

# How Are They Really Doing? Observation of Inclusionary Classroom Participation for Children With Mild-to-Moderate Deafness

Christina M. Borders<sup>\*,1</sup>, David Barnett<sup>2</sup>, Anne M. Bauer<sup>2</sup>

<sup>1</sup>Illinois State University

<sup>2</sup>University of Cincinnati

Received February 20, 2010; revisions received May 21, 2010; accepted May 31, 2010

Direct observation was utilized to study how 5 children with mild-to-moderate deafness participated within inclusive classroom settings. Responses to practice and prompt opportunities, levels of prompting required to follow classroom directions, and engagement were analyzed across students with mild-to-moderate deafness and were compared to students with normal hearing. Similar responses to practice and prompt opportunities were observed across students, and engagement data indicated that 4 children with mild-to-moderate deafness had similar rates to their peers. However, children with mild-to-moderate deafness required higher levels of prompting and were less accurate at following classwide verbal prompts. Agreement data on variables ranged between 83% and 99%, with the exception of 2 prompting levels. Social validity judgments indicated that the information was useful and important. Potential uses for data include consultation with teachers regarding interventions to increase student engagement and research regarding inclusionary practices.

With the passage of educational policy (IDEIA, 2004; NCLB, 2001), an increase in audiological technology, and perhaps exigencies of service decisions, education for hard-of-hearing children is shifting toward inclusive education. More than 42% of identified children who are hard of hearing (about 15,000 in the United States) were served in a general education classroom with normally hearing peers during the 2006–2007 school year (Gallaudet Research Institute, 2006), primarily by general education teachers and itinerant service providers. Specialist services to the largest

percentage for students who are hard of hearing participating in general education classrooms are delivered by itinerant teachers of the deaf (Moores, Jatho, & Creech, 2001; Reed, 2003) based on brief contacts with students and teachers and, at times, parents, and in a consultative manner within various settings. Methods for instructional and social decisions within inclusive classroom settings still need to be developed (Luckner, 2006). It is critical that itinerant teachers and other professionals within the field of deafness “monitor and evaluate students’ progress, share data with the other team members, and advocate for a quality educational program for each student and his or her family” (Luckner, 2006, p. 109).

Although many children who are hard of hearing are served in the inclusive classroom environment, there is little literature regarding the students’ actual participation within this context. Research indicates the level of participation within the classroom is highly related to academic achievement and social competence in elementary school (Brophy, 1988; Finn & Cox, 1992). The findings in studies regarding classroom participation for children who are hard of hearing have relied on peer nominations, ratings, or teacher/student report (Antia, Sabers, & Stinson, 2006; Long, Stinson, & Braeges, 1991; Turner & Patrick, 2004; Wauters & Knoors, 2007). Observation of key instructional and social variables within the classroom context warrants further study related to reliable and functional results. Observations by professionals

\*Correspondence should be sent to Christina M. Borders, Illinois State University, Campus Box 5910, Normal, IL 61790-5910 (e-mail: christy.borders@illinoisstate.edu).

in natural classroom settings may lead to high-quality information for the students they serve.

### Mild-to-Moderate Hearing Impairment

Children with mild-to-moderate deafness (mild, PTA 26–40dB; moderate, PTA 41–55dB), most often included in the general education classroom, are often perceived as requiring minimal support services possibly due to assumptions based on increased access to information through the auditory channel versus those with more severe degrees of deafness (Bess, Dodd-Murphy, & Parker, 1998; Niskar et al., 1998). However, mild-to-moderate deafness affects academic achievement and thus the instructional environment and requires closer scrutiny (Bess et al., 1998; Briscoe, Bishop, & Norbury, 2001; Davis, Ellenbein, Schum, & Bentler, 1986; Moeller, 2000; Wake, Hughes, Poulakis, Collins, & Rickards, 2004; Yoshinago-Itano, 1999).

### Key Instructional and Classroom Variables for Hearing Impaired Consultations

Several key instructional and classroom practices related to successful inclusion (Brophy, 1988) and targeted for classroom-based research (Bronson, Tivnan, & Seppanen, 1995; Finn, 1993; Hartley, Bray, & Kehle, 1998; Hartley, Kehle, & Bray, 2002; Hughes & Kwok, 2006; McCain & Antia, 2005; Turner & Patrick, 2004; Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008) can be directly sampled by students' participation in activities and routines and thus may lead to greater teacher support of student learning.

