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The MAMA-t: A Measure of Relative Maturity in Adolescence

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Three studies explore the MAMA-t, as a measurement of maturity, as an assessment of progress and academic achievement in a residential treatment program, and as a predictor of academic achievement, attendance, and discipline referrals in a public high school setting. In the first study, therapists' ratings on the MAMA-t were significantly related to both academic achievement and progress in the treatment program. This study replicated results of a parent form of the MAMA, as did a factor analysis that revealed the presence of three factors most easily named as Planfulness, Empathy/Consideration of Others, and Moral Reasoning. The second study examined the factor structure and predictive usefulness of the MAMA-t in two local public schools with teachers rating students over three years. The study again demonstrated that ratings on the MAMA-t were positively correlated with academic achievement and predicted school performance several years later. Scores were also negatively related to school absence and discipline referrals. Finally, the third study compared the MAMA-t with the GRIT scale and found the MAMA-t was related to the GRIT scale but provided a stronger prediction of school achievement.

Keywords: maturity, residential treatment, assessment, measurement

Note: This paper was edited by Ellen Behrens, Ph.D., Chief Editor.

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McKinnon (2008, 2010) and his colleagues (Hong, McKinnon, Santa, & Napier, 2013; Santa, 2007) have made the argument that changes observed in longer term residential treatment reflect more than reduction in psychiatric and behavioral symptoms. They suggest the changes that take place reflect an underlying shift in personality development towards an increase in maturity. In order to capture this shift in maturity they developed a scale designed to measure maturity in adolescents named the Montana Adolescent Maturity Assessment for use by parents (MAMA-p; Hong et al. 2013). This 35-item scale was designed to operationalize the underlying concept of maturity, or lack thereof, as reflected in listening to years of parental complaints that their son or daughter was extremely self-centered, inconsiderate of others, exhibited little or no empathy, failed to have a realistic plan or view of the future, and lacked age appropriate prosocial morality.

Hong et al. (2013) described a factor analysis of the MAMA-p scale with 550 parent responses that indicated the data was best captured by a three-factor solution which accounted for more than 60% of the variance. The underlying factors were described as: 1) empathy, or consideration of others, 2) planfulness and future orientation, and 3) pro-social moral reasoning. The MAMA-p was also shown to be internally consistent ($\alpha = .95$), and moreover the MAMA-p was significantly correlated to both progress in the program and to significant decreases in both behavioral and psychiatric symptoms as measured by Achenbach's Child Behavior Check List (Achenbach, 1991).

While the MAMA-p shows considerable promise as a simple instrument designed to measure maturity, it should be generalized beyond a single sample of parents, and it would be desirable if the instrument could be generalized for use by observers other than parents (e.g. therapists and teachers). Therefore, the 35-item MAMA-p was edited and revised to produce an instrument that could be used by therapists, teachers, and parents. The revised MAMA-t was then given to therapists in a therapeutic boarding school to rate their clients, and later to teachers in two public high schools to rate their students.

The goal of these studies was to determine if the MAMA-t, could prove to be a useful instrument for a variety of more normative adolescent populations as well as for raters such as therapists and teachers who are not the adolescent's parents. Moreover, we wanted to see if the MAMA-t would provide a reliable and useful measure of maturity that would be related to actual increases in age/school-grade, and might be a predictor of grades and

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behavior in a conventional high school with teachers as raters. Having the cooperation of a public high school system with a diverse, non-clinical population and hundreds of students tested longitudinally over three years also allowed a close examination of the psychometric properties of the revised maturity scale. The high school cohorts also allowed us to examine consistency and change in maturity over time, and the prospective predictability of a maturity measure on subsequent years of performance and behavior.

Study 1

Study 1 tested the MAMA-t in a clinical setting, making use of therapist ratings of all students enrolled at a therapeutic boarding school with these ratings conducted twice, one year apart. Each snapshot of the student body provided basic psychometric statistics; correlations between maturity ratings and program advancement, marked by program level or “Clan” (1-7) status. Clan status in the program is based on the treatment team assessment of academic, clinical, and interpersonal progress. The design also allows us to examine correlations between maturity ratings and academic performance as reflected in grade point average (GPA).

