Effects of a Leisure Education Program on Social Knowledge and Skills of Youth with Cognitive Disabilities

Lynne Cory, John Dattilo, and Richard Williams

A study using a single subject multiple baseline design across four participants (one girl, three boys, ages 11–13 years) with disabilities (mild mental retardation, Down syndrome, Attention Deficit Hyperactivity Disorder, visual impairment) was used to assess effects of a leisure education program on social knowledge and skills demonstrated during leisure participation. Instructional strategies included use of a computer-assisted leisure education program and experiential learning activities (e.g., role-play, modeling). Participants’ social knowledge was assessed using a computer program and their social skills were examined using videotaped observations of participants during organized recreation activities. Although increases in social knowledge scores were maintained 10 weeks post intervention and the project goals and intervention were reported to be socially significant, appropriate, and important by staff and significant others, participants did not demonstrate improvements in targeted social skills used in leisure participation. Implications for practice and future research are discussed.

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For most of a century, social scientists (e.g., Chandler, Lubeck, & Fowler, 1992; Guralnick, 1990; 1993; Tredgold, 1922) posited that social competence was essential for adaptation to ever-changing situations within one’s environment and suggested social competence may be more valuable than intellectual competence. Although there is little agreement in the literature on a model that sufficiently explains the social competence process (Greenspan & Granfield, 1992), consensus exists that possessing a sense of social competence is helpful for exchanging ideas, actively participating, and responding to negative interactions (Rubin, Bukowski, & Parker, 1998).

Guralnick (1990, 1993) suggested that children’s self-perceptions of independence and overall self-efficacy are associated with successful, fulfilling relationships with peers. Early-life positive peer relations contribute to adjustment in later life (Chandler et al., 1992), and adaptive competencies (e.g., social skills) established in childhood may be predictors of adult adjustment (Healy & Masterpasqua, 1992) and job retention for adults with disabilities (Chadsey-Rusch, 1992).

Odom, Chandler, Ostrosky, McConnell, and Reaney (1992) observed that many children with disabilities have limited involvement with peers due to absence of basic social skills. This lack of social competence may largely contribute to limited opportunities for inclusion (Lord, 1997). Children with disabilities often differ from children without disabilities when developing social competence and this difference is often attributed to limited skills required to establish and sustain effective social interactions and friendships (McConnell & Odom, 1999; Odom et al., 1999). A lack of skills can result in relatively fewer interactions with peers and ensuing friendships, relatively fewer successful responses to social initiations, and relatively fewer opportunities for community inclusion. In addition, children with limited social skills are likely to demonstrate behaviors that reflect negative attitudes, limited interpersonal relationships, and subsequently lead to fewer social interactions (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996a, 1996b). An absence of social skills is particularly noticeable during leisure participation and frequently leads to isolation and an inability to function (Hughes et al., 2000).

One reason people participate in and continue leisure involvement is social interaction (Auld & Case, 1997; Coleman & Iso-Ahola, 1993). Peer relationships during childhood and adolescence are critical (Gresham, Sugai, & Horner, 2001; Zeltin & Morrison, 1998) and for children, play is often a context for engaging in social interactions with peers (Odom et al., 1999). However, without effective social skills, individuals are less likely to be accepted by their peers and continue leisure participation (Dattilo, 1999). Through leisure education individuals can develop skills that facilitate their participation in social groups (Lord, 1997). Additionally, social skills instruction is important because people “who have strong recreational interests that can be shared with others are more likely to be integrated in a meaningful way in social settings” (Terman, Larner, Stevenson, & Behrman, 1996, p. 11).

To better understand children’s social adjustment, Crick and Dodge (1994) proposed a social information-processing model (SIP). The SIP model is based within a variety of theoretical frameworks, among them Social Learning Theory (Bandura, 1977), and Self-Perception Theory (Bem, 1972). Bandura proposed various components related to social learning theory: (a) acquisition by direct expe-
rience and modeling, (b) maintenance through stimulus conditions, thoughts, and consequences, and (c) continuous effects of behavioral, personal, and cognitive influences. Bandura (1971) distinguished between enactive learning (i.e., learning by doing) and vicarious learning (i.e., observational learning). Enactive learning allows individuals to experience consequences related to their behavior that "can be informative, motivating, and reinforcing" (Bandura, 1971, p.5). However, Bandura (1971) implied that learning only by experience may be ineffective and that learning through observations of others may be more powerful. This project incorporated the component "acquisition through modeling" (i.e., observational learning) as the primary method of providing social skills instruction. Complementarily, the SIP model suggests that children's social adjustment can be addressed using a series of steps influenced by the evaluation and responses of others thus becoming a reciprocal cycle of cues and responses. SIP involves: (a) encoding and interpretation of cues, (b) clarification of social goals, (c) response access, construction, and decision, and (d) behavioral enactment. The core of the model provides for a knowledge database of social knowledge and experience accessed during social processing. Children can choose a behavioral response from the database. Crick and Dodge hypothesized that within a social interaction, children selectively attend to external and internal cues, encode the cues, and subsequently interpret the cues. A behavioral response to the cues is based upon processing the cues using social knowledge in the form of memory, acquired rules, and schemas. This study examined social knowledge and skills and was positioned theoretically within the SIP model, specifically how children with disabilities apply social knowledge during behavioral response formulation (e.g., social skills) to a variety of cues within a social interaction. The computer-assisted leisure education social skills software (Williams, Dattilo, & Cory, 1998) was developed to increase participants' social knowledge while the role-plays and learning activities with peers were designed to provide participants with opportunities to learn and practice social skills and thereby increasing their available repertoire of response choices to external and internal cues.

