The Impact of Morningside Math on Grade Level Equivalency of Math Fluency

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An important part of the Common Core Standards is the requirement of fluency in basic math facts, in the operations of addition, subtraction, multiplication and division. At the Judge Rotenberg Center, students have started to work through a math curriculum supplement, Morningside Basic Number Skills: Math Facts Addition, Subtraction, Multiplication and Division, which teaches the basic math facts through a series of fluency based timings. The fluency program is broken into small steps or slices, which each student completes timings in, until they reach a predetermined mastery level of 60-70 per minute. Data is plotted on a standard celeration chart, allowing the teachers to make data based decisions. We will be looking at the impact of using this curriculum, in the areas of grade level equivalence in math fluency.

METHOD

Participants and Setting
There were twenty-one participants in this study. Each participant is currently receiving education services per an IEP. Ages ranged from 13.7 to 21. Diagnosis varied, and included ADHD, Oppositional Defiance Disorder, PTSD, Mood Disorder NOS and Bipolar Disorder. Upon admission all but one participant tested 2 years below grade level or more. Participants attended school at the Judge Rotenberg Center (JRC) and lived in residences in the area, that were part of the JRC program. Participants were selected based on their admission date, all participants were admitted at or after the implementation of the Morningside curriculum in March 2017. Fluency timings were started in the school auditorium and have since moved to the library and the classroom.

Measures
Participants were scheduled to complete timings in Morningside Basic Number Skills each day. Participants were expected to complete seven one-minute timings during each fluency block. The fluency program is organized by operation and fact family known as a slice. Mastery of a slice is achieved when a participant can complete 60-70 problems in one minute with zero errors. Timings are completed individually, or with a partner. Goals are set based on the previous daily performance. When the daily goal is met, or a participant meets their aim to move to the next slice, rewards are given in the form of tickets. Tickets can be exchanged for money that can be used at the school contract store, local restaurants or online shopping. The participants' best timing for the day is plotted on a daily standard celeration chart. Teachers utilized the standard celeration chart to inform decisions on interventions when participants were not making progress as defined by more than two successive days of not meeting daily goals. Interventions included modifications to duration, motivation, or moving back to a previously mastered slice, etc.

RESULTS

We utilized a subtest of the Kaufman Brief form to get a pre and post measurement of Math Fluency. This fluency measure is a timed test, where participants complete as many problems out of 180 as they can in a three minute period. Participants were tested when they were admitted to the program and again in April 2018. Exhibit one shows individual scores for each participant, while Exhibit two shows the amount of time passed from admission to April 2018 and grade equivalency increases and decreases. Eighteen out of twenty-one participants showed grade equivalency increases. Grade equivalency increases ranged from .4 years to 5.8 years. The average grade equivalency growth for the entire participant group was 1.8 years. The average time spent participating in the fluency program was 8 months for all participants, ranging from 3 months to 13 months. There were 3 participants that did not show progress during this time. Two participants were admitted within the last 3 months and one was admitted to the program within 4 months. Not only did these participants now show progress they showed a regression in scores.

DISCUSSION

The results showed that there was a definite impact in math fluency after working through the Morningside Basic Number Skills program. Most participants made significant gains in their Math Fluency grade level equivalency as noted above, while 3 students showed a regression.

There were a few limitations to this study. First, JRC teachers were learning how to implement the fluency program at the same time participants were learning the programs. This could have affected performances as interventions made for some participants could have implemented faster or may have varied in type. Also, all participants attending JRC are here due to very challenging behaviors. The group of participants we looked at were present in JRC for an average of 8 months. Participants within JRC are still considered "new" during their first year of attendance as they are learning about the structure/rules put in place for them. As a result, behavioral stability is often unreliable during this time. Other limitations could be motivation, although participants earn tickets (exchanged for money) the value for that lesson they were on may have not been high enough or they were looking for a different reward etc.

