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The Academic Gap: An International Comparison of the Time Allocation of Academically Talented Students

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Abstract

Despite growing concern about the need to develop talent across the globe, relatively little empirical research has examined how students develop their academic talents. Toward this end, the current study explored how academically talented students from the United States and India spend their time both in and out of school. Indian students reported spending roughly 11 more hours on academics than their U.S. peers during the weekend in both STEM (science, technology, engineering, and math) and non-STEM topics. U.S. students reported spending about 5.4 more hours than their Indian peers on non-STEM academics during the week, leaving an approximately 7-hour-a-week academic gap between U.S. and Indian students. Additionally, U.S. students reported using electronics over 14 hours per week more than their Indian peers. Indian students also reported having control over a greater proportion of their time during the week than U.S. students did. Generally, there were far more cross-cultural differences than gender differences. These results inform discussions on how academically talented students develop within educational systems as well as what each culture supports in and out of school.

Keywords

academic talent, cross-cultural, gender differences, gifted, time allocation

> The responsibility for the creation of new scientific knowledge rests on that small body of men and women who understand the fundamental laws of nature and are skilled in the techniques of scientific research. While there will always be the rare individual who will rise to the top without benefit of formal education and training, he is the exception and even he might make a more notable contribution if he had the benefit of the best education we have to offer.
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> —Vannevar Bush, Head of the U.S. Office for Scientific Research and Development (1945)

Although written decades ago, this quotation underscores the enduring interest in developing talent and the importance of providing the best developmental environment possible. Such concerns persist today (e.g., National Science Board, 2010) and continue to include the need to challenge and develop academically talented students (Ceci & Williams, 2007; Subotnik, Olszewski-Kubilius, & Worrell, 2011). The global reach of such talent development has been discussed by researchers (e.g., Rindermann & Thompson, 2011), scientific organizations (National Academy of Sciences, 2005, 2010), and the popular media (e.g., Friedman, 2005; Zakaria, 2008, 2011). At the same time, at least in the United States, there is growing concern that time spent in academics generally, and in science, technology, engineering, and math (STEM) topics in particular, falls far short of where it should be (National Science Board, 2010). Such concern is often expressed relative to the performance of students from other (often Asian) nations. Nonetheless, relatively little empirical research has been published on international comparisons of how students develop their academic talent in different countries.

Comparisons of international test scores provide performance benchmarks but do not explore the developmental context in which they are created. For example, in the United States, adolescents typically have 6.5 to 8 hours of free time each day (Larson & Verma, 1999); how they spend such a large part of their lives is not a trivial developmental matter, particularly when such time is viewed cumulatively.

Time use is an integral component to several models of talent development. For example, expertise is typically achieved only after about 10 years (or 10,000 hours) of

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sustained deliberate practice, on average (Ericsson, Krampe, & Tesch-Römer, 1993). Giftedness has been conceptualized as a form of developing expertise (Sternberg, 2001) where it is viewed as "the ongoing process of the acquisition and consolidation of a set of skills needed for a high level of mastery in one or more domains of life performance" (p. 160). In this sense, how time is spent (and in what domains) is a fundamental component of developing expertise. Moreover, the potential for environmental factors to act as multiplier effects to catalyze (or accelerate) talent development has also been articulated as part of a bioecological model of development (Bronfenbrenner & Ceci 1994; Papierno, Ceci, Makel, & Williams, 2005). According to this model, even small environmental differences can help lead to large differences in outcomes and performance, especially if these differences accumulate over time. As such, these experiences serve as proximal processes (Bronfenbrenner & Ceci, 1994) that can help engender talent development. Additionally, the ability to devote time toward developing talents is also viewed as part of the developmental trajectory toward creative production and expertise (e.g., Subotnik et al., 2011).

Many scholars (e.g., Csikszentmihalyi, Rathunde, & Whalen, 1993) have previously reported that talent development does not occur in a vacuum; it requires not just tolerance but the support and infrastructure of adults and society more broadly. Csikszentmihalyi et al. posited that if adolescents were not in environments that developed their talents, they could potentially lose interest and/or even lose the ability to achieve their prior potential. They emphasized the need for flow experiences (becoming so involved in a task that one loses track of time and fatigue) to develop talent. However, in the current study, we focus on a more fundamental building block of talent development: time. To have an opportunity to achieve flow, one must first be spending time on that task. Although not an assessment of one particular talent development model, the present study builds on such previously established conceptualizations by assessing how academically talented adolescents from two different cultures spend their time both in and out of school. Given the importance of appropriate environments and the time commitment needed to achieve expertise, knowing how students allocate their time can help parents, educators, and researchers understand and foster adolescent development.

How time is spent appears even more important in the context of both historical and recent findings that indicate top-performing students in the United States are not being challenged in school (Boser & Rosenthal, 2012; Colangelo, Assouline, & Gross, 2004). High-performing students are sufficiently unchallenged in school such that, unlike their same-age peers, their rate of learning during the school year does not differ from the rate of learning in the summer (Rambo-Hernandez & McCoach, 2014). Moreover, a recent national review of gifted elementary programs reported that gifted programs generally do not affect achievement or attitudes toward school (Adelson, McCoach, & Gavin, 2012). Without sufficient challenge in school, time outside school may be a critical opportunity for some academically talented students to develop their talents. Expanding the scope of inquiry beyond school allows for a more complete exploration of experiential and developmental differences. Nonetheless, few studies have focused specifically on how academically talented students spend their time outside the classroom (cf. Bucknavage & Worrell, 2005; Makel, Li, Putallaz, & Wai, 2011; Olszewski-Kubilius & Lee, 2004).

