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Using a Digital Frame and Pictorial Information to Enhance the SafeCare® Parent-Infant Interactions Module With a Mother with Intellectual Disabilities: Results of a Pilot Study

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Abstract

Parents with intellectual disabilities (ID) are disproportionately represented in the child welfare system. Parents with ID can be better served by developing curricula that support various modes of learning. Technology offers a potentially effective tool because it is visual, interactive, and self-instructional. SafeCare® is an evidence-based parenting program with flexibility to adapt its curricula while maintaining fidelity. This research presents the results of a pilot study that examined the effectiveness of an adaptation to the SafeCare® parent-infant interactions (PII) module for a mother with ID by using a digital picture frame with pictures of the mother and her infant engaged in skills that met the performance criteria for PII. A multiple-probe design across behaviors was used with the mother and her infant, showing a dramatic increase in PII skills that was maintained across 3 monthly follow-ups. Although further research is necessary, the preliminary data suggest the digital picture frame enhancement to the SafeCare® PII module may be a promising instructional tool for parents with ID.

Keywords

child maltreatment; child neglect; parents with intellectual disability; parent-infant interactions; technology; SafeCare®; self-modeling

It is estimated that 1,400,000 parents with an intellectual disability (ID) were living in the United States in 2008, though problems with definition of ID suggest this is actually higher (O'Keefe & O'Hara, 2008). Despite recognition that ID is not an adequate predictor of parental competency, parents with ID continue to be disproportionately represented in child maltreatment (CM) cases, particularly neglect. A review of family court cases in 2000 found

that 15.1% included a parent with ID (Booth, Booth, & McConnell, 2004), whereas a review of international studies reported a 40–60% rate of permanent child removal in cases where a parent with ID was accused of CM (McConnell & Llewellyn, 2002). ID combined with concurrent social-ecological factors and social stigma reflects increased vulnerability and the need for comprehensive service intervention (McGaw, Shaw, & Beckley, 2007; Tymchuk & Andron, 1990). Although parents with ID exhibit some cognitive and contextual differences that make them susceptible to neglect, teaching methods that address their learning needs are effective in increasing parenting performance (Feldman, 1994; Wade, Llewellyn, & Matthews, 2008). Practitioners who work with parents with ID often have considerable caseloads and do not always receive specialized training making it challenging to provide adequate support (Clayton, Chester, Mildon, & Matthews, 2008). In order to support the specific learning needs and considerations of parents with ID, efforts should focus on increasing the effectiveness of interventions disseminated in the field (Azar & Read, 2009).

Recommendations for teaching parents with ID support behaviorally based interactive instruction using direct observation, modeling, practice, and positive and corrective feedback (Llewellyn & McConnell, 2002). Instruction generally implies observation of another person who serves as the “model” from which behavior is subsequently imitated (Bandura, 1993). In some instances, however, the participants can become their own models through a procedure termed self-modeling in which the participant observes images of himself or herself successfully demonstrating a desired skill (Dowrick, 1999). Flexibility and individualization also characterize program effectiveness with positive outcomes demonstrated using an in-home setting and achievable goals to ensure parents do not become overwhelmed (Feldman, 1994; Llewellyn, McConnell, Russo, Mayes, & Honey, 2002). Diverse and cognitively appropriate teaching methods remain the most consistent finding in adapting parenting programs for parents with ID. Interventions most often adopt pictorial materials such as color-coded food cards to plan meals and shop for groceries (Sarber, Halasz, Messmer, Bickett, & Lutzker, 1983). Self-instructional materials may help increase self-efficacy and serve as prompts during times when training is not occurring.

To conduct preliminary research to adapt a parent training program for parents with ID, we conducted a pilot project that examined a technological enhancement (a digital picture frame) and a revised version of the parent-infant interactions (PII) module of the SafeCare[®] parenting program. The revised PII module aimed at being more user-friendly through the use of training materials with heavily pictorial information and simple phrasing. SafeCare[®] is a home-visiting, evidence-based parenting program for prevention of CM that provides skills training in health, safety, and parent-child interactions. Several single-case research design studies have documented individual parental behavior change with the SafeCare[®] home safety module (Barone, Greene, & Lutzker, 1986; Metchikian, Mink, Bigelow, Lutzker, & Doctor, 1999; Tertinger, Greene, & Lutzker, 1984; Watson-Perczel, Lutzker, Greene, & McGimpsey, 1988), but only one study focused on PII (S. Z. Lutzker, Lutzker, Braunling-McMorrow, & Eddleman, 1987). The PII module aims to foster positive parent-infant interactions through the use of seven behaviors that can be applied in day-to-day parent-infant interactions.