In addition to the between subject comparisons of Maturity by Clan, a sub-set of the sample, comprised of forty (40) students who were rated twice (a year apart), provided a within subject paired comparison of MAMA-t scores that permitted estimates of the magnitude of a 12-month shift in relative maturity that these students managed—in a program whose clinical goal is to encourage immature teenagers to grow up.

Method

The revised, shortened MAMA-t (for teachers and therapists) required a change from a parental diction (“My child”) to a generic wording (“This student”); we cut the numbers of items to 32; and, on the basis of our pilot studies, we edited each item to reduce ambiguity; and removed items that cross-loaded unstably in factor analyses. But we preserved four specific parental concerns, which were so often repeated when parents first came to visit that we built the prototype MAMA-p around them. In brief, parents complained, again and again, that a son or daughter was:

- a) grossly inconsiderate, oblivious to others’ needs, desires, or rights
- b) lacking empathy, particularly for others unlike themselves

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- c) ethically selfish, brazenly breaking rules, sneaky to avoid punishment
- d) lacking future-mindedness, oblivious consequences of risky present behavior, and lacking step-wise plans to accomplish fully-imagined goals

These four parental concerns capture the basic aspects of a stunted or immature personality development; if you will, a childlike self-centered obliviousness to others. The normal process of “growing up” involves attaining physical and mental capacities as well as attaining a security of self that allows one to feel comfortable with others, and effectively accomplish the tasks of adolescence and young adulthood. We have found that failure to achieve an age appropriate level of maturity produces a plethora of symptoms in adolescence including anxiety, lack of ability to attend, withdrawal, depression, defiance, and various addictions.

Therefore, we constructed the MAMA-t with 8 items that we felt reflected each of these four concerns resulting in the total list of 32 MAMA-t items. They shape the MAMA-t’s underlying conceptual construct, and so implicitly provide our definition of what maturity means. Built into the MAMA-t, then, are potentially four subscales: consideration (cons); empathy (emp), moral reasoning (morR); and planfulness (plan). These are, in theory, sub-constructs which fall under the primary construct of maturity.

We preserved a 5-point Likert-scale used in the MAMA-p, changed the scale anchor descriptors from “Never” to “Almost Never”; and from “Always” to “Almost Always” resulting in the following Likert rating scale: 1 (almost never), 2 (rarely), 3 (sometimes), 4 (often), and 5 (almost always).

Participants

Nine therapists employed by Montana Academy were enlisted to rate each of the client/students on their team (approximately 10) with the MAMA-t. Each therapist rated all of their students who were enrolled in March 2012, and again rated all of their students enrolled in March of 2013. All of the students were enrolled in a therapeutic boarding school for treatment of a variety of behavioral, academic, and emotional issues. The sample in 2012 contained 39.8% females and 60.2% males and in 2013 it was 58% boys and 42% girls. The students were dominantly Caucasian (more than 94%) and almost all from middle and upper middle class families who could afford to pay for private school treatment. The sample in 2012 ($n = 83$) had an average age of 17.8, and an average Level or “Clan”

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status of 3.5 in a program with 7 Levels. In March 2013, the sample ($n = 88$) had an average age of 17.8 and an average Clan status of 3.6. Students present for both ratings ($n = 40$) had an average age of 17.3 and average Clan status of 2.1 in 2012 and in 2013 an average of 18.3 and an average Clan status of 5.2

Procedure

Prior to each rating, therapists received a refresher lecture and standard MAMA-t training materials: a one-page “Introduction” to the MAMA-t; a 5-point Likert scale schematic; an “Adolescent Maturity Spectrum,” discussed at some length, to provide descriptive anchors for extreme Likert ratings (1 or 5) along the four sub-scale dimensions: (a) consideration (vs inconsiderate selfishness); (b) empathy (vs interpersonal obliviousness); (c) moral reasoning-altruistic-abstract (vs concrete, sneaky and selfish); and (d) planful future-mindedness (vs now-orientation). MAMA-t ratings were recorded on-line by means of SurveyMonkey. Clan status or level in the program (1-7) and GPA were then added to the data set.

Results and Discussion

Basic Statistics

Cronbach’s α for MAMA-t_{total} was 0.96 indicating a high level of internal consistency of the MAMA-t scale; and all four subscales had $\alpha > 0.86$. Table 1 shows the correlations of MAMA-t (total) scores for 2012 and 2013 with both stage of treatment (Levels 1-7) and GPA. Consistent with previous findings on the MAMA-p (Hong et al., 2013), both the overall MAMA-t scores as well as all subscales are significantly correlated with both grade point average and progress in program.