- *Providing a practice opportunity*: An adult provides a student with an opportunity to practice by having them perform a skill or verbally restate information that has been provided.
- *Classroom directives/routine*: An adult provides a verbal instruction for the student to perform a task or the student engages in a classroom routine (e.g., lining up, putting papers in mailboxes, moving to another area of the room, etc.).
- *Classwide verbal directions*: An adult gives a verbal direction to the entire class, not addressing any specific student.

- *Individual verbal directions*: An adult restates/rewords a verbal direction specifically addressing an individual student. This prompt is identified as an individualized direction presented to the target student with mild-to-moderate hearing impairment.

- *Visual prompts*: An adult points to an object or picture to assist with following a classroom directive or routine or uses a visual method of indicating the behavior desired (e.g., flashing the lights, holding up her hand, etc.).

- *Physical prompts*: An adult physically manipulates an object or moves toward a specific area of transition to assist a student in following a classroom directive or routine.

- *Hand-over-hand prompts*: An adult physically manipulates the student to assist them in following a classroom directive or routine (e.g., assists with writing by holding the child's hand and pencil, assists in pushing buttons, etc.).

- *Engagement*: A child is engaged in a class activity designed for the child to learn various concepts either in a group or individual activity. The child must have his/her face oriented toward the teacher of the materials while the teacher is instructing the child or the group and/or oriented toward a peer answering a question related to the lesson. In an individual activity, his/her face must be oriented toward the materials. During classwide transitions, he/she is following the teacher's expectation of moving toward or changing positions to go to a new activity.

### Consultation Basics: Function and Qualities of Baseline

Establishing a baseline of behavior within the inclusive classroom context can serve as a general model for behavioral consultation and decision making as well as research. Baseline has descriptive and predictive purposes (Barlow, Nock, & Hersen, 2009; Lane, Wolery, Reichow, & Rogers, 2007) by measuring key variables in a socially valid and consistent condition that may be worthy of instructional changes or intervention development, usually through problem solving, or justification for meeting objectives. The amount of baseline needed depends on qualities of

the data (e.g., trend, variability), but three points are minimal to preliminarily investigate trend, and three to six data points are commonly found in single case research articles. This research used a descriptive and evaluative approach to baseline that could be used by teams to monitor inclusionary decisions.

This study addressed several questions related to classroom participation of children with mild-to-moderate deafness within the inclusive classroom setting. (a) Is there a difference in response to practice and prompt opportunities presented within the inclusive classroom setting between students who are hard of hearing and those with normal hearing? (b) Is there a difference in the level of prompting required to successfully follow classroom directives and routines between students who are hard of hearing and those with normal hearing? (c) Is there a difference in the level of engagement within the inclusive classroom setting between students who are hard of hearing and those with normal hearing? (d) Can three to seven relatively brief observations of key consistent conditions meet criteria for baseline purposes?

## Method

Five case studies specifically linked to single case research (Type 3, multiple cases with continuous assessment and stability data; Kazdin, 2002) were used to examine both preliminary qualities of baseline performance of contextual responding in children with mild-to-moderate deafness and selected variables of a sample of typical peers and teachers. The reliability of variables was examined as well as decisions from visual analysis of variables over time characteristic of single case designs (i.e., confidence in conclusions from five to seven data points using an observational method). Using a variation of multiple participant and time sampling of the target child, peers, and teacher, involving rapid rotation of the observed person within sessions, each of the variables was examined (Thomas, Holmberg & Baer, 1974).

## Participants

The five children with mild-to-moderate deafness each came from different classrooms. Each of these

students was identified by the district as meeting study criteria for inclusion (first- through fourth-grade student with a pure-tone average within the mild-to-moderate range, having an individual education plan, being instructed in the general education classroom for reading/language arts, and not having an identified additional disability beyond a high incidence disability such as attention deficit disorder). Four out of five teachers were female, and four out of five teachers were Caucasian while one was African American. The years of teaching experience among these teachers varied from 1 to 32 years. The class sizes were similar with a range of 18–23 students per class.