Development of social skills used in leisure situations is important because skill acquisition and demonstration of these skills can facilitate acceptance by peers and development of friendships. Social relationships with peers allow individuals to acknowledge their acceptance by peers and provide a range of supports (Salisbury, Evans, & Palombo, 1997). Therefore, studies examining effects of innovative strategies designed to enhance social skills of people with disabilities are needed. One possible way to facilitate acquisition of these important skills is via computer-assisted instruction (CAI).

Generally, researchers have reported that CAI programs are effective learning aids (Wolfe, 1997). Research and development of CAI programs have evolved recently to provide learners with environments that enhance effective knowledge application (e.g., Jonasen, 1996). However, in spite of the potential of computer technology to improve the lives of people with disabilities, data from the 1998 Current Population Survey suggested that "...very few people with disabilities are able to take advantage of these possibilities" (Kaye, 2000, p. 1) and the promise of assistive technology has remained unfulfilled for far too many individuals with disabilities (Davies, Stock, & Wehmeyer, 2001).

Advancements in technology generate possibilities for experiential learning activities for individuals with disabilities through CAI (Gredler, 1994; Rieber, 1992; Tennyson, 1994) and interactivity available via CAI programs is intended to engage mental processes, enhance performance and productivity, and have individuals become active participants in the learning process (Jih & Reeves, 1992).

Researchers have concluded that CAI is a viable method for acquiring knowledge and skills by children and adults with and without

Therapeutic Recreation Journal

146

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disabilities addressing topics including (a) literacy (Lynch, Fawcett, & Nicolson, 2000; van Daal & Reitsma, 2000), (b) mathematics (Nicol & Anderson, 2000), (c) safety (Lee, McGee, & Ungar, 2001), (d) functional life skills (Gaffiero, 2001; Langone, Shade, Clees, & Day, 1999), (e) social-problem solving (Bosworth, Espelage, & DuBay, 1998; Goldsworthy, Barab, & Goldsworthy, 2000), (f) matching skills, (Hitchcock & Noonan, 2000), (g) self determination (Dattilo, Williams, Guerin, & Cory, 2001), and (h) social skills (Dattilo, Williams, & Cory, 2003; Goldsworthy et al., 2000; Margalit, 1995).

Dattilo and colleagues (2003) examined effects of a computer-assisted leisure education program on social knowledge relevant to leisure participation. Participants were three boys with intellectual disabilities and results indicated the intervention increased social knowledge. Although Dattilo et al. provided instruction related to social knowledge, opportunities for students to practice and improve social skills were not provided. This study extends research of Dattilo et al. in two primary ways. First, in the Dattilo et al. study, the intervention used was a computer-assisted leisure education program specifically targeting acquisition of social knowledge. In this study, group learning activities consisting of role-plays and demonstrations with study participants and peers with disabilities were used in conjunction with the computer-assisted leisure education program in an attempt to enhance participants’ social skills. Second, to determine participants’ acquisition of social knowledge, Dattilo et al. used only a computerized assessment. In the present study, videotaped observations of participants interacting with peers during leisure participation were used to measure effects of the intervention on social skills in conjunction with the computerized assessment of social knowledge. The purpose of this study was to extend work of Dattilo et al. by measuring effects of computer-assisted leisure education and experiential learning activities on participants’ social knowledge and skills in a leisure context.

Research Questions

This study addressed the following research questions: (1) What are effects of a computer-assisted leisure education program on social knowledge of youth with disabilities? and (2) What are effects of a computer-assisted leisure education program on social skills (e.g., verbal and nonverbal prosocial and antisocial behaviors) of youth with disabilities?

Method

Participants

Based on the following criteria, four participants were chosen from 37 youth enrolled in a summer day camp for children with disabilities (ages 6–21): (a) having a disability, (b) demonstrating observable social skill deficits (e.g., difficulties with verbal and nonverbal behaviors used during social interactions, behaviors indicative of listening, actions to initiate conversation), (c) expressing interest in study participation, (d) demonstrating choice-making skills, (e) being between the ages of 6 and 14, (f) giving assent for participation, and (g) receiving parental or guardian consent. Observations of campers’ social skills were made by the first author, the camp director, and another TR specialist using defined behavior lists during the initial two weeks of day camp to determine which campers would be enrolled in the study as participants.

Harry. Harry was a 13-year-old African American boy with mild mental retardation and Down syndrome who lived with his father, mother, and two older sisters. Harry performed activities of daily living independently but did not read letters or numbers. Harry communicated verbally and stated he enjoyed music, dancing, playing video games, watching TV, and swimming. Harry had previous computer experience at home and school. Based on behavioral observations during initial assessment at day camp, Harry’s social skill deficits included using excessive volume when speaking and not using courteous verbal and nonverbal behaviors when interacting with others.

