

Psychological Characteristics of Academically Gifted Adolescents Attending a Residential Academy: A Longitudinal Study

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Students attending a state-supported residential academy for academically gifted adolescents (N = 139) completed the Minnesota Multiphasic Personality Inventory for Adolescents (MMPI-A; Butcher et al., 1992) upon entrance to document their psychological characteristics. The same students completed a postadministration of the MMPI-A at the end of their 2nd year at the school. Results indicated that the gifted students were quite similar to the normative group of adolescents on the MMPI-A. While several statistically significant changes were observed over time, the effect-size calculations accounted for only a modest percentage of the variance in all cases. Scores on the 2nd administration of the MMPI-A declined among the majority of students who manifested elevated scores on the initial administration.

Introduction

A paucity of research exists on the psychological characteristics of academically gifted adolescents attending public residential academies. Moreover, virtually no studies about the students attending these residential academies have been published that include substantial psychological instruments (Dixon, Cross, & Adams, 2001). Consequently, even the most basic questions focused on the psychological makeup of academically gifted students abound. For example, are academically gifted students the same as or different from their nongifted peers?

This study, using the Minnesota Multiphasic Personality Inventory Adolescent version (MMPI-A; Butcher et al., 1992), exam-

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ined the psychological characteristics of gifted students attending a state-funded, public residential academy in the Midwest. The MMPI-A was administered to students upon entrance at the academy. In addition, the study documented psychological changes over the 2 years the students attended the residential school.

Literature Review

Gifted Students in School

Researchers interested in gifted students have claimed that being gifted can exacerbate the difficulties associated with development (Coleman & Cross, 2001). Some researchers have asserted that gifted students may be particularly vulnerable to social problems and personal stress while in school (Betts, 1986; Levine & Tucker, 1986; Mallis, 1986; Myers & Pace, 1986; Webb, Meckstroth, & Tolan, 1982). Rakow (1989) suggested that, "during the turbulent years of adolescence, there are many worries about being 'normal' and the past strategies for problem solving don't work here" (p. 18).

Gifted students' school experiences have the potential to retard their learning and development. Tannenbaum (1983) asserted that "a climate of social acceptance has to be created at school and in the community so that the gifted will want to realize their potential rather than suppress their exceptionalities" (p. 419). Others have described in detail how our schools can actually be anti-intellectual environments (Howley, Howley, & Pendarvis, 1995). The importance of the social experiences gifted adolescents have in school cannot be overestimated in their psychosocial development "as they attempt to establish more efficacious interpersonal strategies to reach their desired social goals" (Cross, Coleman, & Stewart, 1995, p. 181). Paramount in gifted students' efforts to achieve these goals are their social cognition and self-perceptions and beliefs about how others perceive them (Cross, 1997; Cross, Coleman, & Terhaar-Yonkers, 1991).

Gifted Students' Psychological Makeup

Terman (1925), one of the first researchers to explore the psychological characteristics of gifted students, did his research when a prevailing view was that gifted students were emotionally borderline neurotic or even psychotic individuals. He did not find support for this view of gifted individuals after 35 years of data collection.

In fact, he found that gifted individuals tended to be better off in almost all areas of their life, although some concerns about his sample pool, such as most of them being from a higher socioeconomic status, have been raised (Clark, 2002). In addition, he did not have many proven psychological instruments at his disposal at that time, such as the MMPI-A, thus limiting some forms of data collection.

More recent research on the social-emotional functioning of gifted students has been mixed at best. Positive characteristics include being less conforming to peer opinions and more independent (Gottfried & Gottfried, 1996), exhibiting better emotional adjustment (Oram, Dewey, & Rutemiller, 1995), valuing cooperative and democratic forms of interaction (Lehman & Erdwins, 1981), showing more leadership capabilities (Roeper, 1992), and being generally better psychologically adjusted (Howard-Hamilton & Franks, 1995; Nail & Evans, 1997). On the other hand, some gifted students have been found to manifest overly elevated levels of sensitivity and emotional reactivity (Piechowski, 1991), to have more difficulties with same-aged peers who do not have high levels of cognitive ability (Davis & Rimm, 1994; Freeman, 1994), and possibly to have lowered self-concepts (Coleman & Fults, 1982; Lea-Wood & Clunies-Ross, 1995). In a recent study, Dixon et al. (2001), using the Self-Description Questionnaire III (Marsh, 1987), reported that the scores of gifted adolescents attending a residential academy fell into 6 clusters that the researchers named Math Superstars, Socially Focused, Nonathletes, Low Overall, Verbal Superstars, and Nonspiritual. The authors noted that their study provided support for the contention that gifted adolescents are not a homogenous group.

