An Evaluation of the Effects of Non-Linear Growth Trajectories on the Decision Accuracy of Curriculum-Based Measurement of Reading Progress Monitoring Outcomes

Ethan R. Van Norman
Georgia State University

Theodore J. Christ
University of Minnesota

Total Amount Requested: $10,776
Overview of Project

Even though a significant proportion of students demonstrate non-linear growth in oral reading fluency, decision making frameworks to evaluate student progress assume growth is linear. The outcomes of this project will lead to empirically based decision making practices when evaluating student response to instruction as measured by curriculum-based measurement of reading when non-linear growth is present. The project will be guided by three research questions:

(1): What conditions influence visual analyst’s ability to identify non-linear growth?

(2): To what degree is the accuracy of visual analysis influenced by non-linear growth?

(3): To what degree is the accuracy of decision rules influenced by non-linear growth?

Funding from SSSP will be used to support three types of project activities. First, we will simulate progress monitoring cases that demonstrate varying levels of non-linear growth. After that, visual analysts will evaluate progress monitoring graphs to determine whether each case is making sufficient progress with their current instructional program or whether a change should be made. Decision rules will also be applied. Finally, we will cross validate results with actual progress monitoring cases and a new group of visual analysts.
Scientific Rationale

Within multi-tiered systems of support, at-risk students are given supplemental interventions to remediate skill deficits. Student progress is then periodically assessed to determine the appropriateness of said interventions. The focus of this project will be on supporting accurate decision making when evaluating student response to instruction. Inaccurate decisions regarding student progress may lead to students receiving inadequate supports or the premature termination of effective supports. The most common class of assessments used to monitor student progress are curriculum-based measures (CBM; Deno, 1985). The most common type of CBM is oral reading (CBM-R). The primary datum from CBM-R is the number of words read correct per minute. To measure student progress data are collected one to two times per week and plotted on time series graphs. Progress is compared to some expected rate of weekly growth, or goal line (Deno, 1986; 1990). Graphs are visually analyzed or decision rules are applied to then make instructional decisions (e.g., continue the intervention or make a change).

Decision Making Approaches

Visual analysis is the process in which educators evaluate changes in level, trend, and variability between phases (i.e., instructional programs) to determine whether a functional relationship exists between the dependent variable and a given intervention as well as to compare the effectiveness of competing interventions (Sidman, 1960). Decision rules provide automated recommendations based upon the most recent 3, 4, or 5 data points in relation to the goal line (data point rule; White & Haring, 1980) or the slope of a trend line estimated through all observations (trend line rule; Good & Shinn, 1990). In all cases performance (either data points or weekly slopes) greater than the goal line is desirable.

Previous Research
A review of CBM-R decision rules (Ardoin, Christ, Morena, Cormier, & Klingbeil, 2013) and visual analysis (Van Norman, 2015), suggest that through 2010 and 2015 respectively, no studies had evaluated the accuracy of recommendations from decision rules and only one study evaluated the accuracy of visual analysis of CBM-R progress monitoring data.

Van Norman and colleagues (2013) evaluated the degree to which different graphic aids promoted the decision accuracy of visual analysis. Analysts were most accurate when given goal and trend lines and when cases demonstrated no progress or substantial progress. Analysts were least accurate when they did not have graphic aids and growth was moderate.

Christ et al. (2013) evaluated the accuracy of trend line decision rules and Van Norman and Christ (2016a) evaluated the accuracy of data point decision rules. Christ et al. found that decisions were feasible within 12-14 weeks if one observation per week was collected and measurement error was minimized. Higher levels of measurement error required longer progress monitoring schedules to make decisions. Van Norman and Christ (2016a) found that when student growth approximated the goal line and measurement error was high, valid decisions were not supported after 15 weeks. When growth was highly discrepant from the goal line and measurement error was minimized, accurate decisions were supported after 8-10 weeks.

Van Norman and Christ (2016b) compared the accuracy of visual analysts and decision rules and found visual analysts supplied with goal and trend lines performed better than decision rules, particularly when few observations were available and measurement error was high. As the available number of observations increased, the benefit of visual analysis became less apparent.

