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The Effects of Behavioral Momentum on Increasing Expressive Writing Behaviors in Children Resistant to Writing Tasks

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THE EFFECTS OF BEHAVIORAL MOMENTUM ON INCREASING EXPRESSIVE WRITING BEHAVIORS IN CHILDREN RESISTANT TO WRITING TASKS

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Submitted in Partial Fulfillment of the

Requirements for the Degree of

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The University of Southern Maine

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THE EFFECTS OF BEHAVIORAL MOMENTUM ON INCREASING

EXPRESSIVE WRITING BEHAVIORS IN CHILDREN

RESISTANT TO WRITING TASKS

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Dissertation Advisor: Mark W. Steege, Ph.D.

An Abstract of the Dissertation Presented

In Partial Fulfillment of the Requirements for the

Degree of Doctor of Psychology

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Within this study, the author aimed to expand the research on high-probability/low-probability (high-p/low-p) interventions to examine the effects of behavioral momentum on the academic behavior of expressive writing. Two second-grade students were selected based on a history of avoidance of with writing tasks, where motivation was determined to be the primary variable impacting expressive writing engagement. An alternating treatments design was used to compare the effects of a traditional expressive writing prompt to the utilization of a high-p/low-p response sequence where instructions to engage in high-probability writing tasks preceded the prompt to complete low-probability writing tasks. Two dependent variables were measured including response latency (the time between the task prompt and task initiation), and total words written. Results of the brief intervention analysis indicate that high-p/low-p interventions were successful in decreasing the response latency for both students when compared to

traditional writing prompts. Additionally, both students wrote more total words on average in the high-p/low-p condition, although the results were more consistently differentiated for one student than for the other and were not as robust as response latency results for both students. The findings suggest that high-p/low-p interventions may be a simple and effective way to help students initiate writing more quickly when motivation for writing is low. Additionally, the intervention may be beneficial in increasing total word output for some students. Implications of these findings and suggestions for future research are discussed.

ACKNOWLEDGEMENTS

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CHAPTER 1: LITERATURE REVIEW

Strategies designed to encourage and utilize behavioral momentum have been well documented in the behavioral literature as effective means for increasing compliance with task demands (Engelmann & Colvin, 1983; Lee, 2005; Mace et al., 1988; Mace & Belfiore, 1990). Behavioral momentum interventions, often referred to as task-sequencing or high-probability/low-probability (high-p/low-p) response sequences, are founded on the principle of behavioral persistence or the tendency for established behaviors to continue even in the face of changing environmental variables. An explanation of behavioral momentum was provided by Nevin (1996) utilizing a scientific explanation drawn from the field of Newtonian physics. Nevin posited that behavior possesses physical momentum similar to that of physical objects, and that behavioral persistence is influenced by velocity (the rate of responding) and mass (history of reinforcement). Additionally, Nevin theorized that many behaviors that have a history of noncompliance occur at a low rate, yielding a weak history of reinforcement, which leads to poor behavioral persistence (Nevin, 2011). Consistent noncompliance may make it difficult to teach and reinforce new behaviors. It is not possible to consistently reinforce a behavior that is not occurring, thus creating the need to examine antecedent strategies as a means of encouraging higher rates of compliance.

One of the pioneering studies examining the application of behavioral momentum theory to applied practice included a series of five experiments conducted by Mace et al. (1988). In these experiments, Mace et al. examined the effect of requesting a series of behaviors that had a high likelihood of compliance (high-p behaviors) prior to requesting a behavior that had a low probability of compliance (low-p behaviors). Examples of high-

probability behaviors included simple requests such as "Give me a high five." Low

probability behaviors included task directions such as, "Please put your lunchbox away,"

and were selected based on a history of noncompliance with such requests. Three to five

high-probability behaviors were requested in succession, and praise was provided

following each instance of compliance with a high-probability task. The low-probability

task was then immediately requested with the hypothesis that the momentum created by

the initial high-probability behaviors would lead to a higher likelihood of compliance

with the low-probability request. The results of these initial experiments demonstrated

that participants were more likely to comply with low-probability behavior prompts if

they were requested following a series of high-probability behavior prompts along with

reinforcement. These results supported the theory that behaviors within the same

response class (e.g. compliance) were more likely to persist when they occurred at a

higher rate and accessed a higher rate of reinforcement, even when other variables (e.g.

response effort) changed. These results were some of the first examples of the

effectiveness of high-probability/low-probability (high-p/low-p) interventions.

High-p/low-p interventions have been shown to be effective in increasing

compliance with a wide variety of behaviors including self-care skills (e.g. Mace &

Belfiore, 1990; Mace et al., 1988), medication adherence (Harchick &Putzier, 1990) and

communication skills (Davis, Brady, Hamilton, McEvoy, &Wiliams, 1994; Sanchez-Fort,

Brady, & Davis, 1995). Although traditional high-p/low-p intervention research has

focused on serving individuals with intellectual and developmental disabilities in

specialized settings, an emerging field of research is expanding the application of high-

p/low-p interventions to use in the school classroom. Noncompliance is a pervasive

problem within the school setting, and significantly impedes the delivery of effective and efficient instruction for all students (Lee et al., 2004). Recent research reports indicate that high-p/low-p interventions are effective in increasing overall classroom compliance and decreasing response latency between and within academic tasks (Belfiore, Basile & Lee, 2007; Lee, 2006; Wehby & Hollahan, 2000). Additionally, a systematic review of task-sequencing interventions for children with emotional and behavioral disorders (EBD) reported improved academic outcomes in all of the 11 included studies (Knowles, Meng, & Machalicek, 2014).

The majority of research on high-p/low-p interventions for academic instruction has been applied to mathematics instruction. For example, Belfiore, Vargas, and Skinner (1997) reported that sequencing single-digit (more preferred) math problems prior to multiple-digit (less preferred) math problems led to a decrease in response latency between problems. However, results also showed that response latency failed to return to baseline levels following the implementation of the high-p/low-p intervention, and decreased response latency was seen across all conditions including subsequent reversals. Belfiore et al. posited that the extra response practice that occurred as the intervention was implemented may have led to a skill increase, making the non-preferred math problems less aversive overall.

Lee, Lylo, Vostal, and Hua (2012) demonstrated that a high-p/low-p intervention for non-preferred mathematics problems resulted in negligible effects on total problems completed, but had larger effects on task initiation. These results were similar to those reported by Banda and Kubina (2010) who found that a student with autism took less time to initiate low-probability mathematics problems, when they followed a sequence of

high-probability mathematics tasks. Alternatively, Hutchinson and Belfiore (1998) reported that students completed more overall low-preference math problems if they were imbedded within a high-p sequence of preferred math problems.

It should be noted that several alterations to the original high-p/low-p intervention were utilized when applying the intervention to mathematics tasks. For example, between-task initiation was entirely student-controlled, as all problems were provided on a worksheet or stack of index cards. Thus the student had control over when to view and initiate each additional problem. This deviates from the original intervention as described by Mace et al. (1988), which required that prompts be delivered verbally by the person implementing the intervention. Additionally, no verbal praise was provided following the completion of each high-probability math problem. The assumption made was that problem completion would act as a conditioned-reinforcer, and would provide an intervention condition more closely aligned to the typical classroom environment, which does not always allow for one-to-one attention.

More recently, behavioral momentum research has expanded to include language arts tasks such as reading and writing. Burns et al. (2009) applied a high-p/low-p intervention to the reading of word lists, with below-grade level words being read prior to a list of grade-level target words. Results indicated increased fluency on target words during the intervention condition as compared to a control condition.

