

## **Quantitative Research with Students from Low-Incidence Populations: Tensions and Tradeoffs between Rigor and Relevance**

### **Panel Summary**

Moderator: Caroline E. Parker

Discussant: Karrie Shogren

Questions exist about program impacts on low-incidence populations that are best answered through rigorous quantitative studies. However, designing such studies with students from low-incidence populations presents challenges that require tradeoffs. Often the tradeoffs include making choices between the rigor of research designs and the realities of students' educational needs. Three recent studies of students with low-incidence disabilities provide examples of how researchers have resolved tensions when the demands of research design come up against the realities of educational needs.

- Think College Transition (TCT) is a post-secondary transition program that provides students with intellectual disabilities access to college classes. A three-year quasi-experimental design study examined the program's impact on students' self-determination.
- SMiLE is a literacy program for students with significant cognitive disabilities, often without oral language. A one-year cluster randomized trial examined the impact of the program on K-5 students' literacy skills.
- The Alternate English Language Learner Assessment (ALTELLA) project researches instructional practices, accessibility features and accommodations, and assessment of English learners with significant cognitive disabilities to develop an evidence-centered design approach to inform understanding of alternate English language proficiency assessments.

In this proposed panel, researchers from the studies will share both results from the studies and the specific tensions they faced and the tradeoffs they made during their research, whether during design, implementation, or analysis. The tensions they faced include:

- Every student receiving special education services has an individualized education program (IEP), and study designs cannot propose assignment to a group (i.e., control rather than treatment) if the treatment is part of the student's IEP.
- Low sample sizes make it difficult to get sufficient power. Many schools and districts, have few students who meet the criteria for inclusion in a particular study.
- Even within small samples, there is great variation within low-incidence populations. It is difficult to design a study generalizable beyond the study sample; this also presents a challenge to design an intervention that meets diverse instructional needs of the target population.
- Developing valid and reliable instruments presents additional challenges:
  - o Student executive function levels vary greatly, making it difficult to find a single instrument that is valid across the full population.
  - o For English learners, instrument validity may be compromised by comprehension in English and/or home language, and existence of reliable assessments in home languages.

Each of the studies in this panel addressed the tensions by making tradeoffs. In some cases the tradeoffs limited the rigor of the research design, while in others it led to changes in the intervention. In all cases, a key factor in successfully making tradeoffs that retained the integrity of both the intervention and the research design was the inclusion of practitioners as active

partners in the decision-making process. The collaboration contributed to effective research designs that answered questions of relevance to practitioners in the context of the realities of educational settings for students with low-incidence disabilities.

## **Presentation 1: Think College Transition Model: Self-Determination in Students with Intellectual Disabilities and Autism**

**Rebecca Schillaci, Meg Grigal, Debra Hart, Caroline E. Parker**

**Background:** Many students with intellectual disabilities or autism (ID/A) remain in high school and receive special education services until the age of 22 (Wehman, 2012). Students with ID/A who stay in school past age 18 typically participate in life-skills or community-based vocational programs, often only with other students with disabilities (Chiang, Ni, & Lee, 2017). Fewer students are supported to access postsecondary education environments or engage in paid employment in their communities. The majority of youth with ID/A exit high school and enter into a lifetime of under- or unemployment, sheltered employment, and day habilitation (Sulewski, Zalewska, Butterworth, & Migliore, 2013; Gidugu & Rogers, 2012).

**Intervention:** The Think College Transition (TCT) Model was developed as an inclusive college-based transition model designed to improve post-school outcomes for transition aged-youth with ID/A. It builds upon an existing state transition initiative called the Massachusetts Inclusive Concurrent Enrollment Initiative (MAICEI) which supports partnerships between local education agencies and colleges and universities to provide transition experiences to youth with various developmental disabilities. The key features of the TCT Model included college classes, work experiences, and social networking opportunities on a college campus with their same-age peers, to improve students' self-determination, career readiness, and employment outcomes.

**Research Question:** A significant tension in this research was defining a specific research question given the breadth of the TCT Model intervention. Instead of modifying the intervention, however, the research focused on an overarching outcome that one or more of the key components could affect: self-determination. Specifically, the study asked, *does enrollment in the TCT model lead to higher levels of self-determination for 18- to 21-year-old students with ID/A after one year compared to comparison students with ID/A enrolled in typical non-college-based transition services?* It was hypothesized that the intervention would provide significant opportunities to develop self-determined action (for example, making intentional choices based on interests and experiences, setting goals and following through, and recognizing strengths) and would therefore significantly increase intervention students' self-determination.

