



REQUEST FOR APPLICATIONS

**SPECIAL EDUCATION RESEARCH AND
DEVELOPMENT CENTER PROGRAM**

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PART I GENERAL OVERVIEW

1. REQUEST FOR APPLICATIONS

In this announcement, the Institute of Education Sciences (Institute) invites applications for research projects that will contribute to its Special Education Research and Development Center Program. For the FY 2011 competition, the Institute will consider only applications that meet the requirements outlined below under *Part II Special Education Research and Development Center Program* and *Part III Requirements of the Proposed Research*.

Separate announcements are available on the Institute's website that pertain to the other research and research training grant programs funded through the Institute's National Center for Special Education Research and to the discretionary grant competitions funded through the Institute's National Center for Education Research (<http://ies.ed.gov/funding>).

PART II SPECIAL EDUCATION RESEARCH AND DEVELOPMENT CENTER PROGRAM

2. PURPOSE

The Institute supports special education research and development centers (R&D Centers) that are intended to contribute significantly to the solution of special education problems in the United States by engaging in research, development, evaluation, and national leadership activities aimed at improving the education system, and ultimately, student achievement. Each of the R&D Centers conducts a focused program of research in its topic area. In addition, each Center conducts supplemental research within its broad topic area and provides national leadership in advancing evidence-based practice and policy within its topic area. For information on existing Institute special education R&D Centers, please see <http://ies.ed.gov/ncser/RandD/>.

For the FY2011 Special Education Research and Development Center competition, the Institute invites applications for four Special Education Research and Development Centers: (1) **Special Education Research and Development Center on School-Based Interventions for Secondary Students with Autism Spectrum Disorders**, (2) **Special Education Research and Development Center on Assessment and Accountability**, (3) **Special Education Research and Development Center on Reading Instruction for Deaf and Hard of Hearing Students**, and (4) **Special Education Research and Development Center on Working Memory Interventions for Students with Disabilities**.

3. BACKGROUND

The Institute's R&D Centers grapple with key education issues that face our nation. Through the Institute's R&D Center program, researchers have greater resources to tackle more complex education problems, create innovative education solutions, and contribute to knowledge and theory in special education. The Institute currently funds 2 special education R&D centers through the National Center for Special Education Research and 13 national R&D centers through the National Center for Education Research. Here are examples of the types of issues that they are addressing.

- Young children who have not had sufficient language and early literacy experiences prior to kindergarten face significant challenges learning to read. These children often continue to experience poor reading skills throughout school. The *Center for Response to Intervention in Early Childhood* is creating a Response to Intervention model including innovative approaches to promote the development of language and early literacy skills and an assessment system for tracking children's progress.
- Educators and policymakers argue that major impediments to increasing college enrollment among low-income students are the complexity of the federal application

process for financial aid and the lack of information that families have about financial aid. The *National Center for Postsecondary Research* is testing interventions to determine which combination of services, including direct assistance with completing the FAFSA (Free Application for Federal Student Aid) application process, will improve access to postsecondary education for low-income students.

- School districts are experimenting with the use of incentives for teachers, administrators, and schools to improve the quality of education in their schools. How should performance incentive programs be structured to achieve desired goals and minimize unintended negative consequences? The *National Center for Teacher Performance Incentives* is conducting a number of studies to test the effects of different parameters for incentive programs on student outcomes.
- For the past several decades, students with emotional and behavioral disorders have had the poorest educational, behavioral, and social post-school outcomes of any disability group, yet very little research exists to inform practice with this population of high school age students. The *Center on Serious Behavior Disorders at the Secondary Level* is developing and evaluating a comprehensive package of interventions to improve outcomes for students through enhancing school and teacher capacity, building youth competence, and increasing family and community supports.
- Despite advances in education technology, many argue that the full potential of electronic media for educational purposes has yet to be reached. Typical products are not ones that students would naturally gravitate to outside of school — lacking high quality graphics and sounds, sophisticated user interface, a reward structure that cultivates a strong sense of motivation, and engaging activities that maintain the user's attention. The Institute is currently funding two R&D centers in education technology. The centers are capitalizing on rich multimedia gaming environments to create innovative instructional products: one Center is focusing on teaching mathematics to ninth graders and the other is addressing science content for seventh graders.
- The recent development of state longitudinal data systems offers the opportunity to answer a multitude of education policy-relevant questions, but requires sophisticated methodological expertise to handle complicated datasets and complex analyses. *The Center for the Analysis of Longitudinal Data in Education Research* (CALDER) brings together a group of economists with such expertise to take advantage of comprehensive education databases in Florida, Missouri, New York, North Carolina, Texas and Washington state to examine the relations between teacher workforce and governance policies (e.g., certification, compensation, accountability, and choice) and key education outcomes (e.g., student achievement, graduation rates, teacher retention).

For its FY 2011 R&D Center competition, the Institute is interested in applications that offer the greatest promise for (1) contributing to the solution of a specific special education problem within the R&D Center topic described below and to the generation of new knowledge and theories relevant to the focus of the R&D Center, (2) providing relatively rapid research and scholarship on supplemental questions that emerge within the R&D Center's topic area and that are not being addressed adequately elsewhere, and (3) providing national leadership within the R&D Center's topic by developing position papers, hosting meetings, and engaging in dialogue with researchers and practitioners in order to identify promising areas of research, development, and dissemination for the field and to advance evidence-based policy and practice.

PART III REQUIREMENTS OF THE PROPOSED RESEARCH

4. TOPIC ONE: REQUIREMENTS FOR SPECIAL EDUCATION RESEARCH AND DEVELOPMENT CENTER ON SCHOOL-BASED INTERVENTIONS FOR SECONDARY STUDENTS WITH AUTISM SPECTRUM DISORDERS

According to the Centers for Disease Control and Prevention (2009), one in 110 children have an autism spectrum disorder (ASD). Autism is a pervasive disorder affecting multiple developmental outcomes (e.g., behavior, communication, cognitive skills). The heterogeneity of deficits pose a significant challenge for schools in determining how best to meet the needs of each child within the least restrictive environment.

In general, there is a lack of research on secondary students with ASD (McGovern & Sigman, 2005; Seltzer, Shattuck, Abbeduto, & Greenberg, 2004). The research to date suggests that despite some mitigation in the severity of some symptoms (e.g., communication deficits) associated with ASD as children grow older (Howlin, Goode, Hutton, & Rutter, 2004; Murphy, Beadle-Brown, Wing, Gould, Shah & Holmes, 2005, Seltzer et al., 2004), significant deficits persist that can affect a range of educational, social, and transition outcomes. For example, reading and math skills for secondary students with ASD are, on average, 4 and 5 years below grade level, respectively (Wagner et al., 2003). Social skill impairments, one of the core deficits in children with ASD, persist in adolescence and adulthood (Selzer et al., 2004; Wagner et al., 2003); social skill deficits are associated with poor development of adaptive skills (McGovern & Sigman, 2005). Behavioral problems, such as challenging behavior and resistance to change, are often long-term issues (Murphy et al., 2005) and may limit successful transition outcomes such as employment (Howlin et al., 2004).

Little attention has been given to the development and evaluation of interventions and strategies for secondary students with ASD (Graetz, 2004; Hendricks & Wehman, 2009; Machalicek, O'Reilly, Beretvas, Sagafoos & Lancioni, 2007). Through the research grant program on Autism Spectrum Disorders, the Institute has funded eight projects to develop or evaluate school-based comprehensive interventions for children with ASD. These projects target preschool and early elementary school children with ASD. Although the Institute's ASD research portfolio is growing, the Institute recognizes that a largely neglected area is interventions for middle and high school students with ASD. To address this need, the Institute is establishing a Special Education National Research and Development Center on School-Based Interventions for Secondary Students with Autism Spectrum Disorders (Autism Research Center). The purpose of this Center is to conduct a program of research to develop and evaluate a comprehensive, school-based intervention program for secondary students with ASD (middle or high school) that is intended to improve cognitive, communicative, academic, social, behavioral, functional, or transition outcomes. By comprehensive intervention, the Institute means an intervention that is designed to address two or more of these outcomes (e.g., academic and behavioral). Applications that propose to develop and evaluate only a singular intervention (e.g., a social skills intervention only) will not be accepted under this Request for Applications. By school-based, the Institute means that the intervention is designed to be implemented in schools alone or schools with a home or community component that may involve non-school staff.

For its focused program of research, the Special Education Autism Research Center is required (a) to develop, or modify an existing, school-based intervention to address multiple student outcomes (e.g., academic, behavioral, cognitive, communicative, social, transition) for students with ASD in middle or high school, and (b) to conduct an efficacy study of the impact of the intervention on student outcomes. Applicants might, for example, consider integrating existing social, behavioral, and literacy interventions in a way that would allow teachers to support middle school students with ASD in general education classrooms. The Institute encourages applicants to develop instructional approaches or strategies appropriate for students in middle and high school with ASD that will improve skills across academic or vocational instruction.

In addition to its focused program of research on the development and evaluation of a comprehensive school-based intervention for students with ASD, the Autism Research Center will conduct supplementary studies and engage in national leadership activities relevant to school-based interventions for secondary students with ASD.