One limiting factor of the research on behavioral momentum is its application only to discrete tasks that typically do not require sustained attention and effort. This presents a challenge when expanding the research to reading and writing, which are continuous tasks and require sustained task engagement. Vostal and Lee (2011) attempted

to address this problem in their application of a high-p/low-p intervention to a continuous reading task. In their study, fifth-grade students with emotional and behavioral disorders were prompted to read a third-grade paragraph prior to reading a fifth-grade paragraph. Results indicated that students in the intervention condition demonstrated decreased latency to reading initiation and increased the words read correctly per minute on the fifth-grade paragraph.

Writing is a difficult behavior to apply behavioral momentum strategies to, as it is a continuous task that requires significant behavioral persistence. However, it is possible that this variable may make writing prompts more likely to evoke non-compliance as it could be seen as an open-ended and overwhelming task. Interventions to increase writing compliance are needed, as writing instruction relies on a teacher-student feedback loop that can only occur if a student actually produces a writing sample (Lee & Laspe, 2003). However, many students may resist writing to the point that they fail to produce enough written work to allow for feedback or instruction.

At this point in time, only one study has examined the effects of high-p/low-p interventions on writing behaviors. Lee and Laspe (2003) examined the effects of behavioral momentum strategies on continued engagement in journal writing. This study deviated from the original high-p/low-p intervention as described by Mace et al. (1988) in that the researchers requested high-probability writing behaviors (three simple written words) in the middle of journal writing only when the writer had lapsed in their engagement in the task for a total of 1-minute. The intervention was not used prior to the initial writing prompt, and thus required that a student had already been engaged in journal writing prior to waning in their task engagement. Lee and Laspe designed the

study to include four experimental conditions: high-p request, high-p plus verbal praise, verbal prompt, and verbal prompt plus verbal praise. The verbal prompt conditions include a simple prompt to resume journal writing. Verbal praise conditions included praise either for re-initiating writing following the verbal prompt, or praise following compliance with each high-probability writing request. The results indicated that all interventions increased the number of words written (particularly when verbal praise was included), but the high-p condition was more efficient and yielded writing behaviors that were more persistent across sessions.

The purpose of this current study was to expand the research on behavioral momentum and expressive writing utilizing a high-p/low-p intervention similar to that described in the original study by Mace et al. (1988). In order to examine the generalizability of the high-p/low-p intervention to expressive writing behaviors, we asked two questions: When motivation has been identified as a primary impediment to writing engagement, what are the effects of adding a "warm-up" activity of three high-probability writing behaviors prior to the initial prompt of a low-probability expressive writing task on initial response latency? Additionally, what are the impacts of the same high-probability task sequencing intervention on total-words written?

CHAPTER 2: METHOD

Participants

The two participants within this study were second-grade students attending a small public elementary school in Maine. Both participants were selected from a pool of individuals identified via teacher nomination. Teachers nominated students based on the criterion that the students frequently resisted initiating or participating in expressive writing tasks. Additionally, participant nominees must have been identified for special education and receiving individualized educational program (IEP) supports. The reason for these criteria was due to the necessity of conducting the interventions within a resource room setting dedicated to the provision of specialized academic instruction. This presented a substantial change in programming for children not currently identified with an IEP, and might have contributed to a reactivity effect. However, for the children selected, receiving instruction within the resource room environment was consistent with the academic services already provided within their IEP, and did not indicate a substantial change in programming. Any students who were not physically or academically capable of independently completing an expressive writing task were excluded.

Following the teacher nomination process, the nominated students were observed during their typical writing instruction to assess for their writing engagement. If the students were observed to avoid writing engagement within this setting, then they were selected to move to the next phase of the pre-intervention assessments. Students who initiated writing within 30 seconds of the writing prompt failed to meet the observation correspondence criteria and were excluded. One student who was originally nominated was removed from the study due to failing to meet the inclusion criteria during the

classroom observation.

Two students met all inclusion criteria and were selected to participate in the study. Within this report, the two students will be referred to as "Frankie" and "Matthew" for the purposes of anonymity. Both Frankie and Matthew were nominated by their classroom teachers with the reports that they frequently avoided participating in written work, and both were observed by the evaluator to avoid writing tasks within the classroom environment. Both Frankie and Matthew were eight years old and were identified for special education supports under the exceptionality of Other Health Impairment, related to diagnoses of Attention-Deficit/Hyperactivity Disorder.

Frankie received the majority of his instruction in a special education classroom dedicated to providing individualized instruction for students with diverse behavioral and academic needs. Frankie was known to have significant writing skill deficits that made writing challenging. However, passive resistance to academic tasks was also known to be a pervasive problem across all of Frankie's academic subjects including writing. Although Frankie had previously demonstrated the ability to write words on a page in response to a prompt, he frequently produced very few words and required multiple verbal prompts to begin writing tasks. Frankie's teachers reported that an intervention to target motivation and task initiation would be extremely helpful so that they might address the writing skill deficits.

Matthew received the majority of his instruction within the general education classroom, with some specialized instruction provided within a small-group resource room setting. Matthew was also known to have mild skill deficits in writing although motivation, distractibility, and difficulty with task initiation were thought to be primary

variables impacting writing engagement.

Setting

With the exception of the initial observation within the students' regular classroom, all pre-intervention assessments and intervention sessions were conducted in a resource classroom dedicated to providing specialized academic instruction. One corner of the resource room was sectioned off using large movable wall dividers, and one table and chair were placed inside the sectioned-off intervention area. This layout design was selected specifically to minimize distraction and prevent other students within the resource room from approaching the student during a writing session. The researcher could easily approach the table to provide instruction, and then retreat to a nearby table to collect response-latency data.

Materials

Data collection sheets were created to record the type of session (Can't Do/Won't Do; Intervention Trial; Generalization Probe), the topic prompt, response latency and total words written. Stopwatches were used by the session leader and the observer to gather response latency data. For the Can't Do/Won't Do assessment, a prize box was created that included a variety of food and toy items that were determined to be reinforcing to each participant. Intervention scripts were created for both conditions in the alternating treatment sessions (Appendix A), and were also used to collect treatment integrity data by an observer.

Dependent Measures

The two dependent variables assessed within each condition included response-latency and total words written. Response latency was defined as the seconds between the

last word of the low-probability writing prompt provided by the researcher, and the participant's initiation of writing. Latency data were collected by the researcher implementing the intervention via observation and a stopwatch. An additional observer collected the same data during 31% of the sessions.

The second dependent variable assessed in this study included total words written. This number only included words written within the low-probability writing task, and not words written as part of high-probability writing prompts. The participants' written work was collected following each session, and written words were counted and totaled. Individual words were tallied based on line spacing, and were not penalized for spelling or grammatical errors. Due to the poor legibility and spelling found in Frankie's writing, Frankie was asked to read back his written work to the evaluator so that a more accurate word count could be gathered.

An additional informal assessment of writing topic relevance was collected, although was not analyzed as a primary dependent variable. This measure was included to assess the possibility of a participant providing a high word count of non-related or meaningless words. The writing samples were provided to a paraprofessional within the special education classroom (also a member of the research staff) and were scored independently by both the paraprofessional and the lead researcher. The written responses were scored using a scoring rubric that rated how topically relevant the written work was to the provided story prompt. Scores were provided on a scale of zero to two, with zero being "No Topic Relevance", one being "Partial Topic Relevance", and two being "Total Topic Relevance." A copy of the scoring rubric can be found in Appendix B.

