I Can Do This Math, Yo!

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Various barriers to developing fluent academic performance can emerge through one's own verbal behavior. Engaging in a high frequency of negative statements is an example of such barriers. A third-grade female student was referred to a Precision Teaching (PT) center to receive services in math remediation. It was quickly identified that she engaged in negative statements about math and about herself as a student. The combination of PT techniques with Calkin's 1-min positive thoughts intervention (Calkin, 2003) resulted in an immediate decrease in negative statements while increasing the student's positive statements and academic performance. This trend in performance continued to grow across 5 weeks. Further, overall grade-level performance improvement was observed on curriculum based measurement assessments given prior to and following the center's 20-hr math intervention.

Keywords: precision teaching, education, negative statements

Method

Client/Target Behavior

Sally was a typically developing 9-year 4-month-old Caucasian girl who was referred for services at the Precision Teaching Learning Center (PTLC) for 20 hr of mathematics remediation. An initial academic assessment showed low levels of accuracy and frequency with respect to grade-level, basic math skills. Further, when Sally attended her first session at PTLC, she seemed to engage in a high frequency (>1/min for 50 min) of negative statements regarding herself and math, especially when presented with new, challenging math material. Data were collected with respect to the frequency of negative statements within an entire session (50 min).

During baseline and intervention phases, data were collected throughout the entire session on two incompatible behaviors: negative and positive statements. A negative statement was operationally defined as any vocal verbal response about the speaker or about math that was stated in negative terms, such as "I am going into 4th grade and I can't even do math," "I don't want to do this math," or "This is too hard." A positive statement was defined as any unprompted positive vocal verbal response about the speaker or about math, such as "I can do this math, yo," "Math will help me be a better student," or "I go so fast, I am like a shooting star."

Procedures/Data Collection

The frequency (count/min) of positive and negative statements was collected and charted during an entire 50-min session. During the baseline phase, positive and negative statements were ignored (i.e., the instructor simply moved on the demand placed regardless of the vocal verbal response made by the speaker). Further, the student never escaped from engaging in any academic response following a negative or positive statement. The student was simply prompted to complete the task.

Following intervention, the primary investigator designed an intervention to provide Sally with an alternative functional response in the form of positive statements with the intention to reduce negative statements. Two 1-min timings took place prior to each math session at PTLC (see Figure 1). The first 1-min timing was free/say positive statements about herself, math, or herself as a student. Free/say positive statements in a 1-min timing has been used to in-
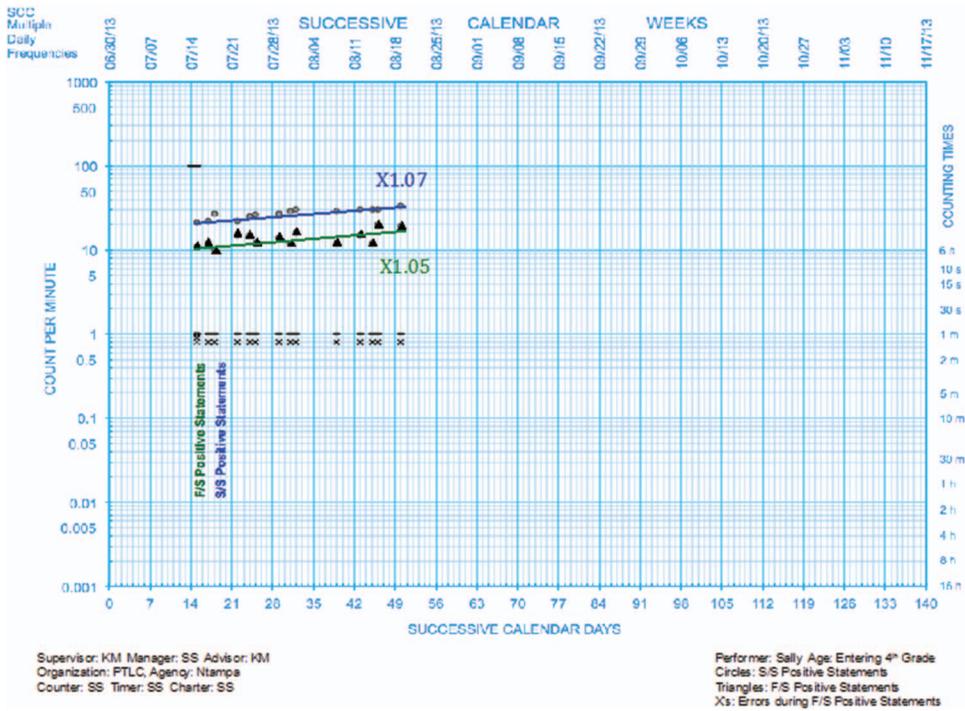
Figure 1. Frequency of see/say and free/say positive statements prior to a positive thoughts math session.