A. Significance of the Focused Program of Research

Under significance of the project, applicants provide a compelling rationale justifying why the proposed research is important to conduct. Specifically, applicants should address the following three questions. (1) What is the target population of ASD students (e.g., high school students with ASD) and the specific outcomes (e.g., transition, communicative, reading) that the proposed intervention will address and why should the Autism Research Center focus its efforts on these outcomes for these students? (2) What intervention will be developed, including the theoretical and empirical rationale for and practical importance of the intervention? (3) Why is the proposed research important to conduct? By addressing these three questions, applicants are addressing aspects of the significance of their proposal.

a. Target population and outcomes

The Institute recognizes that ASD covers a wide spectrum of deficits and that interventions appropriate for some students with ASD would not be appropriate for others. Applicants should clearly describe who the target population will be and how they will be identified. Applicants should specify the outcomes that will be addressed by the proposed intervention (e.g., transition outcomes, communication skills).

b. Intervention to be developed

Applicants must propose to develop a comprehensive, school-based intervention for middle or high school students with ASD. By comprehensive intervention, the Institute means an intervention that is designed to address two or more of the following types of outcomes: cognitive, communicative, academic, social, behavioral, functional, or transition outcomes. Applications that propose to develop and evaluate only a singular intervention (e.g., a social skills intervention only) will not be accepted under this Request for Applications. By school-based, the Institute means that the intervention is designed to be implemented in schools alone or schools with a home or community component that may involve non-school staff. The applicant should include a description of the intervention (components and how it will be used) and the theory of change for the intervention. Applicants should provide a strong theoretical and empirical rationale for the intervention. Applicants should explain why the proposed intervention is likely to produce substantially better outcomes for secondary students with ASD relative to current practice. A clear comparison of the proposed intervention with typical practice helps reviewers determine if the proposed intervention has the potential to produce substantially better student outcomes because it is sufficiently different from current practices and has "active ingredients" that appear on the basis of theoretical or empirical reasons to be powerful agents for improving the outcomes of interest. In the rationale to support the proposed intervention, applicants should address the *practical* importance of the proposed intervention. For example, would the proposed intervention be both affordable for and easily implemented by schools?

c. Importance of the proposed research

As described in *Sections 4.A.a* and *4.A.b*, the applicant should describe and justify the selection of the target population and outcomes to be addressed and describe the proposed intervention. All of this information lends support to the applicant's justification for the importance of the proposed focused program of research. In addition, applicants should clearly summarize for reviewers their argument for why the proposed focused program of research is important to fund.

B. Research Plan for the Focused Program of Research

a. Methodological requirements for developing a comprehensive intervention for secondary students with ASD

For the Autism Research Center, applicants must propose to develop a comprehensive, school-based intervention for secondary students with ASD. Applicants must provide a detailed description of the

methods for developing the proposed intervention. Applicants should articulate the proposed methods for testing the feasibility of implementation of the prototype in an authentic education delivery setting. Applicants should describe the systematic process they will use to collect empirical data that will provide feedback for refining the intervention. Applicants should provide sufficient detail to allow reviewers to judge their capacity to develop, refine, and improve the intervention so that the intervention operates as intended when implemented by the target user. In strong applications, reviewers will be able to understand (a) what will be developed, (b) how it will be developed, and (c) when the development will take place (e.g., timeline for the research activities). Applicants should describe what they would measure or observe to determine whether the intervention is working as intended when they are testing the feasibility of successive versions of the intervention. A useful by-product of such testing is a set of fidelity of implementation measures that can be used in the efficacy trial of the intervention.

b. Methodological requirements for evaluating the efficacy of the comprehensive intervention

Applicants must provide a detailed description of the research design, methods, and data analysis plan for evaluating the efficacy of the intervention. Applicants should include well-specified objectives that link to their design and analysis plans. Applicants should describe how potential threats to internal and external validity would be addressed. Studies using randomized assignment to treatment and comparison conditions are strongly preferred. *Only in circumstances in which a randomized trial is not possible* may alternatives that substantially minimize selection bias or allow it to be modeled be employed. Acceptable alternatives include appropriately structured regression-discontinuity designs or other well-designed quasi-experimental designs that come close to true experiments in minimizing the effects of selection bias on estimates of effect size.

Applicants should describe the proposed measures, provide technical information on the reliability and validity of the measures, and detail procedures for collecting and coding data. In strong applications, applicants use the proposed theory of change as a framework and make clear how the proposed measures link to the proximal and distal outcomes that the intervention is intended to change. In strong applications, applicants would detail procedures for measuring the fidelity of the implementation of the intervention. Applicants must include a detailed description of their data analysis plan.

c. Timeline

Applicants should include a timeline that makes clear when research activities will be conducted. For example, researchers should make clear when development studies will be conducted and when evaluation activities (e.g., recruiting sample, developing measures, implementing intervention) will be conducted.

5. TOPIC TWO: REQUIREMENTS FOR SPECIAL EDUCATION RESEARCH AND DEVELOPMENT CENTER ON ASSESSMENT AND ACCOUNTABILITY

For well over a decade, there has been an increased demand for accountability in education focused on improved student academic performance. This focus on academic achievement has resulted in a shift in accountability models in special education from one that emphasized compliance with policies and procedures set forth in the Individuals with Disabilities Act (IDEA), to one that focuses on measuring student outcomes in order to gauge the quality of academic programming provided to students with disabilities (McLaughlin & Thurlow, 2003).

This emphasis on holding schools accountable for academic outcomes is intended to lead to improved student performance, but this had not necessarily been realized for students in special education. Overall, students with disabilities continue to lag significantly behind their peers without disabilities. For example, the National Assessment of Educational Progress (NAEP) shows that in 2005, only five percent of high school seniors with disabilities performed at or above the proficient level on the NAEP reading assessment.

Holding schools accountable for the achievement of students with disabilities has led to much discussion on the most appropriate ways to measure the achievement of students with disabilities (e.g., accommodations in test taking conditions, alternate standards). At minimum, however, to raise academic achievement for students with disabilities, schools need data that will accurately measure individual student progress from year to year and some means to gauge whether or not individual students are making reasonable progress. Understanding the yearly progress made by students will provide teachers and schools with information necessary to make important instructional and programmatic decisions for students with disabilities.

Measuring progress for students with disabilities raises many questions about what is expected for their achievement over the course of a year. The recent emphasis on accountability has raised expectations for the performance of students with disabilities to achieve the same academic standards as their peers without disabilities. It could also be argued however, that by nature of having a disability, students with disabilities cannot be expected to learn at the same rate as their peers without disabilities. Questions remain as to what progress can be expected within a specified time frame. For example, how much growth can be expected in one year for students with different types of disabilities? Should we expect growth patterns for students with disabilities similar to typical growth for their peers without disabilities? Do patterns of growth differ by type and severity of disability? If growth patterns for students with some types of disabilities differ from students without disabilities, then we need information on how best to aggregate data at the classroom and building-level for accountability purposes.

The field has not, however, reached consensus in determining the best method for measuring academic progress over time. A common model used to measure student progress has been a status model, which measures student performance in the aggregate at the end of one year, and compares those results with scores from the prior year. These assessments tell us how schools and districts are performing systemically based on some external criteria of proficiency, but do not tell us about the general progress or rate of growth of students in that group. As a whole, results may show that students with disabilities are not performing well or not meeting proficiency, but results are not able to show whether students with disabilities made any significant growth in skills over the past year. Furthermore, students with disabilities, as do all students, enter the school year with great disparity in skills and knowledge so aggregating scores does not allow schools to pinpoint which students are having the most difficulty improving academically.

One promising method proposed to measure student performance is the use of growth or value-added models. Growth models allow schools to assess each individual student's progress and allow a comparison of each student's progress against his/her own achievements from the prior year, as well as compare each student's rate of growth to those of other students. Properly designed growth model assessments have the potential to allow teachers and schools to see more clearly whether schools are working to address the needs of individual students with disabilities.

Currently there is no consensus on the most appropriate growth model to use to assess student progress or school performance. The proposed models range from relatively straightforward fixed effects models to relatively complex and general multivariate, longitudinal mixed-models (e.g., McCaffrey et al., 2004; Tekwe et al., 2004). In addition, for growth models to be used by schools, they need to be simple enough to understand and interpret, but still accurately capture individual student progress. Relatively little research has been done to date comparing various growth models. However, at least one team of researchers has compared various complexities of models and found that there was little or no benefit to using the more complex growth model to capture student progress, but students who were enrolled in special education programs were excluded from all analyses (Tekwe et al., 2004).

Researchers have also raised numerous questions about the use of growth models to measure student progress. For example, technical questions remain as to whether and how to include covariates in the models, and whether teacher or schools should be treated as fixed or random effects. Growth models of

student performance will often have missing data because not all students will have data available for all time points tested, and there is yet no commonly accepted method for handling missing data, or determining how much missing data is acceptable before it compromises validity of the procedure.

In addition, some researchers have argued that vertical scaling of tests, a method to link a set of test forms of increasing difficulty, should occur to facilitate the tracking of growth over time. Although not required to conduct a growth model, use of vertical scaling has the potential to enrich the interpretations of test scores and growth trajectories of students by providing a systematic way to examine performance across grade spans (Patz, 2007). Questions remain as to the most valid approach to this analysis, as well as the necessity of this procedure for growth models that measure academic performance of students.

To address these issues, the Institute is establishing a Special Education Research and Development Center on Assessment and Accountability (Special Education Assessment/Accountability Center). The focus of the Special Education Assessment/Accountability Center is on conducting a program of research that identifies the academic growth trajectories of students with disabilities, and develops and tests practical and relevant methods of accurately measuring academic growth for students with disabilities to be used in accountability systems. *The ultimate objective of such work would be to develop assessment methods that schools can use to (1) accurately assess the academic progress of students with disabilities and (2) improve the quality of education provided to students with disabilities to lead to improved student outcomes.*

In addition to its focused program of research on assessing growth for students with disabilities, the Special Education Assessment/Accountability Center will conduct supplementary studies and engage in national leadership activities relevant to assessment of students with disabilities.

A. Significance of the Focused Program of Research

For its focused program of research, the Special Education Assessment/Accountability Center is required (a) to conduct research on the natural developmental progress in achievement by students with disabilities and (b) to develop and test various approaches for measuring growth for students with disabilities intended for use by school systems for accountability purposes.

B. Research Plan for the Focused Program of Research

a. Methodological requirements

(i) Research plan.