It is also important to remember that talent is developed through more than just academics; there are multiple pathways to developing talent. For example, academic performance, values, self-esteem, resiliency, positive peer networks, and decreased risky behaviors are all associated with participation in organized activities (e.g., Fredricks & Eccles, 2006a, 2006b). Similarly, the use of electronics can keep students well-informed of what is happening in the greater world, develop spatial and motor skills, form peer networks, and strengthen family bonds (Durkin & Barber, 2002; Green & Bavelier, 2003). Because of these potential developmental benefits, such activities should not be ignored when assessing talent development; they can contribute to educational dose (Lubinski & Benbow, 2000; Wai, Lubinski, Benbow, & Steiger, 2010) for developing expertise. As such, although time spent in some activities may not appear to be directly related to some outcomes, it could still play a role in positive development. Talent development models take this into account in a variety of ways. For example, the proximal processes to develop talent described in the bioecological model (Bronfenbrenner & Ceci 1994) need not be limited to academic pursuits.

For a global perspective, empirical studies of time allocation must also include students from multiple countries. The current study analyzed student time allocation in the United States and India. Because of its sheer size and status as the largest democracy in the world and its large role in the information technology field, India is a major player on the international stage. Although demand for and cultural value of education in India is high, Indian students are often faced with issues of both access and quality of education (Annual Status of Education Report, 2011; Kingdon, 2007) while living in an environment that places high pressure to perform well (Verma, Sharma, & Larson, 2002).

Although of substantial interest, cross-cultural comparisons are not the only demographic comparison of interest. Given the expressed differences between genders in their interests, values, and preferences (e.g., Su, Rounds, & Armstrong, 2009), the present study also analyzed time allocation across genders. The sharp difference in representation between academically talented males and females in the STEM fields (e.g., Ceci & Williams, 2010; Wai, 2014) may epitomize the potential effects of interest and time allocation differences. With the increasing importance and prevalence of STEM careers across the globe, fostering environments to catalyze interest and passion in both males and females is important to developing a STEM pipeline. These issues may have particular relevance in India where families often continue to show a "son preference" in education and even fertility (e.g., Sen, 1992, 2003).

The current study investigated how academically talented students from the United States and India allocate their time in terms of four primary categories: academics (in class, doing homework, being tutored), electronics use (TV, Internet, videogames, phone, listening to music), extracurricular activities (academic clubs, arts, sports, service clubs), and sleep/family time (nights eating dinner with family, percentage of time determined by self/family/other). These categories were chosen because each represents not only a regular part of adolescent life but also a significant body of research showing connections to developmental outcomes. A fifth "catch-all" category was included to account for other common adolescent activities (household chores, job, religious activities, exercising, shopping, reading, and personal care). Although not a primary focus of the current study, this category was included to help provide a comprehensive picture of modern adolescent life in each culture.

To provide context for the current research, the following sections review previous research on the four primary categories analyzed in this study: academics, electronics use, extracurricular activities, and sleep. Because there has been limited research on how academically talented students spend their time outside the classroom, research on the general student population often serves as useful contextual benchmarks.

Academics

The United States recognizes the importance of educating its citizens by spending 7.3% of its gross domestic product on education, more than all other countries except Iceland, Korea, Denmark, and New Zealand (Organisation for Economic Co-operation and Development [OECD], 2012), whereas India spends about 3.1% of its gross domestic product on education (UNESCO, 2010). In the United States, teachers report teaching students for about 1,100 hours a year, compared to an OECD global average of under 800 hours a year (OECD, 2012). This represents 53% to 57% of the time U.S. students actually spend in the classroom, while the OECD average is only about 39% to 47%. A generation ago, Larson and Csikszentmihalyi (1983) reported that urban middle-class Indian adolescents spent one third of their waking hours in class, being tutored, or doing homework. However, when assessing time spent on academics, it is important to note that allocated time is not always equivalent to time engaged with the material. Academically talented students may find school unchallenging and too easy despite being required to attend (e.g., Boser & Rosenthal, 2012).

Moreover, in the United States, the majority of states require at least 180 school days a year (M. Bush, Ryan, & Rose, 2011). In India, annual school days are also determined largely at the state level, with 180 days of school also being the typical minimum (UNESCO, 2011). However, unlike the United States, in India, the minimum is actually treated as such, with elementary schools averaging 211 days a year with about half providing between 226 and 250 days each year (UNESCO, 2011). Such time gaps, if extended over years, can create the potential for large differences in talent development.

Adolescents also spend time on academics outside the classroom. Such time is important because homework time is positively associated with academic achievement, even after accounting for standardized test scores (Cooper, Robinson, & Patall, 2006). Over 94% of U.S. secondary school students reported doing homework, with females spending an average of 7.5 hours and males 6.0 hours each week (U.S. Department of Education, 2008). In India, the homework rates appeared much higher, with males from urban areas spending 3.9 hours and females 2.9 hours each *day* (Lloyd, Grant, & Ritchie, 2008). However, U.S. students also report completing less than half of what had been assigned (Cooper, Valentine, Nye, & Lindsay, 1999), which may partially explain the cultural gap.