This study provides two estimates of the shifts in relative maturity as a function of treatment, as measured by MAMA-t. The first estimate makes use of the cross-sectional therapist ratings of the entire student body. The average MAMA score combining data from 2012 and 2013 for students in the first Level of Treatment was 2.65 whereas the average MAMA Score for students in the final Level of Treatment was 3.75. This mean difference of nearly two standard deviations was significant ($t(51) = 7.15, p < .001$) even though the sample size was quite small ($n = 40$).

A more powerful test of the hypothesis that MAMA scores and implied maturity increase with progress in the program is provided by the

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forty students who were rated twice a full year apart. In 2012 these students were in early stages of the program ($Clan_{avg} = 2.1$), which explains why they were still in the program a year later, albeit more senior ($Clan_{avg} = 5.2$). A paired (dependent) T-test to compare their MAMA- t_{total} scores a year apart suggested that on average the maturity rating of those 40 students in 2013, as reflected by therapist MAMA- t_{total} ratings ($M = 3.56$, $SE = .08$), was substantially greater than in 2012 ($M = 3.22$, $SE = .09$, $t(39) = -3.325$, $p < 0.001$). The average stay for the school's students at the time was 18 months. But at a year the change in mean MAMA- t_{total} scores was already significant, the effect size substantial ($r = 0.47$).ⁱⁱⁱ

Table 1		
<i>MAMA-t Correlations with Program Progress and Grade Point Average</i>		
Therapist Ratings May 2012 – $N = 83$		
<u>Measure</u>	<u>Program Progress</u>	<u>Grade Point Average</u>
MAMA- t_{total}	0.44	0.52
MAMA- t_{plan}	0.39	0.52
MAMA- t_{cons}	0.34	0.39
MAMA- t_{emp}	0.42	0.36
MAMA- t_{morR}	0.39	0.52
Therapist Ratings May 2013 – $N = 88$		
<u>Measure</u>	<u>Program Progress</u>	<u>Grade Point Average</u>
MAMA- t_{total}	0.43	0.52
MAMA- t_{plan}	0.27	0.46
MAMA- t_{cons}	0.36	0.38
MAMA- t_{emp}	0.45	0.52
MAMA- t_{morR}	0.42	0.42
<i>Note. $p < .02$</i>		

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Factor analysis

Factor analysis with a Varimax rotation of the therapist rating data in both years yielded three easily interpretable factors each with Eigenvalues > 1. The strongest factor clustered all 8 Planfulness (plan) items together. As with the MAMA-p these data tended to lump the items from empathy (emp) and consideration (cons) of others into one underlying factor, and the last factor had largely items related to Moral Reasoning (mor). The results produced by analyzing the MAMA-t scores rated by therapists are consistent with previous factor analyses on the MAMA-p (Hong et al., 2013) even though the current data set was much smaller.

Study 2

Study 2 tests the factor structure and usefulness of the MAMA-t in a non-clinical setting—in two local Montana public high schools. By collaborating with a local school district we will be able to determine if the concept of Maturity as measured by the MAMA-t can be reliably used by teachers. Finally if the scale can be reliably used by teachers it might prove useful in detecting students who are immature and likely to struggle and perhaps require a different pedagogical approach than more mature students. In 2012 all Freshmen students in two high schools were rated by teachers with the MAMA-t and the procedure was repeated in 2013 with all Freshman and with all Sophomores. In 2014 all Freshmen, Sophomores, and Junior students were given MAMA ratings by their teachers. In 2014 we also were able to give the GRIT-s (Duckworth & Quinn, 2009) scale to all Freshmen, Sophomore, and Junior students from one of the participating high schools. The GRIT scale has been used in a number of studies (Duckworth & Quinn, 2009; Duckworth, Peterson, Macworth, & Kelly, 2007) and seems to capture some, but certainly not all aspects of maturity that are included in the MAMA-t. Providing a comparison between the GRIT scale and the MAMA-t will also provide a course of construct validity to the extent that the two scales measure similar underlying concepts.