The total number of students with normal hearing that participated in each classroom varied across classrooms from 6 to 16 participants. Of the students with normal hearing, each classroom teacher selected three to five students who performed typically for their classrooms. These students were then used as “micro-norm” students for direct contextual comparisons in relation to the research questions being evaluated (Bell & Barnett, 1999). The number of micronorm students ranged from four to six across classrooms and varied in gender and race.

The observers utilized in this study were all graduate students (aged from 21 to 32 years, five female, two male, all Caucasian) at a large Midwestern urban-university. Each observer conducted direct observations in classrooms at mutually agreeable times that the classroom teacher designated as containing English/Language Arts instructional time.

Five students, three females and two males, with mild-to-moderate deafness were observed. Pseudonyms are used in an effort to protect student identity. Table 1 indicates the demographic information for these students. Pure-tone averages for all participants fell within the mild-to-moderate hearing range (25–55 dB). Students included in this study had varying configurations of hearing loss. Although some students (e.g., Charity and Hunter) had relatively flat hearing losses that sloped to normal in the high frequencies, some students (e.g., Michelle and Alex) had flat audiograms through the mid-frequencies and then sloped precipitously in the high frequencies. Table 2 indicates information on subject hearing status. Four

**Table 1** Demographics of students with mild-to-moderate hearing loss

Student	Age	Gender	Ethnicity	Grade	PTA-R	PTA-L
Robin	6.92	F	Cauc	1	25	50
Charity	6.92	F	AA	1	30	30
Michelle	8.33	F	Cauc	2	28	27
Alex	9.58	M	Cauc	4	43	42
Hunter	8.00	M	Cauc	2	33	30

*Note.* F = female; M = male; PTA-L = pure-tone average for left ear; PTA-R = pure-tone average for right ear.

out of five students were aided with personal hearing aids. One student did not wear his amplification during the classroom observations. Two out of five students also utilized personal FM systems in the classroom.

### Settings

Five classrooms of first- through fourth-grade students containing at least one child with mild-to-moderate deafness were included in this study. Although four classrooms were fairly evenly split by gender, Michelle's classroom contained mostly female students. Four classrooms displayed ethnic diversity across students, whereas Alex's classroom contained predominately Caucasian students.

Although all classes were contained in large metropolitan areas in the Midwestern area of the United States, they were split across two major cities, two participants in one city and three participants in another. The classes were spread across four school districts ranging in size from 4,976 to 35,507 students. The average class size across these districts was similar, ranging from 18 to 23 students per class. The districts differed in socioeconomic status with the percentage of students on free and reduced lunch ranging from 13% to 66%.

**Table 2** Hearing status of students with mild-to-moderate hearing loss

Student	250 dB		500 dB		1K dB		2K dB		4K dB		8K dB	
	R	L	R	L	R	L	R	L	R	L	R	L
Robin	15	10	10	20	10	55	55	75	45	65	65	65
Charity	30	40	40	45	40	30	10	15	20	20	—	—
Michelle	20	25	15	30	20	30	40	30	50	70	90	80
Alex	15	10	15	15	30	40	85	70	105	90	100	90
Hunter	25	20	25	25	40	40	35	25	15	10	15	15

*Note.* dB = decibel; L = left; R = right.

### Observational Code

Observers used blank coding sheets (available by contacting first author) with sixty 30-s intervals, totaling 30 min of observation time. Each observer utilized either a stopwatch or a motivaider (<http://habitchange.com>) that was set to 30 s for interval recording of teacher and student behavior. A variety of sampling methods are used in this code. Recording of teacher behaviors occurred by means of a partial interval time sampling observation method. Measures of prompt/practice opportunities and classroom directions (of both the teacher and the students) are recorded via frequency count and indicated by tally marks for each instance of the behavior. Classroom directives/routines were coded for each count of teacher behavior by placing a "+" or "-" in the corresponding interval. Recording of target and peer student engagement occurred by means of momentary time sampling, and behaviors of all children in the classroom were recorded through a scan sampling procedure. Teacher behaviors and response to directives/routines were viewed related to the target student with mild-to-moderate deafness during every other interval (e.g., intervals 1, 3, etc.). In alternate intervals (e.g., intervals 2, 4, etc.), these behaviors were recorded in relation to one of the two micronorm students. Student engagement behaviors were coded by means of both momentary time sampling and a scan sampling procedure. During each interval, engagement of the target student was recorded by means of momentary time sampling. During every fifth interval, classwide academic engagement was recorded by observers making one brief scan (approximately 3 s) of the classroom counting the number of students who were not engaged in an academic task and placing the number in the appropriate box.