Third Quarter 2006
Sharon. Sharon was a 13-year-old African American girl with mild mental retardation who lived with her mother and younger brother. Sharon performed activities of daily living independently, communicated verbally, and read at a first grade level. She stated that she enjoyed music, dancing, playing games with her friends, and playing with toys and dolls. Sharon had previous computer experience at school, but did not have a computer at home during the study. Sharon did not initiate conversation with others and often when addressed by others she verbally responded with statements unrelated to the question or activity.

David. David was a 12-year-old African American boy with mild mental retardation and a visual impairment who lived with his mother. David performed activities of daily living independently, communicated verbally, and stated that he enjoyed music, dancing, watching music videos, playing basketball, swimming, and playing video games. David had computer skills from previous school experiences and had a computer at home during the study. David’s social skills deficits included using excessive volume when speaking and laughing, and using discourteous verbal and nonverbal behaviors when interacting with peers.

Phillip. Phillip was an 11-year-old African American boy with Attention Deficit Hyperactivity Disorder. During the study, he resided at either the home of his aunt and cousin or the home of his mother and brother. Phillip performed activities of daily living independently, communicated verbally, and stated that he enjoyed basketball, swimming, listening to music, and dancing. Phillip had previous computer experience at school but did not have a computer at home during the study. Based on behavioral observations during initial assessment at day camp, it was concluded that Phillip’s social skills deficits included limited initiation of conversations or social interactions with others.

Setting and Equipment

The setting for the study was a community leisure services facility that included a multi-purpose gymnasium and a meeting room where the leisure education program was conducted. A Dell laptop computer containing the leisure education social skills software was used in addition to a 17” color monitor. Other leisure education materials included a curriculum manual, chalkboard, chalk, and handouts. Data were collected via a computerized version of the Social Interaction in Leisure Assessment (SILA) (Williams et al., 1998) and a video camera mounted on a tripod. Social validity was determined through responses to surveys completed by participants, family members, and day camp staff.

Research Procedures

Campers were divided into four groups of seven or eight with one study participant assigned to each group. Campers attended daily, scheduled leisure education sessions (5 × per wk, 30 min sessions) that occurred after campers were seated around the computer monitor in a semi-circle seating arrangement. Once campers were seated, the facilitator introduced the topic and presented information addressing a specific objective. The computer-assisted portion of the session was interactive and campers verbally indicated their response choices to the facilitator who operated the computer. Campers participated in experiential learning that included role plays after information was presented via the computer. For this study, traditional experiential learning theory was incorporated in ways such as experiencing (i.e., role plays) and guided reflection (i.e., group processing through discussion). Because of limitations specific to this day camp (e.g., duration, staff, transportation) it was not feasible to incorporate other aspects of experiential learning such as “generalization” and “application” (e.g., spending time with other peers in another recreation setting, observed but unsupervised opportunities for social interaction with peers).
Instructional content identification. Learning objectives on appropriate ways to interact socially during leisure were established following a review of the literature on social skills. Upon completion of the leisure education program, participants were expected to demonstrate knowledge of: (a) definitions and methods of communication, (b) verbal and nonverbal behaviors used during social interactions, (c) behaviors indicative of listening, (d) meaning of assertive behavior, (e) actions to initiate conversation, and (f) actions of a friend. Examples of situations were developed to teach participants information to achieve the learning objectives using both computer-assisted presentations and interactive role-plays and learning activities.

Leisure education social skills software. The “Social Interaction and Friendship” unit of the TRAIL leisure education curriculum (Dattilo & Hoge, 1999) served as the basis for the leisure education social skills software. The leisure education social skills software was developed in a game format with two distinct environments (cave and ice field) through which a cave woman, Beebee, travels. As participants progress through the game, Beebee is confronted with scenarios associated with social skills used during leisure participation with others. When Beebee encounters each scenario, participants examine a statement and two possible response options to complete the sentence and select the correct option. The statement and options are presented using written words accompanied by narration. If a correct option is selected, animated characters (bats or penguins) provide positive auditory and visual reinforcement, and Beebee continues her journey until she arrives at a party. If an incorrect option is selected, an animated character (saber-toothed tiger or wooly mammoth) chases Beebee back to a location that provides her with new clues about the correct response. Beebee returns to the scenario, and participants attempt to select the correct option again. If participants select the incorrect option twice, they are presented with the correct answer and participants can guide Beebee through the next scenario.

Experiential learning activities. Experiential learning activities involving study participants and peers (e.g., role play, modeling) were provided each session following instruction via the computer-assisted leisure education software. These activities were associated with specific information presented in the software. An example of a learning activity associated with “Understands meaning of communication” was for campers to identify different ways in which people communicate. Once campers identified various methods of communication, they were asked to share: (a) their communication preference, (b) their opinion of their own communication effectiveness, and (c) why they felt they communicated effectively using that mode of communication. An example of a role-play associated with “Identifies verbal behaviors used during social interactions” was for campers to choose a folded piece of paper “out of a hat” on which was written a setting (e.g., playground, library, or swimming pool). With a partner, campers presented an enactment of appropriate speech volume typically used in the setting they had selected. The facilitator probed as to why campers thought a specific volume might be appropriate in a specific setting and provided specific feedback to campers related to their responses.

Research Design

The study used a single subject multiple baseline design across participants that permitted direct and systematic replication of conditions over several cases. Using this design promotes attribution of behavior changes to a specific intervention rather than other extraneous variables and was chosen because of its effectiveness in determining individual responses to interventions in therapeutic recreation settings (Dattilo, Gast, Loy, & Malley, 2000).