Interobserver Agreement

To ensure accurate data collection, data were collected and recorded by an additional member of the research team during all pre-intervention assessments, 38% of the alternating treatment sessions, and 100% of the topic-relevance assessments. Prior to the initiation of data collection, members of the research team discussed the data collection criteria and what would constitute an agreement between observers. For response latency, an observer agreement was defined as the same reported number of seconds, plus or minus one second. Seconds were always rounded up to the next nearest whole second. This provided a range of three seconds for an agreement to occur. An exact match was required for total-words-written, and for whether a student provided thumbs up or thumbs down for each of the story topics in the writing task preference assessment. Additionally, for the topic relevance assessment, the researcher graded 100% of the writing samples using the same rubric grading system as the paraprofessional, and an agreement was defined as a 1:1 match of either zero, one or two on the grading scale. Interobserver agreement (IOA) was calculated by dividing the number of agreements by the number of disagreements plus agreements and multiplying by 100.

Table 1 presents the IOA percentages for both students across all assessment conditions, including the Can't Do/Won't Do assessment, the high-probability writing task assessment, the low-probability topic preference assessment, 38% of the alternating treatment sessions, the generalization probe, and the topic relevance assessment.

	CD/WD	High-P Writing Task Assessment	Low-P Writing Task Assessment	38% of Alternating Treatment Sessions	Generalization Probe	Topic Relevance
Frankie	100%	100%	100%	100%	100%	92%
Matthew	100%	100%	100%	100%	100%	100%

Table 1. Interobserver Agreement Percentages

For the Can't Do/Won't assessment, IOA was calculated to be 100% for total words written during each condition. For the high-probability writing task assessment IOA was calculated to be 100% for agreement on response latency. For the low-probability writing task assessment, IOA was calculated to be 100% for agreement on thumbs up/thumbs down. During alternating treatments sessions, IOA was assessed during five of the 13 sessions for each student, totaling 38% of sessions for each participant. The IOA for response latency was calculated to be 100% for Frankie's sessions, and 100% for Matthew's sessions. IOA for Total Words Written was calculated to be 100% for Frankie's sessions, and 100% for Matthew's sessions. IOA for the topic relevance assessment was calculated to be 92% for Frankie's writing, and 100% for Matthew's writing.

Experimental Design

In order to demonstrate the effectiveness of the high-p/low-p intervention, the study was implemented in three phases including a classroom observation probe (first phase of the Can't Do/Won't Do assessment), a single-case alternating treatments phase, and a generalization probe with the students' special education teacher. The alternating-treatments phase included thirteen sessions, and alternated between a simple writing prompt control condition (i.e. verbal prompt with no high-p/low-p) and an intervention

condition that included a high-p/low-p sequence. Each session took approximately five minutes to complete. During the alternating treatments phase, the order of treatments and the assigned order of the topic prompts were assigned at random, and were different for each individual student to control for a sequence effect. One generalization probe of only the high-p/low-p intervention was implemented by the special education teacher to assess generalization across people.

Data were analyzed in three ways. First, visual analysis was used to compare the two treatment conditions to each other and to the baseline and generalization probes. As part of visual analysis, particular attention was given to the general level of performance between conditions (i.e. magnitude of behavior change), the stability of performance within each condition, the number of overlapping data points, and the overall trend in the data over time.

Secondly, a topic relevance rubric was used to measure how well the students adhered to the topic prompts, and to prevent counting high levels of unrelated words as a success. Although it was not anticipated that there would be any differentiation, the topic relevance scores between conditions were compared for any discernable difference.

Finally, a social validity questionnaire was provided to each of the students' classroom teachers to gain insight into the whether the intervention results were interpreted as providing meaningful and helpful change. The results of the questionnaire are provided for discussion.

Treatment Integrity

To ensure treatment integrity, intervention protocol scripts (Appendix A) were created specifying the exact verbal prompts and actions that were to be provided within

each session and the order in which they should occur. Three different scripts were created: one for the Can't Do/Won't Do assessment, one for the high-p/low-p condition, and one for the control condition. Each checklist described the materials that were to be provided, the exact verbal prompts that were allowed, and the order in which they were to occur. This script was also used as a treatment integrity checklist completed by another member of the research team. Treatment integrity data were collected during the Can't Do/Won't do assessment, 31% of the alternating treatment conditions, and the generalization probe trial. 100% treatment fidelity was documented across all phases.

Social Validity

Following the completion of all data collection, a questionnaire was provided to two teachers who regularly provide academic instruction to each of the participating students. The results of the study were presented to each teacher and discussed. The questionnaire was then provided as a means of gaining information on the degree of change in regards to response latency and total words written, as well as how likely they would be to incorporate the intervention components into the students' instruction. A copy of the questionnaire is provided in Appendix D.

Procedure

Pre-intervention Assessments.

Can't Do/Won't Do Assessment. The first assessment included a simple "Can't Do/Won't Do" procedure, and was implemented in two parts, first by the researcher and then by the students' special education teacher. This procedure is supported in the research literature as an effective method for discriminating between academic skill deficits and motivational performance deficits (VanDerHeyden, Witt, & Naquin, 2003;

VanDerHeyden, Witt, & Gilbertson, 2007), which leads to more effective intervention design (Duhon et al., 2004). The Can't Do/Won't Do assessment procedure recommended by VanDerHeyden (2014) was utilized within this current assessment, and a copy of the assessment script can be found within Appendix A.

VanDerHeyden (2014) recommends comparing the performance on a typical in-class writing assignment to that achieved in a setting where a dense schedule of reinforcement is in effect. As recommended by VanDerHeyden (2014), prior to the assessment, the students' classroom teachers provided a list of reinforcers that were hypothesized to act function as reinforcers for the participants. For Frankie these were reported to be any salty or sweet snacks such as peanut butter cups or chips. For Matthew, these items were reported to be sweet snacks such as gummy bears or peanut butter cups. These items were obtained by the researcher and were placed in a prize box that also included a variety of other snacks and small toys (action figures and cars).

The first portion of the assessment was conducted by the lead researcher and included observing the student during typical classroom writing instruction. The teacher was instructed to provide a typical expressive writing prompt followed by a clear verbal prompt to "begin." The researcher recorded the number of seconds between this prompt and when writing was initiated (response latency). Then after four minutes, the researcher went to the student's desk and counted the number of words that had been written on the page. This was counted as a baseline number for comparison and was used not only in the Can't Do/Won't Do assessment, but also as a comparison for the alternating treatment trial results.

The remainder of the assessment was conducted by the special education teacher

who was provided a procedure script and the prize box. First, the participants were individually brought to the intervention area and allowed to peruse the available reward choices. Students were encouraged to choose the item that they preferred to earn. Once each student selected their preferred reward, the script was initiated and included the description of the activity and the criteria for success. Students were notified that they recently wrote a story in class, and their job in order to earn the reinforcer was to write more words in their current story than they had written in their classroom story. The story prompt was provided and the students were allowed four minutes to write.