The research focusing specifically on how much time academically talented adolescents spend on homework is limited. Many students attending a residential high school for academically talented students were "shocked" by having to do homework because they had so little experience with it in their previous schools (because it was either not assigned or not necessary for them to do to excel; Coleman, 2002). This finding suggests that the local school context may moderate the time spent on homework for academically talented students. Makel et al. (2011) reported that academically talented females reported spending more time on homework than their male peers.

Another out-of-school academic endeavor involves tutoring. Interestingly, we could find no published comprehensive rates of U.S. tutoring. In India, on the other hand, students have a tradition of being tutored or taking additional academic preparatory classes at night, with 31% of eighth standard (the equivalent of eighth grade in the United States) government school students and 22% of private school students paying for supplementary educational help (Annual Status of Education Report, 2011).

Use of Electronics

The American Academy of Pediatrics Committee on Public Education (2001) recommends that parents "Limit children's total media time (with entertainment media) to no more than 1 to 2 hours of quality programming per day" (p. 424) because of possible negative health effects. Despite such warnings, adolescents in the United States spend nearly 7.4 hours a day using electronic media (Rideout, Foehr, & Roberts, 2010). Although Internet access is limited to only the relatively affluent in India (perhaps the top 2% to 3%), a

2002 survey showed that Indian adolescents report spending anywhere from 0.5 to 2 hours a day online (see Verma & Sharma, 2003). More recently, Kumari and Ahuja (2010) reported that 9- to 12-year-old Indian public school students reported watching TV or using a computer for just over 16 hours a week. However, given the rapid increase in use of electronic media in India, the above numbers will likely change quickly.

A study of U.S. academically talented students found that males reported watching significantly more TV than females (Makel et al., 2011). The authors concluded that such differences may be partially explained by the fact that females reported spending more time on nearly all other activities surveyed. By spending their time participating in a greater variety of activities and spending more time doing homework, females may simply not have enough hours in the day to consume electronics as much as males.

Extracurricular Activities

Participation in extracurricular activities is of interest because it is associated with greater avoidance of negative outcomes including dropping out of school (Mahoney & Cairns, 1997) and drug use (Youniss, Yates, & Su, 1997) and positively related to standardized test scores, grades, and educational aspirations (Cooper et al., 1999; Mahoney, Cairns, & Farmer, 2003). Such relationships may stem from developing a sense of agency, having a supportive social network, avoiding unstructured time, or providing opportunities to practice meeting challenges (Eccles & Barber, 1999; Eccles, Barber, Stone, & Hunt, 2003; Fredricks & Eccles, 2005). Moreover, these relationships between participation and subsequent outcomes connect activity participation to broad talent development.

Previous research (e.g., Cooper et al., 1999; Fredricks, 2012) has found a positive relationship between time spent participating in activities and achievement test scores with the exception of the very highest level of activity participation where test scores were lower. However, this extreme level of participation involved only a small percentage of students. For example, Mahoney, Harris, and Eccles (2006) reported that U.S. youth spend on an average 5 hours per week in organized activities, but a small subgroup of about 7% of middle school students reported spending more than 20 hours a week in activities. Previous research on participation in activities in India has shown low participation rates that are often due to students perceiving low value by parents and teachers (e.g., Hans, 1999).

Academic Clubs. In a sample of predominantly White middle-class students, Fredricks and Eccles (2006a) reported that 32.5% of students participated in an academic club. However, not surprisingly, academically talented students were far more likely to participate in academic clubs with participation rates ranging from 38% (Bucknavage & Worrell, 2005) to 55% (Olszewski-Kubilius & Lee, 2004). Academically talented females were more likely to participate in academic clubs than academically talented males (Makel et al., 2011).

Athletics. Approximately 55% of adolescents in the United States reported participating in athletics with males reporting slightly higher rates of participation (e.g., McNeal, 1998; Videon, 2002). Several previous studies of U.S. academically talented students reported high participation rates in athletics, ranging from 53% to 72% (Bucknavage & Worrell, 2005; Makel et al., 2011; Olszewski-Kubilius & Lee, 2004; Rinn & Wininger, 2007). In an analysis of how Indian adolescents spent their leisure time, males reported spending more than twice as much time as females in exercise, yoga, games, and sports activities (Verma, 1995; Verma & Saraswathi, 1992).

Arts. Participation in the arts (e.g., theater, orchestra, etc.) among U.S. adolescents may have experienced a slight decline over the past few decades. Child Trends (2012) reports that eighth-grade U.S. student participation in arts activities decreased from 55% to 46% from 1991 to 2010. Regardless, females consistently participated in arts activities across all years. Similarly, in his sample of parent-dubbed Indian "super kids," Pramanik (2007) found that 28% of students were tutored in song/dance, with 75% of these students being females. Although not covering all arts activities, Olszewski-Kubilius and Lee (2004) reported that 67% of academically talented students reported being in a band or orchestra, with no gender difference in participation rates for males. Makel et al. (2011), on the other hand, found slightly lower participation rates, with U.S. academically talented females being 1.65 times as likely as males to participate in an arts activity.

Service Clubs. Service clubs, or organizations dedicated to volunteering and helping others, can play a large role in developing a sense of community and giving. Using the umbrella term *prosocial activities*, Fredricks and Eccles (2006a) reported that 48.1% of their U.S. adolescent sample participated in scouting, junior achievement, a church group, or political campaigns, with no difference in participation between males and females.