During baseline and intervention, following leisure education instruction sessions and learning activities, campers participated in 15
minute organized group recreation activities during which they were videotaped for 10 minutes. Recreation activities (e.g., Balloon Volleyball, Balloon Hot Potato, Musical Balloon Toss, Kooshball® Darts, dancing) were used to promote campers’ interaction with one another. There was no direction to campers as to how they should interact; only information related to participation in the activity (i.e., rules, scoring) was provided. Staff intervened only when a participant’s safety was potentially jeopardized.

Baseline. Interactive computer games similar in format and animation to the leisure education social skills software (e.g., Blues Clues®, Phonics, Where in the USA is Carmen San Diego®) were used during baseline. Participants actively engaged in role-plays and experiential activities unrelated to social skill acquisition during the remaining portions of the sessions.

Intervention. Within baseline condition, after visual inspection indicated that SILA scores demonstrated stable level (i.e., the degree of stability or variability of SILA scores within baseline condition) and zero-celerating trend (i.e., neither increasing/accelerating nor decreasing/decelerating of SILA scores within baseline condition), the leisure education social skills intervention was introduced. Multiple baseline design requires staggered transition of participants from baseline condition to intervention condition. In this study, Harry was the first participant introduced to the intervention condition following stable level and zero-celerating baseline condition scores. After Harry’s participation in at least three consecutive intervention sessions and Harry’s demonstration of stable SILA scores following introduction to the intervention, the second participant (Sharon) began the intervention condition. This procedure continued for each of the participants; following Sharon’s participation in at least three consecutive intervention sessions and her demonstration of achieving stable SILA scores then David began the intervention. Once David met the session number and stability criteria, Phillip began the intervention. Due to the staggered entrance of participants into intervention when using multiple-baseline design, participants participated in different numbers of intervention sessions resulting in varying total hours of leisure education instruction. Harry participated in 15 sessions (7.5 hours), Sharon participated in 12 sessions (6.0 hours), David participated in 6 sessions (3.0 hours) and Phillip participated in 5 sessions (2.5 hours).

After receiving computer-assisted leisure education social skills instruction during leisure education sessions, participants practiced social skills through experiential learning activities with peers. Once learning activities were completed, debriefing occurred to assist participants and peers in processing experiences, to identify relevance of activities, and to conclude sessions.

Follow-up. During follow-up, the SILA was administered 1, 2, and 10 weeks after completion of the intervention condition. Although follow-up data were not collected for social skills because the day camp ended, social validity data were collected.

Data Collection and Instrumentation

Social Interaction in Leisure Assessment (SILA). The SILA is a 13-item computerized assessment used to determine participant social knowledge in leisure (Appendix A). The SILA takes approximately five minutes to complete and participants can choose between two responses, one of which correctly completes the stem of a sentence. The computerized assessment tool addressed a problem identified by Dattilo et al. (2001) who utilized a paper-and-pencil assessment. Participants in Dattilo et al. reported that they were not motivated to repeatedly complete the paper-and-pencil assessment; however, they indicated a computerized assessment was more appealing and therefore improved data collection (Dattilo et al., 2003). The SILA was administered during baseline and intervention conditions.
immediately following instructional sessions and during follow-up probes.

Behavioral measures. In addition to the use of the SILA, effects of the intervention were examined by observing targeted prosocial and antisocial behaviors of participants with peers during recreation activities. Prosocial verbal behaviors by a participant toward peers were defined as (a) vocalizing encouragement (e.g., “Yeah,” “Way to go”), (b) using courteous language (e.g., “Please,” “Thank you,” “Excuse me”), and (c) asking questions to peer or making statements in a positive manner that were related to the ongoing activity. (“It’s your turn,” “How do you play that?”) (Kern-Dunlap et al., 1992; Rutherford, Mathur, & Quinn, 1998; Strain & Kohler, 1995). Prosocial nonverbal behaviors by a participant toward peers were defined as (a) validating gestures (e.g., thumbs-up, clapping) and (b) supportive touches (e.g., physically assisting peer with game, pats on back) (Kern-Dunlap et al.). Antisocial verbal behaviors by a participant toward peers were defined as (a) calling peers a derogatory name (e.g., “Stupid,” “Baby”), (b) verbalizations that were excessive in volume (e.g., shouting words), (c) making statements in a negative manner not related to the activity (e.g., “I don’t want to play this game,” threats), and (d) interrupting others (Kern-Dunlap et al.; Quinn, Sherman, Sheldon, Quinn, & Harchik, 1992; Strain & Kohler). Antisocial nonverbal behaviors by a participant toward peers were defined as (a) physical contact (e.g., hitting, pushing), (b) grabbing objects from another person, and (c) vocalizations that were excessive in volume (e.g., yelling, laughing loudly) (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Kern-Dunlap et al.). Observational data were collected following instructional sessions during recreation activities. During baseline and intervention, a video camera was placed in the meeting room, approximately 10 feet (3 m) away from campers. For 10 minutes of the recreation activities a member of the research team operated the video camera. Videotapes were viewed on a VCR that displayed elapsed time so observers could identify the 10 second interval within which targeted behaviors occurred. During video observation, observers used interval method of observation and marked a code sheet at the intervals in which target behaviors occurred.

