The Role of Clinical Factors on Child Engagement in an Organizational Skills Training Intervention

PI: ██████████████

Fellow, Division of Developmental and Behavioral Pediatrics ████████████████

Funding Path: Young Investigator Award Program

Primary Mentor:

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Additional Mentors:

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Division Director/Department Chair: ████████████████

Participation Statement:

If funded, I agree to participate in any conference calls and/or in person grantee meetings.

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Specific Aims:
This study will examine child engagement in a group organizational skills training intervention (OST-S) and investigate how clinical factors are linked to child engagement. This study will be conducted as part of larger randomized controlled trial (RCT) of the efficacy of OST-S.

1. Aim 1: Evaluate the psychometric characteristics of an adapted version of the Child Involvement Rating Scale (called CIRS-R in this application) for assessing child behavioral engagement in small group behavioral skills training sessions.
    a. Hypothesis 1.1: The CIRS-R will assess child behavioral engagement with an acceptable level of inter-rater reliability (intraclass correlation coefficient; ICCs>=0.6; Cicchetti, 1994).
    b. Hypothesis 1.2: The CIRS-R will assess child behavioral engagement with at least a moderate level of variability, as determined by the range of scores on each item (range at least 4 points on a 6-point scale).
    c. Hypothesis 1.3: CIRS-R will demonstrate initial construct validity, as measured by significant positive correlations with therapist ratings of child engagement.
2. Aim 2: Explore associations between levels of parent- and teacher-reported clinical factors, as measured by the Behavior Assessment System for Children (BASC), and level of in-session child behavioral engagement as measured by the CIRS-R.
    a. Hypothesis 2.1: Inattention and hyperactivity/impulsivity (examined separately and jointly) will be negatively correlated with student engagement.
    b. Hypothesis 2.2: Aggression, which is associated with Oppositional Defiant Disorder (ODD) behaviors (O'Laughlin et al, 2010), will be negatively correlated with student engagement.
    c. Hypothesis 2.3: Anxiety will be positively correlated with student engagement.
    d. Exploratory: Examine the relationship between learning problems and student engagement.
3. Exploratory Aim 3: Investigate whether the association between severity of clinical factors and child engagement differs as a function of children's socioeconomic status (SES), as measured by parents' report of their level of education.

Background:
Psychosocial treatments are key components of a multimodal treatment approach for children with Attention Deficit Hyperactivity Disorder (ADHD; MTA cooperative Group 1999). However, there is limited research on how children engage in these treatments, how clinical factors affect their engagement, and ultimately how their engagement affects overall outcomes. The proposed study will take a critical first step toward filling this gap by examining engagement in a small group, in-school, skills training intervention designed to address problems with organization, time management and planning (OTMP) skills. The study will examine children's engagement in this intervention and how clinical and socioeconomic factors affect child engagement.

Treatment Engagement
Duncan and colleagues (2003) have reported a connection between patient-therapist alliance and outcomes among adults. Several studies conducted with children have examined treatment engagement using proxies such as attendance and parent engagement (Pas et al 2002, Joseph et al 2019). There is far less literature exploring child engagement in interventions based on direct observations of in-session child behaviors. One exception is research by Chu and Kendall (2004), who coded in-session child engagement behaviors and found these to be linked to individualized treatment outcomes for anxiety. The authors of this pivotal study developed a coding system, the Child Involvement Rating Scale (CIRS), to explore the link between in-session behaviors (e.g., initiating discussion, demonstrating enthusiasm, self-disclosure) and treatment outcomes. They found that increased child engagement was positively correlated with

improved outcomes. To our knowledge, no studies have examined in-session child engagement during skills training interventions or child group treatment.

Child Characteristics:
Clinical factors have been shown to effect outcomes in behavioral therapy interventions. Increased severity of ADHD and ODD symptoms have been associated with poorer outcomes in response to psychosocial interventions for ADHD (Owens et al, 2018). Although this study did not examine the moderating effect of ADHD and ODD symptoms on child engagement in interventions, given evidence linking engagement and outcomes, it seems likely that children's level of ADHD and ODD symptoms will be negatively related to engagement.