Applicants should describe their research plan clearly and in sufficient detail for reviewers to understand what the applicants are proposing to undertake and to judge the degree to which following the plan will yield answers to the posed hypotheses or research questions. The research plans should provide evidence that the applicant anticipates and has alternative approaches if difficulties are encountered.

For work involving secondary data analyses, applicants should describe clearly the database(s) to be used in the investigation including information on sampling design, sample characteristics, variables to be used, structure of the database, and ability to ensure access to the database if the applicant does not already have access to it. The database should be described in sufficient detail to allow reviewers to be able to judge whether or not the proposed analyses may be conducted with the database. If multiple databases will be linked to conduct analyses, applicants should provide sufficient detail for reviewers to be able to judge the feasibility of the plan.

Applicants may propose to collect original data. The applicant should carefully describe the sample (including inclusion/exclusion criteria), measures (including reliability and validity), and procedures proposed for the data collection.

(ii) Access to data.

Applicants proposing secondary data analyses must provide sufficient documentation (e.g., letters of agreement) to assure reviewers that they already have access to the data or that access can be obtained and the project can be carried out in a timely fashion.

(iii) Data analysis.

The applicant must include detailed descriptions of data analysis procedures. Data analytic plans must have sufficient detail to permit reviewers to judge the appropriateness and adequacy of the plan for addressing the hypotheses or research questions. Where analyses of existing or new datasets are included, strong applications will include an explicit discussion of how exclusion from testing, or missing data, will be handled within the statistical analyses.

6. TOPIC THREE: REQUIREMENTS FOR SPECIAL EDUCATION RESEARCH AND DEVELOPMENT CENTER ON READING INSTRUCTION FOR DEAF AND HARD OF HEARING STUDENTS

Poor literacy skills have been characteristic of the deaf population for decades. National data suggest that median literacy rates of deaf high school graduates have remained consistently around the fourth grade level since the beginning of the twentieth century (Allen, 1994). About one in five deaf students who graduate from high school have reading skills at or below the second grade level; about one in three deaf students who graduate from high school have reading skills between the second and fourth grade level (Dew, 1999). Compared to deaf students, hard of hearing students (i.e., those with mild to moderate hearing loss) fare better overall, but even mild hearing losses can create significant challenges for developing reading skills (Marschark et al., 2009).

In general, deaf children of deaf parents tend to read better than do deaf children of hearing parents. However, the majority of children who are deaf or hard of hearing are born to hearing parents who are not likely to be fluent or proficient in sign language and are in the process of learning the language themselves (e.g., Goldin-Meadow & Mayberry, 2001). This may limit opportunities for linguistic input to young deaf children with hearing parents.

Recently, researchers have begun to focus on whether the findings of the National Reading Panel (2000) apply to young students who are deaf or hard of hearing (e.g., Schirmer & McGough, 2005) and whether hearing children and children who are deaf or hard of hearing share the same significant predictors of literacy attainment (Kyle & Harris, 2006). For example, one predictor receiving considerable attention among researchers is phonological awareness. For young children with normal hearing sensitivity, research on the importance of phonological awareness and explicit phonics instruction indicates that children who do not learn the alphabetic principle (i.e., letters represent sounds that blend together to make meaningful words) experience significant difficulties obtaining proficient reading skills (National Reading Panel, 2000). However, the role and importance of phonological awareness in the development of reading for deaf children is still not clear (e.g., Allen et al., 2009; Wang, Trezek, Luckner, & Paul, 2009). Similar questions exist related to the importance of other factors, such as language processing skills, vocabulary, syntactic proficiency in the primary language, and speechreading for overall literacy attainment (Chamberlain & Mayberry, 2008; Kyle & Harris, 2006; Marschark et al., 2009).

The Institute recognizes that proficiency in reading is critical for furthering one's education and achieving success in the workplace and that improving reading outcomes for students who are deaf or hard of hearing requires substantial additional research, particularly research to identify, develop, and test instructional approaches, curricula, and other innovative education interventions designed to enhance the reading skills of students who are deaf or hard of hearing.

To complement its existing research programs in literacy education, the Institute is establishing a Special Education Research and Development Center on Reading Instruction for Deaf and Hard of Hearing

Students (Reading/DHH Center). This Center will conduct a focused program of research to further explore underlying factors related to literacy for young students who are deaf or hard of hearing (kindergarten through Grade 2) and to develop innovative approaches to improving reading instruction for these students. The innovative approaches for improving instruction supported by this Center may include instructional strategies to be implemented by teachers or other school specialists as well as innovative instructional approaches delivered through other means such as adaptive computerized tutoring, or instruction delivered through other innovative approaches but must be designed to be implemented in authentic education delivery settings (e.g., schools). The Center will focus on improving literacy skills for students in early elementary school (i.e., kindergarten through Grade 2) to maximize the potential long term impact of early literacy skills intervention on literacy development and overall school performance.

In addition to its focused program of research on improving reading instruction for students who are deaf or hard of hearing, the Reading/DHH Center will conduct supplementary studies and engage in national leadership activities relevant to improving reading outcomes for students who are deaf or hard of hearing.

A. Significance of the Focused Program of Research

For its focused program of research, the Reading/DHH Center is required (a) to explore underlying factors that impede reading and language skills of young students (kindergarten through Grade 2) who are deaf or hard of hearing for the purpose of identifying possible targets for intervention and (b) to develop and test innovative instructional approaches or other interventions for students who are deaf or hard of hearing that utilize research on these underlying factors. By (1) clearly identifying the students who will be the target of the new instructional approaches or interventions, (2) providing a compelling rationale for the underlying factors explored and their potential contribution to reading difficulties, and (3) clearly describing the instructional approaches or interventions to be developed and tested, applicants are addressing the *significance of the focused program of research*.

a. Identification of students

Applicants should clearly describe who the target population will be and how they will be identified. The focused program of research (i.e., exploration of underlying factors and development of innovative instructional approaches) must target students from kindergarten through Grade 2 who are deaf or hard of hearing.

b. Rationale for factors to be explored

Applicants must propose to conduct studies intended to extend our knowledge of the underlying factors that inhibit or constrain reading and language performance in students who are deaf or hard of hearing. Applicants should clearly describe the theoretical and empirical rationale for studies designed to explore underlying factors of learning difficulties in reading and language and identify possible targets for intervention. The rationale should include a discussion of how this new knowledge of the underlying factors could inform the development of innovative instructional approaches or interventions.

c. Rationale for innovative instructional approaches that will be developed

Applicants to the Reading/DHH Center must propose research to develop innovative instructional approaches or other education interventions for teaching reading to students who are deaf or hard of hearing. The Institute expects the Reading/DHH Center to develop reading interventions that are based on *current* knowledge about the factors underlying reading and language performance of deaf and hard of hearing students, in addition to developing interventions based on the exploratory research that the Center conducts. The instructional approaches or intervention to be developed must be designed to be implemented in authentic education delivery settings (e.g., classrooms). The instructional approaches or intervention may be implemented by classroom teachers, delivered by school specialists, incorporate adaptive computerized tutoring, or use other school-based delivery mechanisms.

Although results of the exploratory work will influence the development of instructional approaches or interventions, in order for reviewers to assess applicants' capacity to carry out the research to develop new interventions, applicants should provide an example of how they would conduct such research based on existing knowledge about factors that underlie reading and language performance for students who are deaf or hard of hearing. As part of the Significance section, applicants should describe the instructional approach or intervention to be developed. Applicants should provide a strong theoretical and empirical justification for the design of the intervention.

B. Research Plan for the Focused Program of Research

a. Methodological requirements for exploring the underlying factors that impede language and literacy performance

For the Reading/DHH Center, applicants should clearly describe a set of studies designed to explore the factors underlying the language and literacy performance of students who are deaf or hard of hearing. Such studies might include, for example, short-term longitudinal studies in which the objective is to identify the component processes and skills that are (a) highly correlated with reading proficiency, and (b) can be improved, accelerated, or advanced through instruction. The researcher should make explicit the hypothesized link between the underlying factors and improving reading. Another approach to these exploratory questions is to begin by identifying a constellation of observed behaviors indicating reading difficulties, and then propose a research plan to explore systematically possible causal explanations for that problem.

b. Methodological requirements for developing innovative instructional approaches

For the Reading/DHH Center, applicants must propose to conduct a series of studies to develop innovative instructional approaches or interventions for improving reading instruction for students who are deaf or hard of hearing. The Institute recognizes that detailing all of the studies in the series may not be possible, particularly when later experiments depend on the results of earlier experiments in the series. However, applicants must provide sufficient detail for reviewers to judge the quality of the proposed program of research. Applicants may, for example, describe the overall approach of the focused program of research and provide specific details for two or three exemplar studies.

Strong applications will include clear descriptions of: (1) the characteristics of students who will participate in the studies; (2) the procedures for developing the instructional approaches or interventions; and (3) the research design and procedures (including measures and procedures for collecting and analyzing data) for determining if the instructional approaches or intervention function as intended. It is helpful if applicants explain: (a) how they define "operating as intended" for the proposed instructional approaches or intervention; (b) what data they will collect to determine how the instructional approaches or intervention are operating; (c) how they will use the data they collect to make further revisions to the instructional approaches or intervention; and (d) what criteria they will use to determine if the instructional approaches or intervention operate as intended.

Applicants should propose studies that address the feasibility of implementing the instructional approaches or interventions in authentic education delivery settings and the promise of the intervention for achieving the intended outcomes. Feasibility should be demonstrated on a sample of users (e.g., teachers, students) who are like those for whom the intervention is intended and should show that they can utilize or implement the intervention in the way that the researchers intend the intervention to be implemented. The promise of the intervention for achieving the intended outcomes can be demonstrated through small experimental or quasi-experimental studies.

c. Timeline

Applicants should include a timeline that makes clear when research activities will be conducted. For example, researchers should make clear when specific development activities will occur so that data

collected during the implementation of initial versions of interventions can be used to revise subsequent versions.