Observer accuracy. The first author was the primary observer and an undergraduate student with previous experience conducting behavioral observations and knowledge of single subject research methods was the secondary observer. Prior to observations, the primary observer gave the secondary observer written (a) participant information, (b) definitions of target behaviors, and (c) instructions on videotape viewing procedures. Participants were videotaped while they interacted during recreation activities prior to the study. The primary observer reviewed the tapes several times to establish a standard and subsequently trained the secondary observer to identify target behaviors. The secondary observer then began observations of the training tapes. Once the secondary observer achieved at least 80% agreement with the established standard on three consecutive observations, the secondary observer began interobserver observations.

Observer reliability. To obtain an estimate of interobserver reliability as suggested by Tawney and Gast (1984), a secondary observer viewed 22% of the videotaped sessions across all participants for baseline and intervention conditions (15 sessions of 69 total sessions). Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Overall mean agreement across behaviors was 96% (range = 93–99%), 97% (range = 93–98%), 98% (range = 96–100%), and 99% (range = 98–100%) for Harry, Sharon, David, and Phillip respectively.

Social Validity

Since Wolf (1978) and others have recommended that both participants and significant others determine relevance of an intervention,
participants, parents, professionals, and staff members were asked to report their perceptions of the social skills intervention. Social significance of intervention goals was determined by (a) conducting a review of literature, (b) observing participants during previous summer camps, and (c) examining teacher reports. Social appropriateness of procedures was assessed using surveys administered to four day camp staff members and four family members (three mothers and one aunt) prior to initiating the intervention. Items in the 7-item 5-point Likert-type survey included statements such as “It is important for children to behave in socially acceptable ways” and “Children can benefit from a social skills training program designed to teach them how to interact appropriately with others.” Social importance of results was determined based on surveys completed by four staff members and four family members in addition to face-to-face interviews with participants. Example items from the family-member version of the 7-item 5-point Likert-like survey included “The social skills training program was very helpful for my child” and “My child’s behavior during social interactions has improved since his/her participation in the social skills training program.” During interviews, participants were asked questions such as “What did you like best about the social skills training program?” and “What did you learn from the social skills training program?”

Data Analysis

Data on social knowledge (Figure 1) and social skills (Figures 2 and 3) were graphed. Using procedures described by Tawney and Gast (1984), level, trend, and stability of data within and between baseline, intervention, and follow-up conditions were determined. The graphic display used for visual analysis was a simple line graph designed to: (a) organize data during collection, and (b) communicate information related to the effects of the intervention. The graphic display allowed the researchers to examine data using within condition analyses that included: (a) length of time (number of sessions, days), (b) level (change in percentage score), and (c) trend (direction of change in percentage score, data paths within trend). Statistical within condition analyses (e.g., median) were used to determine level change, level stability, trend direction, and trend stability using the split middle method. The following between condition analyses were examined through visual analysis: (a) number of variables that changed between adjacent conditions, (b) change in level (absolute, relative), and (c) change in trend direction and stability. “Stability” refers to the extent to which measures of behaviors remain stable under the same conditions; conversely, “variability” refers to the extent to which measures of behaviors differ from one another under the same conditions (Cooper, Heron, & Heward, 1987). Participant, staff, and family responses concerning social validity were tabulated.

Results

Social Knowledge

Harry. Harry exhibited variable scores on the SILA that represented a slightly accelerating trend during five baseline probes with a median baseline score of 53% (range = 38–53%). Once intervention began, there was a gradual unstable acceleration of SILA scores to 84%, followed by 100% for the last three intervention probes. Harry’s median intervention score was 84%. Harry’s follow-up scores were maintained at 100% at one, two, and ten-week intervals.

Sharon. Sharon’s SILA baseline probe scores were slightly variable with a median of 54% (range = 38–61%) that resulted in a zero-celeration trend. Although there was not an immediate level change when the intervention was initiated, there was a gradual acceleration of SILA scores to 92% for the last four probes of the intervention condition with a median intervention score of 80%. Sharon’s follow-up scores were maintained at 92% at one and two week intervals, and 84% at a 7-week interval.
**Figure 1. Percentage of Correct Responses on the Social Interaction Leisure Assessment for Harry, Sharon, David, and Phillip.**

David. David's SILA scores for the first six baseline probes were variable (range = 68–92%). For the following six baseline probes at 84% (each score was 84% for six probes) David demonstrated a zero-celerating trend until he scored a 92% on the last baseline.
FIGURE 2. PERCENTAGE OF PROSOCIAL VERBAL AND NONVERBAL BEHAVIOR SCORES DURING RECREATION ACTIVITIES FOR HARRY, SHARON, DAVID, AND PHILLIP.
FIGURE 3. PERCENTAGE OF ANTISOCIAL VERBAL AND NONVERBAL BEHAVIOR SCORES DURING RECREATION ACTIVITIES FOR HARRY, SHARON, DAVID, AND PHILLIP.
probe prior to intervention. David’s overall baseline median score was 84%. After initiation of the intervention, David’s score was maintained to 92% for one probe and then accelerated to 100% for the remaining four intervention probes with a median intervention score of 100%. David’s follow-up scores were maintained at 100% at one, two, and ten-week intervals.