Technology can be unobtrusive and flexible while providing an adjunct to face-to-face instruction. Parents who received phone prompts to engage their children viewed the use of cell phones favorably and experienced high levels of skill mastery (Bigelow, Carta, & Lefever, 2008; Jabaley, Lutzker, Whitaker, & Self-Brown, 2011). Technology gives individuals greater freedom in how they choose to participate and fit an intervention into their daily routine. As a result, practitioners may spend less time rescheduling canceled or missed appointments (Feil et al., 2008; Self-Brown & Whitaker, 2008). Utilizing technological media, through which parents are becoming increasingly familiar, can potentially be cost-effective because many of these devices are already used in the home.

Technology can be particularly useful for persons with ID because it addresses many of their learning needs directly. Research to date has relied primarily on visual media, video (Shiple-Benamou, Lutzker, & Taubman, 2002), computer (Cheng & Chen, 2010), and virtual reality scenarios (Cromby, Standen, & Brown, 1996) all yielding positive results in acquisition of skills by persons with ID. Technology enables presentation of information in smaller and more manageable doses to reduce the risk of cognitive overload (Cihak, Fahrenkrog, Ayres, & Smith, 2010). Technology can also provide a situation in which to learn and practice skills without the possibility of diversions or distractions. A study of a 3-D computer program designed to teach persons with ID how to recognize and identify facial expressions found that the program exhibited positive effects on skill acquisition (Cheng & Chen, 2010). Finally, many technological devices contain an inherent element of self-instruction. Technological devices provide a self-prompting mechanism in the absence of, or in addition to, face-to-face intervention (Mechling, Gast, & Fields, 2008).

In the current study, the SafeCare[®] PII module was adapted to the needs of a mother with ID by making use of technology, self-modeling, and pictorial information. To examine potential effectiveness and ease of implementation, we piloted the enhanced program with one mother with ID and her infant (recruitment and retention difficulties limited our sample size to a single dyad). Specifically, we examined whether a mother with ID could use a digital picture frame with photos of her engaged in criterion performance of parent-infant interactions. A multiple probe design across behaviors was used to demonstrate the effectiveness of the SafeCare[®] PII module enhanced by the digital frame.

METHOD

Participant

A 23-year-old mother with ID participated. She had children ages 3, 5, 7, and 9 as well as one 10-month-old infant living with her. Her Weschler Adult Intelligence Score (WAIS) score was 66 in verbal and 72 in performance with a psychological assessment of mild mental retardation, limited problem-solving skills, and slow information processing. She was referred by a local agency offering support for families with at least one member with a developmental disability. The selection criteria for the referral were a diagnosis of ID for the parent, an infant 0–10 months living in the home, and the parent expressing an interest in enhancing parenting skills. The agency used additional criteria for recruitment that they believed would facilitate successful completion of the program such as history of cooperation and a relatively fixed housing arrangement. The mother gave consent to

participate in the study based on a Georgia State University and Georgia Department of Human Resources-approved informed consent document.

Home Visitor and Observer

The senior author (hereafter referred to as HV for home visitor) successfully completed the SafeCare[®] PII module training and conducted all primary data collection. A graduate research assistant was also trained in the PII module and served as the reliability observer.

Setting

The intervention took place in the living area of the mother's two-bedroom apartment in a housing complex located in a low socioeconomic status (SES) neighborhood.