7. TOPIC FOUR: REQUIREMENTS FOR SPECIAL EDUCATION RESEARCH AND DEVELOPMENT CENTER ON WORKING MEMORY INTERVENTIONS FOR STUDENTS WITH DISABILITIES

Research over the past two decades has demonstrated that performance on working memory measures is highly predictive of academic skills such as reading, oral language comprehension, and mathematics (e.g. Bull & Scherif, 2001; Cain & Oakhill, 2006; Engle, Carullo, & Collins, 1991; Gathercole, Brown, & Pickering, 2003; Geary, Hoard, Nugent, & Byrd-Craven, 2007; Swanson, Zheng, & Jerman, 2009). Deficits in working memory may potentially limit children's ability to learn and function in school (Alloway, Gathercole, Kirkwood, & Elliott, 2009). Although it is not yet well understood how working memory contributes to academic skills, it has been suggested that learning is hampered or fails when the working memory demands of the task exceed working memory capacity (Ayres, 2009; Gathercole, Lamont & Alloway, 2006). For example, if solving a mathematics problem requires the student to execute four procedures in a specific order, a child with low working memory may not be able to execute all of the steps in the proper sequence whereas the child's peer without working memory limitations may experience little difficulty in performing the same sequence of steps.

Working memory deficits are well documented in children with disabilities (see Alloway & Gathercole, 2006; Berch & Mazocco, 2007; Pickering, 2006). For example, children with reading disabilities have specific difficulties in retrieving speech based codes and monitoring attentional processes (e.g., Swanson et al., 2009). Whether specific components of working memory are impaired has also been explored in other groups of children with or at risk for disabilities including mathematical learning disabilities (e.g., Geary et al., 2007), intellectual disabilities (e.g., Henry & Winfield, 2010), speech and language impairments (e.g., Archibald & Gathercole, 2006), autism (e.g., Bennetto, Pennington, & Rogers, 1996), and attention deficit/hyperactivity disorder (e.g., Rapport, Alderson, Kofler, Sarver, Bolden & Sims, 2008). The underlying premise of this body of research is that a greater understanding of the working memory limitations in children with disabilities will ultimately inform the development of interventions and result in improved school outcomes. To date, however, relatively little research has been conducted to develop and evaluate innovative approaches to minimize working memory demands in the classroom (e.g., Gathercole & Alloway, 2008) or directly improve working memory (e.g., Holmes, Gathercole, & Dunning, 2009; Klingberg et. al., 2005; Swanson, Kehler, & Jerman, 2010) for those school-aged students who are most at risk for academic failure – students with disabilities.

To complement its existing research programs on improving instruction for children with disabilities, the Institute is establishing the Special Education Research and Development Center on Working Memory Interventions for Students with Disabilities (Working Memory Center) to support research that explicitly capitalizes on the growing body of cognitive research on working memory deficits and translates this research into education interventions for children with disabilities. The Institute intends for the Working Memory Center to improve student learning by developing instructional approaches or other innovative education interventions for students with or at risk for disabilities who have working memory deficits. Innovative approaches for improving instruction may involve instructional strategies to be implemented by teachers, instruction delivered through adaptive computerized tutoring, or instruction delivered through other innovative approaches. The interventions must be designed to be implemented in formal education delivery settings (e.g., schools). The Working Memory Center will apply current research on reducing working memory task demands (e.g., Ayres & van Gog, 2009; Pashler et. al., 2007; see also Gathercole & Alloway, 2008) and/or improving working memory (e.g., Jaeggi, Buschkuhl, Jonides, & Perrig, 2008; Klingberg et. al., 2005; St. Clair-Thompson, Stevens, Hunt, & Bolder 2010; Swanson et al., 2010; Turley-Ames & Whitfield, 2003) to improve learning of basic academic content and skills (reading, writing, mathematics, science, social studies) or general study skills for children with disabilities or at risk for disabilities. Although development of interventions will comprise the majority of research conducted through the focused program of research, the Working Memory Center will also conduct studies intended to extend our knowledge of the role of working memory in learning academic content *or* efficacy studies

to rigorously evaluate the effects of their interventions on student learning as part of their focused program of research.

In addition to its focused program of research on developing interventions that are intended to improve academic outcomes, the Working Memory Center will conduct supplementary studies related to working memory and the improvement of education outcomes for students with or at risk for disabilities and engage in national leadership activities.

A. Significance of the Focused Program of Research

For its focused program of research, the Working Memory Center is required to conduct research to develop and test interventions for students with or at risk for disabilities who have working memory deficits. The interventions will be designed to improve learning of academic content directly (e.g., reducing length and complexity of instructions or information) or to enhance cognitive functioning in ways that will improve learning of academic content (e.g., devising ways to teach students to remember multi-step procedures that could be applied to learning academic content). In addition, the interventions will be designed to be implemented in formal education settings. As part of their proposed focused program of research, applicants will also include either exploratory studies to extend our knowledge of the role of working memory in learning academic content *or* an efficacy study to rigorously evaluate the effects of their interventions on student learning.

By (1) clearly identifying the students who will be the target of the interventions, (2) describing the instructional approaches or interventions to be developed, and (3) providing a compelling theoretical and empirical rationale for the entire focused program of research, applicants are addressing the *significance of the focused program of research*.

a. Identification of students with disabilities or at risk for disabilities

Applicants should clearly describe and justify the criteria that will be used to identify students with disabilities or at risk for disabilities who have working memory deficits. Applicants must target older elementary or middle school students and must include plans to work with students across a minimum of three grades (e.g., Grades 4 through 6). The Institute recognizes that districts across the country define "older elementary" and "middle school" in different ways (e.g., older elementary might be Grades 3 through 5 or Grades 4 through 6) and that such constraints may contribute to decisions regarding their target grade range. Applicants may choose to focus on a particular group of students with disabilities (e.g., reading disability, math disability, intellectual disability).

b. Rationale for the instructional approaches or interventions that will be developed

The Institute is requesting proposals in which researchers apply *current* knowledge about working memory to develop instructional approaches or other interventions designed to improve learning outcomes for students with disabilities or at risk for disabilities who have working memory deficits. In addition, applicants may develop interventions based on exploratory research that the Center conducts. The instructional approaches or intervention to be developed must be designed to be implemented in formal education delivery settings (e.g., classrooms). The instructional approaches or intervention may be implemented by classroom teachers, delivered by school specialists, incorporate adaptive computerized tutoring, or use other school-based delivery mechanisms.

In order for reviewers to assess applicants' capacity to carry out the research to develop new interventions, applicants should provide an example of how they would conduct such research based on existing knowledge about working memory deficits. Applicants should describe the instructional approach or intervention to be developed. Applicants should provide a strong theoretical and empirical justification for the design of the intervention.

c. Rationale for the entire focused program of research

In addition to developing interventions, as part of their proposed focused program of research, applicants must also include exploratory studies to extend our knowledge of the role of working memory in learning academic content *or* an efficacy study to rigorously evaluate the effects of their interventions on student learning. Applicants should provide a compelling theoretical and empirical justification for the proposed research program.

B. Research Plan for the Focused Program of Research

a. Methodological requirements for developing innovative instructional approaches or education interventions

For the Working Memory Center, applicants must propose to conduct a series of studies to develop innovative instructional approaches or interventions for improving instruction for students with working memory deficits. The Institute recognizes that detailing all of the studies in the series may not be possible, particularly when later experiments depend on the results of earlier experiments in the series. However, applicants must provide sufficient detail for reviewers to judge the quality of the proposed program of research. Applicants may, for example, describe the overall approach of the focused program of research and provide specific details for two or three exemplar studies.

Strong applications will include clear descriptions of: (1) the characteristics of students who will participate in the studies; (2) the procedures for developing the instructional approaches or intervention; and (3) the research design and procedures (including measures, and procedures for collecting and analyzing data) for determining if the instructional approaches or intervention function as intended. It is helpful if applicants explain: (a) how they define "operating as intended" for the proposed instructional approaches or intervention; (b) what data they will collect to determine how the intervention or instructional approaches are operating; (c) how they will use the data they collect to make further revisions to the instructional approaches or intervention; and (d) what criteria they will use to determine if the instructional approaches or intervention operate as intended.

Applicants should propose studies that address the feasibility of implementing the instructional approaches or intervention in formal education delivery settings and the promise of the intervention for achieving the intended outcomes. Feasibility should be demonstrated on a small sample of users (e.g., teachers, students) who are like those for whom the intervention is intended and should show that they can utilize or implement the intervention in the way that the researchers intend the intervention to be implemented. The promise of the intervention for achieving the intended outcomes can be demonstrated through small experimental or quasi-experimental studies.

b. Methodological requirements for additional studies in the focused program of research

For the Working Memory Center, applicants must propose additional studies as part of their focused program of research. These studies may be exploratory studies to extend our knowledge of the role of working memory in learning academic content *or* an efficacy study to rigorously evaluate the effects of their interventions on student learning.

Applicants proposing exploratory studies should clearly specify their hypotheses and the design of the exploratory studies. Applicants should describe the sampling procedures, proposed measures, provide technical information on the reliability and validity of the measures, and detail procedures for collecting and coding data. Applicants must provide a detailed data analysis plan that clearly links the analysis to the proposed hypotheses or research questions. Although the majority of the exploratory research should be conducted with children who are in the target grades for the center's work (i.e., older elementary or middle school students), some exploratory research may be conducted with older students (e.g., college students, samples of convenience) or in laboratory settings.

