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Abstract

This study considered how three groups of academically talented high school students—those who attended an academic summer program (TIP), those who qualified for the program but chose not to attend (QNA), and those who did not qualify (DNQ)—spent time outside the classroom. These groupings differentiated students by ability (QNA vs. DNQ) and attendance (TIP vs. QNA). Male–female comparisons were also conducted. By comparing participation rates across a variety of activities and by sex, the current study helps explain the lives of high-ability students outside the arena by which they are defined: their academic ability. Results reveal numerous group and sex differences based on how high-ability students spend their time outside the classroom. Females tended to participate more than males in activities that were generally positively associated with academic achievement, while also participating in more types of activities. Males, however, reported watching more TV and were less likely to participate in any activity. QNA students reported spending more time on academic-related activities, such as homework and academic clubs, than did DNQ students, indicating a generally higher interest in academic endeavors. However, the QNA and TIP groups differed only in their service club participation rates, indicating that attending a summer program is not associated with spending time outside the classroom differently during the school year. This research underscores the heterogeneity of different groups of high-ability students and suggests some caution when generalizing from research findings based only on program participants. Knowing how students spend their time can help parents, educators, and researchers understand and foster adolescent development.

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Keywords

extracurricular activities, gifted, high ability, talent search, sex differences, time allocation

Adolescence is a time when individuals are able to begin choosing how they spend their time while discovering and developing their individual preferences and identities. U.S. adolescents average about 6.5 to 8 hr of free time each day (Larson & Verma, 1999); thus, how adolescents choose to spend their time is clearly a nontrivial part of their development. To contribute to this area of knowledge, the current study analyzed whether there were differences between how different groups of students with high academic ability spent their time outside the classroom during the school year.

Knowing how students spend their time can help parents, educators, and researchers understand and foster adolescent development. For example, numerous findings point to significant short- and long-term relationships between how time is spent outside the classroom and academic achievement. Research has shown that participation in extracurricular activities helps students develop better attitudes toward school in terms of engagement and performance (Dotterer, McHale, & Crouter, 2007; Marsh, 1992). Participation has also been associated with greater avoidance of negative outcomes like dropping out of school (Mahoney & Cairns, 1997) or drug use (Youniss, Yates, & Su, 1997). Similarly, participation is positively related to standardized test scores, grades, and educational aspirations (Cooper, Valentine, Nye, & Lindsay, 1999; Mahoney, Cairns, & Farmer, 2003). Moreover, longer and more intense participation in organized activities is positively associated with educational, civic, and occupational success 8 years after high school (Gardner, Roth, & Brooks-Gunn, 2008).

However, not all types of free-time activities are comparable. The number of hours worked in a job and time spent watching TV are negatively related to participation in school-based extracurricular activities, academic performance, and intelligence (Cooper et al., 1999; Hancox, Milne, & Poulton, 2005; Ridley-Johnson, Cooper, & Chance, 1983; Schreiber & Chambers, 2002), and may displace more constructive activities (Gaddy, 1986). Although part-time employment offers students an opportunity to earn money and experience the working world, working long hours during school (more than 20 hr a week) has also been associated with increased rates of drug and alcohol use, delinquency, and poor performance in school (Steinberg & Dornbusch, 1991; Steinberg, Fegley, & Dornbusch, 1993).

Researchers have also proposed that how students spend their time may help to predict their participation in certain risky behaviors (Eccles & Barber, 1999; Reis, Colbert, & Hébert, 2005). Eccles and Barber (1999) found that the type of activity dictated whether there was a relationship with avoidance of risk behaviors (e.g., drinking, drug use, or dropping out) or with positive outcomes (e.g., a high grade point average, attending college by age 21). For example, participation in sports is positively related to alcohol consumption (Eccles & Barber, 1999) but negatively related to sexual activity in females (Miller, Sabo, Farrell, Barnes, & Melnick, 1998; Page, Hammermeister, Scanlan, & Gilbert, 1998). At the same time, athletes are more likely

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to report liking school and are more likely to attend college than nonathletes (Eccles & Barber, 1999).

It has been posited that participation in extracurricular activities might be beneficial for adolescent development for several reasons. These include providing skills useful in a variety of settings, developing a sense of agency through helping the community, providing membership in a group, creating supportive social networks, avoiding unstructured time, and helping to practice meeting challenges (Eccles, Barber, Stone, & Hunt, 2003; Reis et al., 2005). The lack of group membership may partially explain why TV watching and jobs are generally associated with negative outcomes. Moreover, students participating in a variety of activities are more likely to form broad and varied social networks, whereas students participating in fewer activities have more focused networks (e.g., Eccles & Barber, 1999, Eccles et al., 2003; Fredricks & Eccles, 2005).

Nonetheless, few studies have addressed how high-ability students spend their time outside the classroom. Only two previous studies have focused on how high-ability adolescents spent their time outside the classroom across a variety of activities (Bucknavage & Worrell, 2005; Olszewski-Kubilius & Lee, 2004). Both studies provide a vast amount of information about a variety of outside-the-classroom activities. However, both studies surveyed only students enrolled in summer academic programs for high-ability students; thus, they relied solely on those students who had sought out academic activities during the summer and did not include high-ability students who had not participated in such opportunities. The current study broadens the scope of inquiry to address how several different groups of high-ability students spend their time outside the classroom.

As discussed above, different types of activities are associated with different outcomes as well as different participation rates for males and females. To provide a context for the current research, the following section reviews participation rates in the specific activities analyzed in this study. We review the relevant literature on participation rates in both the general and high-ability student populations for the activities analyzed in the present study. Such a review provides a reference point from which to compare the behaviors of high-ability students. Because there are only a handful of studies on how high-ability students spend their time outside the classroom, the research on the general student population provides useful comparison information.

We grouped out-of-classroom time into three activity categories: academic (e.g., academic club participation and time spent doing homework), nonacademic (e.g., athletics and arts), and other (e.g., hours spent watching TV and working). Comparing participation rates across all three activity categories instead of focusing on one particular activity allows for a more comprehensive view of the larger tapestry of how high-ability students spend their time outside class. However, comparing participation rates across studies is difficult because activities are often defined or grouped differently. For example, one study (U.S. Department of Education, 2006) reported participation rates in music-related activities of any kind whereas another study (Bucknavage & Worrell, 2005) reported separate participation rates for various types of specific music-related activities (i.e., solo instrument, choral, or band).

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Academic-Related Activities

Homework. An extensive body of literature exists on the time spent on homework by the general student population. A National Center for Education Statistics (NCES) survey of secondary school students showed that in 2007, more than 94% of students reported doing homework: Females spent an average of 7.5 hr and males averaged 6.0 hr a week completing homework outside of school time (U.S. Department of Education, 2008). In a study that examined students' nightly homework time, the average was 15 to 30 min for either a math or English class, but students also reported completing less than half of what had been assigned (Cooper et al., 1999). Other studies reported that students spent anywhere from 2 to 3 hr (Dotterer et al., 2007; Schreiber & Chambers, 2002) to up to 6 hr on homework weekly (McNeal, 1998). However, age typically played an important role in the amount of homework assigned, with older students spending more time on homework than younger students.

Cooper and his colleagues (1989; Cooper et al., 1999; Cooper, Robinson, & Patall, 2006) reported a generally positive relationship between homework and academic achievement, with more time spent on homework being associated with higher achievement, even after accounting for standardized test scores and participation in other activities. However, they also noted that relatively few studies had analyzed whether there were sex differences in the homework–achievement relationship. One exception (Mau & Lynn, 2000) reported a stronger correlation between homework and achievement for females than for males.

The research focusing specifically on how much time high-ability adolescents spent on homework is much more limited. In a qualitative study on students who attended a state-funded public residential high school for academically talented students, Coleman (2002) concluded that studying and doing homework were the dominant forces in students' lives while at school. However, Coleman also found that many students were "shocked" by being required to do homework because they had little experience with it in their previous schools (because it was either not assigned or not necessary for them to do to excel). This finding suggests that the level of challenge and the local school context may moderate the time spent on homework for high-ability students.

Academic clubs. The NCES reported that in a nationally representative sample of sophomores, only 6.8% of males and 9.9% of females participated in academic clubs (U.S. Department of Education, 2006). However, in a sample of predominantly White middle-class students, Fredricks and Eccles (2006a) reported that 32.5% of their student sample participated in an academic club of some form. This apparent disparity is likely to arise from the demographic differences in the two samples. It may be that academic clubs are more likely to be offered in predominantly middle-class schools, that students from middle-class backgrounds are more likely to participate in academic clubs, or both.