Two other areas of psychological concern for gifted students are depression and anxiety. Given the stress and isolation that gifted students sometimes experience, it may be expected that they would exhibit more depression than other students. This has not been found to be the case (Baker, 1995; Neihart, 1991; Parker, 1996). A study by Kaiser, Berndt, and Stanley (1987) measured symptoms of depression in high-ability students utilizing the Multiscore Depression Inventory. They did not find significant differences between gifted and average students in terms of levels of depression. Neihart (1991), utilizing a different instrument, examined differences between high-ability students placed in a gifted program and average students. Neither group was deemed depressed enough to require intervention. Similar findings have been found with anxiety, as well (Neihart, 1999). Reynolds and Bradley (1993) looked at

more than 400 gifted children using the Revised Children's Manifest Anxiety scale. Interestingly, the gifted students indicated lower than average levels of anxiety on nearly all scales when compared to the average students. Scholwinski and Reynolds (1985) repeated the study with a larger sample size ($N = 5,000$) and found similar results.

Similar results have also been found when comparing adolescents who were and were not labeled as gifted in regard to psychiatric disorders. However, many of these studies have used adult subjects instead of adolescents (Neihart, 1999). Touyz, Beumont, and Johnstone (1986) compared subjects on their rate of eating disorders and found no differences between subjects who had average or high cognitive ability. On the contrary, other studies have suggested that there is a connection between IQ and eating disorders (Dally & Gomez, 1979). Gowan and Demos (1964) reported that 6.5% of children in a metropolitan psychological clinic were identified as gifted, which was twice the number they expected, given their theory of giftedness. By contrast, Parker (1996) found that subjects identified as gifted tended to score lower than the normative sample on a measure of psychological symptoms (the Brief Symptoms Inventory).

Dixon, Lapsley, and Hanchon (2004) examined an empirical typology of perfectionism in samples of gifted adolescents ($N = 151$). Their study examined the relationship between a typology of adolescent perfectionism and mental health more directly by including indices of psychiatric symptomology, adjustment, self-esteem, and coping. Using Frost's Multidimensional Perfectionism Scale, they identified four clusters: two pervasive types of perfectionists and two mixed types. They concluded that maladaptive perfectionism may manifest itself in the more differentiated forms from late childhood to early adolescence, at least among gifted students.

At one time, it was speculated that the gifted were more prone to suicide attempts than other students (Delisle, 1990; Lajoie & Shore, 1981). Delisle, as well as Parker and Adkins (1995), suggested that suicide attempts were linked to high levels of perfectionism, while Lajoie and Shore found a link between high ability and suicidal behavior. Hayes and Sloat's (1989) study revealed 8 out of 42 suicidal gestures were made by gifted individuals. Gust-Brey and Cross (1999), by contrast, were more critical of the literature suggesting a link between suicide and gifted individuals. Suicide among the gifted has not been shown to be more prevalent than it is in the adolescent population at large. Dixon and Scheckel (1996)

leveled similar criticisms of the literature. In addition, Baker (1995) found no differences between average students and either moderately or highly gifted students in suicidal behavior.

Two common problems with many of these studies, as well as with other studies in the field examining the psychological characteristics of gifted students, involve the samples drawn and instruments used. Many of the studies listed above note that the gifted students were selected by teachers and other forms of nominations, which would imply that there is a greater chance that these students are well adjusted. Missing from the data analysis are those gifted students who were not nominated due to perceived psychological difficulties. The other problem with the existing literature is that many of the instruments used do not have the same clinical breadth and empirical support that other instruments do to assess a wide range of psychological variation. Although it is important to determine the levels of specific psychological problems in the gifted population, a broader, more comprehensive overview of their psychological functions may provide a better picture of the gifted population, especially when many disorders share a common symptomology. For example, depression and anxiety share similar difficulties with concentration.

This study differs from past studies in three ways: First, it is longitudinal, exploring the changes that occurred in the psychological makeup of students over a 2-year period in a residential school for the gifted; second, the students were going to school in a residential setting at the time of the study; and third, the type of instrument used in this study is one of the most well-respected and comprehensive instruments used to assess psychological functioning (Minnesota Multiphasic Personality Inventory).

The goals of this study were to document and explore the psychological characteristics of gifted students as they entered a residential program and whether these characteristics changed over the course of the program. Specifically, did those students who entered the gifted program differ from students in the same age range? Were there specific ways that students changed while attending the residential school, and were these changes positive or negative? Additional analyses were also conducted on those students who dropped out of the program to examine what psychological characteristics may have predicted their exit from the school. An additional analysis was conducted to find out how well students who appeared to have some level of psychological difficulty (i.e., clinically elevated scales) adjusted over the course of their 2-year stay in the program.