Phillip. Phillip’s SILA scores accelerated for the first six baseline probes (range = 68–92%). For the next 10 baseline probes Phillip scores stabilized at 92% with the exception of 84% on the ninth probe demonstrating a zero- accelerating trend with a median baseline score of 92%. After initiation of the intervention, there was an immediate level change as Phillip’s score increased to 100% for the last four probes during the intervention condition with a median intervention score of 100%. Phillip’s follow-up scores were maintained at 100% at one and two week intervals. Due to scheduling conflicts, ten-week follow-up testing did not occur.

Multiple baseline. During baseline, trends were either zero-accelerating or slightly accelerating with the exception of David’s last baseline score. Participants’ median SILA scores ranged between 53–92% with the highest score across participants being 92%. Once the intervention began, participants’ scores accelerated with medians ranging from 80–100% with highest scores reaching 92% for Sharon and 100% for Harry, David, and Phillip. Scores at follow-up were maintained at the 84% and 100% levels respectively across participants.

Social Skills

Participants’ percentage scores were based on 100% being equivalent to 60 opportunities for target behaviors to occur during a 10 min recreation activity. For example, if a target behavior occurred during 30 intervals, the occurrence was 50%. It should be noted that there were no behavioral observations of David during intervention sessions 22–30 because of his early departures on those days due to family scheduling conflicts. David’s group meetings in which the behavioral observations took place occurred during the afternoons. However, in the mornings prior to his departures, social knowledge (SILA) data were collected for David. During baseline condition, SILA scores demonstrated level and trend stability and the intervention condition was initiated for David based on the stability of these scores (sessions 22–30) and level and trend stability of prosocial verbal and nonverbal behavior scores (sessions 18–22). Across participants, behavioral data were highly variable, especially related to level and trend across different behaviors. The camp lasted seven weeks; because of this time limitation and strong visual and statistical evidence early in the study that the behaviors were not likely to be changed via the intervention, the decision was made to initiate intervention based on stability of SILA scores.

Prosocial verbal interactions. Participants’ baseline prosocial verbal median scores ranged from 5–21% with the highest score across participants being 58%. Intervention median scores ranged from 10–32% with the highest score across participants reaching 43%. Overall, across participants and conditions, there was high variability of social skills data with no change in level or clearly discernable trend.

Prosocial nonverbal interactions. Baseline prosocial nonverbal median scores for participants ranged from 0–13% with the highest score being 28%. Intervention median scores ranged from 4–17% with the highest score across participants being 63%. For Sharon, David, and Phillip there was no observable change in level as well as a zero-accelerating trend across all conditions. There was an accelerating trend for Harry’s prosocial nonverbal behavior during the intervention condition as demonstrated by the changes in from his median baseline score of 0% to a median intervention score of 17%. Although Harry exhibited an accelerating trend and level change, other participants’ scores did not
change during intervention and therefore did not replicate Harry’s scores. Overall, across participants and conditions there was little variability with no change in level and observable trend.

Antisocial verbal interactions. Participants’ median baseline antisocial verbal scores ranged from 0–15% with the highest score reaching 45%. Intervention median scores ranged from 1–12% with the highest score across participants being 40%. Harry exhibited a slight level change during the last five intervention sessions that was not replicated by other participants. For Sharon, David, and Phillip there was no change in level. Sharon and Phillip had low variability with a zero-celerating trend and David had high variability and a zero-celerating trend as well. Overall, participants’ data were relatively stable and did not reflect changes in level or trend.

Antisocial nonverbal interactions. Baseline antisocial nonverbal median scores ranged from 0–9% with the highest score reaching 30%. Participants’ intervention median scores ranged from 0–8% with the highest score being 38%. Harry exhibited a highly variable trend that was slightly decelerating during the last intervention sessions. David’s data were also variable. Sharon and Phillip demonstrated low variability, zero-celeration across all conditions. No participants displayed a change in level upon initiation of the intervention. Overall, participants had moderately variable data with no clearly observable changes in level or trend.

Social Validity

Four staff members and three family members completed a 7-item, 5-point Likert-type survey prior to the beginning of the intervention to determine their perceptions of the social significance of the goals and appropriateness of the procedures. Respondents who completed the surveys answered either “Agree” or “Strongly Agree” with the positively-stated items (i.e., “Some of the time a child spends in recreation activities should be spent on learning social skills.”) and either “Disagree” or “Strongly Disagree” with the negatively-stated items (i.e., “It is not important for a child to learn social interaction skills during recreation activities with their friends.”).

Following the intervention, four staff members and four family members completed a 7-item, 5-point Likert-type survey and participated in interviews to assess their perceptions of the social importance of the results. Survey results indicated that family members answered either “Strongly Agree” or “Agree” on positively-stated items (i.e., “My child enjoyed the leisure education program,” “I have noticed changes in my child’s social skills since this program began,” and “The staff worked well with my child.”) and either “Strongly Disagree” or “Disagree” on negatively-stated items (i.e., “My child did not benefit from the leisure education social skills training program.”). Staff members completing the surveys indicated their support for the social importance of the results by “Strongly Agree” or “Agree” responses on the positively-stated items (i.e., “I think the leisure education program is useful to help the campers learn social skills.”) and “Strongly Disagree” or “Disagree” responses on the negatively-stated items (i.e., “The leisure education program was not helpful for the campers.”).