Total-words-written was used as the evaluative criteria for success. The story that each student had written in class (and the researcher had observed) was used as a baseline. Total-words-written was calculated based on word spacing, with no penalties for spelling errors. When students produced more written words than they had produced during the previous classroom attempt, they earned a reward. Additionally, students were required to produce at least 50% more words than in the classroom observation in order to continue to the intervention phase of the study. Although both students met this criterion, failure to meet the criterion would have resulted in exclusion as it could be assumed that skill, not motivation was the primary impediment to writing engagement. The results of this assessment are presented below in Figure 1.
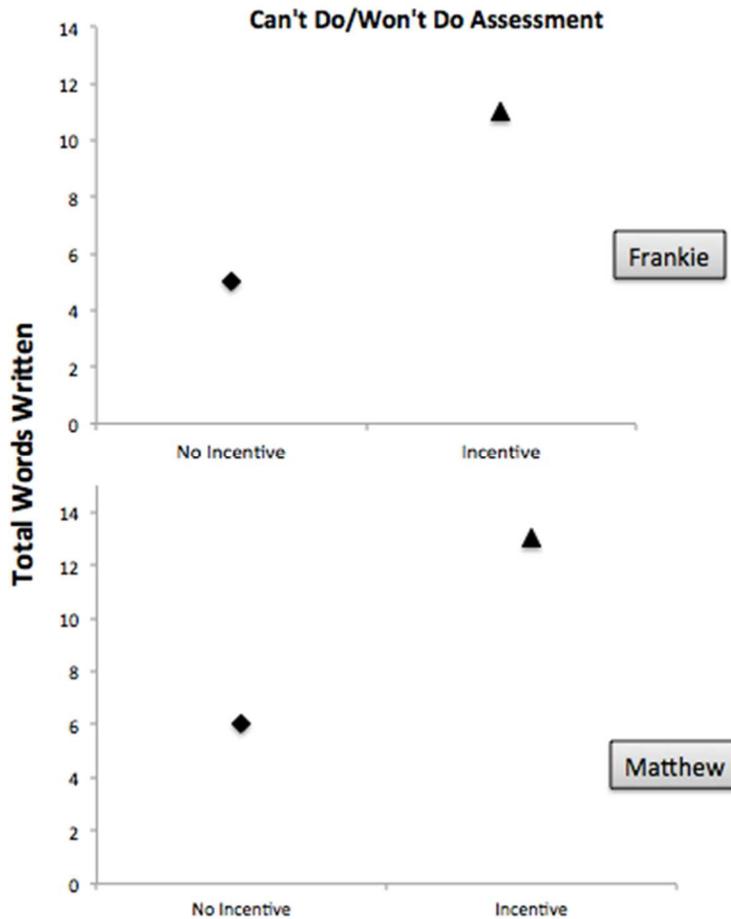
Figure 1. Total words written by Frankie and Matthew with and without an incentive.

During the "No incentive" classroom condition, Frankie wrote five words and

Matthew wrote six words within the four-minute time limit. During the "Incentive"

condition, Frankie wrote 11 words and Matthew wrote 13 words. This analysis indicated

that both Frankie and Matthew had the capability of increasing their word output when

contingent reinforcement was provided. It should be noted that this intervention (albeit

effective) is not a sustainable, socially valid, or generalizable reinforcement procedure.

Additionally the word count produced by both students still falls below typical second-

grade benchmarks for writing fluency. According to Malecki & Jewell (2003), the

average number of words written in a four-minute assessment for a second grade student

at the spring benchmark is 31. Plus or minus one standard deviation expands this to a range of 19-43 words. Both students did not achieve a score within the average range, even when earning a preferred item. This indicates that both motivation and skill were likely to be impacting writing engagement for both students.

High-Probability Writing Task Assessment. Prior to the intervention sessions, a Kindergarten word list was collected from a Kindergarten writing curriculum. This list included simple words such as "cat" and "up." Given the writing skill delays evident in both participants, single letters were also included within the list of possible high-probability writing behaviors. Participants were asked to sit at the desk within the intervention area, and were provided a lined piece of paper and a pencil. Participants were then asked to write each word or letter on the paper after it had been read aloud (e.g. "Write the word cat" or "Write the letter A"). Task latency was recorded by the researcher and an observer, each equipped with a stopwatch. Any word or letter writing that was initiated within three-seconds of the verbal prompt was considered a high probability behavior. Any word or letter initiated after the three-second interval was discarded. Additionally, any words that were misspelled were also discarded. All words and letters that met the high-probability criteria were compiled into a list that was later used in the high-p/low-p intervention sessions.

Low-Probability Writing Task Assessment. Prior to implementing the intervention, an informal preference assessment was conducted to determine which writing topics would be considered low probability writing behaviors. During this procedure, 40 second-grade story topics were collected and compiled into a list. The story topics were read aloud individually to each participant, and the participants were

instructed to provide a "thumbs up" or "thumbs down" for how interested they were in writing about that story topic. Thumbs up/thumbs down data were collected by the researcher and an observer and recorded on the list of story topics. Only topics that received a "thumbs down" were selected for the intervention sessions so as to minimize the effect of personal topic interest.

Intervention Sessions.

High-Probability Intervention Condition. During the high-p/low-p condition, the participant was instructed to sit at the table in the intervention area. Once seated, a pencil and a prepared piece of paper were placed on the desk. The paper included a blank line at the top of the page, followed by the story topic prompt and five lines for providing the written response. The researcher then initiated the high-p/low-p intervention protocol, using the treatment protocol script (Appendix A). The participant was provided with three verbal prompts to engage in high-probability writing behaviors (e.g. "Write the letter R; Write the word CAT; Write the letter L"). Verbal praise and a high five were provided following each instance of task completion. If the student was not compliant with any of the high-p requests, additional high-p prompts were to be provided until the student successfully completed three in succession. However, this procedure was not required as the participants complied with the first three requests across all sessions. Immediately following completion of the third high-probability task and delivery of praise/high five, the story topic prompt was read aloud two times, followed by the instruction that the participant would be allowed four-minutes to write. This specific amount of time was selected, as it the typical time allotted for curriculum-based-measurement of writing samples and the standard time used when developing grade-level

writing fluency norms (Malecki, 2014). The researcher then stepped away from the desk and collected data on response latency via a stopwatch. No further prompts or interactions were provided. If the student asked for assistance, the same prompt was provided across both intervention conditions: "I can't help you. Just do the best you can." Additionally, if the student notified the researcher that they had finished writing prior to the end of the four minutes, the researcher stated the amount of time left and continued timing for the full four minutes. After four minutes, the participant was instructed to stop writing. The researcher then requested that the participant read their writing aloud to the researcher. This was deemed necessary due to significant spelling errors and difficulties with legibility. The researcher transcribed any illegible words so that the topic relevance assessment would more accurately reflect the written work. A total word count was then recorded, and the student was dismissed.

Low-Probability Control Condition. This condition was designed to be comparable to an expressive writing prompt that would be provided within classroom instruction, and did not include a high-probability response sequence. During this condition, the participant was once again invited to sit at the desk in the intervention area. The participant was provided with a pencil and a prepared piece of paper, and the researcher followed the treatment integrity script created for the Control condition (Appendix A). During this condition, only the story topic starter was provided on the participant's paper, followed by five lines for the written response. In order to control for the impact of social interaction as a possible complicating variable, approximately 15 seconds of neutral social conversation was provided to the participant prior to introducing the low-probability writing prompt. For example, the researcher spoke in a neutral tone

about the weather or what they ate for breakfast. Following 15-seconds of this interaction, the researcher read the story topic starter aloud and provided the same time-limit prompt as provided in the high-p/low-p condition. The researcher then stepped away to collect data, and the remainder of the session was identical across conditions.

    Generalization Probe. One follow-up probe was conducted by the students' special education teacher (also a member of the research team) to assess for generalization of treatment effects across people. This probe was also conducted in the intervention setting, and adhered to the same high-p/low-p intervention protocol.