Findings differ on the proportion of high-ability students who participated in academic clubs, ranging from 38% in the Bucknavage and Worrell (2005) study to more

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than 55% in the Olszewski-Kubilius and Lee (2004) study. Similarly, findings on whether there were sex differences in participation rates in academic clubs among high-ability students have been inconsistent. Olszewski-Kubilius and Lee reported greater male participation whereas Bucknavage and Worrell found no statistically significant sex difference but a trend favoring females. Despite the differences found between the two high-ability studies, the overall message is that students who attended high-ability academic summer programs reported high rates of participation in academic clubs during the school year.

Nonacademic Activities

Nonacademic activities include five unique activity types: athletics, arts, service clubs, vocational clubs, and "other" activities.

Athletics. Numerous nationally representative studies have shown that roughly 55% of adolescents participate in athletics (e.g., McNeal, 1998; Videon, 2002). Typically, in the United States, boys are more likely than girls to participate in athletics (McNeal, 1998; Videon, 2002) with greater parity appearing in northern versus southern states (Braddock, Sokol-Katz, Greene, & Basinger-Fleischman, 2005). Thus, when studies with data collected in northern states reported no sex difference in participation rates (e.g., Fredricks & Eccles, 2005), these findings might not generalize equally across the country. McNeal (1998) analyzed the association between standardized test scores and athletic participation in a general student population and found no significant differences by ability in athletic participation rates.

A few studies have examined the athletic participation of high-ability students. Surveying two cohorts of students who attended a summer residential program, Bucknavage and Worrell (2005) found that a majority of the students in both of their cohorts reported participation in athletics, with males participating more than females (69.1% and 59.1% of males vs. 58.1 and 53.3% of females from each cohort, respectively). Among their high-ability samples, Olszewski-Kubilius and Lee (2004) and Rinn and Wininger (2007) reported 72% and 65.2% athletic participation, respectively, with neither finding any sex difference in participation. Thus, it appears that, contrary to the stereotype, academically talented students (at least those who attended summer programs) participate in athletics at rates that are at least as high as the national average.

Arts. The NCES reported that 16.3% of males and 26.8% of females participated in music activities as sophomores, but their survey did not examine participation in other arts-related activities like drama (U.S. Department of Education, 2006). Fredricks and Eccles (2006a) reported that 43.8% of their participants were in some form of performing arts activity (band, orchestra, dance, drama, or art). Because of the varying categorizations, it is unclear whether the reported differences were due to different groupings of arts activities, actual behavioral differences of the samples, or a combination of both.

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Although a general category labeled arts was not included in their studies, Bucknavage and Worrell (2005) as well as Olszewski-Kubilius and Lee (2004) both reported participation rates in specific arts activities. In the Bucknavage and Worrell study, solo music participation had the highest overall participation rates with 53.4% and 45.9% of students from each cohort reporting playing an instrument. Similarly, Olszewski-Kubilius and Lee reported that 67% of their participants were in a band or orchestra group. Neither study found significant sex differences in reported participation rates. Such large numbers of high-ability students reporting playing solo instruments illustrates that high-ability students attending a summer program appeared to participate in the arts at rates well above the general student population.

Service clubs. Using the umbrella term "prosocial activities," Fredricks and Eccles (2006a) found that 48.1% of their sample reported participating in scouting, junior achievement, church group, or political campaigns, with church groups having the most participants at 30.9%. They also included service clubs as a specific subgroup, with 5.4% of students participating. No sex differences were found.

According to Olszewski-Kubilius and Lee (2004), 49.8% of their high-ability sample participated in volunteer work, and there were no sex differences. Furthermore, there appeared to be a growing movement toward the involvement of high-ability students in service learning (e.g., Lee, Olszewski-Kubilius, Donahue, & Weimholt, 2007; Matthews, 2004; Terry, 2008; Terry, Bohnenberger, Renzulli, Cramond, & Sisk, 2008).

Vocational clubs. In general, 8% and 9% of sophomore males and females, respectively, reported participating in vocational clubs such as Future Farmers or Future Teachers of America (U.S. Department of Education, 2006). However, students with higher grades and standardized test scores were less likely to participate in vocational clubs than lower achieving students (Broh, 2002; McNeal, 1998). The relatively low involvement of high-ability students in vocational clubs coupled with the negative association between achievement and vocational club participation may, in part, explain why the previous studies exploring how high-ability students spend their time outside the classroom did not include vocational clubs as an explicit option.

Sum of types of activities. An interesting connection between achievement and participation in activities is revealed when a general activity composite is explored. In their analysis of participation rates in extracurricular activities, Cooper et al. (1999) found a generally positive relationship between time spent participating in activities and high-achievement test scores, except at the very highest levels of participation where test scores were much lower. However, they noted that the sample size for their highest level of participation was only nine students. In a broad analysis of activity participation rates, McNeal (1998) found that girls were more likely to participate in every type of activity except for athletics, whereas Marsh and Kleitman (2002) found that girls reported participation in more activities than boys but spent less time on them. No such composite comparison existed for high-ability male and female students.

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Other Activities

TV watching. The time that adolescents reported spending on watching TV varies across studies, likely due to sampling and methodological differences. During nightly phone interviews, sixth- to ninth-grade students reported watching TV just over 5 hr a week (Dotterer et al., 2007). Relying on survey responses, Cooper et al. (1999) found that students in Grades 6 to 12 reported watching between 1 and 2 hr of TV each school night (with their parents reporting similar numbers for them). Comparisons of the TV-viewing habits of males and females show that although they may watch different programs (another indicator of preference differences), the amount of time spent watching TV is relatively similar (e.g., Brown & Pardun, 2004; Hancox et al., 2005). Research on the TV-viewing behavior of high-ability students has focused primarily on elementary school–aged students (e.g., Abelman, 2007; Abelman & Gubbins, 1999). However, Abelman (1992) reported that high-ability high school students tended to watch less TV than high-ability elementary-aged students.

Jobs. Similar to TV viewing, Cooper et al. (1999) found that working more hours was associated with lower standardized test scores and grades. In their study, about 56% of 10th- to 12th-grade students reported having a job and more than 80% of those students reported working at least 5 hr per week. Steinberg and Dornbusch (1991) reported about 50% of their high school sample was employed with half of the employed students working at least 20 hr per week. Although relying on different reporting methods, both studies indicated that a majority of students were employed but that the amount of time spent per week working varied widely. Despite its apparent importance in understanding how adolescents spent their time outside the classroom, we were unable to find any previous research analyzing high-ability students and after-school jobs.

In summary, previous research has shown that relative academic achievement/ability is often associated with differences in participation rates in many activities. In previous studies, high-ability students attending summer programs appeared to report participating in academic clubs, athletics, and the arts at higher rates than had been reported in research on the general student population. However, given that they were participating in a summer program, these differences may have been due to selection issues: Summer program participants may be more likely to participate in outside activities during the school year. Broadly, the purpose of the present study was to provide a comprehensive examination of how high-ability students spend their time outside the classroom and to assess the extent to which different groups of high-ability males and females differ on the basis of how they spend this time.

Present Study

This study uses data from the Duke University Talent Identification Program (Duke TIP). Founded in 1980, Duke TIP has served more than 2 million youth (for an overview of the Duke TIP model, see Putallaz, Baldwin, & Selph, 2005). Students qualify

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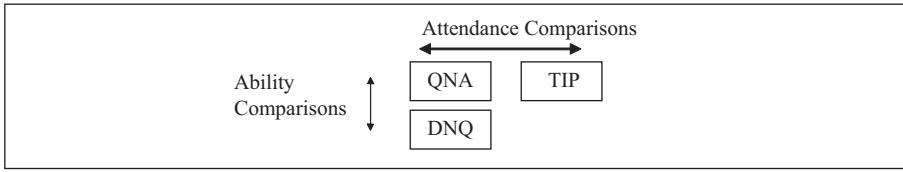

Figure 1. Model of ability and attendance comparisons
Note: QNA = qualified for the program but chose not to attend; DNQ = did not qualify to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program. Comparisons were made along the Attendance axis and the Ability axis. Attendance comparisons compared QNA and TIP. Ability comparisons compared DNQ and QNA. To avoid confusing attendance and abilities, the QNA and TIP groups were not merged for ability comparisons.

for a talent search by scoring at, or above, the 95th percentile on a standardized test in the fifth or sixth grade. Talent search participants then take an out-of-level standardized test (either the American College Testing [ACT] or the SAT) in the seventh grade. Students who score the equivalent of ≥500 on either the SAT-Verbal (SAT-V) or the SAT-Math (SAT-M; or the ACT equivalent) qualify for participation in the summer program. Duke TIP's summer residential programs meet for 3 weeks with students attending an academically rigorous class for 7 hr on weekdays and 3 hr on Saturday for a total of 120 class hours. The curriculum is fast paced, rigorous, and innovative, and courses are similar to those offered to undergraduates in select, competitive universities. The courses combine elements of enrichment and acceleration and are not graded, thereby encouraging intellectual risk taking. Talent search identification methods are not the only way to identify high academic ability; however, such methods are used to identify nearly a quarter million students each year (Lee, Matthews, & Olszewski-Kubilius, 2008).