### Observer Training

All observers were given the Teacher Instruction and Related Student Behavior Research Observation Form and code manual (Borders, 2009) and were instructed to read the manual and memorize the definitions of each variable. A training session met lasting an hour and a half, whereby a presentation was given on variables and coding strategies. Training included

information, diagrams, and scenarios related to amplification devices. Observers were given the opportunity to ask the primary researcher questions regarding the code variables, procedures, amplification, and coding strategy. A quiz was administered at the conclusion of the training with all observers scoring 100%. After completing training, observers conducted direct observations in study classrooms. Observers were assigned to classrooms based on logistics (e.g., corresponding schedules and availability of observers during instructional time).

### Sample of Classroom Observations

A total of 31 observations were conducted to establish the baseline prevalence of all key variables for a total of 921.5 min, with an average session length of 29.73 min. Robin's activities were observed for a total of 178.5 min, Charity for 180 min, Michelle for 210 min, Alex for 199.5 min, and Hunter for 88.5 min. Sessions that were completed in less than 30 min were due to students leaving the room prior to the completion of the observation.

### Interobserver Agreement

Agreement checks were conducted to document achievement of individual observers' skills. This process was also used to examine the adequacy of the code variable definitions. Agreement calculation used block-by-block agreement for engagement and interval agreement for other variables (Page & Iwata, 1986).

Eleven out of 32 observations were co-observed for a total of 34.38% of observations being examined for interobserver agreement (IOA). Between 20% and 30% of data points are typically co-observed and analyzed for agreement among observers, with agreement above 80% viewed as acceptable (e.g., Page & Iwata, 1986). The IOA results for each variable are listed in Table 3. Almost every variable fell within the acceptable range for IOA with the exception of prompts presented at the individual verbal and visual levels. The most likely reason for low agreement is that the frequency of these variables was low (Page & Iwata, 1986). For example, only two visual prompts were presented during the co-observed sessions and observers agreed on one and not the other (IOA of 50%).

**Table 3** Interobserver agreement

Variable	% of Agreement
Teacher-directed instruction	96.77
Conversation	98.99
Individual engagement	94.32
Prompt practice opportunities	84.21
Response to prompt practice opportunities	87.01
Classroom directives/routines	95.25
Prompt-classwide verbal	90.93
Prompt-individual verbal	73.50
Prompt-visual	50
Classwide engagement	82.76

### Visual Analysis

Possible baseline conditions were analyzed through visual analysis for each participant across three to seven sessions. To evaluate the visually graphed data, data points from the child who is hard of hearing were compared to the level and trend of data points from the micronorms showing performance of typical students. As discussed in the Results section, variability is contextual and would be analyzed in part by comparisons with variability in intervention conditions.

### Social Validity

Social validity measures include consumers' judgments of goals, methods, and outcomes of intervention-related procedures (Kennedy, 2005; Wolf, 1978). A caregiver and teacher of each child with mild-to-moderate deafness was contacted via phone and presented with the results of the observation via a scripted conversation. The conversation involved informing the stakeholders of differences (or lack of difference) between their child and normally hearing peers within the classroom on each of the three primary research questions: (a) responding to practice and prompt opportunities, (b) level of prompting required to follow classroom directives, and (c) engagement. After this information was presented, the parent or teacher was given the chance to ask questions. They were then asked to provide information on the usefulness and importance of the information provided in relation to the student's educational planning on a social validity survey consisting of four questions to be answered on a 5-point Likert scale.

## Results

### Difference in Responses to Practice and Prompt Opportunities

Graphs were visually analyzed for differences between the target students with mild-to-moderate deafness and each of two micronorm students in reference to their individual responses to practice and prompt opportunities presented in the classroom. Robin's data overlapped with her typical peers in all sessions during which she was presented opportunities to respond. Charity's data were similar to her peers, falling within the same range for all sessions with the exception of Session 5. Michelle's data fell within the range of her typical peers in the classroom. Alex's responses fell within the same range as his typical peers, even responding more in five out of seven sessions. Hunter responded more to practice and prompt opportunities than his typically hearing peers.