The MTA Cooperative Group (1999) found that children with ADHD who had co-morbid anxiety responded better to behavioral treatment compared to those without anxiety. Given the previously described association between engagement and outcomes and the fact that children with comorbid anxiety responded better to behaviorally based treatment, it is likely that children with comorbid anxiety will be more engaged in a behaviorally based child group intervention.

To our knowledge no research has been conducted exploring the link between family SES and child engagement in behavioral interventions. Low SES has been linked to negative educational outcomes (Aikens and Barbarin, 2008). Some researchers have also found that behavioral and emotional problems (including impulsivity, aggression, and anxiety) were more prevalent in children from low SES backgrounds (McGrath & Elgar, 2015). Further, the quality of implementation of behavioral interventions in schools by non-clinical providers is highly variable (Lochman et al., 2009) and especially challenging in schools in high-poverty communities (Farahmand et al., 2011). It is likely that the higher prevalence of mental health problems and challenges with intervention delivery may negatively affect engagement in children of low SES.

This study will add to the literature by examining the link between clinical and SES factors and their interaction to the level of child engagement in a behaviorally-based group intervention.

Significance:
To date, child engagement has been primarily measured by proxies for engagement, such as attendance or homework completion, or by obtaining ratings of treatment alliance between patient and provider. An exception to this has been that child engagement in individual cognitive behavior therapy has been measured by direct observation using the CIRS. The proposed study is designed to improve methods for assessing child engagement by creating an adapted version of the CIRS (CIRS-R), evaluating its psychometrics and using it to measure child engagement in a behaviorally-based child group treatment, specifically a skills training intervention to improve child organizational skills. The study will also improve our understanding of how specific child clinical factors impact engagement. Additionally, as participating parents vary in education level from <7th grade to graduate education, the study will explore how child socioeconomic status, as measured by parent education level, effects the link between clinical factors and engagement.

Methods:
Study Population: This project will be conducted within a parent study funded by the Institute of Education Sciences (IES), "Evaluation of Organizational Skills Training (OST) Program for Upper Elementary Students (OST-S RCT)." Participating schools are located in ▪▪▪▪▪▪▪▪ and ▪▪▪▪▪▪▪▪▪ and include urban and suburban schools serving a diverse population. The population of these schools has racial/ethnic minority rates ranging from 26% to 99.9% and subsidized lunch rates ranging from 9% to 96%. Of the participants, 68% are male, 88% are non-Hispanic/Latino, 38.5% are Black/African American, 60.4% are white and 26.4% come from

a single parent household. Children were administered the OST-S intervention (16 sessions) by a school staff person in their schools in groups of 3-4 students with sessions being videotaped. To date, 20 groups of students with a total of 91 children have participated in the intervention. Participants range in grade level between 3rd and 5th grades. Parents of participating children range in education level from <7th grade to completed graduate/professional school.

Sample Size Justification: A sample size of 91 participants is more than adequate to examine the psychometric properties of the adapted CIRS. To examine the potential contribution of clinical factors, each factor will be analyzed using separate correlation analyses to ensure sufficient power. However, the more stringent alpha level of p=0.01 will be used to control for experiment-wise error rate. A sample size of 91 allows us to find significance for correlations of $\geq$0.32 (p =0.01). Since a correlation of 0.32 explains 10% of the variance in child engagement, smaller correlations are not likely to be clinically meaningful.

Design/Intervention:
For this current study, our team will select one-half of the intervention sessions that were videotaped, so that the first session and one session randomly selected from each of the four sections of the 16-session program are coded for child engagement. Two graduate level research assistants and ▇▇▇▇▇▇▇ will be the primary coders. A gold standard coder (▇▇ ▇▇▇▇▇) will train all 3 coders to code video tapes to initial reliability (ICC>=.8 for 4 consecutive videos) using the CIRS-R and will lead weekly coding meetings to maintain reliability. Our plan is to code five videos, so that session 1 and one video from each of the four sections of the intervention (tracking assignments, materials management, time management and planning) will be coded for each child. For each session, a different coder will be randomly assigned to code one of the four children in the group and their responses will be used as the measures of child engagement. One of the four children will be randomly selected for reliability coding by ▇▇ ▇▇▇▇▇. If reliability for any tape falls below 0.6, coding will be discontinued until additional training is provided and the reliability criterion is once again achieved.