Methods and Procedures

Setting

Students attending the "Academy," a state-supported, public residential school serving academically gifted students, were participants in this study. In addition to drawing its population of 300 juniors and seniors from across the state, the Academy is located on the campus of medium-sized public university located in the Midwest. Students may enroll in university courses, as well as in the Academy's own courses. The Academy's curriculum is differentiated to meet the needs of students who are academically gifted in science, mathematics, and the humanities.

To enter the academy, a person is required to submit an application, standardized achievement test scores, scores on the Scholastic Aptitude Test, teacher recommendations, transcripts, and essays to indicate desire for admittance to the school prior to their junior year in high school. The admissions committee attempts to select students who can adjust to residential life, as well as benefit from a rigorous academic program. Parents, counselors, administrators, teachers, and psychologists have opportunities to express concern or reservations about a student's emotional, physical, or academic health as he or she completes the required forms during the application process. Students must also visit the Academy and schedule an interview with one or more school officials. The admissions team accepts approximately one half of those applicants whose materials meet the selection criteria. Once accepted, they completed their junior and senior years at the Academy. It should be noted that the Academy does not rank its students nor calculate a grade-point average.

Participants and Procedures

Data from 139 students at the Academy were used for this study. The sample consisted of two groups of students: one group graduated in the 1999 school year ($N = 59$), and the second group graduated in the 2000 school year ($N = 80$). Of this sample, 58 participants were male and 81 were female; the average age was 16. Participants were asked to complete a number of measures, including the MMPI-A, at the beginning of their 1st year in the school. The students were then asked to complete the same battery again at the end of their 2nd year. In both instances, students were free to refuse to complete any or all of the measures given to them. The measures in the battery were typically completed in small groups with a proctor present to answer questions.

It should be noted that the sample used for this study was a subset of the incoming students who took the initial battery. A total of 272 students (109 from the 1999 graduating class and 163 from the 2000 graduating class) completed the initial measure, but only 139 completed the second battery, either because they did not want to or had returned to their home school to graduate. To ensure that the students who completed the second battery did not differ significantly from the ones that did not ($N = 139$ and 133 , respectively), a multivariate analysis of variance (MANOVA) was completed to compare the two groups on the pretest Clinical scales. It was found not to be significant, $F(10, 261) = 1.21, p = .285$, suggesting that those students who failed to complete the second measure did not differ significantly from the participants who did complete it. In a similar manner, a MANOVA comparing the two graduation classes on the MMPI-A Clinical scales was also conducted to determine whether or not they differed significantly on the pretest. Only those who completed the second battery in either graduation year were included in the MANOVA. Results suggested that the two graduation classes did not differ significantly from one another, $F = (10, 128) = 1.28, p = .247$, which allowed them to be combined into one large group ($N = 139$). A MANOVA comparing boys and girls was also not significant, $F(10, 128) = 1.73, p = .080$.

Instrument

Psychological symptomology was assessed using the MMPI-A (Butcher et al., 1992). The MMPI-A is a widely used instrument in both clinical and private settings for adolescents ranging in age from 14 to 18 years. The goal of the instrument is to indicate the likelihood that a respondent is exhibiting particular behaviors or experiencing emotional difficulties. Of the 478 items comprising the instrument, the first 350 address the 10 Clinical scales, while the remaining items made up the Harris-Lingoes and other Supplementary scales used in this study. The MMPI-A utilizes a *T*-score system in which the average score is 50, with a standard deviation of 10. Norms are based on age and gender for the MMPI-A. Butcher et al. suggested that scores in the 60–64 range indicate moderate elevation, while scores 65 and over indicate significant elevations.

The MMPI-A uses numerous Validity scales to assess the participants' honesty and consistency in responding to the measure's items. The *L* scale assesses the respondents' efforts at "faking

good," the F scale measures "faking bad," while the K scale signifies the respondent's willingness to disclose personal information or not (level of defensiveness). Other Validity scales are available for the MMPI-A, but were not utilized in this study.

The Clinical scales on the MMPI-A (Butcher et al., 1992) are as follows: Hypochondriasis (Hs), Depression (D), Hysteria (Hy), Psychopathic Deviate (Pd), Masculinity-Femininity (Mf), Paranoia (P), Psychasthenia (Pt), Hypomania (Ma), and Social Introversion (Si). Test-retest reliability ranges from .70 (Hy) to .84 (Si). Estimates of internal consistency using Cronbach's alpha range from .40 (Mf, girls) to .89 (Si, girls).