**Participants:** Students eligible to participate in the research study were transition-aged students with ID/A enrolled in their district's transition services with no prior college experience. All eligible students from participant school districts were invited to participate in the research study and those who consented were included. Intervention students were enrolled in the MAICEI program at one of the three target colleges and comparison students were enrolled in the transition program but not the MAICEI program. Given that the research included a low-incidence and vulnerable population, recruitment proved difficult. Higher comparison numbers were included at the cost of a potentially contaminated comparison sample. That is, both intervention and comparison students from a single district were taught by staff members trained through TCT Model activities. Comparison students did not, however, participate in the majority

of student-level key component activities themselves. Depending on their district, comparison experiences included participation in community activities, sheltered work, and/or classes with their transition peers.

**Research Design:** A quasi-experimental design, rather than RCT, was appropriate for this research given that students' individualized education program (IEP) plans determined their condition. A pre-test/post-test design using a valid and reliable instrument, the Self-Determination Inventory (SDI), was used to measure the effect of treatment on the students' self-determination. The SDI was developed to measure self-determination in youth aged 13 and 22 with and without disabilities, including those with ID/A (Shogren et al., 2018; Shogren, Wehmeyer, Little, Pratt, Palmer, Seo, 2015). It measures self-determination as described in Causal Agency Theory (Shogren, Wehmeyer, Palmer, Forber-Pratt, Little & Lopez, 2015) and is defined by seven sub-domains making up three essential characteristics of self-determination: autonomy and self-initiation (volitional action); self-direction and pathways thinking (agentic action); control-expectancy, psychological empowerment, and self-realization (action-control beliefs).

**Data Collection and Analysis:** Students completed the SDI on an iPad. Items were presented next to a line with anchors of "disagree" and "agree" on either side. Students responded to each item by touching the place on the line to show how much they agreed or disagreed with the sentence (Shogren et al., 2015, Shogren et al., 2018). Students were ensured that there were no right or wrong responses, were given ample time to complete the task, and received a \$20 gift card for each completed session. While researchers were not blind to the students' condition, the structured nature of the SDI allowed researchers to always remain neutral during administration. Researchers were blind to students' pre-test scores at post-test.

Ordinary least squares regression were used to compare the magnitude, direction, and statistical significance of the difference between the post-test scores of self-determination for students in each condition, after controlling for pre-test scores. In addition, Hedges effect sizes (Hedges, 1981) on students' mean pre to post difference scores were calculated.

**Findings:** The results of the regression analyses indicated significant effects of condition, with students in the intervention condition scoring higher in both sub-domains of Volitional Action: autonomy ( $R^2=.099$ ,  $F(1,64)=4.95$ ,  $p<.05$ ) and self-initiation ( $R^2=.105$ ,  $F(1,63)=4.27$ ,  $p<.05$ ). In addition, a significant effect was found in the sub-domain of self-realization ( $R^2=.254$ ,  $F(1,63)=4.32$ ,  $p<.05$ ). Furthermore, effect sizes for all sub-domains, except pathways thinking, were greater than .25 (range: .25-.77) and are therefore substantively important (WWC, 2017). Indeed, as shown in Table 1, while comparison students' self-determination scores tended to drop over the school year, intervention students' self-determination scores increased in all sub-domains.

Table 1. Mean difference scores from baseline to end-of-the-year and effect sizes for each of the seven sub-domains of self-determination.

		Mean Difference Score (Post-test minus pre-test)		Effect Size (based on Difference Scores)
		Intervention	Comparison	
Volitional action	Autonomy	14.9	-8.8	0.77
	Self-initiation	8.9	-9.5	0.63
Agentic action	Self-direction	5.3	-5.4	0.37
	Pathways thinking	8.0	4.1	0.14
Action-control beliefs	Control-expectancy	7.8	-1.3	0.37
	Psychological empowerment	5.9	-1.1	0.25
	Self-realization	6.5	-5.7	0.50

**Conclusions:** This research found that the broad TCT Model intervention substantively affected the self-determination of students with ID/A over the course of one year, particularly in the domain of volitional action. Future research will need to be conducted to learn what TCT Model components specifically affect self-determination, and what other long term effects participation in the TCT Model might have.

Several tensions played a part in this research effort, which necessitated tradeoffs. First, the IEP-governed student-experience required a QED rather than RCT. Second, sampling proved difficult within this low-incidence population which necessitated recruiting intervention and comparison students from the same district. Third, although the intervention was broad in scope, the research focused on a specific question and used a valid and reliable tool. This approach allowed the research to access a global effect of the intervention on students with ID/A.