### Differences in Level of Prompting

Differences between the target students with mild-to-moderate deafness and each of two micronorm students were analyzed in reference to the level of prompting required to follow classroom directives. Overall, students with mild-to-moderate deafness were more often presented increasing levels of prompting, whereas students with normal hearing rarely received prompting beyond classwide verbal directives. Each student with mild-to-moderate deafness had lower percentages of accurate responding to prompts than at least one of the micronorm students. The levels of prompting presented are as follows: level 1 = classwide verbal prompts; level 2 = individual verbal prompts; level 3 = visual prompts; level 4 = physical prompts; and level 5 = hand-over-hand prompts. Robin responded to classwide verbal prompts with levels near the micronorm students in her class. Robin's classroom teacher presented more individual prompts to Robin than to her typically hearing peers (Robin was presented with 20, whereas her peers were presented with one and eight, respectively). Charity was also observed responding to classwide verbal prompts at levels consistent with her typically hearing peers and that her accuracy increased only slightly

when individual verbal prompts were presented. With individual verbal prompting, Charity's typically hearing peers increased their accuracy to 100%. Michelle responded to classwide verbal prompts with 77% accuracy, individual verbal prompts with 88% accuracy, and visual prompts with 100% accuracy. Although a similar pattern was evident with the typically hearing micronorms (increasing accuracy with higher levels of prompting), the presentation of higher levels was more consistent with Michelle, who was given more individual verbal prompts and visual prompting. Alex was presented higher levels of prompting than his typically hearing peers. The pattern of increased accuracy associated with increased levels of prompting held true for Alex as well as his peers. Alex was presented more prompting at all levels than his typically hearing peers. Hunter responded to classwide and individual verbal prompts at rates similar to his typically hearing peers. He was also shown to have increased his accuracy from 83% to 100% when given an individual verbal prompt over a classwide verbal prompt.

### Engagement

Graphs were visually analyzed for differences in engagement between the target students with mild-to-moderate deafness and each of two micronorm students. Robin was engaged in the classroom at rates close to her typically hearing peers, with overlapping data in 50% of sessions. Charity's data overlapped her typically hearing peers in 67% of sessions. The greatest concern with Charity's data is that it indicates that she was only engaged in three out of six sessions close to 70% of the time. Although Michelle's data indicate lower rates of engagement than most teachers hold standard (less than 80%), her data are consistent with the normally hearing peers in the classroom, overlapping 57% of the time. Alex was engaged in the classroom at rates very similar to those of his typically hearing peers. His data were overlapping in 43% of sessions. Overall, the classroom rates of engagement in this classroom may also be lower than desired by most classroom teachers. Hunter was engaged at rates slightly lower than his typically hearing peers in two out of three sessions.

### Use of Observations as Baseline

Baseline quality, addressed by research question (d), requires socially significant variables, consistent conditions, and adequate data for subsequent intervention comparisons. The sessions observed in Charity's, Michelle's, and Alex's classrooms were adequate to document presence of variables and how both target and peer students were responding to practice and prompt opportunities and classroom directives. There was enough consistency to document when the variables occurred during instruction. Hunter had only three sessions of data. Although all other participant data were collected on separate days, all the data collected in Hunter's room were in the course of one school day, which are inadequate to document baseline condition. Likewise, the six sessions observed in Robin's classroom were inadequate to document baseline condition for response to practice and prompt opportunities or levels of prompting. There were several times when the required variables were not present during instruction.

The sample of students with mild-to-moderate deafness was selected based on hearing characteristics, not on referral problems. Thus, case studies of this type (Kazdin, 2002) can be used for inferences about the effects of classrooms that may be positive, show the need for intervention, or the need for more data.

### Social Validity

The results of the survey indicate that teachers and parents found the information provided as useful and important. They also found the information addressed concerns that they had and was helpful when considering educational planning.

### Discussion

The group of students selected for this study was judged by their teachers as doing relatively well compared to their normally hearing peers. The five students with mild-to-moderate deafness appeared to be placed in classrooms where they are participating similarly to their peers on several key variables. This may be evidence of teacher strategies to keep the student more engaged and interactive within the classroom.