Observation System: The PAT-IV

The Planned Activities Training checklist, infant version (PAT-IV), was adapted from the PAT-IV currently used by SafeCare[®] providers and was used to record the mother's demonstration of PII skills. Target PII skills were smiling, touching, looking, positive verbalizing, imitating infant, and gentle movement. Each skill counted as an independent category on the checklist; thus, there were seven possible observable skills during each activity. The skills were grouped into two skill sets: physical (touching, holding, and gentle movement) and nonphysical (smiling, looking, positive verbalizing, and imitating infant). Four of the skills (smiling, looking, positive verbalizing, and touching) were identified as core skills that could be demonstrated in every interaction between parent and infant. The observations were divided into ten 1-min intervals for each skill so that occurrence-nonoccurrence data could be scored.

Scoring

PII skills were observed at baseline, the beginning of each training session, and postintervention through direct observation by the HV using the PAT-IV. One of three activities was observed during an observation. Activities were selected from two daily activities, such as diapering and feeding, and one free-play activity. Daily activities were chosen by the mother prior to baseline because they were activities she expressed as being more challenging. Partial-interval recording was used to record occurrence or nonoccurrence of each skill on the PAT-IV demonstrated during an interval. A stopwatch with a vibrating alarm was set to vibrate every minute until the conclusion of the observation.

The scoring protocol for the PAT-IV was developed and agreed upon prior to the initiation of the intervention. The HV and reliability observer practiced its application by observing previously taped SafeCare[®] PII sessions and independently scoring the PAT-IV. At the conclusion of the observation, scores were compared and a discussion that aimed at consistent application of the observation system was led by the HV. Scoring and discussion continued in order to obtain increasingly accurate reliability and mastery criterion was maintained above 85%.

During the observation, the HV and the reliability observer independently marked a "✓" for each interval in which the skill occurred with only one possible "✓" per interval. An "n/a"

could also be scored for a noncore skill if the HV ascertained that the context of the activity precluded use of the skill. Such intervals were dropped and not included in the final calculation. A composite score for each skill set was derived by taking the sum of all of the intervals in which the skills in that skill set occurred and dividing by the total number of intervals in that skill set. Based on these individual scores and the HV's observation of skills being demonstrated properly, the HV was able to adjust training to focus on skills that were not improving or were being underutilized.

Training on the next skill set began once mastery criteria were met on the skill set trained in the previous sessions. Mastery for each skill set was considered correct demonstration of all the skills in a set during an activity without any feedback by the HV and a score of 80% occurrence or higher. During training for the new skill set, the mother was expected to maintain mastery of the skills in the previous set. If the score for a skill dropped, booster training was provided until she once again achieved mastery. Final mastery was reached when she was able to demonstrate all of the skills (both skill sets) on the PAT-IV without feedback from the HV and a score of 80% or better.

Materials

Parent Training Materials—The mother was provided with the SafeCare® PII module training, which included revised materials aimed at better usability, during the first home visit. The Daily Activities Checklist–Infant Version (DAC-IV) was used to identify two daily activities chosen by the mother, such as mealtimes and diapering, she found challenging. The activities were used along with one play activity for observation during the remainder of the training. A preliminary version of the newly developed SafeCare® iCards, which contained definitions and examples of each of the skills on the PAT-IV, were also provided. They were developed to be more user-friendly by increasing pictorial content and providing succinct text explanations for each skill as well as incorporating information on determining a child's emotional state (sad, sleepy, alert, etc). The Developmental Checklist included age-specific developmental milestones used to help identify issues related to appropriate development. Activity cards describing various activities in which parents can engage with their infants to encourage proper development were also provided as a resource and for practice following each training session.

Digital Frame—An Opteka digital picture frame with a 20.32 cm. (800 × 600 pixel) LCD screen was given to the mother during the second home visit. The digital frame is an electronically powered photo screen on to which stills, or short videos can be uploaded from the memory card of a digital camera and shown in sequence. Once the photos are uploaded, the frame continuously runs a slideshow unless it is turned off.

Stopwatch—An Independent Living Aids vibrating stopwatch keychain was used during observations. It is small enough that the keychain can be discreetly attached to a clipboard or pocket during an observation and was set to vibrate so the mother was not distracted by noise during the observations.