In sum, bold interventions for students with ID/A are necessary to improve individuals' post-school outcomes. Rigorous research studies, despite tensions and tradeoffs, must be conducted to determine the best way to serve these vulnerable youth.

## **Presentation 2: Structured Methods in Language Education (SMiLE): Examination of a Literacy Intervention for Students with Significant Cognitive Disabilities**

Caroline E. Parker, Raizel Reider, Sarah MacGillivray

**Background:** Of the approximately 6 million students with disabilities in the nation, close to 15 percent are classified with disabilities that may affect their cognition. Students with significant cognitive disabilities (SCD) need a literacy program supporting their unique needs, but teachers have limited strategies available to them. While studies have demonstrated successful strategies for students with moderate cognitive disabilities (Allor, Mathes, Roberts, Cheatham, & Otaiba, 2014; Lemons et al., 2013), far less is known about strategies for students with SCD, many of whom are nonverbal (Baker, Spooner, Ahlgrim-Delzell, Flowers, & Browder, 2010; Browder, Wakeman, Spooner, Ahlgrim-Delzell & Algozzine, 2006). Students with SCD have traditionally been taught only functional literacy and not vocabulary, fluency, comprehension, phonemic awareness, and phonics (Browder et al., 2006; NRP, 2000). Recent research has begun to address this gap. Coyne, Pisha, Dalton, Zeph, & Smith (2012) found significant effects on literacy skills for students with SCD when using Literacy by Design, a technology-based literacy program. The study, however, included only 16 students, and studies of other literacy programs had similar small samples (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008). In addition, many literacy programs targeting students with SCD require intensive teacher training and time for student instruction (Allor, et al., 2014).

**Objective:** This study examines the ability of Structured Methods in Language Education (SMiLE), a highly structured, multisensory reading program, to provide students with SCD who are non- or beginning readers with the skills to access authentic text and become readers. District 75 Citywide Programs, New York City Department of Education (District 75) has been implementing SMiLE with students with SCD since 2008, and this study provides a rigorous evaluation of SMiLE’s impact on literacy skills among students with SCD.

**Setting:** The study was implemented in 2017-2018 in District 75, which is responsible for educating over 23,000 students with the most significant disabilities and has been implementing SMiLE since 2008.

**Participants:** The study focused on students with SCD in grades K-5 in District 75. The cluster randomized control trial (RCT) randomly assigned teachers, none of whom had previously implemented SMiLE, to treatment or control conditions. Each treatment teacher implemented SMiLE with two students, and each control teacher used their business as usual literacy practices. Eligible students were non- or beginning readers. The final analytic sample includes 184 treatment students and 117 control students. (Table 1).

Table 1. SMiLE Study Analytic Sample.

	<b>Full analytic sample</b>
Treatment students	184
Control students	117
Total	301

**Intervention:** SMiLE is a highly structured, multisensory reading program targeting students with SCD and engaging them sequentially, beginning with attention and language imitation tasks and leading to simple sentences and informational texts. SMiLE targets students with SCD who are non- or beginning readers and requires fewer resources for training and implementation than similar literacy programs; special education teachers, speech/ language therapists, and paraprofessionals are trained in three sessions and provide 10-15 minutes of daily intensive, targeted, and individualized instruction.

**Research Design:** This study used a cluster RCT design to address the research question. Participating teachers were stratified based on their role (e.g., special education teacher, paraprofessional, speech therapist). Within each stratum teachers were randomly assigned to either the treatment group or the control group. Two students were selected to receive the SMiLE program from among eligible students of each treatment teacher and the same process was used to select control students. Teachers assigned to the control group taught literacy to their students using business-as-usual practices.

**Data Collection and Analysis:** The primary outcome measure was the Student Annual Needs Determination Inventory (SANDI). District 75 administers the SANDI to its K-5 students in the fall and spring to monitor growth among students who take New York State’s Alternate Assessment (NYSSAA). Not all students in the sample, however, took SANDI. Some educators used the Assessment of Basic Language and Learning Skills (ABLLS). Student results were thus collected for both SANDI and ABLLS, as well as an additional “mini-SANDI” of 15 items (10 measuring reading and five measuring communication). A total of 133 treatment and 85 control students completed the pre- and post- mini-SANDI, 73% of the sample. The full sample was not administered the mini-SANDI because of time constraints.

The study uses a two-level hierarchical linear model in which students are modeled at level-1 and teachers at level-2. To calculate a simple treatment effect, students’ post-test scores are regressed on their pre-test scores, and an indicator of teachers’ membership in the treatment or business-as-usual control condition. Because the mini-SANDI was not administered to the full sample of students, the study will do three sub-analyses, one with each assessment. The research team will also do exploratory analyses to examine systematic differences between those students administered SANDI and those administered ABLLS.