Outcome Measures:
- **The Behavior Assessment System for Children – third edition (BASC-3, Reyolds & Kamphus, 2015)** will be used to assess child clinical factors. This measure was given at baseline to both parents and teachers. Gender-specific T-scores will be used to characterize the sample and derive an index of hyperactivity, inattention, aggression (measure of ODD, O'Laughlin et al., 2010), and anxiety.
- **The Child Involvement Rating Scale (CIRS; Chu & Kendall, 2020**) is a scale designed to evaluate engagement in cognitive behavioral therapy for children. Our team has created an adapted version (CIRS-R) to be used for coding engagement for a group-based skills training intervention. The scale is composed of four positive involvement items and one negative involvement items. Positive engagement items include: (1) verbally contributing to the session, (2) behaviorally participating or following through with tasks/activities suggested by the school partner, (3) self-disclosure of relevant information about organizational practices, and (4) demonstration of understanding. The negative engagement item is: (1) distracting away from the session either verbally or behaviorally. Items are graded on a 0–5-point Likert scale. The negative involvement item will be reverse coded. The overall per session engagement score for a child will be calculated as the mean of the 5 items (with the negative involvement items reverse coded). Since multiple sessions will be coded for each child, the average per session engagement score will be calculated as each child's overall engagement score.

- **Demographic form:** Parents completed a brief demographic form providing information including but not limited to: sex, ethnicity, race, single parent household status, language, parental education, and medication status. Medications will be differentiated as ADHD versus anxiety medications.
- **Rating scale measure of child engagement:** Using a measure adapted from the MTA study, school staff implementing the intervention completed 7-point Likert scale ratings for each group participant regarding the extent to which the student was engaged in in-session activities.

Analysis Plan:
Aim 1:
- **Hypothesis 1.a:** Child engagement will be coded. One out of every four child engagement codings will be randomly selected and reliability coded by the gold standard coder. Interrater reliability will be calculated using ICCs, which will be calculated for the CIRS-R coded results between the primary coder and the gold standard reliability coder. ICC $\geq$ 0.60 will be considered an acceptable level of reliability (Cicchetti, 1994).
- **Hypothesis 1.b:** We will calculate the mean, standard deviation, median, interquartile range (IQR), minimum and maximum score for each item across all child participants. A range of at least 4 points with a standard deviation of 1 on a 6-point scale will indicate sufficient item variability.
- **Hypothesis 1.c**: Coded engagement scores for each child per session will be collapsed into one summary engagement core with reverse scoring for the negative engagement item. Mean summary engagement scores will calculated from the scores for all coded sessions and will be used as a measure of overall behavioral engagement for each child. Rating scale reports of overall child engagement will be correlated with our mean child behavior engagement score. We will conduct bi-variate correlations with SPSS. Significant correlations ($p<0.01$) will provide evidence for construct validity.

Aim 2:
- Bi-variate correlations between baseline scores on the BASC and an average child engagement on the CIRS-R will be conducted. Preliminary analyses will investigate whether there is an effect of clustering at the group level. If so, correlation analyses will be conducted using structured equation modeling in order to be able to account for the clustering. If there is not significant clustering by group, then correlation/regression analyses will be conducted. We will evaluate whether variables such as age, grade, and medication status are significantly correlated with ratings of engagement. If so, we will control for them in regression analyses to account for possible confounding.
- **Hypothesis 2.a:** Bi-variate correlations will be calculated between T-scores for Inattention on the BASC-3 and mean CIRS score. Bi-variate correlations will be calculated between T-scores for Hyperactivity/Impulsivity on the BASC and mean CIRS score.
- **Hypothesis 2.b:** Bi-variate correlations will be calculated between T-scores for Aggression on the BASC-3 and mean CIRS score.
- **Hypothesis 2.c:** Bi-variate correlations will be calculated between T-scores for Anxiety on the BASC-3 and mean CIRS score.
- **Exploratory Hypothesis 2.d:** Bi-variate correlations will be calculated between T-scores for Learning Problems on the BASC-3 and mean CIRS score.