crease positives while simultaneously decreasing negative thoughts and feelings (Calkin, 2003). By applying the same technique used in PT to increase academic skills, Calkin (2003) has improved thoughts and feelings with adults and children, extending the literature on the potent affects of 1-min timings, sprints, and self-recording of all types of behaviors. The second 1-min timing was see/say positive statements about the learner, math, or herself as a student that her case manager and Sally created together or separately. The see/say timing served as practice for sally to help increase her frequencies during the free/say positive statement timings. Following this intervention, data was collected on unprompted positive statements throughout the 50-min session (see Figure 2). In addition, after each unprompted positive statement, vocal verbal praise from the instructor was followed contingent on the response emitted.

All data were recorded and analyzed using the Standard Celeration Chart (SCC) Figure 1 depicts the intervention performance following

baseline. The closed circles represent frequencies of correct see/say positive statements in a 1-min timing. The triangles represent frequencies of correct free/say positive statements in a 1-min timing. The "x" are errors in the Free/Say positive statements timing, defined as repeats, neutral or negative statements. Data of unprompted positive and negative statements throughout the entire 50-min session are displayed in Figure 2. The closed circles are unprompted positive statements and "x" are unprompted negative statements throughout the session. Data were collected every day to the completion of Sally's 20-hr enrollment at PTLC. A few samples of PTLC's prepost academic pinpoint data are displayed in Table 1. These are just sample timings of particular math pinpoints to show the effectiveness of the center's 20-hr math intervention.

Results

Figure 1 shows the intervention of see/say positive statement with F/S positive statement.
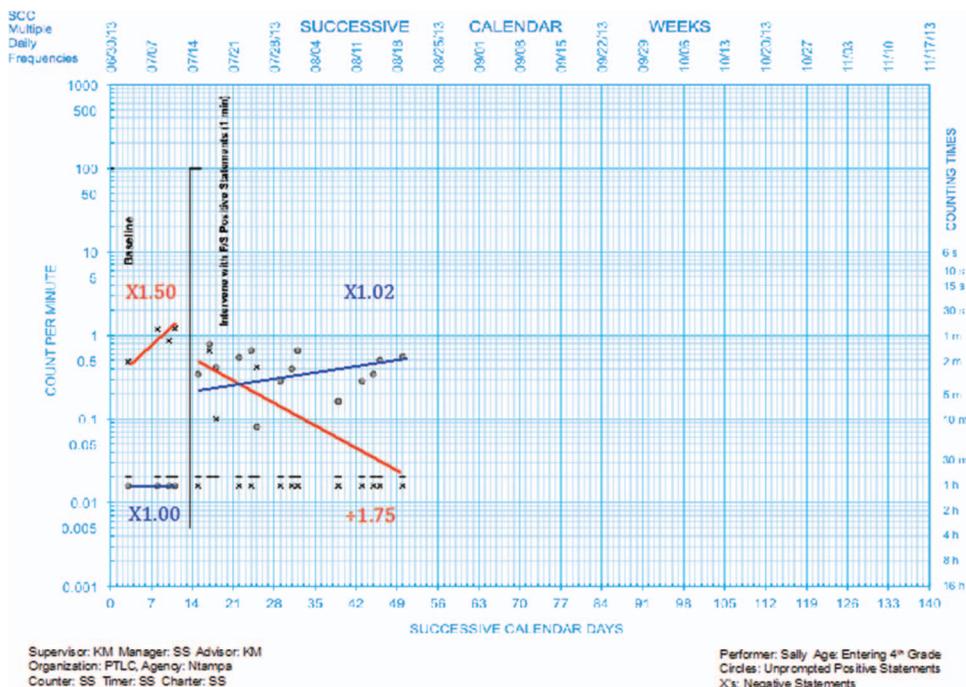
Figure 2. Frequency of unprompted positive statements and unprompted negative statements within a 50-min session.