Although previous research has revealed numerous relationships for general population students between achievement and how time is spent outside the classroom, such work involving high-ability students has typically not used a comparison group, but instead relied solely on responses of students who participated in summer academic programs. The current study expands on this tradition by analyzing how time is spent outside the classroom in more than just a group of students who attended at least one TIP program between the 7th and 10th grades. The current study adds two groups that allow additional comparisons to be made (see Figure 1). First, this study added students who qualified but chose not to attend a summer residential academic program (QNA).[1] Including this group allows for comparison of students who attend talent search programs with those who qualify but do not attend, a research paradigm used in previous talent search research examining academic outcomes (e.g., Barnett & Durden, 1993; Li, Alfeld, Kennedy, & Putallaz, 2009; Schiel & Stocking, 2001). It is possible that this group differed from students who attended at least one Duke TIP program in other relevant ways (e.g., financial situation, type of school attended, etc.).

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The second comparison group (DNQ) consisted of students who participated in the seventh-grade talent search but whose scores on the subsequent out-of-level test in the seventh grade were not high enough for them to qualify to participate in the summer academic program. Because they did score in the top 5% on a standardized test for their age group, they represent a clear high-ability sample. However, they did not score as high on out-of-level tests as the previous two groups, indicating a difference in ability. Because previous work that has been conducted on how high-ability students spend their time outside the classroom has relied solely on responses of students who participated in summer academic programs, the behavior of students in these two new comparison groups has been largely ignored.

In summary, this study sought to extend and expand previous work by testing whether there were ability, attendance, or sex differences within a high-ability group of students based on how their time was spent outside the classroom. To test for ability differences, we compared participation rates of QNA and DNQ students. To test for attendance differences, we compared TIP and QNA students. Male–female participation rates were contrasted across all groups as well as within each group.

Hypotheses

Because most prior studies of high-ability students examined only students who attended a summer program, the comparisons in the present study are largely exploratory, extending the comparison of different groups of high-ability students to include noncognitive variables. Also, because the "other activities" option contained so many potential options, independent predictions about this variable were not made, but it was included as part of the composite variable capturing the sum of different types of nonacademic activities.

Ability differences. In general, previous research has found a positive relationship between participation in extracurricular activities and ability/achievement. Notable exceptions are participation in vocational clubs, time spent watching TV, and time working at a job. If previous research on general student populations generalizes to a high-ability sample, then higher ability students (i.e., QNA students) should spend more time on homework and report participating in a greater number of activities, academic clubs, athletics, arts, service clubs, and other activities but be less likely to participate in vocational clubs than relatively lower ability (DNQ) students. We also predicted that the relatively lower ability students would watch more TV and work more hours in a job than the relatively higher ability students.

Attendance differences. By attending a Duke TIP program, students spend time outside the classroom in an intense academic endeavor during their summer vacation. If this difference extends to other academic-related activities, they should participate at higher rates in academic-related activities than students who qualify but do not attend such a program. Because both TIP and QNA students have demonstrated high ability, both were predicted to participate at relatively high rates in academic-related activities. Nonetheless, because the decision to attend a summer program may force

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students to choose between an academic camp and other opportunities (e.g., an athletics or arts camp), we predicted that QNA students would report higher rates of participation in "other activities" than would TIP attendees during the academic year.

Male–female differences. Previous findings on sex differences in high-ability student participation rates in academic clubs have been mixed. We predicted that males would participate in athletics at higher rates than females. Previous research has shown inconsistent sex differences (or lack thereof) in arts participation, but there has also been inconsistent groupings of what activities fall into this category. We predicted that females would participate in more types of activities than males due to general broader interests of females. We predicted no sex difference in employment or TV watching rates; however, there has been little research with high-ability students in these areas.

Method

Participants

Participants were students from North Carolina who participated in the Duke TIP 7th Grade Talent Search in 1996 or 1997. Overall, there were 5,277 (2,652 female and 2,625 male) DNQ students, 2,610 (1,204 female and 1,406 male) QNA students, and 180 (88 female, 92 male) TIP students. As a total sample, this represents 4.4% of the North Carolina seventh-grade public school population from the relevant school years (North Carolina Department of Public Instruction [DPI], 1999).

There were no differences in terms of ethnicity or sex between the two talent search cohorts; thus, the 1996 and 1997 cohorts were combined. The overall sample of 8,060 (3,940 female and 4,120 male) was 91.4% White, 4.3% Black, 2.8% Asian American, 0.6% American Indian, 0.5% Hispanic, and 0.4% multiracial (see Table 1, Part b for the breakdown by student group). Some previous research on general student populations has revealed ethnicity differences in the effects of activity participation (e.g., participating in more activities is positively associated with alcohol consumption in European American 11th-grade students but negatively associated in African American 11th-grade students; Fredricks & Eccles, 2006b). However, because the non-White proportions across all groups were generally low, ethnic differences were not addressed in this article. All groups were roughly proportionate in their racial/ethnic makeup with the exception of TIP attendees being significantly more likely to be Asian, $\chi^2(1) = 72.2$, $p < .001$, or Hispanic, $\chi^2(1) = 9.0$, $p = .003$, than the two nonattending groups. Asian students were also more likely to qualify for summer programs than not, $\chi^2(1) = 96.8$, $p < .001$.

Using a concordance table (Dorans, 1999), ACT scores were converted to equivalent SAT scores. There were statistically significant differences among all three student groups on the SAT-M, $F(1, 8246) = 2{,}962$, $p < .001$, and SAT-V, $F(1, 8246) = 2{,}138$, $p < .001$, with TIP attendees having the highest average SAT-M and SAT-V scores, followed by QNA and then DNQ students, respectively (see Table 1). On the ability-level comparisons (QNA vs. DNQ), QNA students had statistically

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Table 1. Mean Seventh Grade SAT Scores (*SD*), Race/Ethnicity, and Parent Education Breakdown

	SAT-Math			SAT-Verbal		
a.	Male	Female	Total sample	Male	Female	Total sample
Pre-matching						
DNQ	423.3 (48.7)	418.4 (48.4)	420.8 (48.4)	398.5 (57.3)	407.8 (52.0)	403.2 (54.9)
QNA	522.1 (55.9)	498.3 (56.0)	511.1 (57.1)	486.2 (68.7)	500.7 (64.6)	492.9 (67.2)
TIP	567.1 (77.1)	527.5 (67.7)	547.9 (75.1)	515.4 (97.7)	518.3 (65.6)	516.8 (83.5)
QNA–TIP matching						
QNA	565.0 (66.6)	515.8 (59.4)	537.0 (67.0)	512.6 (73.0)	526.2 (63.1)	520.4 (67.7)
TIP	562.2 (74.6)	523.0 (66.8)	542.9 (73.4)	514.6 (100.4)	516.3 (67.6)	515.4 (85.6)
Male–female matching						
DNQ	419.0 (49.6)	421.7 (46.2)	420.3 (47.9)	404.8 (53.9)	406.5 (52.9)	405.6 (53.4)
QNA	510.5 (53.3)	504.1 (53.4)	507.4 (53.4)	498.2 (64.5)	495.8 (65.0)	497.0 (64.8)
TIP	548.6 (67.8)	529.8 (67.9)	538.2 (74.6)	542.0 (78.8)	513.0 (68.2)	525.9 (74.3)

	Percentage of sample by race/ethnicity						
b.	White	American Indian	Asian	Black	Hispanic	Multiracial	Other
Pre-matching							
DNQ	91.6	0.7	1.7	5.2	0.4	0.3	0.1
QNA	92.0	0.3	4.3	2.3	0.5	0.5	0.3
TIP	77.8	0.6	13.3	6.1	2.2	0	0
NC[a]	65.2	1.6	1.4	29.9	2.0	NA	NA
DNQ–QNA matching							
DNQ	92	0.8	1.8	4.4	0.6	0.5	0
QNA	92.1	0.3	4.1	2.2	0.4	0.5	0.3
QNA–TIP matching							
QNA	80.2	1.7	15.8	1.7	0.6	0	0
TIP	78.8	0.6	13	5.6	2.3	0	0

