of this plausible argument, primarily because of the lack of primary-level data having high comparability. We admit the necessity of further research to explore this possibility, but note here that existing data initially imply that the time spent on learning by Japanese primary school students does not differ greatly from that of their Anglo-American peers. It is true that Japanese primary students spend longer hours on out-of-school learning than their Anglo-American peers, but the opposite is the case for in-school learning.

According to a survey comparing 10- or 11-year-old students in Tokyo, Washington, London and several other cities conducted by a Japanese research institute (Benesse, 2007), students in Tokyo, Washington and London spend 1.69 hours, 1.04 hours and 1.24 hours on out-of-school learning in a typical day, respectively. These values are equivalent to 615, 381 and 451 hours a year, assuming students spend the reported hours on study every day. On the contrary, 4th graders in Japan, America and England spend 903, 1,088 and 994 hours a year on in-school learning, respectively, according to the TIMSS 2015 survey (TIMSS, 2016, p. 175). The totals of in- and out-of-school learning hours are thus 1,518, 1,469 and 1,445 for Japan (Tokyo), America (Washington) and England (London), respectively. Here, the total hours for Japan is somewhat longer than those for America and England, but the differences between Japan and America and between Japan and England are merely 3.2% and 4.8% of the learning hours for Japan, respectively. We remain aware that these differences in total learning hours are only rough estimates based on several arbitrary assumptions and their validity needs to be assessed in succeeding studies. Still, these initial estimates suggest that Japanese primary students do not spend extraordinarily longer hours learning, thus giving them their edge when they reach upper secondary level.

From Japan to East Asia?

Readers willing to concede that ‘exam hell’ no longer defines Japanese education might still argue Japan is an exception in East Asia. That is, is exam hell really coming to a close across all of East Asia? While it would certainly be premature to pronounce the end of exam hell everywhere, we view Japan as part of a wider regional trend, although one that may take several decades to unfold. Our argument is predicated on the fact that the three factors that led to the end of exam hell in Japan are also taking place elsewhere: declining birth rates, leading to a smaller school-age population; loosening of the college entrance exams; and further breakdown of the diploma-turned-high-wage employment pipeline. Here, we briefly sketch the argument, since a fuller explanation is given in the complementary article (Rappleye & Komatsu, 2018).

In terms of decline in school-age population, Rappleye and Komatsu (2018) suggested that a decline in the relative 18-year-old population has been happening in
South Korea, Taiwan and China. Note that students in these countries usually undergo university entrance exams at the age of 18. The decline in South Korea has not been as significant as that in Japan up until this point. However, the decline in South Korea is now accelerating, and the relative population in South Korea will reach the same level as that of Japan by around 2020. The decline in Taiwan has been accelerating, and the relative 18-year-old population in Taiwan is expected to be comparable to that of Japan within a decade. In China, the situation differs from those in South Korea and Taiwan. Although the decline in the 18-year-old population started in the 2000s, the relative 18-year-old population is not expected to reach the level of Japan until 2030.

Meanwhile, policy measures adopted at the peak of the ‘exam hell’ period to alleviate the pressure are still being implemented in South Korea, Taiwan and China. Diversifying the pathways to university entrance in Japan during 1980–1990 helped alleviate the pressures associated with college admissions, reductions in class and curricular content lowered the overall workload and the building of more schools lowered competition rates (Ikegami, 2015). Similar to Japan’s introduction of Admission Office exams, South Korea, Taiwan and China introduced an alternative pathway for students (Ogawa & Nanbu, 2008; Lee et al., 2010). For example, in 1994, South Korea introduced an alternative pathway for students who demonstrated high potential in a specific subject. The percentage of students who used this pathway was 9.7% in 1997, but reached 36.6% in 2005. Simultaneously, there has been a substantial expansion of higher education that, when coupled with the declining youth population, has resulted in a sharp decline in the percentage of students who failed to enter a university in South Korea, Taiwan and China (Ogawa & Nanbu, 2008; Ando, 2013; Tanaka, 2018).