Academically talented students participate in similar numbers, with nearly half doing volunteer work with no gender differences (Olszewski-Kubilius & Lee, 2004). However, Makel et al. (2011) found over 50% of U.S. females reporting participation compared to about 30% for males. Research and reviews of how Indian adolescents spend their time did not report participation in volunteering or service clubs (e.g., Pramanik, 2007; Verma et al., 2002; Verma & Sharma, 2003). This may be a function of the authors' decisions and not the adolescents', or it could reflect a lack of philanthropic emphasis in India. However, India has been undergoing a large cultural shift in the types of activities that are popular with adolescents. Verma and Sharma (2003) reported that increased globalization and urbanization have been associated with a drop in participation in activities with a rich cultural history such as classical music and dance and an increase in service activities such as HIV/AIDS educational groups.

Sleep

Adolescent sleep has been consistently decreasing for decades, but so has the recommended sleep time, currently about 9 hours a night (Matricciani, Olds, Blunden, Rigney, & Williams, 2012). Thirteen-year-old students in the U.S. average about 7.7 hours of sleep each school night (Wolfson et al., 2003). In the United States, no gender differences in sleep behavior are typically reported (Geiger, Achermann, & Jenni, 2010). However, ninth-grade Indian males were nearly twice as likely as Indian females to report having sleep problems (62.7% vs. 37.3%, respectively; Gupta et al., 2008). This could stem from more pressure experienced by Indian males than females.

An international meta-analysis of adolescent sleep behavior found numerous examples where sleep problems and/or lack of sleep were associated with academic and emotional problems (Gradisar, Gardner, & Dohnt, 2011). The authors also reported that Asian students were more likely than North American students to report daytime sleepiness. Because sleep behavior is related to performance, it is an important factor to consider when assessing how students spend their time; insufficient sleep could counteract time spent productively during the day.

A qualitative study of whether U.S. students participating in Advanced Placement and International Baccalaureate programs felt they had to sacrifice social acceptance to excel academically found that academically talented students reported sacrificing sleep to meet both academic and social demands (Foust, Hertberg-Davis, & Callahan, 2008). They equated such sacrifice to a "Superstudent Syndrome" (p. 126) where students felt pressured to juggle all aspects of their life with little to no support while viewing sleep as either a nuisance or a luxury instead of an important part of their development. However, older quantitative studies show that gifted students sleep longer than other children, indicating that lack of sleep may be relatively new or nonuniversal in academically talented students (Lubinski & Humphreys, 1992; Terman, 1925).

The Present Study

This study collected data from talent search participants in the Duke University Talent Identification Program (for a talent search model overview, see Putallaz, Baldwin, & Selph, 2005). The talent search model originated in the early 1970s with the use of above-level tests that avoid the ceiling effects that on-level tests have for students with high academic ability (e.g., Stanley, 2005). Students qualify for a talent search by scoring at or above the 95th percentile on a standardized test in the fifth or sixth grade. In the United States, talent search participants then take an above-level standardized test (either the ACT [American College Test] or the SAT [scholastic aptitude test]) in the seventh grade to assure sufficient test ceiling. Using the same talent search model, Indian students in the seventh standard (the equivalent of the seventh grade in the United States) who score in the 95th percentile or higher on an on-level standardized test qualify for talent search participation. The above-level test used in India is the ASSET (Assessment of Scholastic Skills Through Educational Testing) test developed by Educational Initiatives (http://www.ei-india.com/asset/), which is administered to over 350,000 on-level students each year.

Predictions

Broadly, in an effort to better understand how adolescent talent development fits into the larger global context, we investigated whether academically talented males and females in the United States and India spent their time differently. Based on the prior literature, the following specific predictions were made:

Academics. We predicted a country × gender interaction showing that Indian students spend more time on academics than U.S. students and that Indian males spend the most time on academics and U.S. males spend the least time on academics.

Electronics. We predicted a country × gender interaction with U.S. students spending more time using electronics than Indian students and U.S. males using electronics more than U.S. females.

Extracurricular Activities. Given the focus on academics in India, we predicted that U.S. students would spend more time on extracurricular activities than Indian students and that females would spend less time than males engaged in them.

Sleep. We predicted that academically talented students would generally report healthy sleep habits with participants from the United States reporting more sleep than participants from India.

Time Choices. We predicted that Indian students would report having more of their time controlled by their families than their U.S. peers.

Other Activities. Additional activities not included in the other categories were included in the survey and grouped into an "Other" category. Given the dearth of research (particularly in India), our study is exploratory for this category. Although not a primary focus of the current study, this category helps provide a comprehensive picture of modern adolescent life in each culture.

Method

Participants

All study participants were in a national talent search. Students from both countries were enrolled in numerous schools, across several states, with varying educational curricula and standards. A total of 668 (321 female, 347 male) seventh-grade U.S. students and 353 (118 female, 235 male) seventh-standard Indian students participated. However, data from some individual item responses were omitted because of improbable or impossible responses (e.g., watching 510 hours of TV on the weekend). The ethnicity of U.S. participants was 62.3% Caucasian, 11.5% Asian American, 11.5% African American, 3% Native American or Hawaiian Islander, 11.7% multiracial, and 20.3% of Hispanic ethnicity.

Most U.S. participants (80%) reported speaking one language, 17.8% reported speaking two languages, and 2.3% said they spoke three or more languages. In contrast, 4.3% of India participants reported speaking one language, 43.9% reported speaking two languages, 39.9% reported speaking three languages, and 10.8% reported speaking four or more languages.