(continued)

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Table 1. (continued)

	Percentage of sample by race/ethnicity						
b.	White	American Indian	Asian	Black	Hispanic	Multiracial	Other
Male–female matching							
DNQ	92.1	0.7	1.6	4.7	0.4	0.3	0.1
QNA	93.1	0.4	3.3	2	0.5	0.5	0.3
TIP	81.9	0	8.3	6.9	2.8	0	0

	Parent education level						
c.	No high school diploma	High school diploma	Some college	Trade school	Community, technical, or junior college	College graduate	Graduate degree
Pre-matching							
DNQ	0.9	10.2	5.5	4.9	16.3	36.4	25.4
QNA	0.7	5	4.1	3.6	12.7	37.2	36.8
TIP	0	5.1	2.3	3.4	13.1	38.1	38.1
DNQ–QNA matching							
DNQ	0.7	5	4.2	3.2	12.8	37.2	36.8
QNA	0.7	5	4.1	3.6	12.6	37.2	36.8
QNA–TIP matching							
QNA	0	2.9	2.3	2.9	12	38.9	41.1
TIP	0	5.2	2.3	3.5	13.3	38.2	37.6
Male–female matching							
DNQ	0.9	9.8	5.7	4.9	16.2	36.6	26
QNA	0.7	5	4.4	3.6	12.1	36.9	37.3
TIP	0	5	2.8	3.5	13.5	37.6	37.6

Note: DNQ = did not qualify to attend a summer program; QNA = qualified, but chose not to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program; NC = North Carolina. In Table 1, Part a, the SAT scores based on the match between DNQ and QNA are not reported because they were not matched on SAT score. In Table 1, Parts b and c, each cell consists of the percentage of the student group who responded.
[a]Percentage of all seventh-grade students in North Carolina.

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significantly higher SAT-M, $t(8067) = 73.97$, $p < .001$, $d = 1.71$, and SAT-V scores, $t(8067) = 63.48$, $p < .001$, $d = 1.46$. TIP and QNA students also differed in terms of their mean SAT scores, with TIP students scoring significantly higher—SAT-M, $t(2837) = 7.87$, $p < .001$, $d = 0.55$, and SAT-V, $t(2837) = 4.46$, $p < .001$, $d = 0.32$. There were also significant differences between male and female mean SAT-M and SAT-V scores—$t(8246) = 9.73$, $p < .001$, $d = 0.21$ and $t(8246) = –5.03$, $p < .001$, $d = 0.11$, respectively—with males having higher math scores (458.7 vs. 444.1) and females having higher verbal scores (438.5 vs. 430.2). Follow-up comparisons revealed statistically significant SAT-M and SAT-V differences between male and female DNQ students, with males scoring higher than females on the SAT-M, $t(5408) = 3.52$, $p < .001$, $d = 0.10$, and females scoring higher than males on the SAT-V, $t(5408) = –6.63$, $p < .001$, $d = 0.17$, as well as between QNA students on the SAT-M, $t(2656) = 10.71$, $p < .001$, $d = 0.42$, and on the SAT-V, $t(2656) = –5.80$, $p < .001$, $d = 0.22$. However, for TIP attendees, males and females differed significantly only on the SAT-M, $t(178) = 3.81$, $p < .001$, $d = –0.55$, but not on the SAT-V, $t(178) = 0.02$, $p = .98$, $d = 0.03$.

Parent education levels (often used as a proxy for socioeconomic status [SES]) revealed no statistically significant difference between TIP and QNA parents, $\chi^2(4) = 1.51$, $p = .83$.[2] However, DNQ parents were significantly less likely to have a graduate degree than the parents of the other two groups, $\chi^2(4) = 179.0$, $p < .001$. With 25% of DNQ parents having a graduate degree, they are still 2.5 times as likely to have a graduate degree than the general adult population in the United States (U.S. Census, 2005), indicating that this is still an extremely well-educated group. Although parent education does not automatically equate to family income, it is often used as a proxy for SES. Related research relying on a survey of similar students (Li et al., 2009) has reported no differences in family income between TIP and QNA groups. Given the relative similarity in education levels, these data do not suggest a wide economic disparity between the families of any of the groups.

Measures

In North Carolina, high school students are required to take end-of-course (EOC) tests on completing relevant coursework. Each EOC test also has a short survey associated with it that included questions about how time is spent outside the classroom. Records of Duke TIP Talent Search students who participated in the 1996 or 1997 7th Grade Talent Search were matched with their DPI data by the North Carolina Education Research Data Center (NCERDC), which houses the DPI data at Duke University. The NCERDC supplied a data set in which these students' EOC survey responses had been merged with Duke TIP data. This process was approved by the Duke University Institutional Review Board.

In an attempt to attain the greatest number of responses from the participants when they were in the same grade, survey responses from the U.S. history EOC were used. Other EOC tests (e.g., algebra) are often taken at varying ages due to acceleration opportunities. However, 95% of DNQ students, 93% of QNA students, and 85% of

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Table 2. Proportion of Participants in Academic-Related Activities

	Hours of homework assigned																	
	None			<1			1-3			3-5			5-10			>10		
a.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	1.1	0.5	0.8	14	5.6	9.7	34.9	27.5	31.1	30.6	38.7	34.7	15.1	27.2	21.2	4.4	0.6	2.5
QNA	0.9	0.3	0.6	10.1	4	7.3	26.5	16.7	22	30.7	39.6	34.7	25.7	37.5	31.1	6.1	1.9	4.1
TIP	0	0	0	12.9	1.5	7	40.3	21.2	30.5	21	30.3	25.8	25.8	43.9	35.2	0	3	1.6

	Computer use on homework																	
	No computer at home			Never, even with a computer at home			Hardly ever			1-2 a month			1-2 a week			Almost everyday		
b.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	2.8	2.6	2.7	3.9	1.2	2.5	14.2	9.6	11.8	24.7	26	25.4	32.7	38.3	35.6	21.7	22.3	22
QNA	1.8	0.9	1.4	2.1	0.3	1.3	9.2	5.9	7.6	23.7	26.4	25	37.3	42.2	39.6	26	24.3	25.2
TIP	1.6	1.5	1.6	1.6	0	0.8	8.1	6.1	7	25.8	16.7	21.1	25.8	36.4	31.3	37.1	39.4	38.3

	Academic club participation rate		
c.	M	F	Total
DNQ	35.8	44.6	38.4
QNA	49.3	54.9	51.9
TIP	65.1	66.7	65.9

Note: M = male; F = female; DNQ = did not qualify to attend a summer program; QNA = qualified, but chose not to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program. Each cell consists of the proportion of the student group who responded. The two "none" categories in Computer Use on Homework were combined for all statistical analysis.

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TIP students took the U.S. history test in the 11th grade (the difference is because more TIP students took the U.S. history test as 10th graders). In addition, because most students took this EOC in the 11th grade, it maximized the time in which students could have explored different activities, attended Duke TIP, or secured an after-school job. Individual cell sizes for dependent variables varied depending on whether students answered that particular survey item, but with few exceptions, more than 90% of students responded to each item.

Academic activities. The time students spent on homework ("Time on homework for this class") was assessed along a 6-point scale with response options ranging from "no homework is ever assigned in this course" and "has homework but does not do it" to "more than 10 hr" (see Table 2 for full list of responses). The amount of time students used a computer for homework was measured by asking whether "student uses computer at home" on a 6-point scale with responses ranging from "there is not a computer at home" or "never, even though there is a computer at home" to "I use a computer at home for schoolwork almost everyday." Responses that were equivalent to not doing homework or not using a computer were combined as a "none" response regardless of the reason why no homework was completed or a computer was not used. Participation in an after-school academic club was asked as a yes/no question with *yes* being coded as 1 and *no* as 0.

Nonacademic activities. Nonacademic activities include five unique activity types: athletics, arts, service clubs, vocational clubs, and "other" activities as well as a "total" composite variable, representing the sum of participation in these five activities. Participation in five nonacademic activities (arts, service clubs, athletics, vocational clubs, and "other") was assessed through a series of dichotomous yes/no choices. "Other" was defined as "other than academic, arts, service, sports, vocational club." The number of "total activities" was calculated by summing the responses to the five specific school-related nonacademic activities.

Other activities. Employment was assessed by students' responses to "Hours worked at job" in 1 week during the school year on a 6-point scale with responses ranging from "none, I do not have a job" to "over 20 hr." TV viewing was measured by responses to the survey item, "TV watched at home" each school day on a 6-point scale with responses ranging from "none" to "6 hr or more."