**Limitations of Previous Research**

In all the reviewed studies the degree to which students displayed non-linear growth, was not manipulated. That is, growth trajectories in which student progress tapers off across time,
was not manipulated despite a substantial volume of research that suggests a significant proportion of students demonstrate non-linear growth (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Nese, Biancarosa, Cummings, Kennedy, Alonzo, & Tindal, 2013). The degree to which non-linearity influences the accuracy of visual analysis and decision rules is unknown. Further, guidelines for how to interpret non-linear CBM-R progress monitoring data have not been developed. Instead, current recommendations are based upon expert opinion. Educators have been told to visually analyze graphs and if data appear non-linear, they should use visual analysis (aimsweb, 2012) instead of decision rules to evaluate progress. Studies that evaluate decision rule performance in the presence of non-linear data, the capability of visual analysts to detect non-linear growth, and the impact of visual analyst accuracy in the presence of non-linear growth, have not been conducted with CBM-R progress monitoring data.

**Purpose**

The broad purpose of this project is to explore the degree to which non-linear growth impacts the accuracy of interpretations of student progress monitoring data. Relatedly, this project will also determine the accuracy in which visual analysts can detect non-linear growth. The results of this study will build upon the outcomes of previous research by providing empirically based practical recommendations to evaluate non-linear progress monitoring data. Further, the results of this study will contribute to the broader progress monitoring decision making literature using theoretically defensible methods. The following research questions will frame the study:

1. What conditions influence visual analyst’s ability to identify non-linear growth?
2. To what degree is the accuracy of visual analysis influenced by non-linear growth?
3. To what degree is the accuracy of decision rules influenced by non-linear growth?
Rationale for SSSP Funding

The current project is highly compatible with the purposes of the Society for the Study of School Psychology. The results of this project will improve school psychological practices, particularly by yielding empirically based recommendations to interpret progress monitoring data. Van Norman and Christ have begun a line of inquiry that has challenged, and refined, many of the long-held practices associated with measuring student response to instruction. Prior to their work on decision rules and visual analysis, recommendations regarding optimal data collection schedules and methods to evaluate student progress were based upon untested expert opinion or drawn from studies unrelated to the process of evaluating student progress (see Ardoin et al., 2013). The primary independent variable in this study, non-linear growth, is often acknowledged by researchers but to date no empirically based recommendations for the appropriate way to evaluate such data have been developed.

Last, the results of this study will likely spur subsequent investigations regarding the accuracy of decision making frameworks applied to progress monitoring data. Undeniably reading has received most attention within the progress monitoring literature (Tindal, 2013). Subsequently, many of the recommendations regarding progress monitoring practices for other academic domains (e.g., mathematics, writing, spelling, etc.) are based upon findings from reading. Using practices from one academic domain without appropriately accounting for different psychometric properties associated with different measures may lead to inappropriate decision making frameworks that lack technical adequacy. Thus, Van Norman and Christ plan to continue their collaboration after this project to evaluate decision making frameworks with other types of progress monitoring measures.
Limited Availability

Carrying out the proposed project is contingent on receiving funding from SSSP. Van Norman has expended his initial start-up money from Georgia State University. In addition, due to a potential university administrative oversight, Van Norman’s application for an internal grant at Georgia State University was not funded (no faculty member’s proposal was funded within the department). Last, based upon RFPs from other grant agencies, and communications with grant officers, the duration and scope of this project are likely not sufficient to secure a large external grant. Thus, the project described in this proposal is uniquely suited to serve as a pilot study to serve as a basis for larger external grant applications. Relatedly, to limit the amount of money requested, Van Norman is prepared to incur all costs related to traveling to recruit participants in the local Atlanta metro area.
Operational Plan

Overview

The project will consist of three major activities. First, we will generate progress monitoring graphs across several conditions. Second, visual analysts will evaluate said graphs and we will apply decision rules to those cases. Third, we will cross validate the results from the second set of activities with a new group of progress monitoring graphs based upon actual student data evaluated by new analysts. The following research questions will guide the study:

(1): What conditions influence visual analysts’ ability to identify non-linear growth?
(2): To what degree is the accuracy of visual analysis influenced by non-linear growth?
(3): To what degree is the accuracy of decision rules influenced by non-linear growth?