Adding the GRIT scale and being able to compare MAMA scores on the subset of students who are rated as Freshmen, Sophomores, and Juniors will allow further examination of the construct validity of the MAMA-t as an instrument that measures maturation. To the extent the MAMA-t is positively correlated to GPA and negatively related to misbehavior reports it will add further criterion validity. In addition, the data

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will allow us to see if MAMA-t scores from one year have predictive ability to performance in subsequent years.

Method

Participants

The MAMA-t data sets included those students enrolled in regular academic classes at two public high schools; and excluded students in special education and alternative programs; students who dropped out or moved away; and those whose data files had missing data. The first data set consisted of a total of 3388 ratings including: all freshmen ($n = 495$) in May 2012; all freshmen ($n = 646$) and sophomores ($n = 562$) in May 2013; and all freshmen ($n = 565$), sophomores ($n = 599$) and juniors ($n = 521$) in May 2014. The second data set, is a subset of the first, which includes the 327 students who were rated as Freshmen, again as Sophomores, and a third time as Juniors.

In May 2012, each of the 495 students belonged to a “Freshman Academy” containing 100-140 students. Each “Freshman Academy” had a set of teachers (Math, Science, English, and Health) who taught the subgroup of freshmen in their “Academy”, and each of these teachers rated all students on the MAMA-t in their “Academy” whom they taught. In subsequent years, only English teachers rated freshmen. In 2013 the World History teachers rated the sophomores. In 2014 American History teachers did MAMA-t ratings for juniors. When assembling ratings for the thrice-rated students in the second data set, we had four teacher ratings for each of the 2012 freshman—and arbitrarily chose only the ratings from the English teachers.

Procedure

In order to improve inter-rater reliability participating teachers received a lecture on adolescent development; together with instructions on MAMA-t ratings; a one-page “Introduction” to the study; and a schematic rendering of the 5-point Likert rating scale (which went from 1-almost never to 5- almost always. Each year as a new cohort of teacher raters was added the training became longer and more elaborate. In 2013 a schematic *Adolescent Maturity Spectrum* was added to provide “anchors” for extreme (1 or 5) ratings along dimensions suggested by MAMA-t subscales: *consideration*; *empathy*; *planfulness*; and *moral reasoning*, e.g. a student who almost always turns in their work on time would be rated a 5, whereas a student who almost never turns in their work on time and frequently asks for

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an extension would be a 1. In 2014 the instructor added “sketches” of fictive teenagers for teachers to rate on 3-4 MAMA-t items—and (by raised hands) let them compare their own ratings to the group’s consensus.

After this training, each teacher received his or her list of students and research ID codes, a link to an on-line SurveyMonkey version of the MAMA-t, a computer and the remainder of the day (covered by a substitute) to complete all ratings, which were closed to input or change at the end of three days. For attending the training and for each completed rating the teachers received an honorarium. Several weeks later ancillary data were added to the file: cumulative GPAs, attendance (# of missed days), misbehavior (# of disciplinary referrals), DOB and gender.

Results and Discussion

Basic Statistics

In 2012 when four teachers rated each freshman ($n = 495$), the Internal consistency (ICC) was 0.88 for the MAMA-t_{total}. Inter-rater reliability was nearly as strong for all four subscales, ICC > 0.80. Cronbach’s α for the MAMA-t_{total} was > 0.98; for all four subscales α > 0.90.

Table 2 presents basic statistics for the MAMA-t_{total} and its subscales. Its means and standard deviations provide a measure of the distribution of relative maturity within each high school class.

It is worth noting the enormity of the pedagogical challenge to teachers in a public high school since they must deal with a very large range in maturity within each class. For example in the Freshman class of 2012 there were some freshmen who received the lowest possible maturity rating for nearly every one of the 32 MAMA- items; and other students nearly maxed this maturity metric in their first year of high school.

The data also exhibit a predicted trend of MAMA-t scores improving with class such that the mean MAMA-t score for freshmen was 3.41, sophomores 3.81, and juniors 3.98. When looking at the subset of students who were rated both as freshman and as juniors ($n = 327$) a paired test of the difference in the mean MAMA-t scores is highly significant ($t(326) = 11.7, p < .001$). Improvement in maturity scores with high school class is of course what one would predict if the MAMA-t captures the concept of maturity. However, one must look at these data cautiously as the observed differences might be attributable to changes in teacher raters, and

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instructions from year to year even though the inter-rater reliability of the MAMA-t is quite high.