### Outcomes of Observations in Classrooms

The students with mild-to-moderate deafness had rates of engagement near their typical peers. However, two of the classrooms had rates of overall class engagement less than 80%. This level of engagement may result in difficulty in the classroom over time as engagement is directly tied to academic achievement in the classroom (Finn, 1993). The detection of low rates of engagement also points to the possible use of the code for informing consultation about prioritized target variable decisions, such as improving classwide engagement and more individualized student plans for inclusive classroom success.

This study confirms evidence of successful inclusion overall with some possibly significant differences that may assist in making support efforts more refined or specific for individual children and teachers. Information about which prompts were effective as well as levels of engagement and responding to practice and prompt opportunities was helpful to stakeholders when considering future placements and consultations with future teachers. Two of the students with mild-to-moderate deafness were offered more opportunities to respond than their peers with typical hearing. Those two students were also presented with more classroom directives and routines within the class.

### Role of Observation in Itinerant and Consultation Services

Teachers of the deaf often serve in an itinerant teacher capacity. As part of this role, teachers of the deaf provide limited direct service delivery (Luckner & Howell, 2002) and have limited time with the general education classroom teacher. Direct observations can be a technically adequate means of assessing classroom variables and can be utilized by teachers of the deaf to assess the classroom participation and engagement of children who are hard of hearing within the general education classroom. Educational concerns that parents or teachers had regarding their student in the classroom were adequately addressed through the information presented, or variables may be added by teams to address specific need (e.g., more unusual individualized or classroom variables).

This study points to the important possible use of direct observation for consultation. Robin's data indicated a need for consulting on increasing opportunities to respond within the classroom, an activity that is directly tied to classroom achievement for students (Cook & Friend, 1995). Hunter's data, like Robin's, illustrate the possible use of direct observational data to inform consultation with classroom teachers on increasing opportunities to respond as well as increasing class engagement. One other area highlighted in the data was the topic of prompting. Given the increased accuracy with individual prompting, the teachers may be consulted on the more frequent use of increased levels of prompting.

Students who are hard of hearing are being placed more frequently in the general education inclusive classroom setting. It is imperative that educational placement decisions are based on data (PL 107-110, 2001). The direct observation code utilized in this study provided information regarding how a student participates and engages in the classroom. If the student has limited responses to opportunities in the classroom environment, academic achievement may be negatively impacted (Brophy, 1988; Finn, 1993). The information gained can be used by the educational team to assess whether the student is adequately participating within the current placement or whether additional interventions should be put into place to increase active participation.

The social validity of direct observation may lead to more use by teachers of the deaf. Importantly, both parents and teachers thought the information gained during direct observation was helpful when considering educational planning and that it adequately addressed any concerns held about the student in the inclusive classroom placement.

### Limitations

Conducting research on low incidence populations is difficult based on the small number of possible recruits to the study. The selection of students with mild-to-moderate deafness resulted in a very high functioning sample and may have minimized differences between students who are hard of hearing and those with normal hearing.

Another issue with the selection criteria is in the use of pure-tone averages for identification. Students with varying configurations of hearing have different access to auditory input and therefore differing patterns of speech and language delays. For example, a student with a flat configuration of mild-to-moderate deafness would be expected to have less of a chance of speech and language delay than a student who has a precipitous sloping configuration but a pure-tone average in the mild-to-moderate range. The second student would not have access to high-frequency sounds and would be at a much higher chance of speech and language delay.

The use of small numbers of micronorm students with normal hearing for each focal student may be a source of variability in data. Although the student with mild-to-moderate deafness is observed for variables during 24 intervals per session, each micronorm student is observed for 12 intervals. However, advantages of having norms of children in actual classroom activities and contexts to help with decision making can be weighed by teams (Bell & Barnett, 1999). As an example, peer samples for micronorm data show resemblance in engagement, an omnibus measure of classroom performance.

Both Robin and Hunter lacked an adequate amount of data for consistency of baseline conditions. Although the consistency of baseline can only be viewed relative to a subsequent intervention condition, the clarity of baseline could be enhanced by lengthening the baseline condition if the researcher or consultant is not confident of baseline status.