Phase 1

Generating Progress Monitoring Graphs (July). We will first identify plausible conditions to investigate by estimating linear mixed effects regression models from a large extant dataset collected and maintained by Christ ($n > 500,000$ cases). The general model will be:

$$Y_{ij} = (\beta_0 + b_0) + (\beta_1 + b_1)(Week_{ij}) + (\beta_2 + b_2)(Week_{ij}^2) + e_{ij}$$

Where $Y_{ij}$ states that the words read correct per minute score for individual $i$ at week $j$ is equal to the group average intercept ($\beta_0$), plus the individual students deviation from that intercept ($b_0$) plus the product of the average weekly slope of improvement in words read correct per minute in the group ($\beta_1$) plus the students individual deviation in linear growth from that group average ($b_1$) plus the average rate of quadratic growth in the group ($\beta_2$) plus the individuals deviation in quadratic growth from that group average ($b_2$) plus a random error term ($e_{ij}$).

We will use the fixed and random effects to define typical magnitudes of linear growth ($\beta_1$) and quadratic growth ($\beta_2$). Random effect terms will be added and subtracted to each fixed
effect term for growth to identify “low” and “high” values of linear (+/- $b_1$) and non-linear (+/- $b_2$) growth respectively. True scores will be generated for different durations of progress monitoring, 6, 12, or 18 weeks (using a schedule where one data point is collected per week). For each graph, performance at 36 weeks will be calculated by multiplying 36 by each growth term and adding the baseline score to the resulting product. Performance at 36 weeks will be compared to the spring benchmark for the probes used in the original dataset to document whether the case met their goal or failed to meet their goal. To generate observed scores, a random error term ($e_{ij}$) with a mean equal to 0 and SD equal to 5 or 10 will be added to each simulated score (values often cited in the research literature; Christ, 2006; Christ et al., 2013). There will be 3 (low, medium, and high linear growth) x 3 (low, medium, and high quadratic growth) x 3 (6, 12, or 18 weeks of data collection) x 2 (error equal to 5 or 10) = 54 conditions. We will create 3 unique progress monitoring graphs for each combination of independent variables. With three graphs per condition, 162 graphs will be available for Phase 2.

**Phase 2**

*Website Construction (July-Aug).* We will create a website for visual analysts to evaluate the progress monitoring graphs. Usability will be tested first with a small group of practitioners. Based upon their feedback, modifications will be made as necessary.

*Participants (Aug-Nov).* Power analyses from previous CBM-R studies (Van Norman, 2015), suggest 50-60 visual analysts will be sufficient. Practicing school psychologists, special education teachers, and regular education teachers will be recruited. Several leaders of psychological services in Atlanta and surrounding communities have expressed interest in the project. We will also recruit participants through state school psychology listservs and attend state association meetings throughout the Southeast (see Budget).
**Procedure (Aug-Nov).** Visual analysts will logon to the website via a url and study password where they will be informed of the purposes of the study and rights as participants. Informed consent will also be obtained. Basic demographic information will be collected. Next, visual analysts will answer a series of questions and complete practice exercises to ensure they have sufficient experience with CBM-R using procedures from Van Norman & Christ 2016.

One graph will appear on the webpage at a time in random order. Each graph will have a goal and trend line. For each graph the participant will indicate whether: the student is on track to reach their goal and the intervention should be maintained or the student is not on track to reach their goal and a change should be made. They will also signify on a scale from 1-10 (1 being low and 10 being high) the degree of non-linearity in the graph. Afterward participants will receive a password to redeem a gift card. We will also apply trend line and three-point decision rules to each case. The recommendation from each rule, continue the intervention, or make a change, for each graph will be documented in a spread sheet.

**Data analysis (Dec-Jan).** Responses from each analyst for each graph will be coded along two dimensions: 1) whether the recommendation agreed with the case’s true status and 2) their perception of non-linearity. A 1 will be coded if the response was correct and 0 if incorrect. Accuracy of outcomes from the data point and trend line rules will be coded in a similar fashion.

To address the first research question, we will use linear mixed effects regression to model the relationship between quadratic growth and visual analysts’ perception of non-linearity. After exploring the amount of variance explained in perceptions of non-linearity by quadratic growth terms, we will systematically add interaction terms and test deviance statistics between competing models for statistical significance. The interaction terms of: quadratic growth x duration, quadratic growth x error, and quadratic x linear growth will be of key interest.
To address the other research questions, we will use generalized linear mixed modeling to estimate the log odds that visual analysts correctly interpreted progress monitoring graphs as a function of duration, magnitude of linear growth, magnitude of non-linear growth, and measurement error. We will also estimate the log odds of a correct recommendation from the data point and trend line decision rules. We will use similar techniques of systematic model building to explore the degree to which different characteristics of progress monitoring cases influence the log odds of a correct response. Finally, we will convert log odds to probabilities and compare results across different magnitudes of non-linearity.