Procedure

After their children were registered to participate in the talent search, parents were e-mailed a description of the study and provided a link where they could log in and indicate their consent. Participants then indicated their assent. Surveys were e-mailed to all assenting India talent search participants and to a random sample of U.S. talent search participants the week following their above-level test. Students were informed that the survey's purpose was to better understand how they spend their time, that they could skip any question or stop participating at any time, that their responses would not influence their relationship with the talent search organization, and that their responses would be kept confidential.

Measures

Students were asked to indicate how much time (in hours) they spend on a variety of activities during the average week (Monday through Friday) and on the weekend (Saturday and Sunday). Instructions stated that if some activities overlap, such as watching an hour of TV while doing homework, they should count it as 1 hour for both activities. Because of this potential overlap, responses may not represent a proportion of total time.

Activities were grouped into four overarching categories: academic, electronics use, extracurricular activities, and sleep/family time. For academic activities, students were asked how much time they spend in class, on homework, and being tutored (or in a study group) in the following domains: math, science, computer science, a foreign language, language arts, social sciences, art/music/theater, and other. Math, science, and computer science responses were grouped to form an overall STEM category. Electronics use was the sum of responses on watching TV, using the phone, being on the Internet, playing video games, and listening to music. Extracurricular activities consisted of academic club, arts club, sports, and service club participation. Sleep time was recorded by asking for typical times of going to sleep and waking up. Time choices were assessed by the percentage of time determined by self, family, or someone else as well as the number of nights spent eating dinner with family. Finally, a fifth category of other activities consisted of activities that are often a regular part of life not included elsewhere, specifically the following: doing household chores, having a job, practicing a religion, exercising, shopping, reading for pleasure, and personal care.

Because the goal of the investigation was to identify potential differences in aggregate time allocation, analyses were limited to comparisons of overarching categories, not specific activities. We analyzed the data using a path model that was analogous in design to a 2 × 2 (country × gender) multivariate analysis of variance but superior in handling missing and censored data. For the sake of clarity, we discuss results in the vocabulary of analysis of variance (main effects, interactions), though actual tests were conducted as multiple–degree of freedom Wald tests of constraints; the actual test statistics are reported. For each significant multivariate effect, we compared parameter estimates representing the differences of interest on specific variables relative to their delta method standard errors. These comparisons incorporated the Holm (1979) post hoc adjustment within each main effect and interaction. We report unadjusted 95% confidence intervals for all single–degree of freedom tests.

The estimated model comprised three dichotomous predictors—dummy indicators for country and gender and a product–term interaction—all predicting week and weekend hours reported spent in different domains. Individual items (e.g., weekend social studies homework) were aggregated to sums (e.g., weekend non-STEM academic time). All outcomes except for sleeping were modeled as censored normal with lower bounds at zero. Several variables were rescaled in magnitude to facilitate estimation; this rescaling had no effect on significance testing and is reversed in the reported results. All values can be directly interpreted as hours. To accommodate the complex computations, we used the mixture modeling facility in Mplus Version 7.11 (Muthén & Muthén, 2013) with known classes (instead of multiple groups) and a maximum likelihood estimator with standard errors from first-order derivatives. The maximum likelihood estimator with standard errors from first-order derivatives results in appropriate standard errors in the context of data missing at random (Little & Rubin, 1987).

Results

General descriptive statistics for the overarching categories are reported for each group in Tables 1 and 2 (estimated means and 95% confidence intervals for the more granular variables are presented in Supplemental Tables 1-6, available

Table 1. Estimated Mean (Standard Deviation) Time Spent in Activities.

	United States		India		Effect size [confidence interval]	
Activity	Male	Female	Male	Female	Gender	Nation
STEM week	13.86 (6.56)	14.41 (6.50)	15.89 (9.71)	13.83 (7.81)	0.75 [−1.32, 2.82]	−0.72 [−2.79, 1.35]
STEM weekend	−1.27 (4.17)	−0.32 (3.43)	5.78 (5.88)	4.38 (4.16)	0.23 [−0.96, 1.42]	**−5.88 [−7.07, −4.68]**
Non-STEM week	20.56 (9.76)	21.81 (9.72)	16.62 (11.07)	14.98 (9.21)	0.20 [−2.55, 2.94]	**5.38 [2.64, 8.13]**
Non-STEM weekend	−0.60 (5.15)	0.25 (4.33)	5.66 (5.99)	5.70 (5.97)	−0.44 [−1.88, 0.99]	**−5.85 [−7.29, −4.41]**
Activities week	4.97 (6.65)	4.55 (4.90)	3.91 (4.67)	2.60 (4.13)	0.87 [−0.16, 1.89]	**1.51 [0.482, 2.53]**
Activities weekend	−0.52 (4.69)	−0.27 (3.69)	1.46 (3.70)	0.53 (2.81)	0.34 [−0.41, 1.09]	**−1.39 [−2.14, −0.64]**
Other week	11.56 (7.25)	13.74 (7.61)	9.41 (7.51)	10.17 (7.45)	−1.47 [−3.57, 0.63]	**2.86 [0.76, 4.95]**
Other weekend	6.39 (5.23)	9.06 (6.36)	6.23 (4.85)	8.15 (5.42)	**−2.29 [−3.70, −.89]**	0.54 [−0.87, 1.94]
Electronics week	15.27 (14.47)	18.79 (28.55)	9.76 (10.64	9.48 (8.94)	−1.62 [−7.11, 3.88]	**7.41 [1.92, 12.91]**
Electronics weekend	14.59 (13.43)	15.69 (27.54)	7.77 (6.81)	8.71 (7.27)	−1.02 [−5.99, 3.05]	**6.90 [1.93, 11.87]**
Sleep week	8.97 (0.78)	8.68 (0.90)	8.29 (0.77)	8.63 (2.15)	−0.03 [−.68, 0.63]	0.36 [−0.30, 1.02]
Sleep weekend	9.96 (1.38)	10.23 (1.31)	9.09 (1.13)	9.50 (1.32)	−0.34 [−0.60, −0.08]	**0.80 [0.54, 1.06]**