**Findings/Results:** As of this writing, data analysis is still being completed. Preliminary results indicate a positive and statistically significant effect of the SMiLE intervention on student reading skills (as measured by the mini-SANDI), but no effect on communication skills.

The SMiLE study was designed to address many of the tensions typically found in studies with students from low-incidence populations. By implementing the study in District 75, it was possible to recruit more than 250 teachers at the start of the study, and the resulting analytic sample of 301 students is far larger than similar studies. Despite addressing the key challenge of sample size, the SMiLE study faced additional tensions that required tradeoffs between research design and the realities of educational practice. For example, a stronger research design would have had more students per teacher, but first year SMiLE teachers can only work with two

students (in order to learn the required skills). This led to a risk of bias, if teachers used different criteria to select their two students.

**Conclusions:** Although full data analysis is still pending, the SMiLE study to date highlights the tensions and tradeoffs of doing research that targets outcomes for students from low-incidence populations. Although sample size is the most common methodological challenge highlighted, other tensions include identifying reliable and valid instruments, as is identifying an outcome that is a realistic measure for this group of students with huge levels of variation. Tradeoffs always need to be made. Practitioners (including administrators, teachers and family members) must be included at all stages of research to assure that design decisions do not invalidate the research results for practitioners. Research studies often uncover unexpected findings that lead to critical conversations among and between researchers and practitioners (for example, uncovering different expectations for literacy achievement among administrators).

### **Presentation 3: Alternate English Language Learning Assessment (ALTELLA)** **Laurene Christensen**

**Background/Context:** The U.S. Elementary and Secondary Education Act, as amended by the Every Student Succeeds Act (2015), requires state education agencies to provide for the annual assessments of the English proficiency of all students identified as English learners (Section 3111(b)(2)(G)). This includes students with significant cognitive disabilities who are English learners. In October 2017, the U.S. Department of Education made it clear that all students must be assessed, issuing a memo that referenced 34 CFR § 200.6(h)(5). This regulation requires states to provide an alternate English language proficiency assessment for English learners with the most significant cognitive disabilities, students who cannot participate in the general English language proficiency assessment even with appropriate accommodations.

State departments of education have long recognized the need to be able to ascertain whether students with significant cognitive disabilities are also English learners. English learners with significant cognitive disabilities need to receive appropriate support services and assistance in learning English. However, until the 2017 memo from the U.S. Department of Education, there were no provisions for developing alternate English language proficiency achievement standards. Potential English learners with significant cognitive disabilities had to be assessed against the same achievement standards used for the state's general test. States that develop or adopt alternate English language proficiency achievement standards will need assessments designed to measure these standards. These assessments must meet the technical quality guidelines specified by the U.S. Department of Education's peer review process (see 34 CFR § 200.2(b)(2), (4), and (5)).

Prior to Alternate English Language Learning Assessment (ALTELLA), there has been very little research that has focused on understanding the characteristics of English learners with significant cognitive disabilities and the instructional strategies that educators use to support these students' development of English. This abstract focuses on the student characteristic data that was gathered as part of the ALTELLA project

**Purpose/Objective/Research Question:** This project researches instructional practices, accessibility features and accommodations, and assessment of English learners with significant cognitive disabilities to develop an evidence-centered design approach that informs our understanding of alternate English language proficiency assessment for these students. The purpose of the Individual Characteristics Questionnaire was to learn more about the characteristics of students who are English language learners with significant cognitive disabilities.

**Setting:** Survey data was collected from educators in 29 states.

**Population/Participants/Subjects:** 1578 students in grades K-12 across 29 states.

**Intervention/Program/Practice:** Educators completed one survey for each of their students who met the criteria (i.e., English learner who was or would be eligible for the state's alternate content assessment). Educators learned of the survey through their state department of education.

**Research Design:** The purpose of the research was to create a survey tool, the Individual Characteristics Questionnaire. As part of the development process, researchers piloted the survey in order to eliminate potential bias.

**Data Collection and Analysis:** Data was collected through an online survey tool. The survey was open from February to June, 2018. This gave educators time to complete the survey during a very busy part of the school year.

**Findings/Results:** Findings include:

- Students have 71 primary home languages; the most common primary home languages include Spanish, English, and Arabic. Students use all languages in a variety of settings: in the home, at school, and in the community.
- The most common primary disabilities include intellectual disabilities, autism, multiple disabilities, and developmental delay. Two-fifths of these students had secondary disabilities.
- Over half of these students are in self-contained special education classrooms.
- Almost a quarter of students do not receive English language development instruction.
- Approximately three-quarters of students used speech or speaking to communicate. Many students used picture cards, augmentative and alternative communication devices, and communication boards.
- Generally, a majority of students scored at the lowest level in their state or consortium alternate academic content assessment and English language proficiency assessment. On most English language proficiency assessments, students scored better in the listening domain.