Applicants proposing an efficacy study should clearly specify their hypotheses and provide a detailed research design. Applicants should describe how potential threats to internal and external validity would

be addressed. Studies using randomized assignment to treatment and comparison conditions are strongly preferred. Only in circumstances in which a randomized trial is not possible may alternatives that substantially minimize selection bias or allow it to be modeled be employed. Acceptable alternatives include appropriately structured regression-discontinuity designs or other well-designed quasi-experimental designs that come close to true experiments in minimizing the effects of selection bias on estimates of effect size. Applicants should describe the proposed measures, provide technical information on the reliability and validity of the measures, and detail procedures for collecting and coding data. In strong applications, applicants use the proposed theory of change as a framework and make clear how the proposed measures link to the proximal and distal outcomes that the intervention is intended to change. In strong applications, applicants would detail procedures for measuring the fidelity of the implementation of the intervention. Applicants must include a detailed description of their data analysis plan.

c. Timeline

Applicants should include a timeline that makes clear when research activities will be conducted. Researchers should make clear when development activities will occur and when additional studies in the focused program of research will take place. For example, applicants proposing to conduct exploratory studies should make clear how results from exploratory studies feed into development activities.

8. GENERAL REQUIREMENTS OF THE PROPOSED RESEARCH

A. Basic Requirements

a. Resubmissions

Applicants who intend to revise and resubmit a proposal that was submitted to one of the Institute's previous competitions but that was not funded must indicate on the application form that their FY-2011 proposal is a revised proposal. Their prior reviews will be sent to this year's reviewers along with their proposal. Applicants should indicate the revisions that were made to the proposal on the basis of the prior reviews using no more than 3 pages of Appendix A.

Applicants who have submitted a somewhat similar proposal in the past but are submitting the current proposal as a new proposal must indicate on the application form that their FY-2011 proposal is a new proposal. Applicants should provide a rationale explaining why the current proposal should be considered to be a "new" proposal rather than a "revised" proposal at the beginning of Appendix A using no more than 3 pages. Without such an explanation, if the Institute determines that the current proposal is very similar to a previously unfunded proposal, the Institute may send the reviews of the prior unfunded proposal to this year's reviewers along with the current proposal.

b. Applying to multiple competitions or topics

Applicants may submit proposals to more than one of the Institute's FY 2011 competitions or topics. In addition, within a particular competition, applicants may submit multiple proposals. However, applicants may submit a given proposal only once (i.e., applicants may not submit the same proposal or very similar proposals to multiple competitions or topics). If the Institute determines prior to panel review that an applicant has submitted the same proposal or very similar proposals to multiple topics or competitions and the proposal is judged to be compliant and responsive to the submission rules and requirements described in the Request for Applications, the Institute will select one version of the application to be reviewed by the appropriate scientific review panel. If the Institute determines after panel review that an applicant has submitted the same proposal or very similar proposals to multiple research topics or competitions and if the proposal is determined to be worthy of funding, the Institute will select the research program under which the proposal will be funded.

B. Requirements for the Focused Program of Research

The Institute intends for the work of the R&D Centers to include a focused program of research that ideally will result in solutions or answers to specific special education problems at the end of 5 years.

The Institute expects the *focused program of research* to comprise about 50 to 75 percent of a Center's activities depending on the cost and effort required to carry out the focused program of research.

For the FY2011 R&D Center competition, the Institute expects applicants to propose a focused program of research that consists of a set of tightly linked studies that build on each other and together accomplish the goals specified under Section 4 *Requirements for Special Education Research and Development Center on School-based Interventions for Secondary Students with Autism Spectrum Disorders* or Section 5 *Requirements for Special Education Research and Development Center on Assessment and Accountability* or Section 6 *Requirements for Special Education Research and Development Center on Reading Instruction for Deaf and Hard of Hearing Students* or Section 7 *Requirements for Special Education Research and Development Center on Working Memory Interventions for Students with Disabilities*. The Institute strongly discourages applications that propose a model in which multiple investigators each conduct separate studies that are only loosely coordinated around the topic.

Although the Centers have much broader functions than conducting a focused program of research, the research program is the only portion of the activities of a Center that can be well-specified in advance, and thus can provide a fair basis for comparing and evaluating applications for funding. Consequently, the majority of the application should be a detailed description of the focused program of research.

a. Significance of the focused program of research

Because review panels typically read applications across a number of research programs, it is most helpful if in the first sentence of the project narrative, the applicant identifies the research program to which the application has been submitted (e.g., "This is an application for a Special Education R&D Center on Secondary Students with Autism Spectrum Disorders.").

The rationale for the significance of the focused program of research must address specific requirements detailed in *Section 4.A* or *Section 5.A* or *Section 6.A* or *Section 7.A Significance of the Focused Program of Research*.

b. Research plan for the focused program of research

The most important consideration in the competitive review of proposals will be the applicant's articulation of the focused program of research. The methodological requirements for the focused program of research are detailed in *Section 4.B* or *Section 5.B* or *Section 6.B* or *Section 7.B Research Plan for the Focused Program of Research*.

c. Timeline

Along with the description of the focused program of research, applicants should include a clear timeline for the activities in their focused program of research. (The timeline may be included in Appendix A.)

C. Requirements for Other Center Activities

a. Requirements for supplemental research projects

As part of the Center activities, applicants are expected to conduct smaller, supplemental research projects that speak to other issues that are important within the context of the broad topic of the Center. These projects are typically ones that can be completed within 9 to 12 months. Because these studies are expected to be completed in a relatively short period, typical supplemental studies involve secondary analyses of longitudinal data sets.

Because the Center will work cooperatively with the Institute to select and design supplemental studies to respond to pressing policy and practice needs within the topic covered by the Center, the Institute does not expect applicants to provide highly detailed research plans for these studies in the application. **The Institute expects applicants to devote no more than two or three paragraphs to the description of each supplemental study.** The applicant should, however, document capacity to

conduct such studies (e.g., knowledge of the field and research experience of key personnel) and provide **two** examples of supplemental studies the applicant believes might be useful to undertake, including a short rationale explaining the need for the proposed study and a short description of the type of research approach that would be used. Applicants should bear in mind that, although this section of the proposal does not need to be long, capacity for conducting supplemental research projects will carry weight in the scoring of the application.

b. Requirements for national leadership activities

As part of the Center activities, applicants are expected to provide national leadership within the Center's topic area by developing position papers, hosting meetings, and engaging in dialogue with researchers and practitioners to identify promising areas of research, development, and dissemination for the field.

Because the Center will work cooperatively with the Institute in the development and planning of such activities, the Institute does not expect applicants to provide highly detailed plans for the leadership activities. Applicants should explain why the proposed Center staff are qualified to fulfill this leadership role if awarded a Center and describe at least two examples of the types of activities the applicant believes might be useful to undertake, including a short rationale justifying the need for the proposed activity and a description of the applicant's capacity for conducting such projects. In addition, applicants should identify appropriate organizations and agencies with which they might collaborate in carrying out leadership activities. Although this section of the application does not need to be long, applicants should bear in mind that capacity for carrying out leadership and national activities will carry weight in the scoring of the application.

D. Management and Institutional Resources

The Institute anticipates that the focused program of research, as well as the supplemental studies, and national leadership activities will require the coordination of multiple scientists and other partners. Applicants should describe plans and procedures for the overall management of the Center. These plans should include details of procedures for coordinating with schools and districts or other education delivery settings involved in the projects of the Center.

Competitive applicants will have access to institutional resources that adequately support research activities and access to schools or other education delivery settings in which to conduct the research.

When the proposed focused program of research includes conducting research activities in schools, applicants should document that they have the capacity and experience to obtain such cooperation and to describe the steps they have taken or will take to obtain it. If the plans for the **first year** of grant activities include substantial work to be conducted in schools or other education delivery settings, strong applications will include documentation of the availability and cooperation of the schools or other education delivery settings that will be required to carry out that work via a letter of support from the education organization(s).

An applicant may involve curriculum or assessment developers or distributors (*including for-profit entities*) in the project, from having the developers as full partners in its proposal to using off-the-shelf materials without involvement of the developer or publisher. However, involvement of the developer or distributor must not jeopardize the objectivity of the research. Strong applications will carefully describe the role, if any, of the developer/distributor in the project. Applicants should describe how objectivity in the research would be maintained.

E. Personnel

Competitive applicants will have leadership and staff that collectively demonstrate (a) expertise in the content areas relevant to the Center topic (e.g., literacy and instruction of students who are deaf or hard of hearing); (b) the methodological expertise to carry out the proposed projects; (c) sufficient experience working with education delivery settings to carry out the proposed projects; and (d) experience that is

relevant to national leadership activities. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel.

PART IV GENERAL SUBMISSION AND REVIEW INFORMATION

9. MECHANISM OF SUPPORT

The Institute intends to award cooperative agreements pursuant to this request for applications. The maximum award length is five years.

10. FUNDING AVAILABLE

Typical awards will be in the range of \$1,000,000 to \$2,000,000 (total cost = direct + indirect) per year for 5 years. Larger awards will be considered. The size of the award depends on the scope of the project.

The Institute expects the *focused program of research* to comprise about 50 to 75 percent of a Center's activities depending on the cost and effort required to carry out the focused program of research, with the remainder of the budget devoted to supplemental studies, leadership activities, and any administrative activities not included in the focused program of research.

Although the plans of the Institute include the Special Education Research and Development Center program described in this announcement, awards pursuant to this request for applications are contingent upon the availability of funds and the receipt of a sufficient number of meritorious applications. The Institute anticipates funding at least one Center under each topic. However, because the Institute is committed to funding only high quality work, the Institute will make an award for a Center only if at least one application is deemed meritorious under peer review.

11. ELIGIBLE APPLICANTS

Applicants that have the ability and capacity to conduct scientifically valid research are eligible to apply. Eligible applicants include, but are not limited to, non-profit and for-profit organizations and public and private agencies and institutions, such as colleges and universities.

12. SPECIAL REQUIREMENTS

Research supported through this program must be relevant to U.S. schools.