Note. STEM = science, technology, engineering, and math. Positive effect sizes indicate more time was spent by U.S. students and males. Effect sizes are in hours with confidences intervals that do not include zero in boldface.

online at http://gcq.sagepub.com/supplemental) with primary comparison of academic and electronic time reported in Figure 1. The adjusted estimated means are negative in a small number of cases; this is an artifact of a large zero inflation (i.e., many participants reporting spending no time) for those variables and can be interpreted as zero time spent in that category for that group.

The multivariate country × gender interaction across the 14 outcomes was significant, Wald $\chi^2(12, N = 1{,}020) = 60.13$, $p < .001$. However, none of the individual interaction terms was significant after post hoc adjustment, adjusted ps > .05, and have thus not been interpreted.

For comparisons across countries, the multivariate main effect was significant, Wald $\chi^2(12, N = 1{,}020) = 627.32$, $p < .001$. Parameter estimates representing the marginal main effects (with the interaction in the model) with unadjusted 95% confidence intervals are reported in Table 1. After the Holm (1979) adjustment, 9 of the 12 effects were statistically significant.

For comparisons across gender, the multivariate main effect was significant, Wald $\chi^2(12, N = 1{,}020) = 52.70$, $p < .001$ (see Table 1 for parameter estimates and 95% confidence intervals). However, after post hoc corrections, the only significant gender differences indicated that females reported spending just over 2 hours more than males on "other activities" on the weekends.

Academics

In line with our prediction that Indian students would report spending more time on academics than U.S. students, Indian students reported spending 5.88 more hours each weekend on STEM topics and 5.85 hours more on non-STEM topics each weekend than U.S. students. However, U.S. students reported spending 5.38 more hours during the week on non-STEM academics than their Indian peers. This makes a roughly 7-hour weekly academic gap across countries, with Indian students spending substantially more time on academics (STEM academics in particular) than U.S. students. There was no significant difference in time spent on STEM academics during the week.

Electronics

As predicted, U.S. students reported spending significantly more time using electronics than Indian students both during the week and on the weekend (7.41 hours and 6.9 hours, respectively). Interestingly, the electronics gap between U.S. and Indian participants was just over the time reported in the academic gap (but in the opposite direction).

Extracurricular Activities

As predicted, there were significant reported differences between U.S. and Indian students in time spent on extracurricular activities during the week, with U.S. students reporting spending about 1.5 hours more in extracurricular activities than their Indian peers. However, on the weekend, Indian students reported spending about 1.4 hours more in activities than their U.S. peers, balancing total time in extracurricular activities across countries.

Sleep/Family Time

As predicted, U.S. students reported sleeping significantly more than Indian students during the weekend but only by 0.8 hours. Nevertheless, students from both countries reported sleeping over 8 hours a night, implying that participants were not particularly sleep deprived. Additionally, all groups reported sleeping more on the weekend than during the week. There was no significant difference between groups on time spent sleeping during the week.

Table 2. Estimated Means [95% Confidence Intervals] for Dinners With Family and Time Determination.

	United States		India		Gender		Nation	
Activity	Male	Female	Male	Female	Male	Female	United States	India
Dinner with family								
Week	4.23 [3.97, 4.48]	4.23 [3.98, 4.47]	4.26 [3.97, 4.54)	3.86 [3.56, 4.17]	4.24 [4.01, 4.47]	4.05 [3.82, 4.27]	4.23 [4.01, 4.44]	4.06 [3.82, 4.31]
Weekend	1.71 [1.62, 1.80]	1.69 [1.61, 1.77]	1.73 [1.63, 1.82]	1.69 [1.58, 1.79]	1.72 [1.65, 1.79]	1.69 [1.62, 1.76]	1.70 [1.64, 1.78]	1.71 [1.64, 1.78]
Percentage of time determined by								
You								
Week	27.11 [25.15, 29.07]	25.64 [23.80, 27.47]	32.04 [29.52, 34.56]	33.89 [30.49, 37.30]	29.58 [27.98, 31.17]	29.77 [27.83, 31.70]	**26.37 [25.03, 27.72]**	**32.97 [30.85, 35.09]**
Weekend	26.34 [24.33, 28.36]	25.49 [23.57, 27.41]	28.73 [26.30, 31.16]	29.44 [26.53, 32.34]	27.54 [28.96, 29.12]	27.46 [25.72, 29.20]	25.82 [24.53, 27.31]	29.09 [27.19, 30.98]
Family								
Week	55.19 [52.95, 57.42]	51.93 [49.73, 54.12]	46.81 [44.20, 49.43]	42.24 [38.79, 45.69]	**51.00 [49.28, 52.72]**	**47.08 [45.04, 49.13]**	**53.56 [51.99, 55.12]**	**44.53 [42.37, 46.69]**
Weekend	57.23 [54.97, 59.49]	54.35 [52.09, 56.61]	54.96 [52.35, 57.56]	52.21 [48.77, 55.65]	56.09 [54.37, 57.82]	53.28 [51.22, 55.34]	55.79 [54.19, 57.39]	53.58 [51.43, 55.74]
Other								
Week	16.20 [14.56, 17.84]	18.88 [17.09, 20.66]	19.84 [17.85, 21.83]	21.16 [18.22, 24.10]	18.02 [16.73, 19.31]	20.02 [18.30, 21.74]	17.54 [16.33, 18.75]	20.50 [18.72, 22.27]
Weekend	15.14 [13.60, 16.67]	16.70 [15.06, 18.34]	15.79 [14.13, 17.44]	16.53 [13.98, 19.08]	15.46 [14.33, 16.59]	16.62 [15.10, 18.13]	15.92 [17.80, 17.04]	16.16 [14.64, 17.68]