### Suggestions for Future Research and Practice

Further investigations of student performance and outcomes within inclusive classrooms are needed, including systematic studies of classroom activities and routines as well as their direct impact on student participation. These are also questions of practice by school teams, and observation methods can be shared for both purposes.

When looking at the study variables, some variables are present more during certain activity types than in others. Replications of this study may extend data on key whole group and small group instructional



periods. The specific impact of activities can also be evaluated by school teams as support plans are developed or modified.

The students in this study also spent much of their school days on independent work. Being engaged in independent work does not guarantee that the students are actually following the written or verbal directions stated. In order to better detect how students are following classroom directions and are participating in learning activities, future studies can be enhanced with the use of permanent products and direct measures of academic performance (i.e., writing samples, reading probes, curriculum-based measures, etc.).

Selection criteria can also be modified in future studies. As more children who are hard of hearing are being educationally placed in inclusive classroom environments, this work can also be expanded to look across additional degrees of hearing loss. Teachers of the deaf may first identify students on their caseloads for whom they are concerned about participation in the inclusive classroom setting. The students identified as those that are having potential difficulties can be recruited for inclusion in the study. Using students for whom teachers have concerns will enable to the implementation of interventions that could be tracked through accountability or internally valid single case design (Kennedy, 2005). Variables of concern for students who are hard of hearing may be demonstrated during differing classroom subjects, such as history, science, or mathematics. Future replications can focus on students placed in reading/language arts instruction, or other subjects in which students who are hard of hearing are included.

### Funding

University of Cincinnati Student-Faculty Mentoring grant.

### Conflicts of Interest

No conflicts of interest were reported.

### Acknowledgements

The authors thank the multiple data collectors involved in this project. Without them, this project

would not have been possible. This study was completed as the first author's dissertation under supervision of the other authors.

### References

- Antia, S. D., Sabers, D. L., & Stinson, M. S. (2006). Validity and reliability of the classroom participation questionnaire with deaf and hard of hearing students in public schools. *Journal of Deaf Studies and Deaf Education*, 12, 158–171.
- Barlow, D. H., Nock, M. K., & Hersen, M. (2009). *Single case experimental designs: Strategies for behavioral change* (3rd ed.). Boston: Pearson.
- Bell, S. H., & Barnett, D. W. (1999). Peer micronorms in the assessment of young children: Methodological reviews and examples. *Topics in Early Childhood Special Education*, 19, 112–123.
- Bess, F. H., Dodd-Murphy, J., & Parker, R. A. (1998). Children with minimal sensorineural hearing loss: Prevalence, educational performance, and functional status. *Ear and Hearing*, 19, 339–354.
- Borders, C. (2009). *Teacher instruction and related student behavior research observation form*. Unpublished code and manual, University of Cincinnati, Special Education.
- Briscoe, J., Bishop, D. V., & Norbury, C. F. (2001). Phonological processing, language, and literacy: A comparison of children with mild-to-moderate sensorineural hearing loss and those with specific language impairment. *Journal of Childhood Psychology and Psychiatry*, 42, 329–340.
- Bronson, M. B., Tivnan, T., & Seppanen, P. S. (1995). Relation between teacher and classroom activity variables and the classroom behaviors of prekindergarten children in Chapter 1 funded programs. *Journal of Applied Developmental Psychology*, 16, 253–282.
- Brophy, J. E. (1988). Research linking teacher behavior to student achievement: Potential implications for instruction of Chapter 1 students. *Educational Psychologist*, 23, 235–286.
- Cook, L., & Friend, M. (1995). Co-teaching: Guidelines for creating effective practices. *Focus on Exceptional Children*, 28(3), 1–16.
- Davis, J., Ellenbein, J., Schum, R., & Bentler, R. (1986). Effects of mild and moderate hearing impairments on language, educational, and psychosocial behavior of children. *Journal of Speech and Hearing Disorders*, 51, 53–62.
- Finn, J. D. (1993). *School engagement and students at risk* (Publication No. NCED 93470). Washington, DC: US Department of Education, National Center of Educational Statistics. ERIC Document Reproduction Service No. ED 362 322.
- Finn, J. D., & Cox, D. (1992). Participation and withdrawal among fourth-grade pupils. *American Educational Research Journal*, 29, 141–162.
- Gallaudet Research Institute. (2006). *Regional and National Summary Report of Data from the 2006–2007 Annual Survey of Deaf and Hard of Hearing Children and Youth*. Washington, DC: GRI, Gallaudet University.

