Introduction

Substance use in adolescent and teenage populations is well understood to be strongly correlated with academic failure and dropout (Dupont). With this fact being precedent, the next logical step involves breaking down this problem into smaller pieces by, for example, defining different populations of students. Other research has shown that this problem often disproportionately affects students of color due to a variety of other contributing factors (Bo). Another group of students to look at in this way are student who are labeled "gifted" or "talented" (GT). Many students are given these titles, often in elementary school, by meeting a set of criteria proposed by each state such as scoring well on a cognitive exam, having a high enough IQ, and other measures. Upon receiving this distinction, many students are placed in separate classes from their peers in certain classes like math or reading to help enrich their learning experience. Without this enrichment, as well as support from their family and teachers, GT students tend to do more poorly in school when compared to their peers and have poorer trajectories further in their educational journeys (Baker). Additionally, these students feel extra pressure from familial, teacher, and societal expectations of "giftedness" (Freeman). Because of these findings, the current study seeks to confirm the correlation between higher drug use and lower test scores particularly in gifted and talented student populations, and to see if these issues affect them disproportionately compared to their non-GT peers. It is hypothesized that drug use and lower grades in school will be strongly correlated regardless of GT status and gifted and talented students will have lower overall substance use, but those who do use substances will have significantly lower grades in school compared to non-GT students who also use.

Materials and Methods

Data from the Adolescent Brain and Cognitive Development (ABCD) Study 5.0 data release was utilized for analysis. The ABCD Study is an ongoing national longitudinal study of 11,867 adolescents that releases new data each year. The 5.0 includes data from the baseline to year three visits. Participants range in age from 10-14. In the current study, the variables of interest are substance use, grades in school, and whether the student has been labeled as gifted or talented. To quantify substance use, variables from the "Timeline Followback" (TLFB) were used. This is a survey given to participants to track their substance use habits in which they go through each month back to their last visit day and attempt to recall each instance they used any drugs or alcohol as well as how much of the substance was used. This survey technique has been shown to be an accurate and reliable method of tracking self-reported substance use (McCann). This survey is only administered if a participant indicates at least 3 days of substance use on the "Substance Introduction and Use" survey which precedes the TLFB. 527 participants reported at least one instance of substance use across all three timepoints, and of this 50 were labeled GT. Due to this fact and for simplicity, the measure used for analysis was the cumulative number of instances of substance use from baseline to year three derived by adding up the total number of days of substance use recorded on the TLFB. This is not typical, however due to the low amount of substance use reported and other limitations discussed later, this measure is likely to have the best chance to reveal a correlation and warrant a more thorough investigation. Grades in school were measured using results from "School Attendance and Grades" where parents reported on their child's grades. Answers ranged from "F" to "A" and were later coded numerically from -1 to 6. -1 represents a child who does not receive letter grades at school. These participants were excluded due to lack of appropriate scoring for analysis. 0-6 represents letter grades F-A, respectively. Generally, lower scores represent lower grades in school and higher scores

represent higher grades in school. Lastly, to assess whether a student is labeled as gifted and talented, results from the same survey were used. This question asks, "Does your child receive special services at school?" with several options which includes "gifted and talented services". In the final dataset this was coded as 0 for not gifted and talented or 1 for gifted and talented. These numbers were not used in the final analysis, but to separate groups accordingly.

Analysis was conducted first with the entire dataset. Simple correlation analysis was run on the grades and substance use variables. This was then paired down to GT and non-GT groups where the correlation was run again. Then, the groups were taken down to only GT and non-GT participants with at least one instance of substance use. Additionally, a t-test was run only on this last group of participants to see if there was a significant difference in grades or amount of substance use.

Results

There was found to be no strong correlation between amount of substance use and grades ($r \sim= 0$). Even in the separated groups there was not a strong correlation, but there was a very weak negative correlation in the final dataset analyzed, but not significant enough to report.