Procedure

Recruitment—The limited selection criteria made recruitment challenging and resulted in convenience sampling. Based on the study criteria and additional agency criteria, four mothers were referred. One mother was dropped from agency services altogether and one mother had her children removed from the home. The process for recruitment began with a home visit by an outreach worker from the recruiting agency inquiring if the mother had interest in participating. Once the mother agreed, the HV and the outreach worker visited to explain the SafeCare[®] PII module, use of the digital picture frame, and expectations for research. During this meeting, the informed consent document was read aloud by the HV. The HV modified her language according to the mother's needs and employed an interactive questioning strategy to establish understanding of the research. The HV also brought the digital frame and demonstrated how it would be used. The HV explained that at the end of the project, the mother would receive \$30 and get to keep the digital frame. Once the outreach specialist determined the mother had reached sufficient understanding and did not feel undue pressure to participate, consent was obtained and the first session was scheduled. Of the two mothers who consented to participate, one was lost to attrition and one completed the study after 8 weeks. As a result, the research evolved into a single-case experiment aimed at providing a basis for further development of the technological enhancement and pictorial materials.

Baseline—The HV explained to the mother that the purpose of baseline was to observe her interacting with her infant as she typically would; thus no feedback would be provided. The HV and the mother then chose two daily activities from the DAC-IV to use for a baseline measure and for the remainder of the intervention. The mother was then asked to interact with her infant during each of the chosen activities and to pretend that the HV and observer were not present. To derive a datum point, data from the two activities were used to calculate a cumulative mean. Data from the third activity constituted a second datum point representing the generalization measure.

Training Condition—The skill set with the lowest percentage occurrence was trained first. During training, the mother and HV reviewed each skill on the iCards individually and discussed what they meant and how she could use them in interactions with her infant. Each skill was modeled by the HV and practiced by the mother with positive and corrective feedback provided by the HV. This sequence was followed for each of the skills in each particular skill set. After practicing each skill independently, the mother and the HV practiced using them simultaneously with the HV offering praise and suggestions for missed opportunities. At the close of each session, they discussed any additional questions or comments and chose one age-appropriate activity from the Activity Cards for practice of newly trained skills. At the beginning of the next session, the mother was asked to perform skills from the previous session during one of the chosen training activities. The data were used to determine which skills required more training and when it was time to move on to a new skill set. For the nonphysical skill set, training took two sessions rather than one. In this case, data collection still occurred at the beginning of the next session even though training was incomplete. Once the mother attained mastery with all the skills in one skill set, training began for the next skill set.

Introduction of the Digital Picture Frame and Alarm Mechanism—The enhanced version of the PII training involved staging poses of newly learned skills that were photographed and uploaded to the digital picture frame. Throughout the training, the HV captured photos of the mother correctly modeling each of the PII skills to create self-modeling and a prompting system available when the HV was not present. The HV would ask the mother to repeat the skill several times or provide verbal instruction to her during the activity to ensure the skills were modeled correctly and visible in the photographs. After the HV was able to capture several shots of the skill, training and addition of pictures of the next skill occurred. Photos of verbal interactions, such as positive verbalizing, had to be captured so as to demonstrate the interaction in a still shot without the assistance of audio. For example, a picture of talking needed to show the mother with her mouth open as she was speaking.

The digital frame was introduced during intervention once several images for each skill trained in that session had been captured with the digital camera. All photos were uploaded to the digital frame at the close of each session. Each time new photos were uploaded, the mother and HV reviewed them together. Simple questions such as, “What are you doing in this picture?” and “Which skills are you using with your baby in this picture?” ascertained whether the mother had an understanding of what was occurring in each photo. After this, the HV set the frame to automatically queue a slideshow of the photos on a continuous loop. The HV and mother determined times and activities during the day that she could practice interactions using the digital frame as a guide. Photos of new skills were continuously uploaded to the frame until the mother had a complete catalog of all the skills on the PAT-IV. When the HV arrived each week, she would check to see whether the frame had been turned off and engage the mother in discussion about how she had used the frame to practice in the week prior.

Implementation of the SafeCare® Enhanced PII Module—During the remainder of the sessions, new skills were introduced, trained, and more photos uploaded to the digital frame. At the beginning of each training session, the previous session’s interaction skills were observed using the PAT-IV with no feedback from the HV. After training of all skills occurred, practice of PII continued utilizing boosters as needed for skills she had yet mastered and continuously adding new content to the digital frame as needed to build a cumulative catalog of PII skills. The HV provided ongoing feedback as the mother progressed toward integration and mastery of both skill sets during interactions. In the final session, an observation demonstrating all of the PII skills was conducted.