Table 2					
<i>MAMA-t Correlations With GPA, Missed Days & Disciplinary Referrals</i>					
Freshman – 2012 – $N = 493$					
<u>Measure</u>	<u>Mean</u>	<u>SD</u>	<u>r of MAMA-t with GPA</u>	<u>r of MAMA-t with Missed Days</u>	<u>r of MAMA-t with Discipline Referrals</u>
MAMA-t _{total}	3.26	0.60	0.68	-0.44	-0.48
MAMA-t _{plan}	3.19	0.74	0.78	-0.47	-0.48
MAMA-t _{cons}	3.34	0.60	0.45	-0.34	-0.39
MAMA-t _{emp}	3.18	0.56	0.55	-0.34	-0.41
MAMA-t _{morR}	3.35	0.71	0.68	-0.46	-0.48
Freshman – 2013 – $N = 646$					
MAMA-t _{total}	3.44	0.85	0.67	-0.42	-0.46
MAMA-t _{plan}	3.38	0.96	0.76	-0.45	-0.41
MAMA-t _{cons}	3.48	0.85	0.51	-0.33	-0.42
MAMA-t _{emp}	3.35	0.83	0.58	-0.36	-0.43
MAMA-t _{morR}	3.55	0.95	0.65	-0.44	-0.47
Sophomore – 2013 – $N = 562$					
MAMA-t _{total}	3.66	0.60	0.57	-0.32	-0.37
MAMA-t _{plan}	3.49	0.95	0.67	-0.34	-0.36
MAMA-t _{cons}	3.79	0.79	0.40	-0.23	-0.31
MAMA-t _{emp}	3.59	0.79	0.47	-0.26	-0.33
MAMA-t _{morR}	3.79	0.89	0.54	-0.34	-0.39
Freshman – 2014 – $N = 565$					
MAMA-t _{total}	3.54	0.88	0.71	-0.36	-0.39
MAMA-t _{plan}	3.45	1.05	0.78	-0.37	-0.32
MAMA-t _{cons}	3.59	0.85	0.55	-0.30	-0.36
MAMA-t _{emp}	3.44	0.89	0.66	-0.33	-0.35
MAMA-t _{morR}	3.71	0.96	0.66	-0.35	-0.42
Sophomore – 2014 – $N = 599$					
MAMA-t _{total}	3.74	0.79	0.41	-0.24	-0.37
MAMA-t _{plan}	3.68	0.95	0.61	-0.32	-0.38

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<u>Measure</u>	<u>Mean</u>	<u>SD</u>	<u><i>r</i> of MAMA-t with GPA</u>	<u><i>r</i> of MAMA-t with Missed Days</u>	<u><i>r</i> of MAMA-t with Discipline Referrals</u>
MAMA-t _{temp}	3.65	0.81	0.33	-0.16	-0.26
MAMA-t _{morR}	3.86	0.93	0.44	-0.26	-0.40
Junior – 2014 – <i>N</i> = 521					
MAMA-t _{total}	4.19	0.93	0.52	-0.31	-0.37
MAMA-t _{plan}	3.75	1.04	0.64	-0.36	-0.36
MAMA-t _{cons}	4.01	0.90	0.38	-0.23	-0.34
MAMA-t _{temp}	3.86	0.99	0.42	-0.23	-0.32
MAMA-t _{morR}	3.91	1.00	0.49	-0.34	-0.39
<i>Note.</i> <i>p</i> < .001					

Correlations

The correlations in Table 2 provide strong support for the “immaturity hypothesis.” For MAMA-t_{total} ratings correlate solidly ($r = 0.41$ - 0.71) with cumulative GPA, suggesting that a competent student is a mature student, and vice versa. Of note, the remarkable correlations with GPA of the MAMA-t_{plan} sub-scale ($r = 0.61$ - 0.78) suggests that planful future-mindedness accounts for 40-60% of the academic variance among class-mates. As expected, MAMA-t_{total} also associates negatively ($r = -0.30$ to -0.48) with Missed Days and Disciplinary Referrals, suggesting that immaturity makes a significant contribution to poor school attendance and disciplinary problems.