**Phase 3**

*Generating Progress Monitoring Graphs (Jan-Feb).* We will identify progress monitoring graphs that satisfy the conditions identified in Phase 1 using an extant dataset of actual student data. For each case spring benchmark performance will be available, thus whether the student made sufficient progress will be known.

*Website Construction (Jan-Feb).* Procedures from Phase 2 will be replicated.

*Participants and Procedure (Feb-May).* Procedures from Phase 2 will be replicated.

*Data Analysis (May).* Data will be analyzed in the same manner as Phase 2. However, will also combine recommendations from decision rules and visual analysts with responses collected in Phase 2. A variable signifying whether the graph was simulated or based upon extant data will be created. We will then test whether the log odds of a correct decision or whether the relationship between quadratic growth terms and perceptions of non-linearity depended on whether data were simulated or from actual students to assess the generalizability of results.

*Dissemination (May-Jun).* We will prepare manuscripts and conference proposals to disseminate results.
Reference


Personnel & Resources

Ethan R. Van Norman PhD (Principal Investigator)

Ethan R. Van Norman is an Assistant Professor in the School Psychology program at Georgia State University (GSU). Located in the heart of downtown Atlanta, GSU is the Southeast’s leading urban research institution with an enrollment of approximately 44,000 undergraduate and 8,000 graduate students in 10 colleges, schools and institutes. GSU ranks among the nation’s top 108 public and private universities in the Carnegie Foundation’s elite category of Research Universities/Very High Research Activity. Researchers at GSU utilize the university’s state-of-the-art facilities and work across the disciplines to address critical quality of life issues, such as cancer, obesity, inflammation, vaccines, child and adult literacy, and public health issues related to smoking, among others. GSU technological resources are also readily available to support our efforts to work with and collect information from schools across Georgia, including the most rural and underserved areas of the state.

Van Norman graduated from the University of Minnesota in 2015 with a PhD in Educational Psychology with an emphasis in School Psychology and minor in Quantitative Methods. During his final year of study at the University of Minnesota he was awarded the Eva O. Miller Fellowship to support completion of his dissertation, which was eventually published in the Journal of School Psychology and nominated for article of the year in 2016 (see appendix for CV). The current proposal is a direct extension of that work. Further, the operational plan proposed in this project directly addresses the limitations associated with that work (e.g., criterion used to determine accuracy, cross validation, number of graphs evaluated, etc.). Van Norman completed his internship at Heartland Area Education Agency in Des Moines Iowa. At that time, the state of Iowa mandated that all schools engage in universal screening and progress
monitor students deemed at risk for later difficulties. Van Norman helped the school district he was employed by implement an empirically based progress monitoring system (the school had never used computer adaptive tests or curriculum based measures prior to his arrival). Before that, the district did not have a consistent system to universally screen or progress monitor students. He helped train educators to administer, score, and interpret curriculum-based measures to evaluate student progress.

Aside from his dissertation, Van Norman has authored 20 peer referred works (n = 10 as first author, n =1 sole author) and 1 book chapter. He has also made more than 15 presentations at peer reviewed conferences related to data based decision making. Of the peer referred papers, 13 have been published since he graduated from the University of Minnesota, and over half (n = 11) have been published independent of his graduate advisor. Of relevance for the current proposal, 18 of those papers are directly related to data-based decision making and 14 are related to interpreting progress monitoring data. Although Van Norman has yet to attend the School Psychology Research Collaboration Conference, he will attend one at the APA annual convention in 2017. **This is the first year Van Norman is eligible to attend the conference.**