Participants, family members, and staff were interviewed face-to-face during follow-up sessions about the social importance of the program. Participants expressed that the computer-assisted program was fun and educational. David stated that he liked the program, he liked learning about different social skills, and his favorite part of the program was “the loud voice” used to demonstrate excessive voice volume. He stated that he learned to “not be mean to people, to say excuse me, don’t talk too fast so people can understand” and that if asked about the program by a friend he would respond that he “had fun.” David’s mother stated prior to the intervention that David would not explain why a behavior was not an appropriate social interaction, but after the intervention he responded to verbal...
prompts related to antisocial behaviors by stating, "because that was not appropriate." David's mother expressed that she could envision the presentation of the computer-assisted leisure education program at school with an expanded curriculum designed to promote positive behaviors such as listening, sharing, and lessening influences of negative peer pressure. Phillip's aunt responded that after the intervention she observed Phillip "taking more responsibility, using manners, and being more considerate to others." Sharon's mother stated that she is willing to have her child learn more about social skills by using similar leisure education programs. Harry stated that the program "was good" and that he liked the characters. Harry's father stated that he was supportive of the program and would like Harry to gain social skills. Although he appreciated the software, he felt that a more interactive software design might be more effective, especially since many children have access to and play with fast-paced, interactive, action-filled games such as those manufactured by Nintendo®. A staff member reported that she observed campers playing well together as well as playing more "patiently" with one another after participating in the intervention. Overall, the comments helped to socially validate the intervention. However, there is a discrepancy between the behavioral observation and reports by parents and staff during social validity assessments (e.g., social importance of effects). It is not clear what caused these differences; perhaps participants demonstrated the behaviors in settings other than the observation settings or perhaps the parents were looking for improvement because of their child's participation. Future research can further investigate these differences. In addition, due to this discrepancy between behavioral data and interview data, caution is advised when interpreting results.

**Discussion**

Effects of the computer-assisted leisure education program were limited to increases in scores associated with the assessment designed to measure social knowledge acquisition. There were no changes in social skills (e.g., prosocial or antisocial behaviors) across participants, even though participants, family members, and staff stated support for the intervention. The following sections address the project's limitations as well as implications for future research and practice.

**Limitations and Implications for Research**

Since the SILA provides two options for participants for each response, a random selection of answers should result in a score of approximately 50%. Both Harry and Sharon had median baseline scores that ranged 53–54%. Although David's and Phillip's median baseline SILA scores were relatively high (84 and 92% respectively) their social skill behavior deficits warranted their participation in the leisure education program. Although consistent increases in SILA scores provided support that there were positive effects across participants for social knowledge acquisition, data for social skills were variable with no observable change in level or trend across participants. Additional research is needed to assess effects of CAI for individuals with various disabilities.

The number of intervention sessions implemented across participants ranged from 5–15 30-min sessions (2.5–7.5 hours of instruction) over approximately 3 weeks. Duration of the intervention was limited because the study was implemented during a 7-week summer day camp and involved staggered introduction of the intervention due to multiple baseline design. Rutherford and colleagues (1998) found that interventions of brief duration (i.e., 3–4 weeks) limited generalization of social knowledge to social skills competence and resulted in difficulty in predicting long-term impacts of social skills instruction. In the present study, perhaps if intervention duration had been longer, social skills acquisition may have occurred. In addition, it may have been helpful to
include role-plays (with feedback and processing) that were similar to the observed group activities. Further research is warranted that examines effects of interventions similar to the one used in this study that are longer in duration.

The SILA was composed of questions that were directly related to the content presented in the computerized program. Therefore, content validity was established since there was a direct correspondence between material taught and assessed via the SILA. However, a comparison to other established measures of social skills was not undertaken and reliability indices were not calculated. Therefore, since only content validity data were collected on the SILA, caution is advised when interpreting the results. In addition, although, the items on the SILA reflected the content presented via the computerized program, further attempts to ascertain whether correct responses on the SILA were indicative of knowledge of social interaction did not occur. Perhaps future research might incorporate other measures of knowledge of social skills pre- and post-intervention requiring participants to articulate their knowledge to help examine the validity of findings associated with the SILA.

David and Phillip demonstrated limited change in SILA scores upon initiation of intervention, and given that they demonstrated consistently high scores during baseline condition (David's \( M = 84\% \); Phillip's \( M = 92\% \)), a ceiling effect may have occurred. In this case, the items on the SILA may not have been sufficiently challenging for these two participants. Criteria for participants in future research may include individuals who demonstrate zero-celerating and stable lower scores (e.g., <50%) during the initial assessment prior to baseline as well as during baseline. An additional change may include revising the SILA to include items that present greater challenge for individuals who demonstrate higher scores (e.g., >60%) during the initial assessment prior to baseline.

The present study was similar to other social skills training curricula that address target skills such as communication, assertiveness, and friendship and use training procedures that rely on instruction, modeling, role-play, and feedback (e.g., Hansen, Nangle, & Meyer, 1998; Hoge, Dattilo, & Williams, 1999). Hansen et al. suggested that effectiveness of social skills interventions on adolescents' behaviors has been mixed because there are many variables (e.g., family, peers) that may negatively affect social behavior. Therefore, the present intervention may have enhanced social knowledge as measured by the SILA but did not influence actual social skills as measured in this study. Further analyses of ways to promote generalization of social knowledge to social skills are warranted. In addition, other methods of data collection and analysis procedures may be more effective in determining effects on social skills.