**Conclusions:**

Limitations: The survey sample is a convenience sample. Also, the information gathered is teacher reported.

Conclusions and recommendations: This pilot of the Individual Characteristics Questionnaire is the first step in uncovering more about English learners with significant cognitive disabilities. Knowing the characteristics of these students has a few implications for serving these students appropriately. These student characteristics give insight into the continued development of alternate English language proficiency assessments, with questions designed for students who may have difficulty accessing the general English language proficiency assessment in their state. Additionally, the Individual Characteristics Questionnaire provides information that may be useful for states in developing accountability policies, alternate academic achievement standards, and other state policies and guidance materials. Ultimately, data generated by the Individual Characteristics Questionnaire have the potential to inform optimal instruction and assessment of English learners with significant cognitive disabilities.

## References

- Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Otaiba, S. A. (2014). Is Scientifically based reading instruction effective for students with below-average IQs? [Article]. *Exceptional Children*, 80(3), 287-306. doi: 10.1177/0014402914522208
- Baker, J., Spooner, F., Ahlgrim-Delzell, L., Flowers, C., & Browder, D. M. (2010). A measure of emergent literacy for students with severe developmental disabilities. *Psychology in the Schools*, 47, 501-513.
- Browder, D. M., Ahlgrim-Delzell, L., Courtade, G., Gibbs, S. L., & Flowers, C. (2008). Evaluation of the effectiveness of an early literacy program for students with significant developmental disabilities. [Article]. *Exceptional Children*, 75(1), 33-52.
- Browder, D., Wakeman, S.Y, Spooner, F. Ahlgrim-Delzell, L., & Algozzine, B. (2006) Research on reading instruction for individuals with significant cognitive disabilities. Council for Exceptional Children, 72(4), 392-408.
- Chiang, H., Ni, X., & Lee, Y. (2017). Life skills training for middle and high school students with Autism, *Journal of Autism and Developmental Disorders*, 47, 1113–1121.
- Coyne, P., Pisha B., Dalton, B., Zeph, L., & Smith, N. (2012). Literacy by design: A universal design for learning approach for students with significant intellectual disabilities. *Remedial and Special Education*, 33(3), 162-172. doi: 10.1177/0741932510381651
- Gidugu, V. & Rogers, E.S. (2012). Review of employment services for individuals with intellectual and developmental disabilities: A comprehensive review of the state-of-the-field from 1996–2011. Boston, MA: Boston University, Sargent College, Center for Psychiatric Rehabilitation.
- Hedges, L. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics*, 6(2), 107-128.
- Lemons, C.J., Zigmond, N., Kloo, A., Hill, D., Mrachko, A.A., Pattera, M.F., Bost, T.J. & Davis, S.M. (2013) Performance of students with significant cognitive disabilities on early-grade curriculum-based measure of word passage and reading fluency, *Exceptional Children*, 79(4), 408-426.
- National Reading Panel. (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction.
- Shogren, K.A., Little, T.D., Grandfield, E., Raley, S., Wehmeyer, M.L., Lang, K.M., & Shaw, L.A. (2018). The Self-Determination Inventory-Student Report: Confirming the factor structure of a new measure. *Assessment for Effective Intervention*.

- Shogren, K.A., Wehmeyer, M.L., Little, T.D., Forber-Pratt, A. J., Palmer, S.B., & Seo, H. (2015). Preliminary validity and reliability of scores on the Self-Determination Inventory: Student Report version. *Career Development and Transition for Exceptional Individuals*, 40, 92-103.
- Shogren, K.A., Wehmeyer, M.L., Palmer, S.B., Forber-Pratt, A., Little, T.J., & Lopez, S.J. (2015). Causal agency theory: Reconceptualizing a functional model of self-determination. *Education and Training in Autism and Developmental Disabilities*, 50, 251-263.
- Sulewski, J.S., Zalewska, A., Butterworth, J., & Migliore, A. (2013). Trends in employment outcomes of young adults with intellectual and developmental disabilities, 2004–2011. Boston, MA: University of Massachusetts Boston, Institute for Community Inclusion.
- What Works Clearinghouse (2017) U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.
- Wehman, P. (2012). *Life beyond the classroom: Transition strategies for young people with disabilities* (Edition 5). Baltimore, MD: Paul H. Brookes Publishing Co.