Analytic Plan

The analytic strategy for the present study highlighted three primary comparisons: DNQ and QNA students were compared to assess the impact of differences in *ability* whereas TIP and QNA students were compared to assess the impact of differences between students who had attended or not attended a Duke TIP program. TIP and QNA students were not combined for the ability comparison to avoid potential overlap between ability and attendance. In addition, sex differences across and within each group of high-ability students were examined.

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Because there were numerous statistically significant differences between the student groups of interest, propensity score matching was conducted to help reduce bias (D'Agostino, 1998; Shadish, Cook, & Campbell, 2002). This procedure creates a subset of the data by matching students from the comparison group to students in the treatment group on the matching variables. Given the nature of the research questions, separate propensity matches were made for each of the primary comparisons. For the ability comparisons, the DNQ and QNA groups were matched on parent education, sex, and ethnicity. For the attendance comparisons, the QNA and TIP groups were matched on SAT-M, SAT-V, parent education, sex, and ethnicity. For the sex comparisons, males and females were matched on SAT-M, SAT-V, parent education, and ethnicity. A greedy nearest-neighbor matching algorithm without replacement was used (see Parsons, n.d., for the exact matching and selection methods and the SAS macro). Logistic regressions were used to generate the propensity scores. No caliper or maximum distance was imposed; however, the higher distances were examined, and they appeared to be good matches. For example, the largest distance between pairs matched on TIP–QNA was between two Asian males whose parents had graduate degrees (670 SAT-M and 630 SAT-V vs. 690 SAT-M and 580 SAT-V, respectively). For the male–female comparison, the largest distance occurred between two Asian participants who qualified for, but did not attend, a program and whose parents had college degrees (male: 630 SAT-M and 410 SAT-V vs. female: 550 SAT-M and 330 SAT-V). The propensity-matching technique successfully removed all significant differences on the matching covariates (see Table 1 for a comparison of the descriptive statistics for the selection variables before and after matching). The results section along with Tables 3 and 4 report statistical analyses based on the propensity-matched groups.

The response options for the nondichotomous dependent variables (TV, jobs, time spent on homework, computer use at home) were not on a regularly spaced interval scale (i.e., the difference between working "less than 2 hr" and working "2-4 hr" is smaller than the difference between working "2-4 hr" and working "5-10 hr"). Because of this, the data do not meet normality or interval assumptions required to use typical parametric statistical tests. Instead, the nonparametric Mann–Whitney test was used when comparing participation rates on all nondichotomous dependent variables. Similarly, calculation of effect sizes such as Cohen's *d* (1992) is also not appropriate with ordinal data. Instead, a statistic called Cliff's delta (Cliff, 1993) was used as a nonparametric equivalent of effect size. Cliff's delta can range from −1 (*when all participants in one group responded higher than a second group*) to 1 (*when all participants in the second group respond higher than those in the first group*). The statistic communicates the overlap of two distributions, such that the closer Cliff's delta is to zero, the greater the overlap between two sets of responses. Although the value of delta cannot exceed 1.0, Cohen's *d* effect sizes of 0.20, 0.50, and 0.80 that are typically associated with small, medium, and large effects, are roughly equivalent to delta values of 0.147, 0.33, and 0.474, respectively (Romano, Kromrey, Coraggio, &

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Table 3. Statistical Significance Tests of Propensity Score–Matched Activity Participation Coded Dichotomously

Comparison	χ^2	RR	95% CI RR
Ability[a]			
Academic club	64.50***	1.29	[1.21, 1.38]
Athletics	3.96*	0.96	[0.91, 1.00]
Arts	26.70***	1.20	[1.12, 1.28]
Service club	21.27***	1.22	[1.16, 1.29]
Vocational club	40.36***	0.66	[0.57, 0.74]
"Other" activity	16.13***	1.10	[1.05, 1.16]
No participation	0.18	0.95	[0.74, 1.21]
Attendance[b]			
Academic club	2.00	1.14	[0.95, 1.38]
Athletics	3.41	0.81	[0.65, 1.02]
Arts	0.19	0.77	[0.61, 0.97]
Service club	5.67*	0.75	[0.59, 0.96]
Vocational club	0.01	1.02	[0.53, 1.96]
"Other" activity	0.88	1.09	[0.91, 1.31]
No participation	1.56	1.67	[0.74, 3.78]
Sex[c]			
Academic club	19.62***	1.14	[1.07, 1.20]
Athletics	2.37	0.97	[0.93, 1.01]
Arts	268.27***	1.65	[1.55, 1.76]
Service club	245.05***	1.48	[1.40, 1.56]
Vocational club	13.88***	1.21	[1.10, 1.34]
"Other" activity	61.28***	1.18	[1.13, 1.24]
No participation	66.02***	0.44	[0.36, 0.54]
Sex: DNQ			
Academic club	12.65***	1.15	[1.06, 1.24]
Athletics	2.97	0.96	[0.91, 1.01]
Arts	214.57***	1.77	[1.63, 1.92]
Service club	197.53***	1.57	[1.47, 1.67]
Vocational club	15.80***	1.26	[1.12, 1.41]
"Other" activity	51.11***	1.21	[1.15, 1.28]
No participation	56.36***	0.40	[0.32, 0.52]
Sex: QNA			
Academic club	8.68**	1.14	[1.04, 1.24]
Athletics	0.02	1.00	[0.93, 1.08]
Arts	54.85***	1.45	[1.31, 1.61]
Service club	58.47***	1.36	[1.26, 1.48]
Vocational club	0.07	1.03	[0.82, 1.29]
"Other" activity	11.84**	1.13	[1.06, 1.22]
No participation	10.92**	0.53	[0.36, 0.78]

(continued)

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Table 3. (continued)

Comparison	χ^2	RR	95% CI RR
Sex: TIP			
Academic club	0.21	0.94	[0.71, 1.24]
Athletics	0.84	0.82	[0.54, 1.25]
Arts	4.96*	1.57	[1.03, 2.40]
Service club	0.03	0.96	[0.64, 1.45]
Vocational club	0.76	1.62	[0.53, 4.94]
"Other" activity	0.06	1.03	[0.80, 1.34]
No participation	0.75	0.57	[0.16, 2.03]

Note: RR = relative risk; CI = confidence interval; DNQ = did not qualify to attend a summer program; QNA = qualified, but chose not to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program. All tests had one degree of freedom.
[a]Ability compares QNA and DNQ students only (RRs equal probability of QNA to participate as DNQ).
[b]Attendance compares TIP and QNA students only (RRs equal probability of TIP participating compared with QNA).
[c]Sex compares females and males (RRs equal probability of females participating compared with males).
*$p < .05$. **$p < .01$. ***$p < .001$.

Skowronek, 2006). For all dichotomous variables (e.g., participation in athletics: yes/no), chi-square analyses and relative risks were calculated.[3]

Results

How time was spent outside the classroom and differences between student groups and between males and females are presented within each category of activities. The proportions from the entire sample participating in each activity are reported in Tables 2, 5, and 6. However, all statistical significance test results based on the propensity-matched samples are reported in Table 3 (dichotomous outcomes) and Table 4 (non-dichotomous outcomes) to facilitate ease of reading. Results explained in the text are limited to those that were statistically significantly different (at the $p < .05$ level).