- Hartley, E. T., Bray, M. A., & Kehle, T. J. (1998). Self-modeling to increase classroom participation. *Psychology in the Schools, 35*, 363–372.
- Hartley, E. T., Kehle, T. J., & Bray, M. A. (2002). Increasing student classroom participation through self-monitoring. *Journal of Applied School Psychology, 19*(1), 51–63.
- Hughes, J. N., & Kwok, O. (2006). Classroom engagement mediates the effect of teacher-student support on elementary student's peer acceptance: A prospective analysis. *Journal of School Psychology, 43*, 465–480.
- Individuals with Disabilities Education Improvement Act of 2004 (IDEIA). Public Law 108–446.
- Kazdin, A. E. (2002). *Research design in clinical psychology* (4th ed.). Boston: Allyn & Bacon.
- Kennedy, C. H. (2005). *Single-case designs for educational research*. Boston: Allyn & Bacon.
- Lane, K., Wolery, M., Reichow, B., & Rogers, L. (2007). Describing baseline conditions: Suggestions for study reports. *Journal of Behavioral Education, 16*, 224–234.
- Long, G., Stinson, M. S., & Braeges, J. (1991). Students' perception of communication ease and engagement: How they relate to academic success. *American Annals of the Deaf, 136*, 414–421.
- Luckner, J. (2006). Providing Itinerant Services. In D. F. Moores & D. S. Martin (Eds.), *Deaf learners: Developments in curriculum and instruction* (pp. 93–111). Washington, DC: Gallaudet University Press.
- Luckner, J., & Howell, J. (2002). Suggestions for preparing itinerant teachers: A qualitative analysis. *American Annals of the Deaf, 147*, 54–61.
- McCain, K. G., & Antia, S. D. (2005). Academic and social status of hearing, deaf and hard of hearing students participating in a co-enrolled classroom. *Communication Disorders Quarterly, 27*, 20–32.
- Moeller, M. P. (2000). Early intervention and language development in children who are deaf and hard of hearing. *Pediatrics, 106*. Article e43. Retrieved November 12, 2008, from <http://www.pediatrics.org/cgi/content/full/106/3/e43>.
- Moores, D., Jatho, J., & Creech, B. (2001). Issues and trends in instruction and Deafness. *American Annals of the Deaf, 146*, 72–76.
- Niskar, A. S., Kieszak, S. M., Holmes, A., Esteban, E., Rubin, C., & Brody, D. J. (1998). Prevalence of hearing loss among children 6–19 years of age: the third national health and nutrition examinations survey. *Journal of the American Medical Association, 279*, 1071–1075.
- Page, T. G., & Iwata, B. A. (1986). Interobserver agreement. In A. Poling & R. W. Fuqua (Eds.), *Research methods in applied behavior analysis* (pp. 99–126). New York: Plenum.
- Public Law 107–110 The No Child Left Behind Act, 20 USC 6301.
- Reed, S. (2003). Beliefs and practices of itinerant teachers of deaf and hard of hearing children concerning literacy development. *American Annals of the Deaf, 148*, 333–343.
- Thomas, C., Holmberg, M., & Baer, D. M. (1974). A brief report on a comparison of time sampling procedures. *Journal of Applied Behavior Analysis, 7*, 623–626.
- Turner, J. C., & Patrick, H. (2004). Motivational influences on student participation in classroom learning activities. *Teachers College Record, 106*, 1759–1785.
- Valiente, C., Lemery-Chalfant, K., Swanson, J., & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*, 67–77.
- Wake, M., Hughes, E., Poulakis, Z., Collins, C., & Rickards, W. (2004). Outcomes of mild-profound hearing impairment at age 7–8 years: A population study. *Ear and Hearing, 25*, 1–8.
- Wauters, L. N., & Knoors, H. (2007). Social integration of deaf children in inclusive settings. *Journal of Deaf Studies and Deaf Education, 13*, 21–36.
- Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*, 203–214.
- Yoshinaga-Itano, C. (1999). Benefits of early intervention for children hearing loss. *Otolaryngology Clinics of North America, 32*, 1089–1102.