Focusing on the 327 students who participated in these studies as freshmen, sophomores, and juniors, one is able to examine the predictive correlations between MAMA-t scores of freshmen and sophomores as they relate to academic performance of the same students when they are juniors. This cohort of thrice-rated students provides a test of the instrument’s predictive validity—the capacity of its MAMA-t maturity ratings in one year to anticipate academic performance in the next year. The correlation of total MAMA-t_{total} score of freshman to GPA’s of juniors is .42, and the correlation to discipline referrals is -.24 (both $p < .001$). Similarly, sophomore MAMA-t total scores predicts semester GPA as a junior ($r = .47$, $p < .001$) and as one might expect is also negatively correlated with discipline referrals ($r = -.37$, $p < .001$). The MAMA-t subscale score for

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Planfulness is even more highly predictive of future GPA of the student as a junior ($r = .53, p < .001$).

Factor Analysis

The high school study allowed us to perform a factor analysis with a large data set to determine if the same underlying factors emerge when teachers use the MAMA as when it is used by parents or therapists. To this end, we pooled three years of freshman ratings by English teachers ($n = 1,685$). Again, three clusters of items produced Eigenvalues >1.00 , suggesting three factors or fewer (see Appendix A).

A Varimax rotation suggested the data might be best described as having two underlying factors rather than three: Factor 1 loaded decisively nearly all (14 of 16) consideration and empathy items as well as 2 of the Moral Reasoning items. Factor 2 decisively loaded all (8) Planfulness items and 3 of the Moral Reasoning items. In the Varimax solution ten (10) items cross-loaded (i.e., as heavily loaded on Factor 1 as Factor 2) (See Appendix A). Moreover, this cross-loading group contained nearly all (8) Moral Reasoning items, suggesting that teachers cannot reliably make distinctions about their students moral/ethical development, at times basing decisions on their views of the student as planful and responsible, and at times basing decisions concerning a Moral Reasoning question on their view of the students sensitivity or empathic qualities. The difference in the 2 factor solution provided by Teachers as compared with previous 3 factor solutions provided by parents (MAMA-p, Hong, et al., 2013) and therapists in Study 1 (MAMA-t) might result from teachers being able to observe planfulness, empathy, and consideration of others in a classroom setting, whereas parents and therapists would know much more than a teacher about a teenager's ethical thinking and behavior in a broader context than the classroom.

Study 3

As a test of concurrent validity we chose the established “grit” scale, a well-validated measure of “perseverance and passion for long-term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007). Grit predicts several “success outcomes,” including cumulative GPA among Ivy League undergraduates. We hypothesized that “grit” was related but not identical to “maturity” as measured by the MAMA-t. We expected the subscale of MAMA-t Planfulness to correlated highly with the GRIT scale, but not

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necessarily the other MAMA-t sub-scales, which conceptually have little to do with perseverance or goals.

Method

Participants

In May 2014 we invited regular freshmen, sophomores and juniors in one high school—for whom we had MAMA-t teacher ratings—to complete the 8-item Short Grit (Grit-S) Scale (Duckworth & Quinn, 2009). Both parents and students volunteered to participate in this assessment and were clearly informed that their choice to participate or not would not affect their course grades. A total of 705 participated: 385 girls and 322 boys. Of these, 211 were freshmen; 294 sophomores; and 200 juniors.

Procedure

With Angela Duckworth's permission we transcribed the Grit-S (Children's Version)ⁱⁱⁱ onto Survey-Monkey. Participating students, read the on-line standard instructions, entered a research ID, and rated eight brief statements—e.g., "I am a hard worker"—according to a 5-point Likert Scale: 1 = Very much like me; 2 = Mostly like me; 3 = Somewhat like me; 4 = Not much like me; and 5 = Not like me at all (half the items had a reversed polarity). Ratings were later down-loaded, combined with MAMA-t teacher ratings and ancillary data.

Results and Discussion

The Grit-S was internally coherent as indicated by Cronbach's $\alpha = 0.69-0.75$ for the Freshman, Sophomore and Junior class cohorts.

