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Abstract

A substantial knowledge base exists regarding the social-cognitive and behavioral correlates of aggression among hearing children; however, less is known regarding these relationships among deaf children. Among aggressive hearing children, social-cognitive deficits result in poor social problem solving and increased aggressive behavior. Among aggressive deaf children, both poor social problem solving and communication difficulties are thought to lead to aggressive behavior. The Coping Power Program has demonstrated effectiveness as an intervention for aggressive hearing children. This year-long multicomponent program was adapted for use with deaf children and included both child groups and teacher and dormitory staff consultation. Study participants were 49 aggressive deaf children randomly assigned to either Coping Power or a wait-list control group. Particular attention was paid to assessing children's functional communicative competence. Findings revealed positive intervention effects. Specifically, intervention children improved their social problem solving and communication skills. Significant teacher-rated behavioral improvement also was found.

Introduction

Literature in deafness documents the factors that promote positive social behavior and academic achievement for deaf children. Developmental variables such as early meaningful parent-child communication, parental adjustment to the child's deafness, and consistent early intervention are related to cognitive and social functioning. A number of effective interventions have been implemented to encourage protective factors and reduce the risk factors associated with deafness (e.g., early intervention, Greenberg, Calderon & Kusché, 1984; early intervention and deaf mentoring, Clark & Watkins, 1985; universal social-cognitive intervention program, Greenberg and Kusché, 1993). Although innovative resources and programs have undoubtedly had a positive impact on many deaf children and their families, professionals continue to report a high number of deaf children with behavioral problems (Greenberg & Kusché, 1993; Hindley; Hill, McGuigan & Kitson, 1994).

Aggressive Behavior and Social-Cognitive Difficulties of Hearing Children
Correlates and causes of aggressive behavior have been extensively researched with samples of hearing children. One focus of these studies has been on children's social-cognitive and social information processes. Crick and Dodge (1994) have proposed that social information-processing deficits can be found among aggressive children across six separate stages of information processing, from encoding information to the end behavioral response. In the first two stages, children encode relevant details in the immediate environment and then generate interpretations about the nature of the situation, including beliefs about the intentions of others. Next, children formulate a social goal (e.g., avoiding embarrassment or getting

the toy that they want) that will influence their response to the situation. The final three stages involve generating, selecting, and eventually enacting a chosen response. In particular, children initially generate a mental list of possible behavioral responses using previous experiences and other information stored in long-term memory. After accessing these possible responses, children systematically evaluate the quality of each response by considering factors including the possible outcomes and their perceived ability to enact the response. Once the child has chosen the most appropriate response, the last stage involves carrying it out. The entire process is said to be circular in nature because the outcome of the enacted response often influences the child's future response choices.

Consistent with Crick and Dodge's (1996) model, several studies have shown that aggressive and antisocial children exhibit problems at each stage of the social problem solving process (Azar, Robinson, Hekimian, & Twentyman, 1984; Lochman & Curry, 1986). During the encoding stage, aggressive children are more likely to attend to hostile cues (Milich & Dodge, 1984), remember fewer cues (Dodge & Newman, 1981), and attend only to the most recent cues (Milich & Dodge, 1984) in comparison to their non-aggressive peers. Various studies have also found that higher levels of aggression are associated with an increased tendency to view others' actions as hostile (Lochman, 1987; Lochman & Dodge, 1994), suggesting that aggressive children have problems interpreting the encoded information. When generating interpersonal goals, aggressive children tend to endorse goals associated with dominance, disruption, and trouble making more often than their peers, even in fairly benign conflict situations (Lochman, Wayland, & White, 1993; Melnick & Henshaw, 1996). When asked to generate solutions to interpersonal conflicts, aggressive children demonstrate deficiencies in the overall number and quality of solutions generated (Lochman, Meyer, Rabiner, & White, 1991), and they produce fewer verbal solutions and more direct-action solutions involving physical aggression (Lochman & Lampron, 1986; Richard & Dodge, 1982). Moreover, children with disruptive behavior problems are more confident that aggressive solutions will produce positive outcomes and less likely to believe that negative consequences will result from hostile actions (Pardini & Lochman, 2000; Perry, Perry, & Rausmussen, 1986; Perry, Williard, & Perry, 1990). Even when aggressive children choose to enact positive responses, evidence suggests that they are less adept at carrying them out (Dodge, Pettit, McClaskey, & Brown, 1986). Although this evidence supports the notion that social information processing deficits at all six stages are associated with disruptive behavior disorders in children, it is important to note that specific processing errors may perpetuate the development and maintenance of behavior problems in subgroups of deviant children (Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Lochman & Dodge, 1994).