Note. The maximum number of dinners was 5 during the week and 2 on the weekend. Participant responses for percentage of your time outside school during the week is determined by "You, Family, and Other" were forced to add up to 100% for the week and the weekend. Text in bold represents statistically significant differences.

Contrary to prediction, U.S. students reported having significantly less freedom in choosing how they spent their time during the week than their Indian peers (26.4% and 33.0%, respectively) and had more of the time determined by their family (53.8% and 44.3%, respectively). There were no significant differences on the weekend.

There were no significant differences across country or gender in how often students ate dinner with their families. All groups reported eating dinner with their family about 4 nights each week and about 1.7 times on the weekend.

Other Activities

U.S. students reported spending 2.86 hours more time on other activities during the week than students from India. There was no significant difference in time spent on other activities during the weekend. As mentioned above, in both countries, females reported spending about 2.3 hours more time on other activities than their male counterparts.

Discussion

The present study analyzed the self-reported time allocation of academically talented students from the United States and India. Among other things, these findings highlight the importance of broadening the scope of investigation beyond time spent in school. As shown in Figure 1, if the current analysis had focused solely on academic time during the week, U.S. students would have reported spending over 5 more hours per week on non-STEM topics than their Indian peers. However, the addition of academic time on the weekend substantially alters such a conclusion (Indian students spent roughly 11 more hours on academics on the weekend than U.S. students), making total academic time an essential consideration. The relative difference in time spent using electronics may provide, in part, an explanation for the question "What are the U.S. students doing instead of academic work?"

Overall, Indian students reported spending just over 7 more hours each week on academics than their U.S. peers. Assuming an equivalent number of school days, the annual academic gap between academically talented Indian and U.S. students is 254 hours. However, given that Indian students typically attend between 20 and 40 more days of school each year than their U.S. counterparts, the annual academic gap widens to between 400 to 600 hours more per year spent on academics. Such an academic gap between countries, if consistently present over many years, gives academically talented Indian students a substantial advantage relative to their U.S. counterparts in developing their talents, putting in 10,000 hours, and potentially developing expertise, not to mention an accelerated pace. Such experiential differences serve as a higher and perhaps more frequent educational dose for academically talented Indian students. Moreover, they can also serve as proximal processes to foster talent and potentially accelerate creative production. This gap may vary depending on how students spend their vacation time away from school (e.g., during the summer, over holidays, etc.).

U.S. students reported spending more time in extracurricular activities and other activities during the week (with Indian students reporting spending more time in