*Theodore J. Christ PhD (Mentor)*

Dr. Christ is the Yackel Professor of Assessment and Measurement in Educational Psychology, Co-Director of the Research Institute on Problem Solving, and Director of the Center for Applied Research and Educational Improvement (CAREI), which are all located at the University of Minnesota. He is engaged in the development, evaluation, and refinement of assessments and guidance to use data to improve educational systems, professional practices, and student outcomes.
He and his colleagues received more than $12 million in funding from the US Department of Education to research and development (see appendix for CV). One of those grants, the Data-Based Decision Rule Project (DRRP) informed the scientific rationale of this project. Dr. Christ has more than 60 peer refereed publications, 12 authored tests, and 100 national peer reviewed presentations. He consults with federal, state and nongovernmental agencies and is the Founder and Chief Scientific Officer of FastBridge Learning, which supports and distributes the *Formative Assessment System for Teachers, or FAST*. FAST originated from research at the University of Minnesota and is now used in 40 states around the country and internationally. There were more than 9 million administration of FAST in the 2015-16 academic year. Therefore, there is more than enough data available to conduct analyses and create progress monitoring graphs. He serves on a host of editorial boards where he contributes his expertise with regard to data use in schools. Dr. Christ received the 2008 Lightner Witmer Award from Division 16 of the American Psychological Association for outstanding early career scholarship.

His leadership at CAREI supports their mission to improve the quality of education for all learners, and thereby society as a whole. CAREI has more than 45 affiliated school districts. CAREI has four service offerings: 1) evaluation, 2) research and analytics, 3) assessment, and 4) innovation & outreach. Christ will work with Van Norman to recruit participants from affiliated school districts. As applied researchers and evaluators, the people at CAREI believe they can have an immediate impact on our communities. Accordingly, they listen to and work with educational leaders and partners to understand their experiences and their challenges. Dr. Christ and the CAREI team seek to impact 80% of Minnesota students within five years. Several
psychometricians are employed at the center, all of whom will be available to collaborate with Christ and Van Norman to carry out project activities.

Dr. Christ will supervise all phases of the project. He will draw from his experience in conducting similar studies to assist Van Norman in extracting and cleaning data as well as conducting initial multilevel model building. After that, Christ will provide oversight during the identification of independent variables and creation of progress monitoring graphs. Given his experience with developing cloud based assessments and conducting teacher trainings, Christ will review the websites used with visual analysts prior to data collection. Dr. Christ will also help with conducting inferential statistical tests, authoring manuscripts that arise from this study, and mentor Van Norman in drafting new applications for external funding to continue this line of research. Dr. Christ is committed to trouble shooting issues as they arise via email and phone conferencing with Dr. Van Norman at least once a week to discuss project progress. In addition, Christ is willing to incur the necessary expenses to travel to Van Norman to work on the project as well as the expenses associated with flying Van Norman to Minneapolis to carry out project activities.
## Proposed Budget

### Phase 1 (July 2017)

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<th>Category</th>
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<tr>
<td>Stipends</td>
<td>Summer Funding (PI)</td>
<td>Extracting, cleaning, and analyzing data; creating progress monitoring graphs; creating website; recruiting participants</td>
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### Phase 2 (July 2017 – January 2018)

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<td>Stipends</td>
<td>Focus Group Reimbursement</td>
<td>$50 Gift Card x 3 Volunteers (Anticipate 3 hours of work based upon previous studies)</td>
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<td>Stipends</td>
<td>Research Participants</td>
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<td>Stipends</td>
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<td>Assist with Constructing website ($15 per hour x 50 hours) Assist with contacting state organization listserv managers ($15 per hour x 20 hours)</td>
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<td>Travel</td>
<td>Participant Recruitment</td>
<td>Georgia Association of School Psychologists Fall Conference* † Mileage: 500 Miles Round Trip x $.54 = $270 Per Diem Hotel 1 Night = $115 Meal per Diem (2 days) = $88.50 Conference Registration = $125</td>
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<td>Mid-South Conference for Psychology in the Schools* † Mileage: 564 Miles Round Trip x $.54 = $304.56 Per Diem Hotel 1 Night = $91 Meal per Diem (2 days) = $76.50 Conference Registration = $185</td>
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Phase 3 (January – May 2018)