Correlations

Table 3 shows the correlations of GRIT-s with MAMA-t. In all three class cohorts correlations between grit self-ratings and MAMA-t teacher ratings of maturity were moderate, but significant (e.g., for MAMA-t_{total} $r = 0.25-0.37$). The subscale demonstrating by far the highest correlation with grit was the MAMA-t_{plan}. ($r = .40, p < .001$)

Table 4 shows correlations of both the MAMA-p and GRIT scores with GPA, missed days, and discipline referrals. The Grit-S self-ratings had modest negative correlations with indices of academic attendance and self-discipline (r 's ranging from $-.12$ to $-.21$) and moderately with semester GPA (r 's ranging from $0.33-0.42$).

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Table 3

Correlations of MAMA-t and GRIT

<u>Year</u>	<u>N</u>	<u>MAMA-</u> <u>t_{total}</u>	<u>MAMA-</u> <u>t_{plan}</u>	<u>MAMA-</u> <u>t_{cons}</u>	<u>MAMA-</u> <u>t_{emp}</u>	<u>MAMA-</u> <u>t_{morR}</u>
Freshman	221	0.37***	0.40***	0.33***	0.31***	0.34***
Sophomore	294	0.25***	0.31***	0.16**	0.17**	0.24***
Junior	200	0.29***	0.32***	0.20**	0.29***	0.25***

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

Table 4

MAMA-t and GRIT Correlations With GPA, Missed Days & Disciplinary Referrals

<u>Year</u>	<u>N</u>	<u>Missed</u> <u>Days</u>	<u>Disciplinary</u> <u>Referrals</u>	<u>Grade Point</u> <u>Average</u>
MAMA-t				
Freshman	221	-0.26***	-0.31***	0.66***
Sophomore	294	-0.24***	-0.41***	0.42***
Junior	200	-0.29***	-0.36***	0.61***
GRIT-s				
Freshman	221	-0.21**	-0.15*	0.42***
Sophomore	294	-0.12*	-0.177*	0.33***
Junior	200	-0.06	-0.08	0.35***

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

But across all class cohorts in all correlations with all aspects of academic performance, the MAMA-t—in particular, the MAMA-t_{plan} subscale—stood out. The MAMA-t_{total} ratings were solidly correlated with GPA (r 's ranging from 0.42-0.66), but the MAMA-t_{plan} demonstrated striking correlations with GPA indices in all three grades ($r > 0.57$). MAMA-t_{plan} accounts for more than half the variance in GPA in all three Freshman classes (r 's ranging from 0.76 -0.78).

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General Discussion

This series of studies was designed to examine the coherence, reliability and validity of the MAMA-t, a proxy (therapist/ teacher) rating scale designed to gauge relative adolescent maturity (vs immaturity). The MAMA-t was designed as an instrument that could provide a simple measure of adolescent personality maturation and was based on the MAMA-p (Hong et al., 2013) which had previously been developed and substantiated with a set of data based on ratings of parents in a therapeutic boarding school. The MAMA-t was designed as an instrument that might be useful to adult observers other than parents.

When used by therapists factor analysis suggests that the MAMA-t data are best described as having three underlying factors: 1) Planfulness, 2) Empathy/Consideration of others, and 3) Ethical/Moral thinking. This result is consistent with previous research by Hong et al. (2013) on the MAMA-p designed for parents. We originally designed the MAMA to allow for the possibility of four underlying factors that would allow for a separation of Empathy as a separate factor from Consideration of others. However, both the current and past research (Hong et al. 2013) indicate that items designed to relate to empathy and those designed to relate to consideration of others tend to indistinguishably cluster together resulting in a scale that has three rather than four underlying factors.

When the MAMA-t is used by teachers, two underlying factors are preserved: 1) Planfulness and 2) Empathy/Consideration of others. The third presumed factor of items intended to relate to Ethical/Moral thinking drops out. As noted in the earlier discussion, this factor structure makes sense in that parents and therapists are more aware of ethical decisions, and teachers are better able to evaluate dimensions of Planfulness and Consideration of others.

In all three studies, the MAMA-t demonstrated substantial criterion validity by substantiating the relationship of MAMA-t ratings to performance both in a therapeutic program and in a conventional high school in terms of grades and behavior. In the third study when the MAMA-t was compared with the GRIT scale, the two measures both seemed related to maturity. Although, the GRIT scale was designed to measure only a small aspect of personality maturation, which might be called “grit” or determination, whereas the MAMA has been designed to capture broader dimensions of maturity. It turns out that the MAMA-t, and particularly the Planfulness subscale, is actually a better predictor of academic success and

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behavior than the GRIT scale. Using the MAMA-p to provide an index of maturity of students as freshman is a powerful predictor of how successful a student will be in future years particularly in terms of academics (as measured by GPA), but also in terms of attendance and disciplinary issues.