Follow-up Observation—Follow-up observations occurred at 1-month, 2-month, and 3-month intervals to evaluate skill maintenance. During these sessions, the mother was asked to engage in one activity observed during baseline and one new activity in which she had not been trained without feedback from the HV. The mother was also asked about her use of and experience with the digital frame. If the HV found that the skills were not being maintained, booster sessions were conducted. In these sessions, the HV focused on the skills being underutilized by modeling the skills and sharing opportunities for their use. The HV would refer to the digital frame to provide examples in which the mother had already used the skill

correctly. Then they would practice the skill in another activity so that she would have the opportunity to use the skill correctly and in context.

Experimental Design

A multiple probe design across skills was used to demonstrate the effectiveness of the SafeCare[®] PII module enhanced by the digital frame. In order to determine whether the physical or nonphysical skill set was introduced to begin the training process, the skill set with the lowest baseline percentage was implemented first. Once mastery was obtained for that skill set, introduction and training for the new skill set began. Prior to the introduction of the new skill set, another baseline probe was conducted.

Consumer Evaluation

After the final training session, the mother was asked to respond to a consumer evaluation questionnaire administered by the reliability observer to assess the usefulness of the SafeCare[®] program and the digital frames. It was read aloud and followed an interactive question-and-answer format applicable to the mother's cognitive ability. The 10-question survey used a Likert scale with additional space for comments.

RESULTS

Interobserver Reliability

Reliability observations occurred in 42% of the sessions: baseline, one training session, and the immediate posttraining observation. Interobserver reliability was maintained above 90% over the duration of the study with a mean of 96% overall and 96.1% and 96.2% for nonphysical and physical skill sets, respectively.

Results of Enhanced SafeCare[®] Training on Skill Acquisition

The effects of the adapted PII intervention and digital frame enhancement on the occurrence of PII skills are shown in Figure 1. There was a substantial increase in the occurrence of PII skills in both skill sets after training and the digital frame were introduced. Baseline means for physical and nonphysical skills were 16.65 and 58.3, respectively. The most dramatic change was in physical skills, a more than 83% increase from baseline. Baseline for nonphysical skills showed a range of 50–62.5% before the training condition was introduced in Session 3. In Session 3, skill demonstration increased to 83% with only partial training and 91.6% after training was completed. The mean percentage occurrence continued to increase in both skill sets for the remainder of the training condition so that the range was 83–100% for physical and 83–92.5% for nonphysical. The mother continued to show generalization of the skills in which she had been trained after training was completed. During her training in nonphysical skills, she maintained 100% occurrence in physical skills for the remainder of training condition. Additionally, after she received partial training in two of the four skills in the nonphysical skill set, she performed both at 100% in the next observation session and those in which she was not fully trained, 83.3% occurrence. Generalization data were collected at baseline and at the final training session from an activity not used during training. Generalization also increased from 33.3% for physical and 58.3% for nonphysical to 100% for physical and 83% for nonphysical in the final session.

After 1 month, there was a slight decrease for physical and nonphysical skills with a mean of 90% and 83%, respectively. At 2-month follow-up, the mother maintained a mean of 85% for nonphysical skills with a 2% increase. She decreased utilization of physical skills by an additional 10% attaining the minimum score for mastery at 80%, which represented a 20% overall decrease from the final training session. A booster session focused mainly on those skills she was underutilizing. Scores increased in physical and non-physical skill sets at 90% and 88.75% at 3-month follow-up representing an overall decrease in maintenance within 10% from final training session.

Consumer Satisfaction

The consumer satisfaction survey results were favorable. The mother perceived playtime with her infant as more fun and indicated feeling very sure of herself when she thought about using playtime to help him maintain healthy development. She indicated that the information was delivered well, and she was able to learn it easily. She considered the digital frame easy to use and helpful for instruction but expressed she sometimes felt uncomfortable posing for the pictures.