Ability-Level Differences (QNA vs. DNQ)

As predicted (see Tables 3 and 4 for test statistics), across all comparisons, there were statistically significant differences based on ability level (QNA vs. DNQ). However, the direction of the differences varied. On academic-related activities, QNA students reported spending more time on homework and on using a computer for homework, and being more likely to participate in academic clubs than DNQ students. In non-academic activities, QNA students reported higher rates of participation in the arts, service clubs, and "other" activities whereas DNQ students reported higher rates of

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Table 4. Statistical Significance Tests and Confidence Intervals of Propensity Score–Matched Activity Participation

Comparison	*Z*	Cliff's delta	95% CI
Ability[a]			
Total activities	3.34***	.06	[.02, .09]
TV	−0.4.49***	−.16	[−.19, −.13]
Job	−0.3.64***	−.32	[−.36, −.29]
Homework	8.17***	−.01	[−.04, .02]
Computer used with homework	3.87***	.13	[.10, .16]
Attendance[b]			
Total activities	1.72	−.07	[−.19, .06]
TV	0.24	.13	[.01, .25]
Job	−0.51	−.20	[−.34, −.05]
Homework	−0.086	−.04	[−.16, .09]
Computer used with homework	−1.94	.00	[−.12, .13]
Sex[c]			
Total activities	17.83***	.17	[.14, .19]
TV	14.20***	−.28	[−.30, −.25]
Job	1.71	−.27	[−.31, −.24]
Homework	12.57***	.11	[.08, .13]
Computer used with homework	4.85***	.15	[.12, .18]
Sex: DNQ			
Total activities	16.08***	.20	[.17, .24]
TV	11.73***	−.26	[−.29, −.23]
Job	2.42*	−.27	[−.31, −.23]
Homework	11.38***	.14	[.10, .17]
Computer used with homework	4.49***	.15	[.11, .19]
Sex: QNA			
Total activities	8.26***	.09	[.04, .13]
TV	8.10***	−.29	[−.33, −.24]
Job	0.21	−.33	[−.39, −.27]
Homework	5.53***	.05	[.00, .10]
Computer used with homework	1.80	.14	[.09, .19]
Sex: TIP			
Total activities	0.79	.11	[−.11, .31]
TV	1.12	−.36	[−.53, −.16]
Job	3.23**	.00	[−.25, .25]
Homework	2.54*	.08	[−.13, .28]
Computer used with homework	1.01	.36	[.13, .55]

Note: CI = confidence interval; DNQ = did not qualify; QNA = qualified not to attend; TIP = attended a Duke TIP (Talent Identification Program) summer program.
[a]Ability compares QNA and DNQ students only (positive Cliff's delta indicates QNA higher than DNQ).
[b]Attendance compares TIP and QNA students only (positive Cliff's delta indicates TIP higher than QNA).
[c]Sex compares females and males (positive Cliff's delta indicates females higher than males).
*$p < .05$. **$p < .01$. ***$p < .001$.

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Table 5. Proportion of Participants in Other Activities

	Hours of TV viewed each school night																	
	None			<1			2			3			4-5			6+		
a.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	6.3	11.4	9	38.4	49.3	44.4	29.1	24.6	27.2	14.7	10.4	12.7	6.1	3.3	4.7	2.9	1	2
QNA	12.2	17.7	14.7	41.1	51.9	46.1	26.5	20.4	23.7	10.6	6.9	8.9	6.1	2.3	4.3	3.5	0.9	2.3
TIP	16.1	27.3	21.9	41.9	36.4	39.1	24.2	21.2	22.7	9.7	10.6	10.2	4.8	1.5	3.1	3.2	3	3.1
	Hours worked at a job each week																	
	None			<2			2-4			5-10			11-20			20+		
b.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	42.4	45.8	44.1	4.4	2.7	3.5	4.1	6.3	5.2	12.9	15.6	14.3	23.9	21.9	22.9	12.3	7.8	10
QNA	50.8	50.8	50.8	4.2	4.6	4.4	5	6.8	5.9	12.6	15.8	14.1	19.3	17.3	18.3	8	4.8	6.4
TIP	80.6	46.4	65.6	2.8	3.6	3.1	2.8	0	1.6	5.6	7.1	6.3	8.3	25	15.6	0	17.9	7.8

Note: M = male; F = female; DNQ = did not qualify to attend a summer program; QNA = qualified, but chose not to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program. Each cell consists of the proportion of the student group who responded.

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Table 6. Proportion of Participants in Nonacademic-Related Activities

	School clubs														
	Athletics			Arts			Service clubs			Vocational clubs			Other activities		
a.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	62.4	58.8	60.5	27.6	50	38.9	37.7	58	47.9	19.3	24	21.7	49.4	60.3	54.9
QNA	60.9	59.9	60.4	36.7	55.7	45.5	49.5	65	56.6	13.7	13.7	13.7	58	65	61.2
TIP	52.4	42.4	47.3	31.8	59.1	45.7	41.3	47	44.2	9.5	15.2	12.4	57.1	71.2	64.3

	Sum of types of activities																	
	0			1			2			3			4			5		
b.	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
DNQ	9	4	6.5	27.8	14.6	21.1	31.3	29	30.1	22.7	33.5	28.1	8.2	16.4	12.3	1.1	2.5	1.8
QNA	7.3	4	5.8	20.6	12.2	16.7	31.5	28.4	30	28.9	33.7	31.1	10.2	19.9	16.7	1.6	1.9	1.7
TIP	14.3	6.1	10.1	20.6	19.7	20.2	34.9	28.8	31.8	20.6	27.3	24	7.9	15.2	11.6	1.6	3	2.3

Note: M = male; F = female; DNQ = did not qualify to attend a summer program; QNA = qualified, but chose not to attend a summer program; TIP = attended a Duke TIP (Talent Identification Program) summer program. Each cell corresponds to the proportion of the student group who responded.

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participation in athletics and vocational clubs. In other activities, DNQ students reported watching more TV and working more hours at an after-school job than QNA students.

As indicated in Table 3, participation rate differences based on ability were largest for academic club participation where QNA students were 1.29 times as likely to participate in an academic club as DNQ students. However, QNA students were only 0.66 times as likely to participate in vocational clubs as DNQ students. Similarly, the 95% confidence intervals for all Cliff's deltas for all ability comparisons except homework did not include zero, indicating that differences between groups were not just statistical in nature. The largest differences between QNA and DNQ students on the nondichotomous outcomes were in time spent working at a job or watching TV (both favoring lower ability students). Taken together, these findings indicated that even within a high-ability sample, relative ability level appears to differentiate how adolescents spend their time outside the classroom.

Attendance Differences (TIP vs. QNA)

Unlike ability group comparisons, there was only one statistically significant difference between TIP and QNA groups after the propensity matching; QNA students were more likely to participate in service clubs than TIP attendees. There were no statistically significant differences between the groups on the other activities. Although statistically significant, the relative participation differences between groups were not extremely large. TIP attendees were 0.75 times as likely to report participating in a service club. Although the Mann–Whitney test was not statistically significant, there was a minor difference between TIP and QNA students for hours spent working at a job (0.20). With so few significant differences between these groups compared with the ability-level comparisons, the present findings indicate that attendance at a summer program does not appear to be associated with differences based on how time is spent outside the classroom during the school year.

Male–Female Differences

Similar to findings from the general student population, the current study reveals that males and females spend their time in different ways. In the overall male–female comparisons across all students, there were statistically significant participation differences on nearly every variable. Females reported higher rates of participation in academic clubs, spending more time on homework, and spending more time using a computer for homework than males (see Table 2). In terms of nonacademic activities, females reported higher rates of participation across all activity types, including total types of school-related activities, with the sole exception of athletics, where there was no significant difference (see Table 6). Overall, males reported spending more time watching more TV and were more likely to not report participating in activities than females (see Tables 3 and4).

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When comparing male–female participation rates within each group, the pattern of findings were generally the same, with the exception of TIP attendees. Although the overall pattern was similar for TIP attendees, the smaller sample size of this group lacked the power to surpass the statistically significant threshold. The noteworthy contradiction here is the difference between male and female TIP attendees in the amount of time spent working in an after-school job ($Z = 3.23$, $p < .001$). More than 80% of males reported not working at all compared with nearly 20% of females, who reported working at least 20 hr a week (increasing to 40% working at least 10 hr a week). Together, these between-group sex differences in participation rates illustrate the heterogeneity in how high-ability male and female students spend their time outside the classroom.

Discussion

The current study aimed at furthering our understanding of participation rates across three categories of activities outside of classroom time (academic related, nonacademic school related, and other) for three groups of high-ability students: those who attended a summer program (TIP), those who qualified but did not attend (QNA), and those who did not qualify to attend (DNQ). Investigations such as the present study further our understanding of how high-ability students spend their free time. The current research revealed numerous ability, attendance, and sex differences on the basis of how time is spent outside the classroom within the high-ability adolescent population.

Student Group Differences

Ability differences. By focusing on a broad set of students who have all demonstrated high academic ability, the present study expands previous research that focused on a general student population or solely on students attending summer programs. Similar to previous studies on the general student population, relatively higher ability students reported spending more time on academic-related activities (e.g., homework and academic clubs) as well as on many nonacademic school-related activities than the relatively lower ability students. However, the relatively lower ability group was more likely to report participating in vocational activities, watching TV, and working in an after-school job.

Attendance differences. Students who attended a summer program generally reported spending time outside the classroom during the school year similar to those who qualified but did not attend a summer program. This suggests that the two groups may not differ substantially from each other based on how they spend their time outside the classroom during the school year.