The data taken together provide further evidence of the reliability of the MAMA-t as a simple rating scale that can be used by teachers and therapists to gauge the relative maturity of their clients and students. Each of the experiments demonstrate a high level of internal consistency and inter-rater reliability. Moreover, the MAMA-t appears to be applicable and potentially useful for a sample of adolescents who have a mixture of clinical issues as well as a more general population of high school students. Being able to assess maturity might well lead to better designed approaches to pedagogy and clinical intervention that take into consideration the relative maturity of the individual student or client. From a school system point of view, the relationship of MAMA-t scores to future performance might well provide useful information for identifying students who will benefit from more attention, structure, and support to counteract their lack of maturity. It will also provide early indicators of those mature students who can benefit from more independence, enrichment, and challenge.

The set of experiments of course are limited in establishing the measure's general reliability and validity in that the populations and criterion that have been measured are themselves limited. It remains to show that the MAMA-t can be reliably used with more diverse populations and raters. It also remains to demonstrate the relationship of the MAMA-t to other instruments that measure aspects of the underlying concepts of maturity and personality development.

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Appendix A

Factor Analysis – Varimax Rotation

MAMA-t Factor Analysis (Varimax Rotation) with Three Years of Freshman Teacher Ratings ($n = 1,685$)						
Item #	Factor 1		Factor 2		Sub-Scale	
M32R	86	*	21		cons	This student has an inflated sense of own importance.
M2R	85	*	17		cons	This student has an entitled attitude.
M7R	82	*	22		cons	This student treats others as servants or puppets.
M24R	76	*	47		cons	This student is willing to inconvenience others.
M11	76	*	39		emp	This student is sensitive to the feelings of others, even those who seem different from self.
M23R	75	*	39		emp	This student is self-preoccupied.
M16	73	*	39		cons	This student is self-effacing, quick to give others credit.
M29R	73	*	52		emp	This student is oblivious to others' needs.
M13	70	*	42		cons	This student is grateful for help and kindness.
M30R	69	*	51		emp	This student does not recognize own social mistakes or see why others take offense.
M15	69	*	46		cons	This student is courteous, considerate and respectful.

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Item #	Factor 1		Factor 2		Sub-scale	
M19	64	*	32		emp	This student makes new students feel welcome.
M3R	64	*	56		morR	This student would lie without remorse to parents, if getting caught seemed unlikely.
M22R	64	*	55		morR	This student thinks a rule is less important than what one wants to do.
M8	63	*	57		emp	This student recognizes accurately how own behavior will affect others.
M26R	62	*	61	*	emp	This student cannot imagine how it might look from a teacher's point of view.
M10	61	*	46		emp	This student is tactful.
M14	59		58		morR	This student accepts that all school rules and societal laws apply, even the "silly" or frustrating ones.
M9	57		54		morR	This student would feel ashamed to do or say something dishonest.
M20R	56		56		morR	This student would shoplift if the group thought this was acceptable behavior.
M21	50		32		cons	This student is quick to share.
M1	27		88	*	plan	This student sets priorities to accomplish a goal in a sequence of logical steps.

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Item #	Factor 1		Factor 2		Sub-scale	
M25	29		86	*	plan	This student commits to a clear goal with sustained focus, energy and enthusiasm.
M28R	34		85	*	plan	This student gets side-tracked and can't keep to the plan.
M6	34		84	*	plan	This student, when it is time to work, works hard.
M17	29		80	*	plan	This student keeps work spaces and belongings in order.
M31R	32		77	*	plan	This student gets discouraged by setbacks and gives up.
M18R	41		77	*	plan	This student prefers to play now and work later.
M4R	47		71	*	plan	This student fails to anticipate the risks and consequences of present actions.
M5	60	*	66	*	morR	This student identifies with an ideal of integrity and can be trusted.
M27	53		62	*	morR	This student acts on abstract principle, e.g., "honor," even if honor turns out to be inconvenient.
M12R	59		61	*	morR	This student would plagiarize a paper, if getting caught seemed unlikely.
<i>Note. An * Marks item loadings ≥ 60.</i>						