In addition to these changes, a reduction in the belief in the link between good universities and a good life has been taking place, particularly in South Korea and Taiwan. This change is particularly significant after the Asian Financial Crisis of 1997, which hit East Asian economies hard (Kang, 2014).

Transcending stereotypes (again)

Even just a few years ago, one of the leading scholars of international higher education based in London wrote of East Asia, ‘the same “examination hell” is now central to life in Japan as it is in all Confucian systems’ (Marginson, 2011, p. 601). Similarly, a 2013 article in The Atlantic described Japanese education as a ‘cutthroat system’ fixated on competition and testing (Berlatsky, 2013). In March 2016, the BBC published a humorous article cataloguing the strange exam rituals found in East Asia, where ‘the pressure is on to achieve sky-high results’ for the region’s ‘exam crazy students’ (Castle, 2016). These works underscore just how strong the dominant image of East Asian exam hell remains.

Nonetheless, we would do well to acknowledge a handful of scholars who preceded us in trying to overcome these persistent stereotypes. In Transcending stereotypes: Discovering Japanese culture and education (Finkelstein et al., 1991), Finkelstein (1991) was already attempting to caution Western readers that ‘Japan’s examination hell is a middle- and upper-class affliction . . . Not more than one-third of students in pre-
collegiate schools enter the fierce competition . . . It is thus by no means a universal experience of Japanese students’ (p. 140). A decade later, two leading scholars refuted the purported link between school pressure and suicides so often rehearsed in the American media, arguing that:

In the wake of a decade of study that vividly depicts the poor international standing of United States students on standardised tests, it has become soothing to focus on the problems of Japan . . . [but] the focus on ‘Japan’s problems’ has served to draw attention away from the positive aspects of the system. (Zeng & LeTendre, 1999, p. 120)

Park (2013) delivered a robust quantitative refutation of the four most dominant stereotypes of Korean and Japanese education. And most recently, popular authors like British teacher Lucy Crehan (2016), who took time to visit the region, concluded that stereotypes she once subscribed to were false: ‘Our stereotypes about Asian education systems are misinformed; they are not all exam hellhole, devoid of joy and deep learning and nor are they all the same’ (p. 266). Our quantitative, longitudinal analyses further support these earlier efforts and contribute to (re)opening the space to think deeply about the cause of high performance of East Asian students (see also Francis & Archer, 2005; Jerrim, 2015; Komatsu & Rappleye, 2017a; Rappleye & Komatsu, 2017). We hope that these deeper, more thoughtful analyses will eventually replace the superficial popular and political debate, which remains stalled at the level of scandalisation or caricature (Takayama, 2017), or sometimes ill-fated attempts to borrow structural elements from East Asia (e.g. You & Morris, 2016).

Indeed, the UK has already initiated such an attempt to learn about East Asian practice in a more thoughtful way, in the Mathematics Mastery programme (Mathematics Mastery, 2018; National Centre for Excellence in the Teaching of Mathematics, 2018). The aim of this programme is to implement methods of teaching and learning purportedly used in Singapore and Shanghai. Given that the programme includes teacher exchanges between the UK and East Asia, it does not initially seem to be a superficial borrowing of ‘what works’ from East Asia by the UK. Such attempts are a reasonable starting point for learning from East Asia. We are thus tentatively positive about the recent attempt made by some in the UK to open themselves to learning from elsewhere.

With that said, our concern about the Mathematics Mastery programme is that the programme does not explicitly mention the importance of rethinking epistemology and ontology as a crucial component for successful implementation of East Asian methods of teaching and learning. Methods of teaching and learning in East Asia, as elsewhere, presuppose a certain view of knowledge and personhood (self) (see Komatsu & Rappleye, 2017a; Rappleye & Komatsu, 2017). To borrow only the pedagogical techniques without the underlying epistemological and ontological foundations is likely to lead to failure of even earnest, widely supported attempts to transform practice in the home country. Our hope is that education scholars, once freed from the stereotypical images of East Asia, can turn to thoughtfully assessing the attempt to borrow at a deeper level, ensuring that the borrowing becomes a real rather than a rhetorical force for rearticulating schooling and self in these Anglo-American countries.

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