Recipients of awards are expected to publish or otherwise make publicly available the results of the work supported through this program. Institute-funded investigators should submit final, peer-reviewed manuscripts resulting from research supported in whole or in part by the Institute to the Educational Resources Information Center (ERIC, <http://eric.ed.gov>) upon acceptance for publication. An author's final manuscript is defined as the final version accepted for journal publication, and includes all graphics and supplemental materials that are associated with the article. The Institute will make the manuscript available to the public through ERIC no later than 12 months after the official date of publication. Institutions and investigators are responsible for ensuring that any publishing or copyright agreements concerning submitted articles fully comply with this requirement.

Applicants must budget for one meeting each year in Washington, D.C., with other grantees and Institute staff for a duration of up to three days of meetings. At least one Center representative must attend the three-day meeting.

Research applicants may collaborate with, or be, for-profit entities that develop, distribute, or otherwise market products or services that can be used as interventions or components of interventions in the proposed research activities. Involvement of the developer or distributor must not jeopardize the objectivity of the evaluation.

Applicants may propose studies that piggyback onto an existing study (i.e., requires access to subjects and data from another study). In such cases, the Principal Investigator of the existing study must be one of the members of the research team applying for the grant to conduct the new project.

If an application is being considered for funding based on the technical merit scores from the scientific peer review panel and the research relies on access to secondary data sets, the applicant will need to provide documentation that they have access to the necessary data sets in order to receive a grant. This means that if an applicant does not have permission to use the proposed data sets at the time of application, the applicant will need to provide documentation to the Institute from the entity controlling the data set(s) indicating that the applicant has permission to use the data for the proposed research for the time period discussed in the proposal before the grant will be awarded.

The Institute strongly advises applicants to establish a written agreement among all key collaborators and their institutions (e.g., Principal and Co-Principal Investigators) regarding roles, responsibilities, budgets, access to data, publication rights, and decision-making procedures within three months of receipt of an award.

Through the terms of the cooperative agreement, grantees will work with the Institute to plan activities related to supplemental research and leadership activities.

13. DESIGNATION OF PRINCIPAL INVESTIGATOR

The applicant institution is responsible for identifying the Principal Investigator. The Principal Investigator is the individual who has the authority and responsibility for the proper conduct of the research, including the appropriate use of federal funds and the submission of required scientific progress reports. An applicant institution may elect to designate more than one Principal Investigator. In so doing, the applicant institution identifies them as individuals who share the authority and responsibility for leading and directing the research Center intellectually and logistically. All Principal Investigators will be listed on any grant award notification. However, institutions applying for funding must designate a single point of contact for the Center. The role of this person is primarily for communication purposes on the scientific and related budgetary aspects of the Center and should be listed as the Principal Investigator. All other Principal Investigators should be listed as Co-Principal Investigators.

14. LETTER OF INTENT

The Institute asks all applicants to submit a letter of intent by 4:30 p.m. Washington D.C. time on the relevant due date for the competition to which they plan to submit. The information in the letters of intent enable Institute staff to identify the expertise needed for the scientific peer review panels and secure sufficient reviewers to handle the anticipated number of applications. The Institute encourages all interested applicants to submit a letter of intent, even if they think that they might later decide not to submit an application. The letter of intent is not binding and does not enter into the review of a subsequent application.

The letter of intent must be submitted electronically using the instructions provided at: <https://ies.constellagroup.com>. Receipt of the letter of intent will be acknowledged via email.

A. Content

The letter of intent should include:

- a. Descriptive title
- b. Center topic to which the applicant intends to submit a proposal
- c. Brief description of the proposed focused program of research
- d. Name, institutional affiliation, address, telephone number and e-mail address of the Principal Investigator(s)

- e. Name and institutional affiliation of any key Center personnel, including collaborators and contractors
- f. Duration of the proposed project
- g. Estimated total budget request (the estimate need only be a rough approximation).

B. Format and Page Limitation

Fields are provided in the letter of intent for each of the content areas described above. The project description should be single-spaced and should not exceed one page (about 3,500 characters).

15. MANDATORY SUBMISSION OF ELECTRONIC APPLICATIONS

Grant applications must be submitted electronically through the Internet using the software provided on the Grants.gov Web site: <http://www.grants.gov/>. Applicants must follow the application procedures and submission requirements described in the IES Grants.gov Application Submission Guide and the instructions in the User Guide provided by Grants.gov.

Applications submitted in paper format will be rejected unless the applicant (a) qualifies for one of the allowable exceptions to the electronic submission requirement described in the Federal Register notice announcing the Special Education Research and Development Center Program (CFDA Number 84.324C) competition described in this Request for Applications and (b) submits, no later than two weeks before the application deadline date, a written statement to the Institute that documents that the applicant qualifies for one of these exceptions.

For more information on using Grants.gov, applicants should visit the Grants.gov web site.

16. APPLICATION INSTRUCTIONS AND APPLICATION PACKAGE

A. Documents Needed to Prepare Applications

To complete and submit an application, applicants need to review and use three documents: the Request for Applications, the IES Grants.gov Application Submission Guide, and the Application Package.

- The *Request for Applications* for the Special Education Research and Development Center Program (CFDA 84.324C) describes the substantive requirements for a research application.
- ✓ Request for Applications <http://ies.ed.gov/funding/>
- The *IES Grants.gov Application Submission Guide* provides the instructions for completing and submitting the forms.
- ✓ IES Grants.gov Application Submission Guide <http://ies.ed.gov/funding/>

Additional help navigating Grants.gov is available in the Grants.gov User Guide:

- ✓ Grants.gov User Guide http://www.grants.gov/help/user_guides.jsp
- The *Application Package* provides all of the forms that need to be completed and submitted. The application form approved for use in the competitions specified in this RFA is the government-wide SF 424 Research and Related (R&R) Form (OMB Number 4040-0001). The applicant must follow the directions in *Section C* below to download the Application Package from Grants.gov.

B. Date Application Package is Available on Grants.gov

The Application Package will be available on <http://www.Grants.gov/> by the following date:

Application Package Available by

July 19, 2010

C. Download Correct Application Package

a. CFDA number

Applicants must first search by the CFDA number for each IES Request for Applications *without* the alpha suffix to obtain the correct downloadable Application Package. For the Special Education Research Request for Applications, applicants must search on: **CFDA 84.324**.

b. Special Education Research and Development Center Application Package

The Grants.gov search on CFDA 84.324 will yield more than one Application Package. For the Special Education Research and Development Center Request for Applications, applicants must download the package for the appropriate deadline marked:

Application Package: **CFDA 84.324C-September Special Education Research and Development Center Application Package**

In order for the application to be submitted to the correct grant competition, applicants must download the Application Package that is designated for the grant competition and competition deadline. Using a different Application Package, even if that package is for an Institute competition, will result in the application being submitted to the wrong competition. Applications submitted to the wrong competition may not be reviewed for the Special Education Research and Development Center Program competition.

17. SUBMISSION PROCESS AND DEADLINE

Applications must be submitted **electronically and received by 4:30:00 p.m., Washington, D.C. time** on the application deadline date, using the standard forms in the Application Package and the instructions provided on the Grants.gov website.

Potential applicants should check this site for information about the electronic submission procedures that must be followed and the software that will be required.

18. APPLICATION CONTENT AND FORMATTING REQUIREMENTS

A. Overview

In this section, the Institute provides instructions regarding the content of the (a) project summary/abstract, (b) project narrative, (c) bibliography and references cited, (d) Appendix A, and (e) Appendix B. Instructions for all other documents to be included in the application (e.g., forms, budget narrative, human subjects narrative) are provided in the IES Grants.gov Application Submission Guide.

B. General Format Requirements

Margin, format, and font size requirements for the Center project summary/abstract, Center project narrative, bibliography, Appendix A, and Appendix B are described in this section. To ensure that the text is easy for reviewers to read and that all applicants have the same amount of available space in which to describe their projects, applicants must adhere to the type size and format specifications for the entire narrative including footnotes.

a. Page and margin specifications

For the purposes of applications submitted under this RFA, a "page" is 8.5 in. x 11 in., on one side only, with 1 inch margins at the top, bottom, and both sides.

b. Spacing

Text must be single spaced in the narrative.

c. Type size (font size)

Type must conform to the following three requirements:

- The height of the letters must not be smaller than a type size of 12 point.

- Type density, including characters and spaces, must be no more than 15 characters per inch (cpi). For proportional spacing, the average for any representative section of text must not exceed 15 cpi.
- Type size must yield no more than 6 lines of type within a vertical inch.

Applicants should check the type size using a standard device for measuring type size, rather than relying on the font selected for a particular word processing/printer combination. The type size used must conform to all three requirements. Small type size makes it difficult for reviewers to read the application; consequently, the use of small type will be grounds for the Institute to return the application without peer review.

Adherence to type size and line spacing requirements is necessary so that no applicant will have an unfair advantage, by using small type or by providing more text in their applications. **Note, these requirements apply to the PDF file as submitted.** As a practical matter, applicants who use a 12-point Times New Roman font without compressing, kerning, condensing or other alterations typically meet these requirements.

Figures, charts, tables, and figure legends may be in a smaller type size but must be readily legible.

d. Graphs, diagrams, tables

Applicants must use only black and white in graphs, diagrams, tables, and charts. The application must contain only material that reproduces well when photocopied in black and white.

C. Project Summary/Abstract

a. Submission

The Center project summary/abstract will be submitted as a separate .PDF attachment.

b. Page limitations and format requirements

The project summary/abstract is limited to one single-spaced page and must adhere to the margin, format, and font size requirements above.

c. Content

The Center project summary/abstract should include:

- (1) Title of the proposed Center
- (2) The topic under which the applicant is applying (i.e., Special Education Research and Development Center on School-Based Interventions for Secondary Students with Autism Spectrum Disorders)
- (3) Brief description of the focused program of research
- (4) A list of the key Center personnel

D. Project Narrative

a. Submission

The Center project narrative will be submitted as a .PDF attachment.

b. Page limitations and format requirements

The Center project narrative is limited to **35 single-spaced pages** for all applicants. If the narrative for the Center program is determined to exceed the 35 single-spaced page limit, the Institute will remove any pages after the thirty-fifth page of the narrative.