Male–female differences. In general, females tended to participate in more types of activities than males, including those positively associated with achievement such as homework and academic clubs. Males, however, reported watching more TV than females, a passive activity. One finding of note is that the direction of difference

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between males and females differed by ability group in after-school jobs. Males reported working more than females in the DNQ group, but the difference was in the opposite direction for students who attended the Duke TIP summer program.

The male–female results also add to a substantial literature that has compared males and females across a variety of activities. The difference in homework time differs from previous work addressing male–female differences on history homework (Trautwein & Lüdtke, 2009). However, this may not generalize to time spent on homework in classes other than history. Contrary to Olszewski-Kubilius and Lee (2004) and similar to the nonsignificant trend found by Bucknavage and Worrell (2005), a greater proportion of females in the current study participated in academic clubs. Nonetheless, for both males and females, athletic participation rates were high across all studies, providing further evidence against the gifted geek stereotype. The male–female differences found for TV viewing may be partially explained by the differences seen in other activities. With females participating in more types of activities, and spending more time on homework, it comes as little surprise that they spend less time than males watching TV. They may simply not have enough hours in the day.

In general, high-ability girls appear to be extremely active in a wide array of activities. Such findings appear in line with research comparing males and females from general student populations. Females in the present sample, particularly those attending summer programs, appear to be extremely well rounded and spend their time outside the classroom involved in activities that benefit their academic and social development. In fact, the activities with higher male than female participation (TV watching and jobs for the DNQ and QNA groups) have the most tenuous relationship with academic achievement and other positive developmental outcomes for males. This is not surprising given the findings shared in recent publications such as *Boys Adrift* (Sax, 2009) and *Why Boys Fail* (Whitmire, 2010) on the trend of performance of males in general. Both books report on the social and cultural factors that contribute to the growing gap between males and females in grades as well as college attendance and graduation rates.

Limitations and Future Research

Given the nature of the dichotomous data, the current findings should not be used to conclude that one group "does more" in terms of activities than another group. Rather, the current findings illustrate group differences in the type of activities. As mentioned earlier when comparing high-ability males and females, participation in fewer types of activities need not imply lack of engagement but could be indicative of focused commitment in a particular area. In addition, it is important to note that the current study joins previous research in being unable to make causal arguments regarding the relationship between how students spend time outside the classroom and their academic achievement. However, it does provide clues about associations that may be meaningful and worthy of future investigation.

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The current study expanded the group of students studied to assess the heterogeneity of high-ability students; however, further expansion is needed. Specifically, because previous research on general adolescent populations has revealed racial/ethnic and age-related differences in how youths spend their free time, future work should investigate the extent to which such differences also exist within a high-ability sample. Although parents from all groups were highly educated, additional inquires into potential family financial differences between the different groups of high-ability students would shed light on the extent to which attendance is a function of family finances or of interest. Similarly, expanding the sample beyond talent search students as well as students from states other than North Carolina would help identify potential factors unique to these particular groups.

The depth and breadth of analysis of activities should also be expanded. For example, participation can be analyzed more deeply through more refined measurements of activity participation in terms of types of activities (team vs. individual sports, etc.) as well as level of involvement (1 hr a week vs. 20 hr a week, etc.). Given the nature of the present data, the student who participated in one sport could not be differentiated from the student who participated in three sports or the student who spent an hour a week on one academic club from the student spending 10 hr a week in several academic clubs. Similarly, other ways adolescents spend their time outside the classroom should also be analyzed to better portray the lives of high-ability youth. For example, the recent growth of online social networking sites such as Facebook and Twitter may (or may not) take time away from activities that had previously occupied students. Including these additional variables will likely further differentiate the groups discussed in the current article and better illuminate the role of activities in their lives.

Overall, the current findings show high-ability students of all levels to be highly engaged in a variety of activities outside the classroom. The current study adds to the understanding of the lives of high-ability students, specifically, how they spend their time outside the classroom. Furthermore, it underscores the heterogeneity of high-ability students in their academic and nonacademic behaviors and interests. Although this may be a well-established belief within the field, it continues to be a widely believed myth outside the field (for a review, see Reis & Renzulli, 2009). The current study provides a new facet in *how* high-ability students differ from each other.

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Notes

1. A subset of these QNA students ($n = 178$) was surveyed as part of another study, and about 20% reported attending some type of academic program over the summer (it is also possible that some DNQ students attended an academic program with different qualifying criteria over the summer).
2. Parent education levels were collapsed to No High School Diploma, High School Diploma, Some College, College Degree, and Graduate Degree for all statistical comparisons. The full range of parent education levels are presented in Table 1.
3. The relative risk statistic represents the probability of an event occurring in one group compared with another (Agresti, 2007). Although typically used in epidemiological research (with "risk" commonly being associated with whether a disease is contracted or cured), relative risks are increasingly being reported in the social science literature (e.g., Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz, & Woloshin, 2008; Wai, Lubinski, Benbow, & Steiger, 2010) to help interpret whether a difference between two groups is meaningful. If the probability of two events is equal (e.g., flipping a coin and getting heads vs. getting tails), the relative risk would be 1.0. A relative risk is considered significantly different from 1.0 if its 95% confidence interval does not include 1.0.

References

Abelman, R. (1992). Some children under some conditions: TV and the high potential kid. *The National Research Center on the Gifted and Talented.* Retrieved from http://www.gifted.uconn.edu/nrcgt/reports/rbdm9206/rbdm9206.pdf

Abelman, R. (2007). Fighting the war on indecency: Mediating TV, internet, and videogame usage among achieving and underachieving gifted children. *Roeper Review, 29*, 100-112.

Abelman, R., & Gubbins, E. J. (1999). Preaching to the choir: TV advisory usage among parents of gifted children. *Roeper Review, 22*, 56-64.

Agresti, A. (2007). *An introduction to categorical data analysis* (2nd ed.). New York, NY: Wiley.

Barnett, L. B., & Durden, W. G. (1993). Education patterns of academically talented youth. *Gifted Child Quarterly, 37*, 161-168.

Braddock, J. H., Sokol-Katz, J., Greene, A., & Basinger-Fleischman, L. (2005). Uneven playing fields: State variations in boys' and girls' access to and participation in high school interscholastic sports. *Sociological Spectrum, 25*, 231-250.

Broh, B. A. (2002). Linking extracurricular programming to academic achievement: Who benefits and why? *Sociology of Education, 75*, 69-91.

Brown, J. D., & Pardun, C. J. (2004). Little in common: Racial and sex differences in adolescents' television diets. *Journal of Broadcasting & Electronic Media, 48*, 266-278.

Bucknavage, L. B., & Worrell, F. C. (2005). A study of academically talented students' participation in extracurricular activities. *Journal of Secondary Gifted Education, 16*, 74-86.

Downloaded from joa.sagepub.com at DUKE UNIV on April 7, 2012

Cliff, N. (1993). Dominance statistics: Ordinal analyses to answer ordinal questions. *Psychological Bulletin, 114*, 494-509.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159.

Coleman, L. J. (2002). A shock to study. *Journal of Secondary Gifted Education, 14*, 39-52.

Cooper, H. (1989). *Homework*. White Plains, NY: Longman.

Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does homework improve academic achievement? A synthesis of research, 1987-2003. *Review of Educational Research, 76*, 1-62.

Cooper, H., Valentine, J. C., Nye, B., & Lindsay, J. J. (1999). Relationships between five after-school activities and academic achievement. *Journal of Educational Psychology, 91*, 369-378.

D'Agostino, R. B. (1998). Tutorial in biostatistics: Propensity score methods for bias reduction in the comparison of a treatment to a nonrandomized control group. *Statistics in Medicine, 17*, 2265-2281.

Dorans, N. J. (1999). Correspondences between ACT and SAT I scores. *College Entrance Examination Board.* Retrieved from http://professionals.collegeboard.com/profdownload/pdf/rr9901_3913.pdf

Dotterer, A. M., McHale, S. M., & Crouter, A. C. (2007). Implications of out-of-school activities for school engagement in African American adolescents. *Journal of Youth and Adolescence, 36*, 391-401.

Eccles, J. S., & Barber, B. L. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research, 14*, 10-43.

Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*, 865-889.

Fredricks, J. A., & Eccles, J. S. (2005). Developmental benefits of extracurricular involvement: Do peer characteristics mediate the link between activities and youth outcomes? *Journal of Youth and Adolescence, 34*, 507-520.

Fredricks, J. A., & Eccles, J. S. (2006a). Extracurricular involvement and adolescent adjustment: Impact of duration, number of activities, and breadth of participation. *Applied Developmental Science, 10*, 132-146.

Fredricks, J. A., & Eccles, J. S. (2006b). Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations. *Developmental Psychology, 42*, 698-713.