The Harris-Lingoes subscales are utilized to understand better the nature of the following Clinical scales: Depression, Hysteria, Psychopathic Deviate, Paranoia, Schizophrenia, and Hypomania. The Harris-Lingoes subscales divide each Clinical scale into subscales by grouping items into themes. Butcher and Williams (1992) suggested not examining the Harris-Lingoes subscales unless their corresponding Clinical subscale is elevated. There are 28 Harris-Lingoes subscales for the MMPI-A.

The Content scales are valid for describing and predicting personality variables and include the following: Adolescent-anxiety (A-anx), Adolescent-obsessiveness (A-obs), Adolescent-depression (A-dep), Adolescent-health concerns (A-hea), Adolescent-alienation (A-aln), Adolescent-conduct problems (A-con), Adolescent-low self-esteem (A-lse), Adolescent-low aspirations (A-las), Adolescent-social discomfort (A-sod), Adolescent-family problems (A-fam), and Adolescent-school problems (A-sch). Internal consistency using Cronbach's alpha ranges from .55 (A-las, boys) to .83 (A-dep, girls). Test-retest reliability ranges from .62 (A-aln, A-con) to .82 (A-fam, A-dep). There are also supplemental scales available for the MMPI-A: Alcohol/Drug Problem Acknowledgement (ACK), Alcohol/Drug Problem Proneness (PRO), Immaturity (IMM), Anxiety (A), Repression (R), and MacAndrew Alcoholism Scale-Revised (MAC-R). Internal consistency ranges from .62 (R, girls) to .89 (A, girls).

Results

Descriptive Statistics

Means, standard deviations, and ranges for the MMPI-A Clinical scales are given in Table 1. Mean scores on the Clinical scales were in the 40–50 range, regardless of year, except for the Mf scale, which was approximately 52 for both years. Standard deviations for the

Table 1
Means, Standard Deviations, and Ranges
for the MMPI-A Clinical scales, 1st and 2nd Years

Clinical scales	1st Year			2nd Year		
	Mean	SD	Range	Mean	SD	Range
Hypochondriasis (Hs)	46.33	7.67	31-70	46.89	10.02	31-77
Depression (D)	48.58	10.82	30-85	50.45	10.84	30-87
Hysteria (Hy)	49.80	8.14	30-72	53.16	10.65	33-96
Psychopathic Deviate (Pd)	46.72	7.58	30-77	47.37	8.52	30-75
Masculinity- Femininity (Mf)	52.04	10.27	30-89	52.09	9.90	30-86
Paranoia (Pa)	47.122	8.22	30-76	48.36	9.70	30-85
Psychasthenia (Pt)	44.97	9.07	30-85	45.43	11.24	30-85
Schizophrenia (Sc)	45.65	7.95	31-86	45.83	10.45	30-96
Hypomania (Ma)	48.91	10.88	30-89	48.24	9.87	34-89
Social Intro- version (Si)	45.83	12.11	30-80	45.53	12.09	30-79

scales during the 1st year were close to those found in the normative sample and ranged from 7.58 (Pd) to 12.11 (Si). However, scores during the 1st year did range from well below average (30) to the clinically elevated range (89), although participants, on the average, were not in the clinically elevated range (below 65, as suggested by Butcher et al., 1992). Going from the 1st year to the 2nd year, the average for each scale increased, although not to the clinically elevated range. Standard deviations for the second measure were slightly larger and approximated the standard deviation of the normative sample. The larger standard deviation suggests that there was more of a range during the second measure. However, this range did not differ much from the first measure of the Clinical scales.

Data Analysis

The general strategy for the data analysis was to conduct a MANOVA, with time (two levels, 1st and 2nd years) being used as a repeated measure. If the multivariate *F* for the repeated measure was found to be significant (the within-subjects factor), we proceeded to examine the univariate results for each of the Clinical

Table 2
Source Table for the Univariate Results
for MMPI-A Clinical Scales

Clinical scales	SS	df	MS	F	Sig.	Eta ²
Hypochondrias	21.89	1, 138	21.89	.520	.472	.004
Depression	243.17	1, 138	243.17	4.31	.040*	.030
Hysteria	784.50	1, 138	784.50	15.53	.000**	.101
Psychopathic Deviate	29.14	1, 138	29.14	.958	.330	.007
Masculinity- Femininity	.18	1, 138	.18	.004	.949	.000
Paranoia	106.42	1, 138	106.42	1.64	.202	.012
Psychasthenia	14.73	1, 138	14.73	.338	.562	.002
Schizophrenia	2.43	1, 138	2.43	.052	.821	.000
Hypomania	30.45	1, 138	30.45	.549	.460	.004
Social Introversion	6.65	1, 138	6.65	.115	.735	.001

* $p < .05$. ** $p < .01$.

scales. Subsequent to the initial analysis, for those Clinical scales that displayed a significant change from the first to second measure, appropriate Harris-Lingoes subscales were then subjected to a similar analysis. Finally, the supplementary scales, which consist of items that are not included in either the Clinical or Harris-Lingoes subscales, were examined in the same manner.