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<td>Stipends</td>
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<td>Stipends</td>
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<td>Assist with Constructing website ($15 per hour x 10 hours)</td>
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<td>Assist with selecting progress monitoring cases from dataset ($15 per hour x 10 hours)</td>
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<td>Assist with contacting state organization listserv managers ($15 per hour x 20 hours)</td>
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<td>Travel</td>
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<td>Georgia Association of School Psychologists Spring Conference*†</td>
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<td>Mileage: 314 Miles Round Trip x $.54 = $169.56</td>
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<td>Conference Registration = $125</td>
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<td>Student Support Team Association for Georgia Educators Promising Practices Conference*†</td>
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<td>Conference Registration = $175</td>
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* Based upon last conference location / next location listed on conference website


**Indirect Costs to Georgia State University:** $0  **Total Amount Requested:** $10,776
To the selection committee,

I strongly encourage the committee to fund Dr. Ethan Van Norman to do this work. He has an exceptional record of independent scholarship and promise to make important contributions to the field of school psychology and the social sciences generally. I have consulted with Dr. Van Norman regarding the scientific rationale and operational plan proposed in this project. I am certain that we are capable of completing the activities proposed.

My Role, Capacity and Commitment as Mentor

I will provide access to data, which includes screening and progress monitoring data that spans reading, math, and social-emotional-behavioral domains. With respect to capacity, I have access to the 20+ million annual assessment administrations done within the Formative Assessment System for Teachers (FAST; www.fastbridge.net). It also includes samples from the 500,000 extant cases of CBM-Reading progress data that were collected and contributed to my research lab by prominent researchers around the country (i.e., Vaughn, Tindal, Shinn, Ardoire, Cummings). Those data were collected with each of the prominent CBM-Reading passage-sets that are used around the country (i.e., AIMSweb, DIBELS 6th, DIBELS Next, EasyCBM, FAST).

I will mentor and collaborate to design initial and iterative studies to evaluate and refine methods to model, interpret, and use progress data to guide decisions. With respect to capacity, I have access to the fourth year of a Goal 5 (measurement) project funded by the Institution for Education Sciences (R324A130161) that was aimed to develop, refine, and disseminate improve methods to model, interpret and use progress data. Although we have a one year no cost extension planned, much of this work is pending. There is an extensive backlog of unpublished findings—some of which Dr. Van Norman contributed as a graduate student many years ago. We will share technical reports and unpublished findings (along with lessons learned) with Dr. Van Norman and other members of his team. This will add substantial value and potential to his work, as it will build on an extensive set of findings that we have yet to publish. As a result, his work will extend on knowledge rather than repeat my errors and lessons learned.

I will mentor and collaborate on the selection, interpretation, and presentation of data analysis and results. Dr. Van Norman has extensive skills in these areas, but it will be a pleasure to work with him in this regard. With respect to my capacity, I direct the Center for Applied Research and Educational Improvement (CAREI; https://www.cehd.umn.edu/carei/) and FAST Labs at the University of Minnesota. I have two PhD level quantitative methodologists on staff. One of whom is a psychometrician (Dr. Dupuis) and the other an expert in longitudinal analysis (Dr. Desjardins). I routinely work and collaborate with these methodologists to address issues similar to those identified by Dr. Van Norman in his proposal (similar, but not the same issues).

I will mentor and collaborate with Dr. Van Norman to disseminate findings in peer refereed outlets, national presentations, and other applied outlets to ensure that his findings benefit the field. It will be a joy to work with him on publications and presentations. With respect to my capacity, I have more than 100 publications and more than 100 national presentations and I serve on many editorial boards. I believe I can provide useful mentoring for dissemination.

Continue on next page.
I will mentor and collaborate on the development of **online tools** for purposes of research, development, and dissemination. With respect to my capacity, I lead a team to develop FAST as an online assessment system, which required me to develop skills and networks to design, develop, quality-test, and deploy many aspects of software. I have developed knowledge and know-how with respect to backend databases, user interface, user experience/flows, functionality requirements, user-testing, and deployment. I have a network of experts in each of these domains who I employ and with whom I collaborate. This includes the team of 21 full time employees at Fast Bridge Learning, LLC where I am the founder and Chief Science and Product Officer. My experiences and these assets will benefit Dr. Van Norman’s work.