Gaddy, G. D. (1986). Television's impact on high school achievement. *Public Opinion Quarterly, 50*, 340-359.

Gardner, M., Roth, J., & Brooks-Gunn, J. (2008). Adolescents' participation in organized activities and developmental success 2 and 8 years after high school: Do sponsorship, duration and intensity matter? *Developmental Psychology, 44*, 814-830.

Gigerenzer, G., Gaissmaier, W., Kurz-Milcke, E., Schwartz, L. M., & Woloshin, S. (2008). Helping doctors and patients make sense of health statistics. *Psychological Science in the Public Interest, 8*, 53-96.

Hancox, R. J., Milne, B. J., & Poulton, R. (2005). Association of television viewing during childhood with poor educational achievement. *Archives of Pediatric Adolescent Medicine, 159*, 614-618.

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Larson, R. W., & Verma, S. (1999). How children and adolescents spend time across the world: Work, play, and developmental opportunities. *Psychological Bulletin, 125*, 701-736.

Lee, S., Matthews, M. S., & Olszewski-Kubilius, P. (2008). A national picture of talent search and talent search educational programs. *Gifted Child Quarterly, 52*, 55-69.

Lee, S., Olszewski-Kubilius, P., Donahue, R., & Weimholt, K. (2007). The effects of a service-learning program on the development of civic attitudes and behaviors among academically talented adolescents. *Journal for the Education of the Gifted, 31*, 165-197.

Li, Y., Alfeld, C., Kennedy, R. P., & Putallaz, M. (2009). Effects of summer academic programs in middle school on high school test scores, course-taking, and college major. *Journal of Advanced Academics, 20*, 404-436.

Mahoney, J. L., Cairns, B. D., & Farmer, T. W. (2003). Promoting interpersonal competence and educational success through extracurricular activity participation. *Journal of Educational Psychology, 95*, 409-418.

Mahoney, J. L., & Cairns, R. B. (1997). Do extracurricular activities protect against early school dropout? *Developmental Psychology, 33*, 241-253.

Marsh, H. W. (1992). Extracurricular activities: Beneficial extension of the traditional curriculum or subversion of academic goals? *Journal of Educational Psychology, 84*, 553-562.

Marsh, H. W., & Kleitman, S. (2002). Extracurricular school activities: The good, the bad, and the nonlinear. *Harvard Education Review, 72*, 464-514.

Matthews, M. S. (2004). Leadership education for gifted and talented youth: A review of the literature. *Journal for the Education of the Gifted, 28*, 77-113.

Mau, W. C., & Lynn, R. (2000). Gender differences in homework and test scores in mathematics, reading and science at tenth and twelfth grade. *Psychology, Evolution & Gender, 2*, 119-125.

McNeal, R. (1998). High school extracurricular activities: Closed structures and stratifying patterns of participation. *Journal of Educational Research, 91*, 183-191.

Miller, K., Sabo, D. F., Farrell, M. P., Barnes, G. M., & Melnick, M. J. (1998). Athletic participation and sexual behavior in adolescents: The different worlds of boys and girls. *Journal of Health and Social Behavior, 39*, 108-123.

North Carolina Department of Public Instruction. (1999). *North Carolina Public Schools Statistical Profile: 1999*. Retrieved from http://www.ncpublicschools.org/docs/fbs/resources/data/statisticalprofile/1999profile.pdf

Olszewski-Kubilius, P., & Lee, S. (2004). The role of participation in in-school and outside-of-school activities in the talent development of high ability students. *Journal of Secondary Gifted Education, 15*, 107-123.

Page, R. M., Hammermeister, J. J., Scanlan, A., & Gilbert, L. (1998). Is school sports participation a protective factor against adolescent health risk. *Journal of Health Education, 29*, 186-192.

Parsons, L. (n.d.). Using SAS software to perform a case-control match on propensity score in an observational study. *SAS Institute.* Retrieved from http://www2.sas.com/proceedings/sugi25/25/po/25p225.pdf

Putallaz, M., Baldwin, J., & Selph, H. (2005). The Duke University Talent Identification Program. *High Ability Studies, 16*, 41-54.

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Reis, S. M., Colbert, R. D., & Hébert, T. P. (2005). Understanding resilience in diverse, talented students in an urban high school. *Roeper Review, 27*, 110-120.

Reis, S. M., & Renzulli, J. S. (2009). Myth 1: The gifted and talented constitute one single homogeneous group and giftedness is a way of being that stays in the person over time and experiences. *Gifted Child Quarterly, 53*, 233-235.

Ridley-Johnson, R., Cooper, H., & Chance, J. (1983). The relation of children's television viewing to school achievement and IQ. *Journal of Education Research, 75*, 294-297.

Rinn, A. N., & Wininger, S. R. (2007). Sports participation among academically gifted adolescents: Relationship to the multidimensional self-concept. *Journal for the Education of the Gifted, 31*, 35-56.

Romano, J., Kromrey, J. D., Coraggio, J., & Skowronek, J. (2006, February). *Appropriate statistics for ordinal level data: Should we really be using t test and Cohen's d for evaluating group differences on the NSSE and other surveys?* Paper presented at the annual meeting of the Florida Association of Institutional Research, Cocoa Beach, FL.

Sax, L. (2009). *Boys adrift: The five factors driving the growing epidemic of unmotivated boys and underachieving young men*. New York, NY: Basic Books.

Schiel, J. L., & Stocking, V. B. (2001). Benefits of TIP summer residential program participation, as reflected by subsequent academic performance in high school. In N. Colangelo & S. G. Assouline (Eds.), *Talent Development IV: Proceedings from the 1998 Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* (pp. 435-438). Scottsdale, AZ: Great Potential Press.

Schreiber, J. B., & Chambers, E. A. (2002). After-school pursuits, ethnicity, and achievement for 8th- and 10th-grade students. *Journal of Educational Research, 96*, 90-100.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental design for generalized causal inference*. Boston, MA: Houghton Mifflin.

Steinberg, L., & Dornbusch, S. M. (1991). Negative correlates of part-time employment during adolescence: Replication and elaboration. *Developmental Psychology, 27*, 304-313.

Steinberg, L., Fegley, S., & Dornbusch, S. M. (1993). Negative impact of part-time work on adolescent adjustment: Evidence from a longitudinal study. *Developmental Psychology, 29*, 171-180.

Terry, A. W. (2008). Student voices, global echoes: Service-learning and the gifted. *Roeper Review, 30*, 45-51.

Terry, A. W., Bohnenberger, J. E., Renzulli, J. S., Cramond, B., & Sisk, D. (2008). Vision with action: Developing sensitivity to societal concerns in gifted youth. *Roeper Review, 30*, 61-67.

Trautwein, U., & Lüdtke, O. (2009). Predicting homework motivation and homework effort in six school subjects: The role of person and family characteristics, classroom factors, and school track. *Learning and Instruction, 19*, 243-258.

U.S. Census. (2005). *American Community Survey*. Retrieved from http://factfinder.census.gov/servlet/STTable?_bm=y&;-geo_id=01000US&-qr_name=ACS_2005_EST_G00_S1501&-ds_name=ACS_2005_EST_G00_

U.S. Department of Education. (2006). Table 154. Percentage of high school sophomores who participate in various school-sponsored extracurricular activities, by selected student

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characteristics: 1990 and, 2002. *Digest of Education Statistics*. Retrieved from http://nces.ed.gov/programs/digest/d08/tables/dt08_154.asp

U.S. Department of Education. (2008). Table 156. Percentage of elementary and secondary school students who do homework outside of school, whose parents check that homework is done, and whose parents help with homework, by frequency and selected student and school characteristics: 2003 and, 2007. *Digest of Education Statistics*. Retrieved from http://nces.ed.gov/programs/digest/d08/tables/dt08_156.asp

Videon, T. M. (2002). Who plays and who benefits: Sex, interscholastic athletics, and academic outcomes. *Sociological Perspectives, 45*, 415-444.

Wai, J., Lubinski, D., Benbow, C. P., & Steiger, J. H. (2010). Accomplishment in science technology, engineering, and mathematics (STEM) and its relation to STEM educational dose: A 25-year longitudinal study. *Journal of Educational Psychology, 102*, 860-871.

Whitmire, R. (2010). *Why boys fail: Saving our sons from an educational system that's leaving them behind*. New York, NY: AMACOM.

Youniss, J., Yates, M., & Su, Y. (1997). Social integration: Community service and marijuana use in high school seniors. *Journal of Adolescent Research, 12*, 245-262.

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