CHAPTER 3: RESULTS

Response Latency

Results for response latency across conditions are presented in Figure 2. For Matthew, the original classroom observation and Can't Do/Won't Do assessment confirmed that writing engagement was low and slow to initiate. Matthew initiated writing 113 seconds after the initial writing prompt, which is consistent with teacher reports of behavioral history. During the first several trials of the alternating treatment phase, a substantial decrease in response latency was observed across both the high-p condition and the control condition. This was hypothesized to be related to a reactivity effect as this student appeared highly motivated by individualized adult attention, and did not typically receive instruction in a one-on-one format. Thus the control condition did not appear to truly represent treatment as usual, and was in and of itself a type of intervention. However, over time an upward trend was observed within the control condition, and clear differentiation was evident between the two conditions. Additionally, remarkable stability was observed in the high-p intervention condition, with response latency never exceeding two seconds. No overlapping data points were observed between the two conditions, adding additional weight to the reliability of the differentiation.

During the initial classroom observation, Frankie was observed to not begin writing until 36 seconds after the prompt had been given. Although no normative data are available on typical response latency for writing, when a student is only provided four minutes to write, 36 seconds is perceived as a prolonged latency. This is certainly evident when aligned with teacher reports, which indicated that Frankie's response time in general was far longer than his peers'.

In the very first high-p intervention condition, Frankie's response latency dropped to one second, representing a significant behavior change compared to classroom levels. Frankie's response-latency in the remainder of the high-p conditions was very stable, not once exceeding three seconds and typically falling at two seconds or less. Visual analysis indicates that this represents a significant behavior change given the magnitude of behavior change and the stability of performance.

More variability was observed in response latency for the control condition that did not include a high-p component. During trial two, it appeared that the response latency in this condition was decreasing, indicating a possible reactivity effect related to the increased individualized attention. However, as trials progressed the trend in the control condition indicated a return towards baseline levels. It should be noted that response latency never reached levels observed in the classroom. It is possible that a reactivity effect contributed to this. However, given the upward trend in latency data in the control condition overtime, it is hypothesized that this condition would have eventually reached similar levels to those seen in the regular classroom. Additionally, the upward trend in this condition appeared in sharp contrast to the stability seen in the high-p intervention condition, which showed no upward trend over time. No overlapping data points were observed between the conditions, which strengthens the reliability of the intervention differentiation and the conclusions that can be drawn as a result.
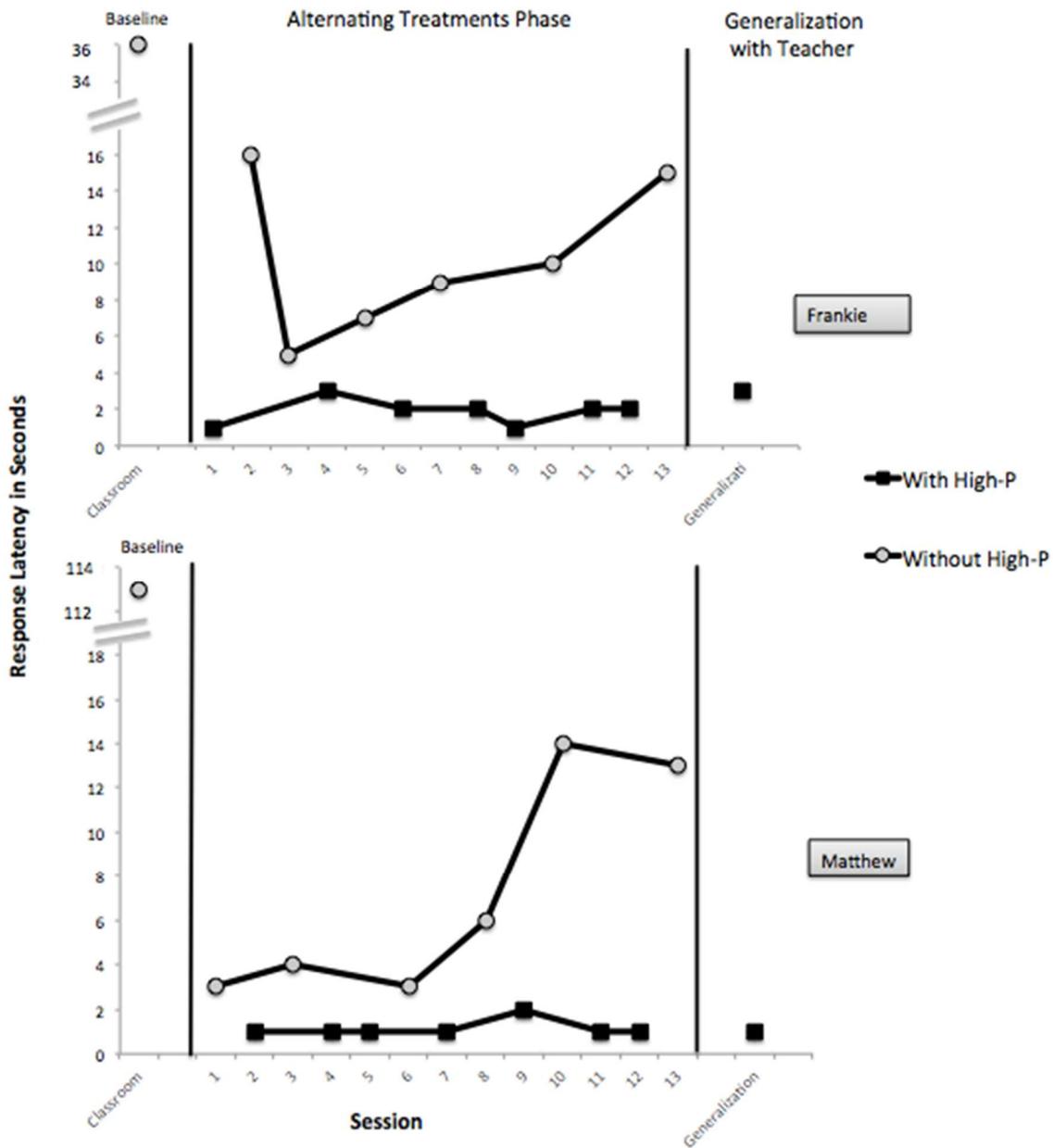
Figure 2. Response-latency data for Frankie and Matthew

Finally, the effects of the high-p intervention were also observed during generalization probes with the special education teacher. When engaging in the same high-p/low-p writing task with the classroom teacher, Frankie provided a response latency of three seconds, and Matthew provided a response latency of one second. This suggests that the effectiveness of this intervention on response latency translates across

people, and was not related to the researcher as an individual.

Total Words Written

As evident in Figure 3, differentiation was also evident for the number of words written between conditions, although this difference was less stable and took longer to become evident. For Frankie, minimal differentiation between word count was observable during the first eight trials, and a substantial increase in word count was observed in both conditions when compared to classroom performance. It should be noted that Frankie's writing skills were observed to be at least one grade level behind typical second grade performance, and Frankie had significant difficulties with spelling, word spacing, and sentence planning. Anecdotal teacher reports indicated that Frankie seldom wrote more than five or six words when prompted in class. Thus the jump in total word output in both conditions was seen as a remarkable behavior change. It is difficult to know whether this was related to a simple reactivity effect due to the awareness of being observed, or whether the researcher took on properties of a generalized reinforcer, with the effects carrying over across conditions. However, over time a differentiation between conditions became evident. As response latency increased in the control condition, the number of words written began to decrease. Likewise the stability in response latency during the high-p intervention condition yielded similarly stable word counts.