The 35-page limit for the project narrative does not include any of the SF 424 forms, the one-page summary/abstract, the appendices, research on human subjects information, bibliography, biographical sketches of senior/key personnel, narrative budget justification, subaward budget information or certifications and assurances.

Reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages numbered consecutively using the top or bottom right-hand corner.

c. Format for citing references in text

To ensure that all applicants have the same amount of available space in which to describe their Center in the project narrative, applicants should use the author-date style of citation (e.g., James, 2004), such as that described in the *Publication Manual of the American Psychological Association, 6th Ed.* (American Psychological Association, 2009).

d. Content

By incorporating the requirements outlined in *Part III Requirements of the Proposed Research*, the *Center project narrative* provides the majority of the information on which reviewers will evaluate the proposal.

To be compliant with the requirements of the Request for Applications, the Center project narrative must include five sections: (a) Significance of the Focused Program of Research, (b) Research Plan for the Focused Program of Research, (c) Other Center Activities, (d) Management and Institutional Resources, and (e) Personnel. Information to be included in each of these sections is detailed in *Part III Requirements of the Proposed Research*.

E. Bibliography and References Cited

a. Submission

The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements

There are no limitations to the number of pages in the bibliography. The bibliography must adhere to the margin, format, and font size requirements described in *Section 18.B. General Format Requirements*.

c. Content

Applicants should include complete citations, including the names of all authors (in the same sequence in which they appear in the publication), titles (e.g., article and journal, chapter and book, book), page numbers, and year of publication for literature cited in the research narrative.

F. Appendix A

a. Submission

Appendix A should be included at the end of the Project Narrative and submitted as part of the same .PDF attachment.

b. Page limitations and format requirements

Appendix A is limited to 15 pages. It must adhere to the margin, format, and font size requirements described in *Section 18.B. General Format Requirements*.

c. Content

(i) Purpose

The purpose of Appendix A is to allow the applicant to include any figures, charts, or tables that supplement the research text, examples of measures to be used in the project, and letters of agreement from partners (e.g., schools) and consultants. In addition, in the case of a resubmission, the applicant may use up to 3 pages of the appendix to describe the ways in which the revised proposal is responsive to prior reviewer feedback. Similarly, applicants who have submitted a somewhat similar proposal in the past but are submitting the current proposal as a new proposal may use up to 3 pages in Appendix A to provide a rationale explaining why the current proposal should be considered to be a "new" proposal rather than a "revised" proposal. These are the only materials that may be included in Appendix A; all other materials will be removed prior to review of the application. Narrative text related to any aspect of the project

(e.g., descriptions of the proposed sample, the design of the study, or previous research conducted by the applicant) must be included in the research narrative.

(ii) Letters of agreement

Letters of agreement from institutions integral to the proposed work should include enough information to make it clear that the author of the letter understands the nature of the commitment of time, space, and resources to the research project that will be required if the application is funded. The Institute recognizes that some applicants may have more letters of agreement than will be accommodated by the 15-page limit. In such instances, applicants should include the most important letters of agreement and may list the letters of agreement that are not included in the application due to page limitations.

G. Appendix B (Optional)

a. Submission

If applicable, Appendix B should be included at the end of the Center Project Narrative, following Appendix A, and submitted as part of the same .PDF attachment.

b. Page limitations and format requirements

The appendix is limited to 10 pages. Appendix B must adhere to the margin, format, and font size requirements described in *Section 18.B. General Format Requirements*.

c. Content

The purpose of Appendix B is to allow applicants to include examples of curriculum materials, assessments that are pertinent to the project, computer screens, or other materials used in an intervention. These are the only materials that may be included in Appendix B; all other materials will be removed prior to review of the application. Narrative text related to the intervention or assessment (e.g., descriptions of research that supports the use of the revised curriculum components, the theoretical rationale for specific types of assessment items, or details regarding the implementation or use of the intervention) must be included in the 35-page Center project narrative.

19. APPLICATION PROCESSING

Applications must be submitted electronically and received by **4:30:00 p.m., Washington, D.C. time** on the application deadline date listed in the heading of this request for applications. Upon receipt, each application will be reviewed for completeness and for responsiveness to this request for applications. Applications that do not address specific requirements of this request will be returned to the applicants without further consideration.

20. PEER REVIEW PROCESS

Applications that are compliant and responsive to this request will be evaluated for scientific and technical merit. Reviews will be conducted in accordance with the review criteria stated below by a panel of scientists who have substantive and methodological expertise appropriate to the program of research and request for applications.

Each application will be assigned to one of the Institute's scientific review panels. At least three primary reviewers will complete written evaluations of the application, identifying strengths and weaknesses related to each of the review criteria. Primary reviewers will independently assign a score for each criterion, as well as an overall score, for each application they review. Based on the overall scores assigned by primary reviewers, an average overall score for each application will be calculated and a preliminary rank order of applications will be prepared before the full peer review panel convenes to complete the review of applications.

The full panel will consider and score only those applications deemed to be the most competitive and to have the highest merit, as reflected by the preliminary rank order. A panel member may nominate for

consideration by the full panel any proposal that he or she believes merits full panel review but would not have been included in the full panel meeting based on its preliminary rank order.

21. REVIEW CRITERIA FOR SCIENTIFIC MERIT

The purpose of Institute-supported research is to contribute to the solution of education problems and to provide reliable information about the education practices that support learning and improve academic achievement and access to education for all students. Reviewers for all applications will be expected to assess the following aspects of an application in order to judge the likelihood that the proposed research will have a substantial impact on the pursuit of that goal. Information pertinent to each of these criteria is also described in *Part III Requirements of the Proposed Research*.

A. Significance of the Focused Program of Research

Does the applicant provide a compelling rationale for the significance of the project as defined in the sections on the significance of the focused program of research?

B. Research Plan for the Focused Program of Research

Does the applicant meet the requirements described in the sections detailing the methodological requirements for the focused program of research?

C. Plans for Other Center Activities

Do the content of the examples of proposed supplemental studies and leadership activities and the description of the applicant's capacity to conduct such projects demonstrate that the applicant has the ideas, experience, and capability to successfully carry-out such projects in cooperation with the Institute?

D. Management and Institutional Resources

Do the plans and procedures for the overall management of the Center indicate that the applicant has the capacity to efficiently and successfully complete the proposed research, dissemination, and leadership activities? Does the applicant have the facilities, equipment, supplies, and other resources required to support the proposed activities? Do the commitments of each partner show support for the implementation and success of the proposed Center activities?

E. Personnel

Does the description of the personnel make it apparent that the Principal Investigator, project director, and other key personnel possess the appropriate training and experience and will commit sufficient time to competently implement the proposed research?

22. RECEIPT AND START DATE SCHEDULE

A. Letter of Intent Receipt Date

July 19, 2010

B. Application Deadline Date

September 16, 2010

C. Earliest Anticipated Start Date

July 1, 2011

D. Latest Possible Start Date

September 1, 2011

23. AWARD DECISIONS

The following will be considered in making award decisions:

- Scientific merit as determined by peer review
- Responsiveness to the requirements of this request

- Performance and use of funds under a previous Federal award
- Contribution to the overall program of research described in this request
- Availability of funds

24. INQUIRIES MAY BE SENT TO

A. Special Education Research and Development Center on School-Based Interventions for Secondary Students with Autism Spectrum Disorders

Dr. Celia Rosenquist
 Institute of Education Sciences
 555 New Jersey Avenue, NW
 Washington, D.C. 20208

Email: Celia.Rosenquist@ed.gov
 Telephone: (202) 219-2024

B. Special Education Research and Development Center on Assessment and Accountability

Dr. Shu Jing Yen
 Institute of Education Sciences
 555 New Jersey Avenue, NW
 Washington, DC 20208

Email: ShuJing.Yen@ed.gov
 Telephone: (202) 219-2126

C. Special Education Research and Development Center on Reading Instruction for Deaf and Hard of Hearing Students

Dr. Kristen Lauer
 Institute of Education Sciences
 555 New Jersey Avenue, NW
 Washington, DC 20208

Email: Kristen.Lauer@ed.gov
 Telephone: (202) 219-0377

D. Special Education Research and Development Center on Working Memory Interventions for Students with Disabilities

Dr. Celia Rosenquist
 Institute of Education Sciences
 555 New Jersey Avenue, NW
 Washington, D.C. 20208

Email: Celia.Rosenquist@ed.gov
 Telephone: (202) 219-2024

25. PROGRAM AUTHORITY

20 U.S.C. 9501 *et seq.*, the "Education Sciences Reform Act of 2002," Title I of Public Law 107-279, November 5, 2002. This program is not subject to the intergovernmental review requirements of Executive Order 12372.

26. APPLICABLE REGULATIONS

The Education Department General Administrative Regulations (EDGAR) in 34 CFR parts 74, 77, 80, 81, 82, 84, 85, 86 (part 86 applies only to institutions of higher education), 97, 98, and 99. In addition 34

CFR part 75 is applicable, except for the provisions in 34 CFR 75.100, 75.101(b), 75.102, 75.103, 75.105, 75.109(a), 75.200, 75.201, 75.209, 75.210, 75.211, 75.217, 75.219, 75.220, 75.221, 75.222, and 75.230.