DISCUSSION

The purpose of this pilot research was to examine the potential effectiveness and ease of implementation of adaptations to the SafeCare[®] PII module for parents with ID. Specifically, could a mother with ID use a digital picture frame with pictures of her own PII to imitate PII taught by the HV in order to enhance interactions with her child? This study was only the second study conducted using the SafeCare[®] PII module. Although there were no systematic efforts to differentiate between the effects of the enhancement versus SafeCare[®] as usual, skill acquisition occurred more quickly than in the previous SafeCare[®] PII study, which used verbal prompts only with typically developing high-risk mothers (S. Z. Lutzker et al., 1987). In addition to rapid skill acquisition, the enhanced PII module produced a substantial increase in the mother's use of physical and nonphysical skills across a range of daily and play activities with mastery maintained up to 3 months. During the follow-up visits, the mother demonstrated mastery in activities in which she had not been trained, thus demonstrating the ability to generalize.

The mother was able to attain mastery in each skill set after a maximum of two sessions and consistently performed each skill well during training, but because she had recently entered a job search program, home visits were not able to be scheduled with regularity. Although home visits were as many as 22 days apart, she regularly demonstrated mastery of skills from the previous session. Skill acquisition and maintenance was achieved despite a variable home visiting schedule and she was able to use the photos on the digital frame as a training resource during times when the HV was not present in the home.

The digital frame provided a continuous source of prompting that was unobtrusive and accessible. The mother appeared engaged with using the digital frame, which likely contributed to enhanced interest during training and an increased opportunity for practice outside of home visits. For example, there were indications that she was using the digital frame between home visits as she was generally able to provide examples of how and why

she looked at the frame. The mother had little difficulty operating it. When the HV returned for the second training session, the mother had successfully uploaded her own pictures to the frame. So as not to confound the research, she was asked to remove them until the conclusion of the intervention.

Self-modeling (Dowrick, 1999) likely helped to increase confidence and recall during the intervention. Initially, the mother was uncomfortable posing for photos but eventually began to appear more at ease and began offering her own ideas for poses with her infant to correctly demonstrate a skill. During discussion of each picture, she could identify skills being demonstrated by recalling the experience of posing for the pictures. Thus, self-modeling may be a useful intervention enhancement for parent engagement and skill acquisition.

Although the adapted SafeCare[®] PII module with digital frame enhancement appears to have been effective in increasing the instances of parent-infant interaction skills in this pilot study, there are several limitations to this research. The narrow parameters for inclusion made recruitment difficult and resulted in a convenience sample. In addition to the selection criteria outlined in the study design, the local agency recruited mothers using its own criteria, such as history of cooperation with the agency and a relatively stable home environment. Of the four mothers who expressed interest, one had her children removed from the home, one was dropped from agency services altogether, and one was lost due to attrition. Consequently, the research evolved into a single-case experiment, which can still serve as a basis for further development of the technological enhancement. For example, J. R. Lutzker, Campbell, and Watson-Perczel (1984) laid groundwork for full development of an assessment tool and intervention for home cleanliness with their single-case experiment. Similarly, Steed and Lutzker (1997) described a single-case experiment using picture prompts that set the stage for larger studies using other technology to improve skills.

The limited sample and selection criteria combined with the predisposition of the participating mother toward cooperation and a consistent home environment potentially created self-selection bias, raising the question of external validity. Although it seems probable that the participating mother's success was associated with these factors, it is unclear whether her motivation to participate had anything to do with learning positive parenting interactions thus introducing bias. Any perceived selection bias likely occurred at the researcher level rather than from the mother herself. The dearth of additional variables in the population related to socioeconomic status also invited potential for design bias because it was difficult to ascertain which factors responded most positively to the intervention and which did not. Nonetheless, there was rapid skill acquisition by the participating mother, which lays groundwork for replications.