Exploratory Aim 3: We will calculate mean and standard deviation of the mean CIRS score for the children whose parents fit in each of the parent education categories. We will perform an

ANOVA comparison of the means to test for significance, with follow-up t-tests for any significant ANOVA results.

Timeline: This project will be completed in one year. Research assistants will initially be trained to reliability in coding and then will code video sessions for five months. Data analysis and preparation of the results will occur over a period of 5 months of the year. Manuscript writing of the results of this project will occur in the remaining two months of the year.

Description of Key Personnel:
- PI – ██████████████ Developmental and Behavioral Pediatrics (DBP) Fellow at ████████████████████████████ ████████ brings ██ clinical experience as a DBP fellow to the research project.
- Primary Mentor - ██ ██ has collaborated on multiple research projects with ████████████████████ and has mentored numerous fellows on research projects. ████████ will mentor ██████████ on ██ completion of this project.
- Co-Mentor - ██ ████████████████████████████████ is a co-PI on the IES funded study on which this project is based, as well as a 2nd IES funded study. ████ has extensive experience coding and, with the assistance of ██████████, has trained coders to high levels of reliability on a Intervention Process Coding system that is uses a similar type of coding, as well as on several other projects. ██████████████████ has prior experience mentoring DBP fellows in the successful completion of research projects. ████ ██████████ will assist ████████ in mentoring ██████████ on ██ completion of this project.
- Co-mentor - ██ ██ ████ is currently PI of the IES funded study that serves as the parent study for this project, as well as on other federally funded studies. He has a long history of successful mentoring trainees and junior faculty on research projects, including prior mentoring of numerous DBP fellows. ████████ will assist ████████████████████████ in mentoring ██████████ on ██ completion of this project.
- Co-investigator - ████████████████████████████████ ████████████████████ has extensive experience coding, training coders to reliability and revising coding systems such as the one being used in this study. ████ will function as the gold standard coder and will train all coders to initial reliability and lead weekly coding meetings to maintain reliability
- Consultant - ████████████████████████████████████ ████████████████████████████████████ ██████████ is co-PI on a nationally funded study examining the OST intervention. ████ ████████ will provide consultation to ██████████ as needed during ██ completion of the project.
- Assistant coders: Two graduate student volunteer research assistants have been recruited to code video sessions. All have an interest in psychology.

References:

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16. Rinsky JR, Hinshaw SP. Linkages between childhood executive functioning and adolescent Budget and Budget Justification

Budget and Budget Justification

Item	Details	In Kind (optional)	Amt requested from APA	Total Amount	Justification
Remuneration for coding expert	▮▮▮▮▮ will be able to continue dedicating one day/week to the project to serve as the gold-standard coder allowing coding of additional videos. ▮▮▮▮▮ is critical to this project. ▮▮ will run weekly coding meetings to ensure reliability is maintained, and serve as the gold standard reliability coder. ▮▮ ▮▮▮▮ has functioned in this role using a similar coding system for the larger project and therefore has the necessary expertise to ensure the success of this project.	N/A	$9000	$9000	▮▮▮▮▮ will be working to revise CIRS, develop coding-manual, train coders to reliability and function as gold standard code. This money will allow ▮▮ to provide dedicated time to the project.
Software	License for EndNote	N/A	$200	$200	Software will be used to catalogue references and assist with citation management for the project
Statistical software	License for SPSS	100% in-kind	$0	$300	Statistical software will be needed for data analysis. It is offered at a discounted rate of $300 for in-training individuals and will be purchased through

					separate funds.
Statistical support consultation	Statistical support for data analysis will be required and is available through the larger OST-S project in-kind.	100% in-kind	$0	100% in kind	We will require statistical for full data analysis. This support is available in-kind through the larger OST-S project.
Supplies	Poster production fee	N/A	$150	$150	Estimated cost of printing a poster for PAS presentation
PAS travel	Travel to PAS 2023	N/A	$650	$650	Estimated cost of travel for PAS 2023 for poster presentation. Travel cost based on estimate for round trip tolls ██████████ ███████ plus hotel stay.
GRAND TOTAL			$10,000		