27. REFERENCES

- Allen, T. E. (1994). Who are the deaf and hard-of-hearing students leaving high school and entering postsecondary education? Gallaudet University Center for Assessment and Demographic Studies, Washington, DC.
- Allen, T. E., Clark, M. D., del Giudice, A., Koo, D., Lieberman, A., Mayberry, R., & Miller, P. (2009). Phonology and reading: A response to Wang, Trezek, Luckner, and Paul. *American Annals of the Deaf, 154* (4), 338-345.
- Alloway, T. P., & Gathercole, S. E. (Eds.) (2006). *Working Memory and Neurodevelopmental Disorders*. New York, NY: Taylor & Francis.
- Alloway, T. P., Gathercole, S. E., Kirkwood, H., & Elliott, J. (2009). The cognitive and behavioral characteristics of children with low working memory. *Child Development, 80*, 606-621.
- American Psychological Association (2009). *Publications Manual of the American Psychological Association* (6th ed.). Washington, D.C.: Author.
- Archibald, L. M., & Gathercole, S. E. (2006). Short-term memory and working memory in specific language impairment. In T. P. Alloway, & S. E. Gathercole (Eds.), *Working memory and neurodevelopmental disorders* (pp. 139-160). New York, NY: Taylor & Francis.
- Ayres, P. (2009). State of the art research on cognitive load theory. *Computers in Human Behavior, 25*(2), 253-257.
- Ayres, P. & van Gog, T. (Eds.) (2009). State of the art research on cognitive load theory [Special Issue]. *Computers in Human Behavior, 25*(2).
- Bennetto, L., Pennington, B. F., & Rogers, S. J. (1996). Intact and impaired memory functions in autism. *Child Development, 67*, 1816-183.
- Berch, D. B., & Mazzocco, M. M. M. (Eds.) (2007). *Why is Math So Hard for Some Children: The Nature and Origins of Mathematical Learning difficulties and Disabilities*. Baltimore, MD: Paul H. Brookes.
- Bull, R., & Scerif, G. (2001). Executive functioning as a predictor of children's mathematics ability: Inhibition, switching, and working memory. *Developmental Neuropsychology, 19*, 273-293.
- Cain, K., & Oakhill, J. (2006). Profiles of children with specific reading comprehension difficulties. *British Journal of Educational Psychology, 76*, 683-696.
- Centers for Disease Control and Prevention (2009) Prevalence of autism spectrum disorders - Autism and Developmental Disabilities Monitoring Network, United States, 2006. *Morbidity and Mortality Surveillance Summaries*. Autism and Developmental Disabilities Monitoring Network Surveillance Year 2006 Principal Investigators. December 18, 2009; 58 (10) 1-20.
- Chamberlain, C. & Mayberry, R. I. (2008). American Sign Language syntactic and narrative comprehension in skilled and less skilled readers: Bilingual and bimodal evidence for the linguistic basis of reading. *Applied Psycholinguistics, 29*, 367-388.

- Dew, D. (Ed.). (1999). *Serving individuals who are low-functioning deaf: Report of the Twenty-Fifth Institute on Rehabilitation Issues*. Washington, DC: George Washington University.
- Engle, R. W., Carullo, J. J., & Collins, K. W. (1991). Individual differences in working memory for comprehension and following directions. *Journal of Educational Research, 84*, 253-262.
- Gathercole, S. E., & Alloway, T. P. (2008). *Working Memory and Learning: A Practical Guide for Teachers*. London: Sage.
- Gathercole, S. E., Lamont, E., & Alloway, T. P. (2006). Working memory in the classroom. In Pickering, S. J. (Ed.), *Working Memory and Education* (pp. 220-240). Oxford, UK: Elsevier.
- Gathercole, S. E., Brown, L., & Pickering, S. J. (2003). Working memory assessments at school entry as longitudinal predictors of National Curriculum attainment levels. *Educational and Child Psychology, 20*, 109-122.
- Geary, D. C., Hoard, M. K., Nugent, L., & Byrd-Craven, J. (2007). Strategy use, long-term memory, and working memory capacity. In D. B. Berch & M. M. M. Mazzocco (Eds.), *Why is math so hard for some children: The nature and origins of mathematical learning difficulties and disabilities* (pp. 83-105). Baltimore, MD: Paul H. Brookes.
- Goldin-Meadow, S. & Mayberry, R. I. (2001). How do profoundly deaf children learn to read? *Learning Disabilities Research and Practice, 16* (4), 222-229.
- Graetz, J. E. (2004). Making the grade: Promoting success of secondary students with autism spectrum disorders. In T. E. Scuggs & M. A. Mastropieri (Eds.), *Research in secondary schools: Advances in learning and behavioral disabilities* (Vol. 17, pp. 123-145). Oxford, UK: Elsevier.
- Hendricks, D. R. & Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 24*, 77-88.
- Henry, L. & Winfield, J. (2010). Working memory and educational achievement in children with intellectual impairments. *Journal of Intellectual Disability Research, 54*, 354-365.
- Holmes, J, Gathercole, S. E., & Dunning, D. L. (2009). Adaptive training leads to sustained enhancement of poor working memory in children. *Developmental Science, 12*, F1-F7.
- Howlin, P., Goode, S. Hutton, J., & Rutter, M. (2004). Adult outcomes for children with autism. *Journal of Child Psychology and Psychiatry, 45*, 212-229.
- Jaeggi, S. M., Buschkuhl, M., Jonides, J., & Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. *Proceeding of the National Academy of Sciences, 105*, 6829-6833.
- Klingberg T, Fernell E, Olesen PJ, Johnson M, Gustafsson P, Dahlström K, et al. (2005). Computerized training of working memory in children with ADHD--a randomized, controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry, 44*, 177-186.
- Kyle, F. E. & Harris, M. (2006). Concurrent correlates and predictors of reading and spelling achievement in deaf and hearing school children. *Journal of Deaf Studies and Deaf Education, 11* (3), 273 – 288.

- Machalicek, W., O'Reilly, M. F., Beretvas, N., Sigafoos, J., & Lancioni, G. E. (2007). A review of interventions to reduce challenging behavior in school settings for students with autism spectrum disorders. *Research in Autism Spectrum Disorders, 1*, 229-246.
- Marschark, M., Sapere, P., Convertino, C. M., Mayer, C., Wauters, L., & Sarchet, T. (2009). Are deaf students' reading challenges really about reading? *American Annals of the Deaf, 154* (4), 357-176.
- McGovern, C. W. & Sigman, M. (2005). Continuity and change from early childhood to adolescence in autism. *Journal of Child Psychology and Psychiatry, 46*, 401-408.
- McCaffrey, D. F., Lockwood, J. R., Koretz, D., Louis, T. A., Hamilton, L., & Kirby, S. (2004). Models for value-added modeling of teacher effects. *Journal of Educational and Behavioral Statistics, 29*(1), 67-102.
- McLaughlin, M. J., & Thurlow, M. (2003). Educational accountability and students with disabilities: Issues and challenges. *Educational Policy, 17*, 431-451.
- Murphy, G. H., Beadle-Brown, J., Wing, L., Gould, J., Shah, A., & Holmes, N. (2005). Chronicity of challenging behaviours in people with severe intellectual disabilities and/or autism: A total population sample. *Journal of Autism and Developmental Disorders, 35*, 405-418.
- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.
- Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., and Metcalfe, J. (2007). *Organizing Instruction and Study to Improve Student Learning* (NCER 2007-2004). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ncer.ed.gov>.
- Patz, R. J. (2007). *Vertical Scaling in Standards-Based Educational Assessment and Accountability Systems*. Washington, DC: Council of Chief State School Officers. [TILSA project; <http://www.ccsso.org/content/pdfs/VerticalScaling.pdf>]
- Pickering, S. J. (2006). *Working Memory and Education*. Oxford, UK: Elsevier.
- Rapport, M. D., Alderson, R. M., Kofler, M. J., Sarver, D. E., Bolden, J., & Sims, V. (2008). Working memory deficits in boys with attention-deficit/hyperactivity disorder (ADHD): The contribution of central executive and subsystem processes. *Journal of Abnormal Child Psychology, 36*, 825-837.
- Schirmer, B. R. & McGough, S. M. (2005). Teaching reading to children who are deaf: Do the conclusions of the National Reading Panel apply? *Review of Educational Research, 75* (1), 83-117.
- Seltzer, M. M., Shattuck, P., Abbeduto, L., & Greenberg, J. S. (2004). Trajectory of development in adolescents and adults with autism. *Mental Retardation and Developmental Disabilities Research Reviews, 10*, 234-247.
- St. Clair-Thompson, H., Stevens, R., Hunt, A., & Bolder, E., (2010). Improving children's working memory and classroom performance. *Educational Psychology, 30*, 203-219.
- Swanson, H. L., Kehler, P., & Jerman, O. (2010). Working memory, strategy knowledge, and strategy instruction in children with reading disabilities. *Journal of Learning Disabilities, 43*, 24-47.

- Swanson, H. L., Zheng, X., & Jerman, O. (2009). Working memory, short-term memory, and reading disabilities: A selective meta-analysis of the literature. *Journal of Learning Disabilities, 42*, 260-287.
- Tekwe, C.D., Carter, R.L., Ma, C., Algina, J., et al (2004). An empirical comparison of statistical models for value-added assessment of school performance. *Journal of Educational and Behavioral Statistics, 29*, 11-36.
- Turley-Ames, K. J., & Whitfield, M. (2003). Strategy training and working memory task performance. *Journal of Memory and Language, 49*, 446-468.
- Wagner, M., Marder, C., Blackorby, J., Cameto, R., Newman, L., Levine, P., & Davies-Mercier, E. (with Chorost, M., Garza, N., Guzman, A., & Sumi, C.). (2003). *The Achievements of Youth with Disabilities During Secondary School. A Report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International. Available at www.nlts2.org/reports/2003_11/nlts2_report_2003_11_complete.pdf.
- Wang, Y., Trezek, B. J., Luckner, J. L., & Paul, P. V. (2008). The role of phonology and phonologically related skills in reading instruction for students who are deaf or hard of hearing. *American Annals of the Deaf, 153* (4), 396-407.