I will advise and collaborate with Dr. Van Norman to prepare and submit **applications for sponsored research**. This will be a primary focus for me as a mentor, and it is where I might provide the most value. I have substantial experience and many lessons-learned to share. With respect to my capacity, I have been PI \((n = 8)\) or Co-PI \((n = 1)\) on nine research grants funded by either IES \((\text{Goal 5, } n = 4)\) or OSEP \((n = 5)\). We currently have two active IES research projects and one OSEP research project. We have two additional IES projects pending final funding decisions in the current competition (both scored < 1.7, which is the funding range). I served as a primary author of those grant applications. I have successfully mentored multiple colleagues at the University of Minnesota who have since received research funding. I have served on the application review panel for IES over many years and for multiple competitions.

**Mentorship Schedule**
I will mentor and communicate with Dr. Van Norman on a weekly basis by phone, video conference, and email. I will meet with him in person at least once per year and I expect to meet with him two or more times per year in person. With respect to my capacity, I have funds for travel and I am very motivated to mentor and support Dr. Van Norman in any way I can.

**Advising and Mentoring**
I was Dr. Van Norman’s academic advisor, but there are differences between my prior role and the role we proposed here. Dr. Van Norman has established himself as an independent productive research, which is apparent upon review of his vita. This project will provide the structure to mentor a professional.

In the last years since Dr. Van Norman graduated, we each functioned as independent researchers. Dr. Van Norman set out to establish his own record of independent scholarship in that time. He has many first author publications and many other publications that are entirely independent of me. This project will allow us to reengage as Dr. Van Norman enters the next phase of his career. As a professional mentor and collaborator, I will work with Dr. Van Norman to facilitate advanced skills and professional dispositions toward the practice of research and scholarship. Drs. Ysseldyke, Christenson, Shapiro and others did this for me and it made all the difference.

I reviewed the proposal and described my commitment and role above. I strongly encourage you to fund this proposal. Our investment in Dr. Van Norman will yield dividends.

Sincerely,

Theodore J. Christ, Ph.D.
Professor of Educational and School Psychology
John P. Yackel Professor in Educational Assessment and Measurement
Director of the Center for Applied Research and Educational Improvement
Director of FAST Labs
Co-Director of the Research Institute for (school-based) Problem Solving
March 24, 2017

Dr. Ethan R. Van Norman  
Assistant Professor  
Department of Counseling and Psychological Services  
Georgia State University  
P.O. Box 3980  
Atlanta, Georgia 30302

Dear Dr. Van Norman:

It is without hesitation that I support your grant proposal focusing on a better understanding of how students develop and demonstrate proficiencies in oral ready fluency across the span of an academic year. In addition to reading your project description, scientific rationale, and operational plan, I have discussed the breadth and depth of the proposed activities with you. I have full confidence that you possess the necessary skills and time needed to complete your goals within the stated time frame.

As an early career faculty member in the Department of Counseling and Psychological Services here at Georgia State University (GSU), you have already demonstrated a high level of scholarly activity, including peer reviewed publications in your field’s top journals and professional presentations. Obtaining this grant and addressing the three proposed research goals will substantially assist your efforts to increase your contributions to your profession and enhance your attempts to seek additional external funding. These efforts would also coincide with your efforts to obtain promotion and tenure here at GSU.

Members of the department, including our post award management director, are also fully supportive of you completing this project. If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Brian J. Dew, Ph.D.  
Department Chair and Associate Professor
Ethan R. Van Norman Ph.D.
evannorman@gsu.edu
404-413-7068 (Office Phone)

Education

Ph.D. 2015
University of Minnesota – Twin Cities
Educational Psychology
Emphasis: School Psychology (APA & NASP Accredited)
Minor: Quantitative Methods
Internship: Heartland Area Education Agency, Des Moines IA

M.A. 2012
University of Minnesota – Twin Cities
Educational Psychology
Emphasis: School Psychology

B.S. 2010
Illinois State University
Psychology
Summa Cum Laude with University & Departmental Honors

Academic Appointments
2015 –
Assistant Professor of School Psychology
Georgia State University

Peer Reviewed Publications


Funded Projects and Evaluations


Relevant Service
2016 - Society for the Study of School Psychology Early Career Forum (Co-Chair)

Editorial Board Service
2016- Journal of School Psychology
2015 - School Psychology Review
2012 - Assessment for Effective Intervention

Awards
2017 Invited Participant – School Psychology Research Collaboration Conference
2017 Article of the Year Nominee – Journal of School Psychology
2014 Student Reviewer of the Year – Assessment for Effective Intervention
2013 Eva O. Miller Doctoral Fellow (University of Minnesota)
ABBREVIATED CURRICULUM VITAE
Theodore J. Christ, Ph.D., Professor
Department of Educational Psychology, University of Minnesota, tchrist@umn.edu