Prior to examining the Clinical scales, the Validity scales were briefly examined. Wilks's Lambda from the multivariate analysis was found to be significant, $F(3, 136) = 4.95, p = .003$. Of the three Validity scales, only the K scale showed a significant change, $F(1, 138) = 5.02, p = .027$, from the first to the second measure, going from a *T* score of 54.17 to 56.79. On all the Validity scales, the average score in either the 1st or 2nd year was below 60 in all instances (they ranged from 44.61, F scale at first measure, to 56.79, K scale at the second measure). The Validity scales suggested that the participants answered in a consistent and honest manner during both measures, thus allowing for interpretation of the Clinical scales.

Results from the multivariate analysis of the Clinical scales was found to be significant, Wilks's Lambda $F(10, 129) = 2.121, p = .027$, suggesting it was permissible to utilize the univariate results. Table 2 shows the results of the univariate tests. As Table 2 illustrates,

Table 3
Means, Standard Deviations, and Ranges
for the Harris-Lingoes Subscales for Depression and Hysteria

Clinical scales	1st Year			2nd Year		
	Mean	SD	Range	Mean	SD	Range
Subjective						
Depression (D1)	48.1	11.31	32–80	50.01	11.12	31–79
Psychomotor						
Retardation (D2)	50.61	10.77	30–81	52.68	10.04	30–84
Physical Mal-						
functioning (D3)	49.99	8.67	30–77	48.99	9.67	33–83
Mental						
Dullness (D4)	47.06	10.65	35–85	49.58	11.57	35–81
Brooding (D5)	45.96	10.69	33–74	47.57	11.39	33–81
Denial of Social						
Anxiety (Hy1)	53.12	10.86	31–66	54.87	10.40	31–66
Need for						
Affection (Hy2)	53.30	9.20	34–76	56.47	11.36	33–80
Lassitude-						
Malaise (Hy3)	48.	7.95	31–86	45.83	10.45	30–96
Somatic						
Complaints (Hy4)	48.91	10.88	30–89	48.24	9.87	34–89
Inhibition of						
Aggression (Hy5)	45.83	12.11	30–74	45.53	12.09	30–74

the only Clinical scales to show a statistically significant change from the first to the second measure were the Depression and Hysteria Clinical scales. In both instances, the average *T* score on the second measure was higher, although somewhat small (1.87 for the Depression scale and 3.36 for the Hysteria scale). Examining the range and standard deviation for the second measure of the Hysteria scale revealed that there was a greater range in scores than at the first measure.

To further understand the cause of this increase in these two scales, the Harris-Lingoes subscales for Depression and Hysteria were also examined. The multivariate statistic was found to be significant, Wilks's Lambda $F(10, 129) = 4.439, p < .001$, suggesting one or more univariate analyses were significant. Table 3 shows the means, standard deviations, and ranges for the Harris-Lingoes subscales for the Depression and Hysteria Clinical scales, while Table 4 shows the univariate results for the same subscales.

Table 4
Source Table for the Univariate Results
for Harris-Lingoes Subscales

Clinical scales	SS	df	MS	F	Sig.	Eta ²
Subjective						
Depression (D1)	254.52	1, 138	254.52	3.94	.049*	.028
Psychomotor						
Retardation (D2)	298.36	1, 138	298.36	5.61	.019*	.039
Physical Malfunctioning (D3)	69.50	1, 138	69.50	1.11	.294	.008
Mental						
Dullness (D4)	443.17	1, 138	443.17	6.97	.009*	.048
Brooding (D5)	180.49	1, 138	180.49	2.99	.086	.021
Denial of Social						
Anxiety (Hy1)	212.41	1, 138	212.41	4.27	.041*	.030
Need for						
Affection (Hy2)	696.40	1, 138	696.40	10.72	.001**	.072
Lassitude-						
Malaise (Hy3)	59.86	1, 138	59.86	1.06	.305	.008
Somatic						
Complaints (Hy4)	7.28	1, 138	7.28	.166	.685	.001
Inhibition of						
Aggression (Hy5)	243.17	1, 138	243.17	4.41	.038*	.031

* $p < .05$. ** $p < .01$.