Participants, family members, and staff indicated that the computer-assisted leisure education program designed to teach social skills that was used in this study was a socially appropriate technique to teach individuals with disabilities. Participants' and their significant others' positive views of the program were consistent with previous research supporting the use of CAI in a variety of contexts for youth with disabilities (Dattilo et al., 2001; Dattilo et al., 2003; Goldsworthy et al., 2000; Hitchcock & Noonan, 2000; Hourcade & Parrette, 2001; Irvin & Walker, 1994; Langone et al., 1999; Lynch et al., 2000; Morgan, Gerity, & Ellerd, 2000).

Although verbal praise was provided for prosocial behaviors demonstrated during the intervention learning activities, there was no reinforcement for prosocial behaviors nor were there consequences for antisocial behaviors exhibited during the recreation sessions. Further research may employ behavior modification strategies to enhance prosocial behaviors (Fozz, Faw, & Weber, 1991; Hansen, 1993). Priest, Gass, and Gillis (2000) described several ways to enhance learning activities; specifically applicable to this setting are methods such as frontloading and framing an experience, goal setting, and action plan-

Third Quarter 2006
ning. In a similar study, Loy and Dattilo (2000) used token reinforcement to reward participation and engagement during recreation, but did not reward positive social behavior. Loy and Dattilo suggested that the provision of recreation activities alone may not be sufficient in changing social skills of children with and without disabilities and that behavior strategies designed to reward prosocial behavior during social interactions may be effective in increasing positive behaviors. Therefore, Wolfe, Dattilo, and Gast (2003) examined effects of a token economy system used to reward positive social skills on social behaviors of adolescents with emotional and behavioral disorders during cooperative games using a single subject ABAB withdrawal design. Results indicated that positive social behaviors were dramatically higher during intervention conditions (including token economy rewards) than during baseline conditions. Research that examines effects of a computer-assisted leisure education program used in conjunction with reinforcement procedures for positive social behaviors on the social skills of children with disabilities may be useful.

Though some studies have assessed more comprehensive leisure education programs (e.g., Dattilo & Hoge, 1999; Searle, Mahon, Iso-Ahola, Sdrolia, & van Dyck, 1995), findings of this study support suggestions by Dattilo and Williams (1997) and Dattilo et al., (2001) that there may be value in emphasizing and evaluating one aspect of leisure involvement (e.g., social interaction) and leisure education. There may be merit in designing CAI programs to teach and systematically assess other leisure-related skills (e.g., leisure appreciation, leisure decision-making, awareness of leisure resources).

**Implications for Practice**

Although results of the current study did not indicate the intervention was associated with an increase in social skills, various authors encourage practitioners to consider using CAI for individuals with disabilities (Dattilo et al., 2001; Lee et al., 2001; Margalit, 1990; Wenzel, 1999) due to increased availability of computers within various settings. However, when considering the use of computers with individuals with disabilities, Siegel (1999) cautioned practitioners "... that in their enthusiasm for embracing exciting instructional opportunities for students with disabilities, they do not segregate them into computer labs" (p. 298). With continuing advances in technology and computer availability, opportunities are increasing for practitioners to incorporate teaching strategies that promote inclusion and computer-assisted presentation of learning materials along with experiential learning.

**Conclusion**

Initiation of the computer-assisted leisure education program designed to teach social knowledge and skills resulted in immediate level changes for three participants and gradual acceleration trends in all four participants’ SILA scores. Follow-up probes taken up to 10 weeks post-intervention showed maintenance of scores achieved during intervention. Observed targeted social skills across participants during baseline were variable. Upon intervention initiation, although there were slight level and trend changes in targeted social skills for some participants across some behaviors, results were not consistently replicated across participants. Therefore, while performance on the SILA provided limited support for the effectiveness of the intervention on social knowledge, observations of actual social skills did not support intervention effects. However, participants, family members, and leisure service providers expressed that the computer-assisted leisure education program was socially valid and considering that previous research has demonstrated positive effects of computer-assisted education programs, further examination of computer-assisted interventions designed to enhance the skills of youth with disabilities may provide useful information.
References


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Therapeutic Recreation Journal


Appendix A

Questions presented on the Social Interaction in Leisure Assessment

1. Click on the picture where Beebee lets you know what she’s thinking.
2. Which picture shows Beebee paying attention?
3. Which voice is too loud?
4. Which voice is too fast to understand?
5. Which picture shows Beebee letting you know what she thinks?
6. Which picture shows Og standing too close to Beebee?
7. What should Beebee ask Og to show she is paying attention?
   (a) "Are you going to a party?" Or (b) "Who went bowling with you?"
8. Which picture shows Beebee being assertive?
9. Are these birds paying attention to each other?
10. What do friends do? (a) Talk to each other. Or (b) Ignore each other.
11. What do friends do? (a) Are mean to each other. Or (b) Have fun together.
12. What do friends do? (a) Listen to each other. Or (b) Lie to each other.
13. What to friends do? (a) Make each other laugh. Or (b) Are mean to each other.