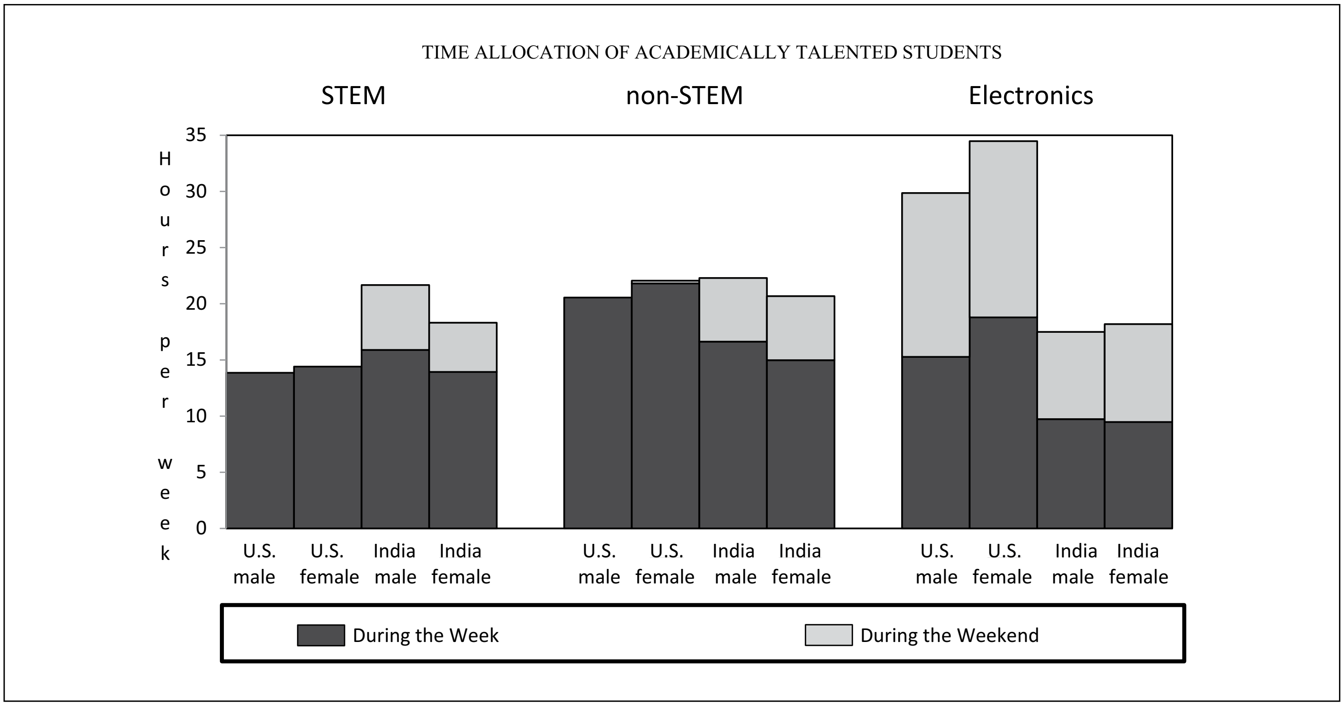

Figure 1. Academic and electronic time comparison by gender and country.
Note. The first set of stacked columns represents the total number of hours of STEM (math + science + computer science) work (class + homework + tutoring) done by students. The second set of stacked columns represents the total number of hours of non-STEM (foreign language + language arts + social science + arts + other) work (class + homework + tutoring). The third set of stacked columns represents the total number of hours of electronics use (watching TV + on the Internet + playing videogames +talking on the phone + listening to music). The darker bottom sections represent time during the week while the lighter top sections represent time during the weekend.

extracurricular activities on the weekends). Although not necessarily related to academics, many of these activities may contribute positively to development, perhaps with a greater focus on developing social and other noncognitive or soft skills that are increasingly being recognized as important for future success (e.g., Heckman, Stixrud, & Urzua, 2006). As such, it may be that despite spending less time directly on academics, U.S. students are spending their time on tasks that may help develop talents or on tasks that help them better leverage their talents into successful endeavors, especially within the U.S. employment structure. For example, being in a school play or serving as captain of the soccer team could help develop skills relevant to future success.

The finding that participants are generally sleeping a sufficient number of hours during both the week and the weekend suggests that academically talented students do not all suffer from a "Superstudent Syndrome" (Foust et al., 2008) where they feel required to sacrifice sleep to accomplish their goals. This finding does not necessarily contradict the previous findings of Foust et al. because the participants in the current sample are younger than their sample. It may be that Superstudent Syndrome does not begin until academically talented students begin taking more challenging classes like college preparatory coursework in Advanced Placement and International Baccalaureate programs.

Limitations and Future Directions

Academic quantity does not necessarily equal quality. Time spent on academics does not always equate to time spent actually learning or being academically challenged and engaged, especially for academically talented students. An hour of rote repetition is not equivalent in learning value to an hour of engaged critical thinking (Halpern, 2013). The current study did not assess the efficiency or effectiveness of learning, so academic time represents potential learning opportunity and not necessarily actualized learning time. Future longitudinal research could be conducted to assess educational, occupational, and creative achievements. The quantity–quality balance may be particularly relevant in India because their school enrollment levels are expanding so rapidly that access to quality resources may be particularly difficult (e.g., Duraisamy, James, Lane, & Tan, 1998). However, academically talented students from any country may find school unchallenging and too easy despite being required to attend (e.g., Boser & Rosenthal, 2012). If students are not challenged in school, academic quantity does not accurately represent actual time spent learning. However, students may seek/find intellectual stimulation and engagement outside school.

Additionally, the reported gender differences may be artificially small because gender bias may be less likely in the current Indian sample than the overall Indian population.

This is because families had to enroll their child to participate in an academic talent search, thus indicating investment in their daughter's academic development to be a priori. Academically talented females not represented in the current study may have had fewer academic experiences available to them than the present participants.

If the current survey had encompassed all of the participant's time, then every participant would have reported exactly 168 hours of activity per week (or more if they multitasked some activities). This was not the case. The survey may not have captured the full breadth of how time is spent (e.g., it did not ask about all time spent traveling between activities) or participant estimates were not precise. Future qualitative or experience sampling research following similar individuals may help clarify such issues.

Future assessments of time allocation may also consider investigating adjustment, well-being, peer relations, or psychopathology, particularly in light of assessing the extent to which academically talented students may make up a substantial portion of the small group of adolescents who are overscheduled (e.g., Fredricks, 2012). Similarly, the current study analyzed time allocation in the United States and India but academically talented students exist in all countries and cultures. The differences reported in the current study may vary across cultural contexts and ages.

In conclusion, the idea that gifted students do not face problems or challenges is considered one of the biggest myths about giftedness (Moon, 2009). A major tenet of the gifted education field is that gifted students require scaffolding and or specialized environments; they will not develop optimally on their own. With India amending its constitution to assure universal education in 2009 and leaders from the United States making statements like "The success of the United States in the 21st century–its wealth and welfare–will depend on the ideas and skills of its population. These have always been the Nation's most important assets" (President's Council of Advisors on Science and Technology, 2012, p. v), both countries appear to agree that educational development is key to national development. The degree to which each country is able to effectively harness such potential is where long-term growth will develop at the individual, national, and global levels. Providing appropriately challenging and engaging environments in which academically talented students can develop is the challenge that parents, educators, and policy makers face to foster such growth.

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