Three of the five Depression subscales were found to be significant. The subscales assessing physical malfunction and brooding were not found to differ significantly from first to second testing. Those subscales found to be significant tended to be higher during the second measure than the first, which was expected since the Depression clinical scale increased from the first to the second measure. Given the small increase in the Depression scale, it was not expected that the increase in the Harris-Lingoes subscales would be very high. The Subjective Depression subscales went up by 1.91 points, while the Psychomotor Retardation subscale increased by 2.07 points and the Mental Dullness subscale went up by 2.52 points. As these results suggest, the biggest change occurred on the Mental Dullness subscale. In all cases, however, none of the effect sizes reached even the small level of effect (.20) as established by Cohn (1977).

Table 5

**Source Table for the Univariate Results
for the Supplemental Scales**

Clinical scales	SS	df	MS	F	Sig.	Eta ²
A-Anxiety	205.47	1, 138	205.47	3.90	.050*	.027
A-Cynicism	219.46	1, 138	219.46	5.37	.022*	.037
A-Conduct	248.81	1, 138	248.81	6.21	.014*	.043
A-School Problems	428.15	1, 138	428.15	8.74	.004**	.060
PRO Alcohol/ Drug Proneness	747.97	1, 138	747.97	17.022	.000***	.110

* $p < .05$. ** $p < .01$. *** $p < .001$.

Three of the five Hysteria subscales were found to be significant. A similar pattern was found with the Hysteria subscales as with the Depression subscales, with the second measure being higher than the first one, albeit only slightly. The Denial of Social Anxiety scale increased by 1.75 points, as did the Need for Affection (3.17 points) and Inhibited Aggression (1.87 points) scales. The Lassitude-Malaise and Somatic Complaints subscales did not display a significant change between measures. None of the significant comparisons reached the .20 effect-size expectation.

Because the Supplemental scales measure different aspects of emotional and behavioral functioning than the Clinical scales, a theoretical underpinning could not be established to focus on particular scales and ignore others. As a result, all of the Supplemental scales were examined. Due to the large number of Supplemental scales, only the scales that were found significant are reported in Table 5. As was found in the previous analysis, the multivariate statistic was significant, Wilks's Lambda $F(20, 119) = 3.147$, $p < .001$. However, only five scales were found to be significant (see Table 5). Table 6 lists the descriptive statistics for those Supplemental scales that were significant. As has been the case with all the other measures, participants scored higher on the second measure than the first, although the increase was marginal at best (the largest was 3.28 points). Specifically, the A-Anxiety, A-Cynicism, A-Conduct, A-School Problems, and PRO-Alcohol/Drug Proneness scales were found to be significant. Of the five scales, the PRO-Alcohol/Drug Proneness scale displayed the greatest change,

Table 6
Means, Standard Deviations, and Ranges
for the Supplemental Scales

Clinical scales	1st Year			2nd Year		
	Mean	SD	Range	Mean	SD	Range
A-Anxiety	45.53	9.50	30–89	47.26	11.50	30–88
A-Cynicism	46.96	8.42	33–81	45.18	9.23	30–88
A-Conduct	43.39	7.92	30–66	45.28	9.27	30–88
A-School Problems	43.28	6.10	31–71	45.76	10.01	31–90
PRO Alcohol/ Drug Proneness	42.58	8.32	30–67	45.86	9.17	30–79

with the second measure being significantly higher than the first. The A-Anxiety scale, in contrast, was on the borderline of being nonsignificant and showed the least change. As Table 6 indicates, the average scores for those Supplemental scales that were significant did not exceed the normative average of 50 (the scores ranged from 42.58 to 45.86, both of which were the PRO-Alcohol/Drug Proneness scale). Once again, none of the statistically significant differences reached the .20 threshold of practically significant effect size.

Additional Analysis

Participants Who Left the Program

For a variety of reasons (financial, health-related, academic, social), a percentage of students chose to leave the school and return to their local high school. Of the 272 students who participated in the initial measure (from the 1999 and 2000 graduation class), 72 participants (approximately 26%) left the Academy before the second measure was administered (2 years later). Comparing those participants who left the program and those who stayed on the initial measure of MMPI-A Clinical scales revealed a significant MANOVA, Wilks's Lambda $F(10, 261) = 1.987, p = .035$. Of the 10 Clinical scales, 5 were found to be significant. Table 7 lists the univariate results for this analysis. However, Levine's Test of Equality of Error Variances was found to be significant for the Hypochondriasis, $F(1, 270) = 5.04, p = .026$; Psychopathic Deviate,

Table 7

**Source Table for the Univariate Results
for Clinical Scales Comparing Participants
Who Did or Did Not Drop Out of the School**

Clinical scales	SS	df	MS	F	Sig.	Eta ²
Hypochondriasis (Hs)	587.65	1, 138	587.65	7.83	.006**	.028
Hysteria (Hy)	407.52	1, 138	407.52	5.65	.018*	.020
Psychopathic Deviate (Pd)	956.00	1, 138	956.00	12.87	.000***	.046
Schizophrenia (Sc)	332.94	1, 138	332.94	3.88	.050*	.014
Hypomania (Ma)	503.85	1, 138	503.85	4.05	.045*	.015

* $p < .05$. ** $p < .01$. *** $p < .001$.