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: ███████████

eRA COMMONS USER NAME (credential, e.g., agency login): ████████

POSITION TITLE: Fellow Physician

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
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as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

A.   Personal Statement

As a Developmental and Behavioral Pediatrics fellow, my research interests involve understanding how clinical factors such as ADHD, autism and anxiety affect child engagement in a group-based academic skills intervention. My academic training and past research experience have provided me with a background in general pediatrics as well as Developmental and Behavioral pediatrics. I graduated from ███████████████████████████████ after which I completed my residency and in pediatrics at ██████████████████████████████. I was also selected for and completed a chief resident year at ████████████████████████████████. While at ████████, under my mentor, ████████████████, I pursued scholarly work and advocacy in the field of Developmental Pediatrics. I served for two years as a student liaison to the ABA in ██ initiative to help support patient advocacy work and ABA legislature in the ████████ ████████████ I also co-authored a case report titled, ██████████████████████████ █████████████████████████████████, published in Pediatrics. During residency training at ████████████████████████████, I worked with my mentor, ████████ ██ to pursue research related to medical homes for children with autism. Now, as a fellow in Developmental and Behavioral Pediatrics, I am working with my mentors, ████████████████ ██████████████████████████████ and to create a coding system to measure child in session engagement, investigate clinical factors associated with child engagement and examine the role of socioeconomic status on child engagement.

B.   Positions and Honors

2020-Present Developmental and Behavioral Pediatrics Fellow, ████████████████████ █████████████████████████████

Professional Memberships

American Academy of Pediatrics, Member

Academic Pediatric Association, Member

Society of Developmental and Behavioral Pediatrics, Fellow Member

Honors

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C.   Contributions to Science

1. **Early Career:** ██ ██ ██

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D.   Additional Information: Research Support and/or Scholastic Performance

- Research project investigating the role of clinical factors on child engagement in an
organizational skills training intervention. ████████████████████████████
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NAME: ███████████████

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POSITION TITLE: █████████ Professor of Pediatrics

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A. Personal Statement.

I am ██
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led the development of ██████████████████ over the past 11 years including the development
the implementation of multisite intervention research studies.

I have conducted clinical and translational research related to care of children with intellectual and other developmental disabilities including ADHD and autism spectrum disorders. These include studies on the etiology of developmental disorders, development of screening and outcome measures, and clinical trials of pharmacologic interventions, behavioral interventions and combined behavioral and pharmacological interventions.

I have mentored numerous fellows on their research projects and these projects have often resulted in national presentations and first-authored publications by the fellow. I am well prepared to mentor ████████ on ██ Young Investigator Award project.

I also have had multiple national leadership positions that can provide important contacts for nurturing young investigators including ██████████████████████████
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B. Positions and Honors.

Positions and Employment

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C. Contributions to Science.

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e. Moss CM, Metzger KB, Carey MB, **Blum NJ**, Curry AE, Power TJ. Chronic care for ADHD: Clinical management from childhood through adolescence. Journal of Developmental & Behavioral Pediatrics 2020;41:S1-S6.

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D. Research Support

Ongoing Research Support

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Completed Research Support (within last 3 years)

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January 7, 2022

Re: Mentor Letter for ████████████████

To APA Research Committee Members:

As ██
███████████████████████████████ , and a research mentor for ███████████████████ I enthusiastically support ███ Academic Pediatric Association Young Investigator Award Program proposal, "**The Role of Clinical Factors on Child Engagement in an Organizational Skills Training Intervention."** Working with me and my long-time collaborator, ████████████████████████
████████████ has designed this important study of a direct observation measure of child engagement in a school-based organization skills training program and will use this measure to study the relationship between engagement and child clinical symptoms as measured by the Behavior Assessment System for Children (BASC).