Starting at frequencies of 20/min and 10/min respectively, both positive statement pinpoints increased at nearly identical celerations (X1.07 and ×1.05). After 6 weeks of intervention, free/say positive statement ended at 20/min and see/say positive statement ended at 30/min. However, the significant effect of these two interventions was on the unprompted positive and negative statements freely elicited by Sally during the 50-min session.

During baseline, Sally's data showed a ×1.50 celeration of negative statements across 2 weeks, ending at a frequency level greater than 1/min (see Figure 2). Further, she never engaged in a single unprompted positive statement throughout baseline. Following the intervention, the data displayed an immediate decrease in frequency (jump down) in unprompted negative statements where none were observed in the first session postintervention. Further, an increase in frequency (jump up) in unprompted positive statements to 2/min occurred within the first session postinterention. Throughout the course of the next 6 weeks (13 sessions), Sally's within-session unprompted statements continued to increase at a ×1.02 across 5 weeks, and negative statements continued to decrease at a ÷1.75 across 5 weeks with

Table 1
Pre-/Postdata on Computation and Concept Curriculum Based Measurement (CBM) Assessments Before and Following A 20-Hour PT Math Intervention

	Pre (6/4/13)		Post (8/19/13)	
Pinpoint	Accuracy	Frequency	Accuracy	Frequency
S/W digit: Computation CBM	82%	9.2/min	100%	14.5/min
S/W answer: Concepts CBM	60%	1.5/min	100%	2/min

Note. S/W = see/write.

ending frequencies at approximately 2/min positive statements and no observed negative statements.

Sally's engagement in a functionally alternative response (positive statements) not only decreased within-session negative statements, it also improved Sally's math performance across all programs and generalized to untrained math facts during her reassessment (see Table 1). Prior to enrollment at PTLC, Sally completed two grade-level CBMs: computation and concepts. Her performance on these assessments prior to the 20-hr enrollment resulted in moderate to poor accuracy and low frequency: 82%, 9.2 digits written per min for computation and 60%, 1.5 answers written per min for concepts. However, following the math intervention, Sally's accuracy improved to 100% on both assessments with increases in frequency: 14.5 digits written per min for computation and 2 answers written per min for concepts. In the future, additional generalization probes and follow up data may be collected in order to see if Sally has used theses strategies, at home and/or in her regular education classroom.

Discussion

The data indicate that Calkin's positive thoughts intervention of saying positive statements for a 1-min timing significantly effected Sally's unprompted negative and positive statements made within her 50-min math sessions. The intervention was so powerful that Sally only emitted negative statements for three out of the 14 sessions postinterventions. The negative statements on those days were associated with the introduction of new math programs (higher level programs or programs involving new facts).

For Sally, not only were we able to spend more time on academic work because work refusal and crying were no longer occurring along side the negative statements, but parents reported that positive statements were observed at home during homework time. According to the parents, this resulted in a shift in the dynamics and overall environment in their home after school. Extensions of this case study can conduct more formal social validity and generalization measures with respect to parent/teacher re-

port and emergence of positive statements and reduction of negative statements in different settings across different subjects.

Further research can look at possible "aims" or predicted frequency levels at which an individual needs to emit positive statements to see generalization across settings and subjects. In the current case study, Sally emitted between 10 and 20 independent positive statements (free/say positive statement) for 1 min at the beginning of her math session. Further research could examine if similar effects could be observed when the student only emitted five statements, for example, or would the frequency of the statements need to occur at a higher level to produce similar results.

Finally, the topography of the statements can be further investigated. For Sally, we created a rule where her positive statements had to be specifically related to school and math because those were the behaviors we were targeting during her session at the center. However, statements unrelated to school, such as "I'm a good friend" and "I make people laugh," would produce similar results as the current case study.

Although this case study was not a formal, controlled empirical study, it nevertheless had profound effects for our client. Sessions with Sally went from ones that were unproductive and aversive for both the instructor and student. Sally would cry and emit negative statements at such a high frequency about herself and her performance. Yet, when the focus of the session shifted by having her say positive statements about herself and her school performance, whether or not she believed them, her session was more productive and she left happy and eager to return to the center. At any level, Sally now has a set of 20–30 statements that she can use when confronted with a difficult skill at school or at home.

Reference

Calkin, A. (2003). A minute a day makes good feelings grow. *European Journal of Behavior Analysis, 1,* 5–12.