$F(1, 270) = 6.77$ $p = .010$; and Schizophrenia, $F(1, 270) = 3.95$, $p = .048$ scales. This suggested that the error variance on these three scales were not equal, implying that the differences between groups may be due to other factors. In addition, Box's Test of Equality of Covariance Matrices was found to be significant, $F(55, 61,888) = 1.37$, $p = .037$, indicating that the observed covariance matrices of the dependent variables are not equal across groups in the multivariate analysis, also suggesting that differences may be due to factors other than group differences. As a result, the differences are somewhat questionable.

On both the Hysteria and Hypomania scales (the two scales that did not exhibit difficulties on Levine's test), the group that dropped out of the program tended to score higher than those who did not. However, these differences were again found to be minimal (the group who dropped out scored 2.77 points higher on the Hysteria scale and 3.09 points higher on the Hypomania scale) with the highest scale average being 52. In this final set of comparisons, none of the statistically significant comparisons exceeded the .20 effect-size cut-off established by the researchers as meaningful.

Analysis of Participants With Elevated Clinical Scales

A difficulty with using multivariate and univariate analyses is that averages among the groups are compared, which means that individual differences are lost. Of concern to the researchers are those

students who showed a clinical elevation on one or more of the Clinical scales and how those elevations might have changed over the 2-year period. Table 8 shows the total number of participants who had an elevation of 65 or more on one of the Clinical scales (*n* total column), while the second and third columns indicate the number of participants that increased from their initial elevation and the percentage of those who increased on the second measure. The last column shows the range of increase from the first to the second measure. An "N/A" indicates that no participants increased on the second measure, and an entry of one number signifies how much of an increase one participant changed between measures.

Of the 10 Clinical scales, three (Hypochondriasis, Psychopathic Deviate, and Paranoia) did not increase from the first to the second measure. In fact, the elevation on these scales was lower on the second measure. On the Depression scale, 3 of the 12 participants increased on the second testing, but this increase was not substantial (1 to 3 points). A similar, small increase on the Masculinity-Femininity scale was noted, as well (one participant increased by 2 points). A slightly larger increase was found on the Social Introversion and Hysteria scales on the second measure (an increase of 5 and 7 points, respectively). Of particular concern was the 17-point increase on the Schizophrenia scale and the 14-point increase on both the Psychasthenia and Hypomania scales. A review of the data revealed that these were three students who differed in background variables (they did not share a common gender or racial background). Besides these three students, who all completed the program, a majority of students who showed an initial elevation tended to decrease in their scores on the second measure.

Discussion

The data from this study supports the contention that the academically gifted students attending the residential academy were not different from their nongifted counterparts relative to the numerous scales measured by the MMPI-A. In general, participants' Clinical scales increased from the first to the second testing. However, only two scales, Depression and Hysteria, showed a statistically significant elevation from the first to second testing. Analyses of the Harris-Lingoes subscales were utilized to better understand the nature of this change. For the Depression scale, participants' feelings of subjective depression (general worry, concentration problems, and apathy), psychomotor retardation (denial of

Table 8

Number of Participants That Increased on the Second Measure

Clinical scales	<i>n</i>	Total no. increased on 2nd measure	Total % increased	Range of point increase
Hypochondriasis (Hs)	4	0	00	N/A
Depression (D)	12	3	25	1-3
Hysteria (Hy)	7	1	14.3	7
Psychopathic Deviate (Pd)	4	0	00	N/A
Masculinity- Femininity (Mf)	14	1	7.1	2
Paranoia (Pa)	5	0	00	N/A
Psychasthenia (Pt)	4	1	5.90	14
Schizophrenia (Sc)	2	1	50.00	17
Hypomania (Ma)	13	2	15.40	4-14
Social Intro- version (Si)	2	1	50.00	5

Note. The number of participants who did not increase from the first to the second measure can be found by subtracting the second column from the first one.

affect, listlessness, and social withdraw), and mental dullness (denial of ability to work as well as before, memory difficulty, listlessness) increased from the first to the second testings. Changes in the Hysteria scale were marked by denial of social anxiety (feeling less shy and finding it easier to talk to others), increased need for affection from others (by not getting mad or sharing problems), and inhibition of aggression (denying irritability and hostile feelings). At first the change in the Hysteria subscales seemed to be a positive change, which runs contrary to the notion that elevation on the scales is a negative trait. The key characteristic of hysteria is the denial of problems and lack of insight into one's motives and behaviors. Therefore, more extreme denial of a need for affection, anger, and anxiety are more characteristic of hysteria. Practically speaking, when the elevation of the Hysteria scale and its corresponding Harris-Lingoes subscales are in the average range, as was the case in this study, this increase likely represents more confidence in the participant's ability and less anxiety than a pathological tendency to deny his or her problems. Although these findings

were statistically significant, none reached even the .20 effect-size cutoff.