I have known ████████████ since ███ did a developmental-behavioral pediatric elective at ████ ██████████████████████████████████████ when ███ was a pediatrics resident at ████ ██ . Since that time ████████████ has impressed with me ███ commitment to conducting research with the potential to improve the health, developmental, and behavioral outcomes for children with special health care needs.

████████████ passion for research is long-standing and includes ███ work as a research assistant prior to medical school during which time ███ was a co-author on a number of basic science research publications. As a resident, and Chief Resident, at ████████████████████████
████████████ participated in research on the medical home for children with autism spectrum disorder and published a first authored peer-reviewed review on this topic. Further ███ presented ███ research at the Pediatric Academic Societies meeting.

I have had the opportunity to work more closely with ████████████ during the last 18 months during ███ developmental-behavioral pediatric fellowship at ██████ . ███ continues to impress me with ███ motivation for research, intelligence, productivity, willingness to learn, and passion for improving outcomes for children with developmental and behavioral conditions. ███ has demonstrated strong writing skills in ███ clinical reports, publication of a case report as a pediatric resident, drafts of ███ research proposal, and ███ work with developmental-behavioral pediatric faculty as a co-author on a recently completely chapter on evidence-based treatments for autism spectrum disorder that has been sent to the book's Editor.

Most important for this project ████████████ , became a valued member of the research team conducting this randomized clinical trial of a school-based organizational skills training program during ███ first year of fellowship despite the busy clinical demands of the first year. ███ has meet with me and/or other members of the team at-least weekly for the past 12 months since ███ identified this as the line of research ███ wanted to pursue during fellowship and is working with the team to develop reliability in coding engagement in the intervention using videos of the sessions. This progress will facilitate ███ ability to complete the project within the 1-year time frame. ███ is gaining experience in the training of research assistants to reliability on the coding scheme and ultimately will evaluate whether clinical factors that could be identified prior to implementing an organizational skills training program can identify children who are more (or less) likely to engage in the intervention. Further the RCT explicitly includes school serving low-income communities allowing the research to identify potential differences in engagement across schools with varying resource levels. As the RCT is completed, the team will be able to

utilize ███████ contributions to investigate whether directly observed engagement with the intervention is associated with differences in outcomes in response to the intervention.

███████████████████████████ are the Co-PIs for the RCT and will work with me as mentors for ████████ . I am the ████████████████████████████ ████████████████████ and have conducted multiple studies of ADHD related interventions, often in collaboration with ████████ . Specifically, ████████ and I have mentored another fellow on a study of the impact of treatment engagement on a pediatric primary care based psychosocial intervention for families that have children with ADHD that resulted in a first authored publication by the fellow. Further, I have mentored numerous developmental-behavioral pediatrics fellows on other research projects that have also resulted in many first authored publications by fellows. ████████ and I have frequently co-mentored fellows participating in our ADHD intervention research including previous APA Young Investigator Award recipients. ████████████ is a psychologist who helped develop the organizational skills intervention program being studied in this research.

The fellowship program at ██████ is committed to training future researchers and leaders in the field of developmental-behavioral pediatrics. Fellows initially participate in introductory research training as participants in our ████████████████████████████ interdisciplinary training program. This is supplemented by monthly participation in our ██████ ████████████ during which fellows lead the critical review of the selected article. Further, fellows meet monthly as a group with the leader of the ████████████████████████ ██████ to assure progress towards their scholarly goals and every 6 months meet individually with the ████ to report on their progress and trouble-shoot any challenges. Fellows have a number of options for additional research training and ████████████ has elected to participate in the ████████████ Certificate Training Program at the ████████████████████ during ████ second and third year of fellowship. A formal process is available for fellows who receive a young investigator award to apply for Divisional support if there are expenses not covered by the award.

In summary, ████████████ is an outstanding candidate for the APA Young Investigator Award. ████ project addresses critical questions related to intervention development and efficacy for very common skill deficits in children. The knowledge and skills ████ will develop in this project will be critical in supporting ████████████ career in research and academic medicine as they are foundational skills for developing and implementing interventions to improve the health and well-being of children including vulnerable children living in low-income communities in ████████████

Sincerely,

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