The stability observed in Frankie's performance might have been indicative of a ceiling effect, with Frankie maximizing his word production potential. Although one might hope to see an increase in word output over time, research on writing fluency norms reports that the average increase in total words written for a four-minute writing

fluency assessment is .43 words per week (Tadatada, 2011). As the current data were collected in sessions spanning only three weeks, it would not be expected that an upward trend would be observable within the current data set.

Visual analysis of Frankie's data reveals a high level of overlap between conditions, with only three non-overlapping data points recorded during the alternating treatments phase. Therefore, the results are deemed less robust than the behavior change witnessed in response latency.

For Matthew, differentiation became evident after the third trial and remained relatively stable for the remainder of the trials. Again, a significant increase in word output was observed in both conditions when compared to the classroom observation. This is consistent with the possible reactivity effect that was posited to have impacted response latency as well. However, over time total words written remained at high stable levels in the high-p intervention condition, and a downward trend was evident in the control condition. Due to some variability during the first few trials, only four non-overlapping data points were observed for the total words written. Therefore, although visual analysis indicates that trends were differentiated, the results are also less robust due to performance variability.

Matthew produced his highest word count yet recorded during the final generalization probe (34 words) indicating generalizability of treatment effects across people. In contrast, a decrease in performance was witnessed during Frankie's generalization probe, with Frankie producing fewer words than he had written during any previous high-p intervention trial. However, this degree of change was small, and more than doubled the performance seen during the classroom observation probe.
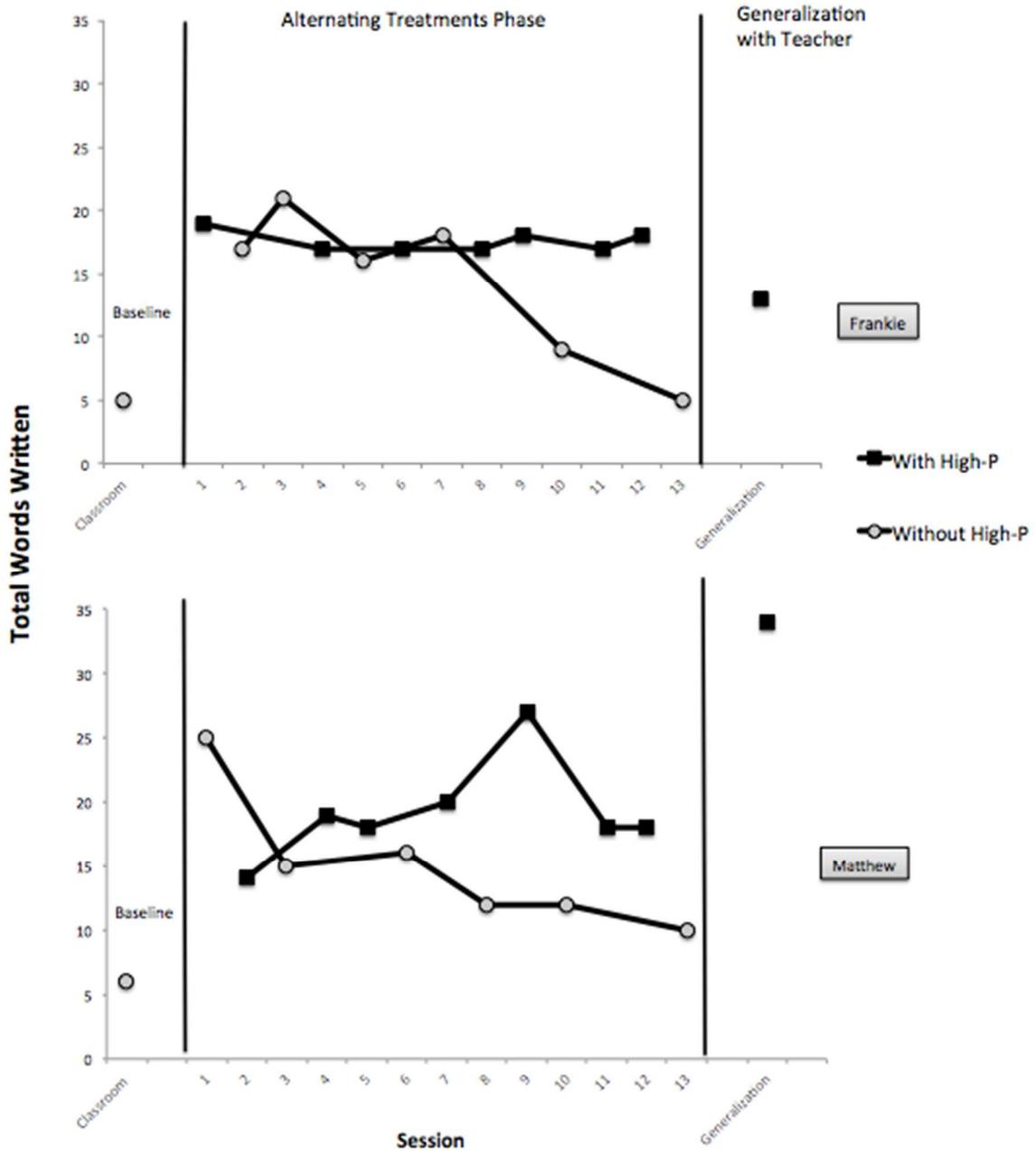
Figure 3. Total Word Count Data for Frankie and Matthew

Topic Relevance Assessment

All of the writing samples were scored using a topic relevance rubric (Appendix

B) to assess how well the students remained on-topic during their writing tasks. The

results of this assessment were not intended as a primary dependent measure, as the high-

p/low-p intervention was not expected to impact writing quality. Rather, this step was

taken to ensure that any high word counts did not simply include repetitions of gibberish, or topically irrelevant work. The writing samples were provided a score of either 0, 1, or 2 in relation to topic relevance. No scores of zero were observed on any writing samples. All written work displayed an attempt to answer the topic prompt, although scores of 1 were provided if the participant failed to answer all parts of the prompt question or if they added irrelevant details in addition to answering the question. Overall, no differentiation in topic relevance was observed between the conditions, and all written samples appeared to be either partially or fully relevant to the writing prompt. A list of the writing prompt topics and relevance scores can be found in Appendix C.

Social Validity

A questionnaire was created to assess the practical relevance of the intervention results (Appendix D). The questionnaire was completed by two teachers, both of whom regularly provide instruction to each of the study participants. The responses on these two questionnaires indicated that both teachers felt that the effect of the intervention on response latency represented "Substantial Improvement" when compared to classroom levels. The effect on total word count was reported by both teachers to represent a "Moderate Improvement." One teacher reported that she would be "Very Likely" to incorporate the intervention components into regular writing instruction. The other teacher reported that she would "Possibly" incorporate the components of the intervention into writing instruction. This second teacher added that she typically provides classwide instruction to the group, and this student would be more likely to receive this kind of individualized instruction during his resource room instructional time.