Education

2002  PhD in School & Counseling Psychology University of Massachusetts, Amherst
1999  MEd in School & Counseling Psychology University of Massachusetts, Amherst
1996  BA in Psychology and Elementary Education Westfield State College

Professional Experience

2014-  P. Yackel Endowed Professor of Educational Assessment & Measurement
2005-  Professor, University of Minnesota, Twin Cities
2014-  Director of Center of Applied Research and Educational Improvement
2009-2013 Directo r of Graduate Studies, Educational Psychology Program
2009-  Co-Director of the Research Institute for Problem Solving
2009-  Principle Panel Member (Consultant), Institute for Education Sciences Special Education Grant Application Review Panel (contracted through SRA)
2009-2016 Consultant & Member of Technical Review Committee for Assessment, National Center for Response to Intervention & National Center for Intensive Intervention, American Research Institute
2007-  Adjunct Member in Psychology & Center for Reading Research
2002-2005 Assistant Professor, School Psychology Program, University of Southern Mississippi

Honors and Awards

2017  Finalist Article of the Year Award in Journal of School Psychology
2017  Top 3 Most cited article in Journal of School Psychology 2014-2016 [x2]
2014  Innovation Award, Office of Technology Commercialization, University of Minnesota
2013  Catalyst Scholar, School Psychology Research Collaboration Conference
2011  Catalyst Scholar, School Psychology Research Collaboration Conference
2010  Most cited article in Journal of School Psychology 2006-10
2010  Mid-career Scholar, School Psychology Research Summit
2009  Award for Service as Division 16 Program Chair - APA
2009  Catalyst Scholar, School Psychology Research Collaboration Conference
2008  Lightner Witmer Award from Division 16 (School Psychology) of the American Psychological Association: “given for scholarly activity and contributions that have significantly nourished school psychology as a discipline and profession… [with] exceptional potential and promise to contribute knowledge and professional insights that are of uncommon and extraordinary quality”
2005  Early Career Scholar, School Psychology Research Collaboration Conference

Selected Grant Support
Total: $12,700,000 in research funding
Co-Investigator with P. Kendeou (PI) and K. McMaster (Co-PI), Technology-Based Early Language Comprehension Intervention (TELCI), IES, U.S. Dept. of Educ., Goal 2(Development): Cognition and Learning (CFDA 84.324). Funded 2016-2020 (Award # R324A160064), $1.5 million 3 yrs

Principal Investigator, Formative Assessment System for Teachers (FAST): Scale Up, Office of Special Education Programs (OSEP), Stepping Up (CFDA 84.327S). Funded 2015-2020, $2.5 million 5 yrs

Principal Investigator, Decision Rule Research Project: Curriculum Based Measurement in Reading, Institute for Educational Sciences, U.S. Department of Education. Goal 5: Measurement under Topic 1: Reading, Writing and Language (CFDA 84.324). Funded 2013-2017 (Award # R324A130161), $1.6 million 4 yrs

Co-Investigator with Kristen McMaster (Co-PI) and Erica Lemke (Co-PI), Supporting Teachers' Data-Based Instruction in Early Writing: Tools, Learning, and Collaborative Support, Institute for Education Sciences, U.S. Department of Education. Goal 2: Reading, Writing and Language (CFDA 84.324). Funded 2013-2017 (Award # R324A130144), $1.5 million 4 yrs

Principal Investigator, Computer Based Assessment System for Reading: Skills Analysis and Progress Monitoring, Institute for Educational Sciences, Goal 5: Measurement under Topic 1: Reading and Writing (CFDA 84.324). Funded 2012-2016 (Award # R305A120086), $1.6 million 4 yrs

Principal Investigator, Formative Assessment Instrumentation and Procedures for Reading (FAIP-R), Institute for Educational Sciences, U.S. Department of Education. Goal 5: Measurement under Topic 1: Reading, Writing and Language (CFDA 84.324). Funded 2009-2013 (Award # R324A090038), $1.6 million 4 yrs

**Selected Publications (N>97)**

**Selected Journal Articles**


**Selected Book Chapters**