When comparing the GT and non-GT groups who have used substances at least once, there was no significant difference in their average amount of substance use ($p > 0.05$), but there was a significant difference in their average grades ($p < 0.05$), with the GT participants having significantly lower grades on average compared to the non-GT participants as shown in **Figure 1**.
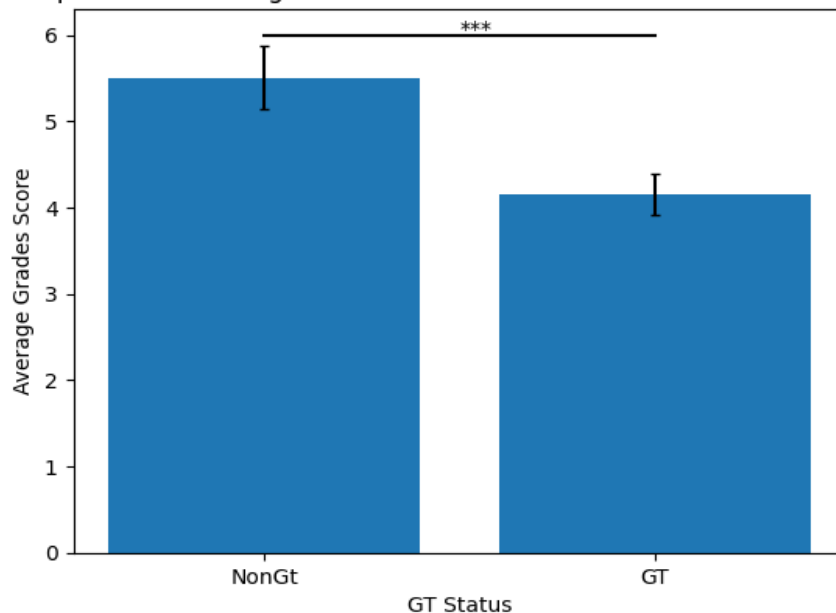
Figure 1. Shows results of the t-test. The average of parent-reported grades for GT and non-GT students who self-reported having at least one instance of substance use at any point from baseline to year 3. Results indicate that GT students had significantly lower grades on average when compared to the non-GT group.

Conclusions + Limitations

To begin, it is important to highlight the fact that out of almost 12,000 participants included in the analysis, only 525 had at least one reported instance of substance use. Of that total 50 were labeled gifted and talented causing uneven groupings. Additionally, the data release used included a relatively young population aged 10-13, which is middle school age for most students. There is a chance that substance use tends to be more prominent in older demographics starting closer to 15 or 16 where access to substances is more likely and curiosity is stronger. Because of this, these results are not surprising. Although there was no strong correlation between grades and substance use for any of the groups, there was a weak negative correlation which became

slightly stronger in the GT participants with substance use group. Due to limiting factors in the current study, it may be possible that these results become more significant with a later data release that includes the results for the participants as they move into an older age demographic.

Interestingly, the average grades for non-GT kids with substance use was found to be nearly 6, or mostly As and Bs, where GT kids hovered right above 4, or mostly Bs and some Cs. As this age group is largely in middle school, grades tend to be determined largely by participation and less on actual content. Some research indicates that these students with significantly lower scores may be due to a lack of effort (DuPont). This could then in turn lead to higher substance use in the future. Additionally, middle school is a critical time for GT students to feel challenged, or they risk underachievement or apathy to school all together (Freeman). Therefore, it may be important to recognize these students exhibiting such behavior and ensuring their academics are enriching and appropriate for them and their unique situation.

On another note, the measures for the variables are either self or parent reported. Adolescents are likely to not share that they have used a substance even in a confidential environment. This is exemplified by a study where researchers found that out of randomly selected hair samples 20% had evidence of substance use, but reported no substance use at their visits (Wade). In a similar vein, having parent-reported measures for grades and GT status is imperfect as well. It is possible that parents over estimate their student's grades or did not know at the time of data collection. Also, the phrasing of the question used for GT categorization being "special services" may cause parents to dismiss the question even if their child is a GT kid.

The significantly lower grades in GT students who use substances and the weak negative correlation between grades and substance use seen in this research highlights the idea that gifted and talented students may be more prone to apathy at school and need to be given opportunities

for further enrichment. This also points to the idea that there could be a significant correlation between these two variables in an older population of students that have more access to and greater curiosity regarding substance use that can be further explored with later data releases of ABCD data.

References

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