CHAPTER 4: DISCUSSION

Effects of High-P/Low-P Interventions

The goal of this study was to expand the research on high-p/low-p intervention strategies to the academic behavior of expressive writing. Support for high-p/low-p interventions for increasing task compliance is well documented in the behavioral research literature, particularly in regards to increasing adaptive skills in specialized treatment settings (Davis et al., 1994; Engelmann & Colvin, 1983; Harchick &Putzier, 1990; Lee, 2005; Mace et al., 1988; Mace & Belfiore, 1990; Sanchez-Fort, Brady, & Davis, 1995). More recently, research on behavioral momentum strategies has expanded into the classroom setting, and is being applied to a wider variety of student needs. High-p/low-p interventions have been shown to be effective in increasing general compliance and decreasing academic transition time within the classroom (Belfiore, Basile & Lee, 2007; Lee, 2006; Wehby & Hollahan, 2000). Additionally, researchers have more recently begun applying the principles of behavioral momentum to academic work tasks, and have reported that high-p/low-p interventions may be effective in decreasing response latency between mathematics problems (Belfiore, Vargas & Skinner, 1997; Lee, Lylo, Vostal & Hua 2012), increasing the number of math problems completed (Hutchinson & Belfiore, 1998), and improving fluency for reading word lists (Burns et al., 2009) and reading passages (Vostal & Lee, 2011). One previous study, (Lee & Laspe, 2003) examined the effects of a high-p/low-p intervention on journal writing, and reported moderate effects in regards to more efficient writing behaviors and greater writing persistence.

This study contributes to the literature on behavioral momentum, and supports the use of high-p/low-p interventions as a simple and effective way to increase engagement

in expressive writing tasks. A significant decrease in response latency was observed across both participants, with notable stability in performance reported in all high-p intervention trials. Both participants initiated writing in three seconds or less during all high-p intervention trials, representing a marked change in behavior when compared to typical classroom performance, and when compared to the intervention condition without high-p. This trend continued in the generalization probe with the special education teacher, indicating that the intervention sustained effects across people.

Response latency was observed to gradually increase with both participants in the control condition that included only a verbal prompt. This gradual increase could be conceptualized as the return of noncompliance following a brief reactivity effect, which supports the theory that motivation was a primary variable impacting writing initiation. It is possible that verbal prompts for writing have a history of acting as warning signals for the presence of a non-preferred task (Conditioned Motivation Operation-Reflexive). Without the presence of the high-p intervention, the verbal prompts in the control condition appeared overtime to evoke opposition to the task, which may have been related to this learning history. This supports the theory that high-p/low-p interventions as antecedent strategies can alter motivating operations, as a gradual increase in opposition was not observed in the intervention condition.

A more moderate degree of change was observed in regards to total-words-written. Although both participants produced substantially more words in the intervention phase of the study compared to their classroom baseline probe, differentiation between the high-p/low-p intervention and the control condition was not as robust. Although a downward trend did eventually become evident in the control condition, there was a high

level of data overlap during the first several trials, indicating a possible reactivity effect. It is also hypothesized that the researcher may have been seen as a generalized reinforcer with treatment effects generalizing across conditions. However, although some overlap was present, visual analysis indicated a trend back towards baseline for both students in the control condition, with no such downward trend observed in the high-p intervention trials. This suggests that the high-p intervention did increase word output when compared both to classroom performance and the control condition without high-p.

For Matthew this effect generalized across people according to the generalization probe with the classroom teacher. For Frankie, a slight decrease in total words was reported on the generalization probe. There are many variables that may have impacted this score. Frankie may have found the praise of the classroom teacher to be less reinforcing (making the intervention less effective), may have found the topic prompt more difficult, or may simply have had an "off day." However, given the change from classroom levels, the results still appear promising for increasing total-word-counts.

Implications for Instruction

Behavioral interventions are typically considered meaningful if they are targeted at behaviors that are important to individuals and the society, and if they produce changes that are clinically and practically significant (Baer, Wolf & Risley, 1968). Writing was chosen as a meaningful behavior, and is considered a foundational skill that supports academic performance, personal communication, and vocational opportunity (Graham & Harris, 1968). Additionally, writing skills are particularly susceptible to the impacts of student work avoidance, as writing instruction requires a feedback loop that can only occur if a student actually produces writing samples for assessment. As described by Lee

and Laspe (2003) "In order to improve writing, we need students to produce something so that teachers can give feedback." This predicament fits well into the narrative that led to the introduction of high-p/low-p interventions as an antecedent strategy for increasing compliance to demands. We cannot reinforce behaviors that are not occurring. Therefore, antecedent strategies are critical for first evoking the behavior that we hope to strengthen using reinforcement.

A social validity questionnaire was used to confirm the clinical relevance of the results and the likelihood of the intervention being applied in the instructional setting. Both teachers reported that the results were clinically significant, particularly in regards to the decrease in response latency time. One teacher reported that she was "very likely" to apply the components of the intervention to the students' writing instruction. The other teacher suggested that this intervention appeared most suited to an individualized instructional setting (as opposed to a whole class instructional setting), although she would consider applying the components of the high-p intervention to the students' writing instruction.

Limitations and Future Research

A significant limitation of this study was that it occurred in an individualized and separate instructional setting that was outside of the norm for both students' writing instruction. Although one student often received one-on-one instruction, it occurred within his typical classroom environment, and not within a separate space. The other student received the majority of his academic instruction within the general education environment, and thus one-on-one attention represented a significant change in typical instructional practices. Both students typically participated in writing instruction within a

small group. Therefore, the research setting and individualized attention may have acted as confounding variables impacting the results. Behavior change occurred across both conditions, with and without the high-p intervention, and a true return to baseline/classroom performance did not occur. Although the trend of the control condition without the high-p intervention suggested that behavior may have eventually reached baseline levels, it was not ethical or feasible to continue to pull each student out of their regular classroom setting for research purposes.

In order to fully assess the impact of the intervention on student writing performance, it would be most helpful to have the high-p/low-p intervention conducted by the classroom teacher within the student's typical writing instruction. This would minimize the impact of setting and personnel changes that could impact intervention results. Although privacy and setting constraints prevented this form of instructional design within the current study, future research may be most clinically useful if it is more closely aligned with the writing instruction currently being offered to the participating students. Additionally, given that writing instruction often happens in a small group setting, it may be beneficial to explore the effectiveness of this intervention when applied in a group format.

Another limitation of this study was that it occurred with only two students who were demographically very similar. Generalizability is limited at this point in time, and it is unclear how well the results of this study would translate to students of different ages, abilities and behavioral needs. Replication of this type of intervention is needed to fully assess its impact on writing engagement across a wider population of students.

Finally, only praise was used within this high-p/low-p intervention design, which

is consistent with the original study design by Mace et al. (1988). However, praise may not have reinforcing effects for all children, and imbedding other reinforcement options (e.g. tangibles/edibles) into the high-p sequence may be more impactful than praise alone (Wilder, Majdalany, Sturkie, & Smeltz, 2015; Zuluaga & Normand, 2008). Additionally, although praise was impactful within the current setting, it is unclear how long the results might sustain over time. Future research directions may include a comparison between verbal praise alone and tangible reinforcement systems such as edibles or token economies in regards to the impact of high-p/low-p interventions on academic behaviors such as writing. Additionally, the inclusion of maintenance probes over time may help determine how long these interventions continue to evoke behavior change.

CHAPTER 5: SUMMARY

Utilizing behavioral momentum strategies such as high-p/low-p interventions is well supported by the research literature as a means to increase compliance with task demands, and may also increase efficiency and engagement with academic tasks within a school setting. The overall results of this study suggest that sequencing high-probability writing prompts as a "warm-up" activity before low-probability writing prompts can decrease response latency and increase the total-words-written for students who typically resist engaging in writing tasks. The results of the study are limited by the fact that the interventions were conducted outside of the typical classroom environment, and future research would strengthen the findings by applying the intervention within classroom writing instruction. However, overall the results provide promising evidence for the application of high-p/low-p interventions to the academic behavior of writing.