JRC is currently making plans for instruction in the future. JRC will continue to utilize the Morningside Basic Number Skills program. At this time we have a total of 50 students participating, our goal over the next year is to add 30 more students and train 3-5 more teacher and multiple support staff. We are still in the training phase so additional goals are to train 1-2 classroom teachers to become coaches themselves, allowing for more support in the classroom. JRC will continue to move through more of the Morningside Math programs , once a student masters Basic Number Skills (addition-division), they will then move on to Computation Fluency followed by the Diagnostic and Prescriptive Approach program and Algebra for beginners. We will then expand to the writing curriculum with a similar instructional model.
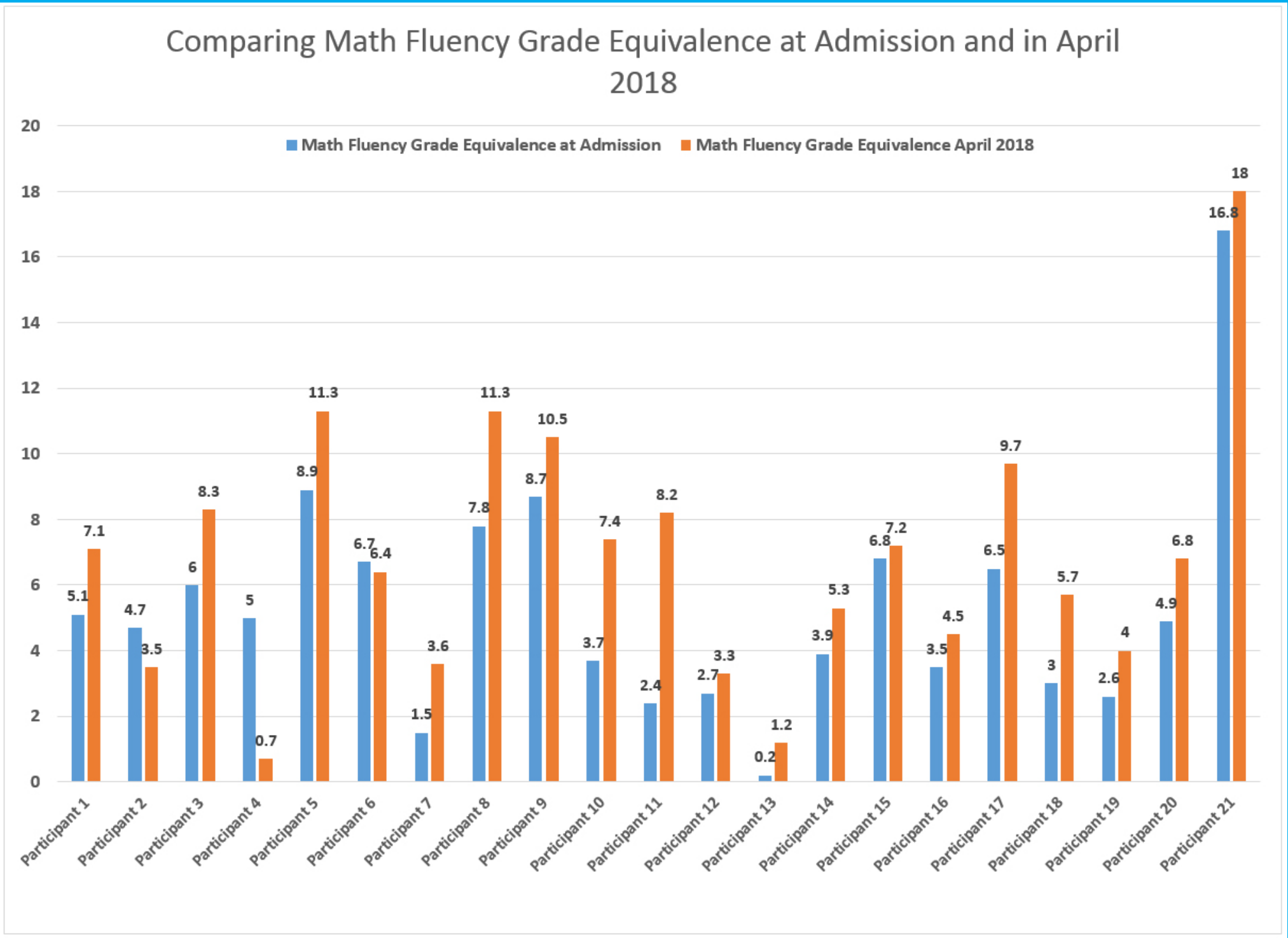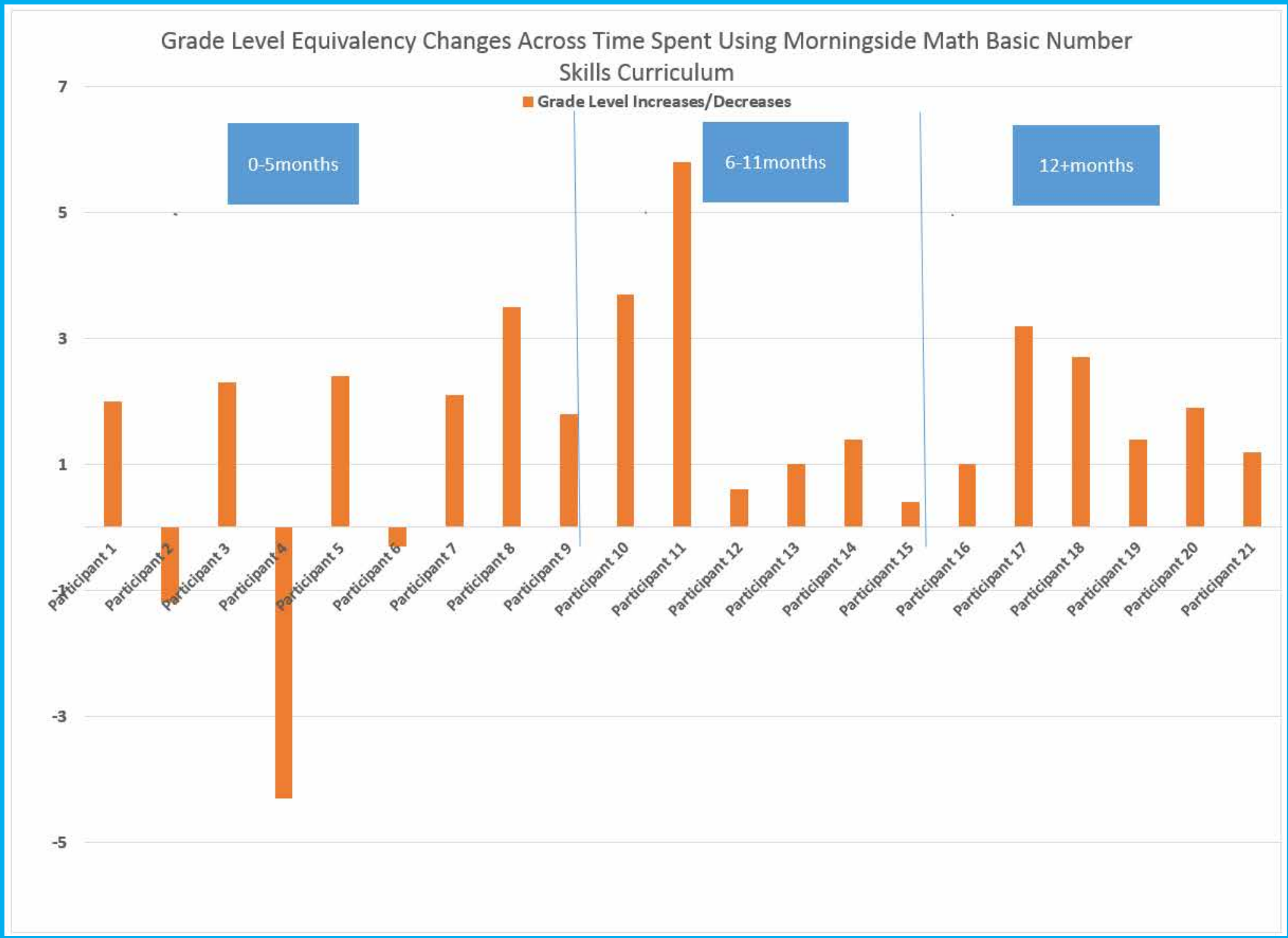

Exhibit 1

Exhibit 2

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