The research design did not separately examine the digital frame from the standard PII module; thus the primary limitation was knowing with any certainty the degree to which the frame itself was responsible for the rapid skill acquisition. Because the intervention utilized various forms of instruction (e.g., digital frame, face-to-face instruction, pictorial instructional materials, SafeCare[®] PII), it is difficult to conclude the contributions of any one procedure. Particularly, the use of the newly developed iCards was not examined for the

role they may have played in the successful outcome. The cards were developed to be a more user-friendly tool, which might confound evidence pointing to the frame as the sole reason for rapid skill acquisition. Additionally, there was no mechanism that measured whether the frame was prompting the mother between home visits beyond anecdotal evidence. Although some modifications, such as an alarm or a text, were considered to serve as a prompt, they were deemed too cumbersome and consequently not included in the design.

Further limitations lie in the implementation of the digital frame itself. It was difficult to capture photos that adequately portrayed verbal skills, and there were fewer instances of these skills represented in the photo log. The video option on the digital frame was not used during the intervention because it could not be run simultaneously with the still shots. It required more complicated instructions for switching from still to video and so could not be used as an audio alternative for verbal skills. Another limitation of the frame was the discomfort in posing for pictures experienced by the mother during training. Initially, she expressed her uneasiness in posing for several pictures in a row but appeared more relaxed as weeks went on. Although interrater reliability was extremely high (mean of 96%) suggesting the validity of the assessment data, it should be noted as a limitation that, as part of the ongoing assessment approach, the HV was responsible for assessment data collection.

Future research should examine the separate roles of curriculum and the digital frame. Additionally, particular focus on frequency of skills displayed in each image uploaded to the frame could ensure that the parent is being properly exposed to each skill and can help to identify those that might be underrepresented. The integration of the digital frame into the PII module of SafeCare® would continue to make its use relevant to the parent as the child develops. The video and audio capabilities on the digital frame could be used for parents to begin to transition into more use of verbal versus nonverbal skills.

This research contributes to the large evidence base for the effectiveness of SafeCare®, specifically the PII module. Despite the limitations, the mother participated actively throughout the intervention, which resulted in an impressive increase of occurrence of skills surpassing outcomes with typically developing mothers (S. Z. Lutzker et al., 1987). She attained mastery in physical skills after only one training session and continued to maintain those skills even when she had moved to the next skill set. This preliminary research suggests promise for the use of technology in SafeCare® modules and parenting programs targeted for parents with ID and other at-risk populations.

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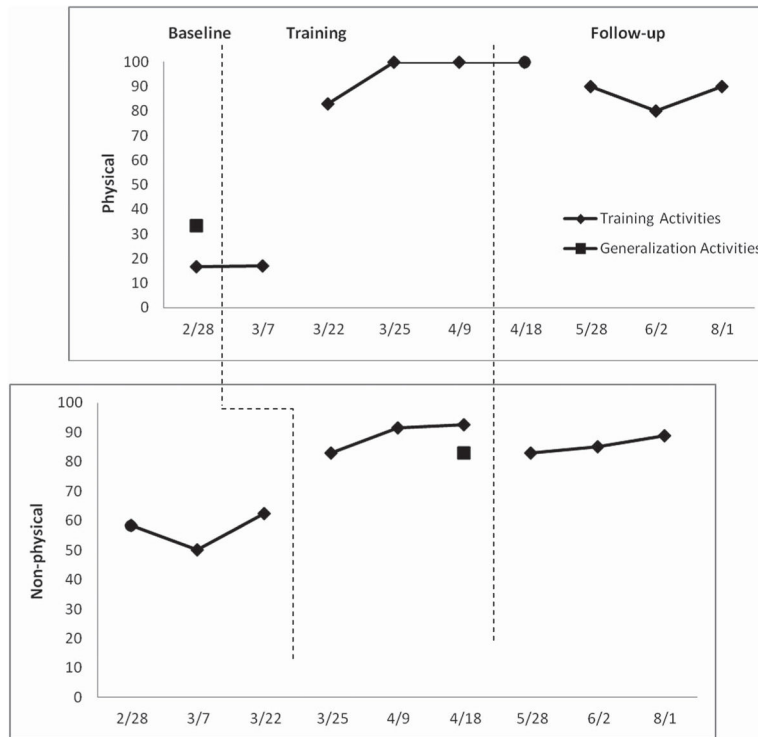


FIGURE 1. Percentage occurrence per skill set. The ● connotes a datum point in which the training and generalization scores were the same.