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APPENDIX A

Can't Do/Won't Do Script/Treatment Protocol

1. *"We're going to do some writing today"*
2. *"The last time you wrote a story with your class, you wrote _____ words."*
3. *Now, I'm going to give you the opportunity to write another story. If you can write more words this time than you did last time, then you can pick one item from the prize box."*
4. Show the student the prize box. Allow the student to briefly look through the items.
5. Say, *"Do you see anything in there that you would like to earn?"* If the student does not seem excited about any of the items, you may offer free time, a visit with his or her favorite teacher, or get the student to nominate something reasonable.
6. Say, *"This is a writing assignment. Turn your paper over and you will see a sentence at the top of the page. It says "What do you like to do during recess and why?" Please write a story about what you like to do at recess and why. You will have four minutes to write. Remember, write as much as you can, and if you can write more words than last time, you will earn a prize from the prize box. Do you have any questions?"*
7. Say, *"Start writing now."*
8. Time for four minutes.
9. Say, *"Stop."*
10. Count the number of words written. If the student increased their score by one word, then allow the student to select something from the prize box.

High-P Intervention Condition Script/Treatment Protocol

1. *"We're going to do some writing today"*
2. *"Turn over your paper."*
3. Point to the top line. *"On the line at the top of your paper write":*
    Choose any of the following until you reach three in succession of compliance:

"The letter R"	"The letter A"	"The letter O"
"The word cat"	"The word it"	"The word car"
"The letter L"	"The letter B"	"The letter E"
"The word up"	"The letter S"	"The letter C"
"The word sit"	"The word the"	"The word no"

    Provide praise and/or high fives for each example of compliance.
4. Point to the next line on the paper. *"Now I want you to write a story about _____ [read prompt] I'll read the prompt one more time."* (Repeat the story prompt)
5. Say, *"You will have four minutes to write. You may begin."*
6. Use stopwatch to record the number of seconds between when the prompt "begin" is said, and when the student makes the first mark on the page. Round up and

record in whole seconds. Time the whole interval for four minutes.

-If the student asks any questions say: "*I can't help you. Just do the best you can.*"
Continue timing.
-If the student says they are finished before the four minutes, continue timing and
tell them how much time they have left.
Time for the full four minutes.

7. At the four-minute mark, say, "*Stop.*"
8. If the work is legible, thank the student for working and dismiss. Count the
   number of words written and record.
9. If the work is illegible, have the student read back what they wrote. Then thank
   the student, and dismiss. Count the number of words written and record.

Control/No High-P Condition Script/Treatment Protocol

1. Turn the student's paper over so the prompt is visible.
2. When the student is seated, provide 15 seconds of neutral social statements (e.g.
   the weather, the temperature)
3. Say: "*We're going to do some writing today*"
4. Point to the top line on the paper. "*I want you to write a story about* ____
   _____ *[read prompt]* _____ *I'll read the prompt one more time.*" (Repeat the
   story prompt)
5. Say, "*You will have four minutes to write. You may begin.*"
6. Use stopwatch to record the number of seconds between when the prompt "begin"
   is said, and when the student makes the first mark on the page. Record in whole
   seconds. Time the whole interval for four minutes.

   -If the student asks any questions say: "*I can't help you. Just do the best you can.*"
   Continue timing.
   -If the student says they are finished before the four minutes, continue timing and
   tell them how much time they have left.
   Time for the full four minutes.

10. At the four-minute mark, say, "*Stop.*"
11. If the work is legible, thank the student for working and dismiss. Count the
    number of words written and record.
12. If the work is illegible, have the student read back what they wrote. Then thank
    the student, and dismiss. Count the number of words written and record.

APPENDIX B

Story Topic Relevance Rubric

0 **No topic Relevance**	1 **Partial Topic Relevance**	2 **Total Topic Relevance**
-No attempt to answer the question -All written content is off-topic	EITHER: -Answered only part of the topic question (e.g. WHAT, but not WHY) -OR Answered all parts of the question but added off-topic comments non-related to the writing prompt.	-Answered all parts of the topic question, with no irrelevant/off-topic comments.

APPENDIX C

Frankie's Scores		Matthew's Scores	
HIGH-P SESSIONS			
Tell me about a toy that you like to play with and why you like it.	2	What is your favorite thing to do when you play inside and why?	1
Tell me about a TV show you like and why you like it.	2	Tell me about a TV show you like and why you like it.	2
What is your favorite lunch to eat at school and why?	1	Which holiday is your favorite and why?	1
What do you like to do during school vacation and why?	2	Tell me about a snack that you like and why you like it?	1
Write about what you did today in school.	2	Who is your favorite superhero and why are they your favorite?	1
If you could be any animal, what would you be and why?	2	What is your favorite thing to do when you play outside and why?	1
What kind of pet do you think your teacher should get for their classroom and why?	2	What is your favorite part of the school day and why?	1
CONTROL SESSIONS			
Tell me about what you want to be when you grow up.	2	Write about what you did today in school.	2
What do you like to do when it is snowing and why?	1	Write about what you want to be when you grow up.	2
Tell me about something you are really good at doing or creating.	2	What is your favorite kind of dinosaur and why?	1
What is your favorite meal of the day and why?	2	Do you like snowball fights? Why or why not?	1
What season do you like most and why?	1	Tell me about something you are really good at doing or creating.	1
Would you rather have a tiger or a gorilla for a pet and why?	1	If you could be any animal, what would it be and why?	1
GENERALIZATION PROBE			
Write about what you would like to do for your next birthday.	2	What do you like to do during school vacation?	1

APPENDIX D

Teacher Social Validity Rating Scale

1. On a scale of 0-3, with 0 being "no improvement" and 3 being substantial improvement, how would you rate the effectiveness of the intervention relative to:

a. Response latency

0	1	2	3
No Improvement	Minimal Improvement	Moderate Improvement	Substantial Improvement

b. Numbers of words written

0	1	2	3
No Improvement	Minimal Improvement	Moderate Improvement	Substantial Improvement

2. On a scale of 0-3 with 0 being "Definitely Not Likely" and 3 being "Very Likely," how likely are you to incorporate the intervention components into this student's instruction?

0	1	2	3
Definitely Not Likely	Probably Not	Possibly	Very Likely

Comments:

BIOGRAPHY OF THE AUTHOR

Hannah Batley was born and raised in midcoast Maine, and graduated from Camden Hills Regional High School in 2005. After first studying voice at the University of Toronto, Faculty of Music, Ms. Batley moved back to Maine and pursued a degree in Early Childhood Development from the University of Maine at Augusta. Upon graduating with a B.A. in 2012, Ms. Batley entered the doctoral program in School Psychology at the University of Southern Maine, earning a Master's in Educational Psychology in 2015. Throughout her studies, Ms. Batley has focused her interests on behavioral consultation in the public school environment, and school-wide Positive Behavior Interventions and Supports. Ms. Batley is passionate about providing high-quality and meaningful mental health, behavioral and academic supports within the public school environment, and is looking forward to transitioning into her new position as a School Psychologist for a school district in rural Maine. Ms. Batley currently resides in Orono, Maine and is a candidate for the degree Doctor of Psychology in School Psychology from the University of Southern Maine in June 2017.