Overall, the change in the Clinical scales showed only minimal change over the 2-year stay in the program. It was interesting to note that the Hysteria scale showed the greatest change, but the type of change actually indicates a positive improvement (less anxiety, hostility, and need for affection) since the scales stayed in the average range for this population. By contrast, the Depression scale indicated a slight negative change for the participants over the 2-year period, although this change was not clinically significant (the change was only about 2 points on a *T*-score scaling) and still fell within the average range. None of the changes were deemed practically significant, given their modest effect sizes.

The Content scales revealed some minor change in the second measure, which was also found in the Clinical scales. The A-Anxiety scale suggests difficulties in thinking, concentrating, and tension, which is also characteristic of individuals who are experiencing feelings of depression. As a result, the Depression and A-Anxiety scales are likely tapping into thinking and concentration difficulties. It was not surprising the A-Cynicism, A-School Problems, and A-Conduct Problem scales were higher on the second measure. In fact, it was expected that they would be higher, given the nature of the population. Individuals who score higher on the A-Cynicism scale may be inclined to be distrustful of other people's motives and tend to not trust others. The A-Conduct scale measures resistance to rules and authority, while the A-School Problem scale indicates a negative attitude to school. It is likely that the participants in the study are somewhat distrustful of others, especially authority figures, and may doubt the motives behind the rules and regulations given to them. As a result, they may have some negative feelings toward school at the end of their 2nd year because the institution is the one placing the rules and expectations on them. It should be noted, as was the case with the Clinical scales, that the increase in elevation was minimal and did not approach clinically significant elevations. As a result, most of the negative feelings the participants expressed were typical for the age group and did not indicate that gifted students were any different from other students in their age group. In this study, gifted students did not differ significantly from other students in their level of emotional and behavioral symptomology as measured by the MMPI-A.

An additional concern of this study was to examine if students who left the academy before graduation differed in a meaningful way from those who stayed to graduate. If there were a difference,

services could be implemented to help these students, which, in turn, could aid them in completing the program. Unfortunately, the MMPI-A was not useful in discriminating differences between those students who stayed in the program and those who did not.

One potential factor influencing students to leave the school may have been the stress of the program on students with initial difficulties (those with clinical elevations during the first measure). A review of individual cases revealed that those students whose scores initially displayed an elevation of 65 or more on the initial measure tended to decline on the second measure. Of the scores that reversed, a majority of them only did so by a few points, with only three students showing a strong increase in elevation. While one explanation for the decline in scores falling into the extreme range is regression toward the mean, direct observations of these same students suggests that a majority of them appeared to have improved over time.

This study displays the importance of making the distinction between clinically and statistically significant results. While there were some statistically significant changes, they tended to be only a few points when changes occurred, yielding very small effect sizes. In the context of *T* scores, a few points are of little significance. This is especially true when most of the scores were slightly below average for the age group (40 to 50). However, what it does suggest is that gifted students do not appear to display a level of emotional or behavioral symptomology above and beyond what would be expected of other adolescents in their age group.

This study provides evidence that gifted adolescents attending residential academies are the same as their nongifted peers psychologically in terms of the 10 Clinical scales, as well as the myriad supplemental scales, measured by the MMPI-A. This finding is contrary to a growing voice in the field of gifted studies claiming that gifted students are qualitatively different psychologically than their nongifted peers. It also revealed that virtually no substantial psychological changes occurred for the group of gifted students while living in a residential setting over a 2-year period of time. This is a particularly important finding given the widespread speculation that these types of schools cause high levels of stress among their students. The third finding shed light on the students who entered the Academy with elevated subscores on the MMPI-A. Said more directly, for those students most vulnerable to psychological upset upon admission to the Academy, it was found that their elevated scores tended to decline over time, often moving into normal ranges. This finding suggests that residential academies may be

helpful in the psychological development of adolescents experiencing some level of distress. Perhaps living and going to school in a highly challenging academic environment, while potentially stressful, is actually a positive influence on the psychological well-being of gifted adolescents.

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