One of the most important factors influencing aggressive children's ability to effectively process social information in interpersonal conflict situations is anger. Anger is described as one of the most difficult emotions to control, partly because it elicits significant physiological arousal

(Novaco, 1978). Studies have found that children with disruptive behavior problems experience greater increases in physiological arousal when provoked in comparison to their peers (Craven, Lochman, Phillips & Barry, 2002; van Goozen et al., 1998). Furthermore, this threat-induced arousal makes aggressive children more likely to attribute hostile intentions to others and less able to detect social cues indicating that conflicts are accidental (Craven et al., 2002; Dodge & Somberg, 1987). By distorting aggressive children's perceptions and interpretations in this manner, anger can legitimize retaliatory social goals involving physical aggression and limit children's ability to generate prosocial problem solving strategies.

Aggressive Behavior, Social Problems, and Social-Cognitive Difficulties of Deaf Children

One explanation for the social problems of some deaf children is experiential deprivation. Communication problems with others, especially in the family and at school, can lead to gaps and delays in social-cognitive development (Greenberg & Kusché, 1993; Lou & Charlson, 1991). Although some deaf children perform well on measures of communication and social maturity (e.g., deaf children of deaf parents; Meadow, 1980, see also Lou, 1989; deaf children with early mother/child dialogue; reviewed in Schlesinger, 1988; deaf children with early exposure to manual communication; Greenberg et al., 1984), as a group, deaf youth demonstrate delays when compared with hearing children. Particular areas of difficulty include understanding the perspectives of others (Kusché & Greenberg, 1983; Lou, 1987-a; see also review by Cates & Shontz, 1990), person perception (Lou, 1987-a), impulse control (Harris, 1978), language/communication (reviewed in Paul & Jackson, 1993), and understanding of emotions (reviewed in Greenberg & Kusché, 1993).

Of the negative outcomes associated with social-cognitive delays, aggressive behavior is one of the most disruptive behaviors in school and is a principal concern of teachers of the deaf (Hayes, 1996). Due to the language delays of many deaf children, professionals often theorize that conduct problems are related to communicative competence (Benderly, 1990; Meadow, 1980; Mindel & Vernon, 1971). Studies with deaf children that examine aggression and reading achievement (Kuntz, 1992) and aggression and communication mode (Cornelius & Hornett, 1990) lend support to the link between language and aggression. However, no investigators have directly assessed communicative competence as it relates to aggression among deaf children; therefore, this issue remains largely theoretical. In addition, there has been little examination on the social-cognitive issues of aggressive deaf and hard of hearing children. A central question is whether aggressive deaf children exhibit the typical information processing deficits associated with aggression for hearing children.

In one of the few information processing studies with deaf children, Murdock and Lybarger (1997-1998) examined the attributions of 30 children aged 9 to 12 years at a residential school for the deaf. Students were presented with ambiguous social situations in which one character experienced a minor hurt and students were asked to respond as if they

were the harmed character. Most deaf children reported hostile attributions. In addition, there were significant correlations between hostile attributions, level of anger and anticipated responding: "the more frequently students perceived others intentionally harming them, the angrier they reported they would be, and the more likely to respond aggressively" (p. 16). Likewise, Macklin and Matson (1985) found that, when compared to a matched sample of hearing children on a social skills inventory, teachers rated deaf children as more likely to believe that others were picking on them. Further research is needed on the relationship between cognitive distortions and actual aggressive behavior for deaf children.

Social problem-solving difficulties, along with other information-processing deficits, hinder a child's ability to effectively deal with social issues in a non-aggressive way. Professionals and school personnel often cite problem-solving training as a priority for deaf individuals (Boone & Johnson, 1991; Freeburg, Sendelbaugh, & Bullis, 1991). In a social problem-solving task, Coady (1984, reviewed in Greenberg & Kusché, 1993) found that deaf children demonstrated rudimentary understanding of social problems, exhibited delays in anticipating consequences to actions, and showed little positive initiative in solving problems. Similar to previous research with deaf adolescents (Lou, Strong, & DeMatteo, 1991), Coady reports that nonverbal intelligence and reading ability were predictors of problem-solving skills for younger deaf children. For older children, however, lower cognitive impulsivity was the most important predictor of advanced social problem-solving skills.

Social-Cognitive Intervention for Deaf Children

Research on the social and behavioral problems of aggressive children has indicated a need for a social-cognitive intervention targeting aggressive deaf children's social-cognitive difficulties and their behavioral problems. With samples of hearing aggressive children, successful cognitive-behavioral interventions have sought to improve children's dysfunctional social problem solving by addressing their information processing deficits. As part of a task force on effective psychosocial interventions, Brestan and Eyberg (1998) found that several interventions with a child component addressing social-cognitive deficits, including the Anger Coping Program (Lochman, FitzGerald, & Whidby, 1999), had substantial support for being efficacious in the treatment of disruptive behavior problems in children. The Anger Coping Program produced reductions in aggressive children's aggressive-disruptive behaviors at school, their aggressive behavior at home according to parent ratings, and led to reduced substance use at a three-year follow-up, in comparison to aggressive control children (e.g., Lochman, 1992; Lochman, Burch, Curry, & Lampron, 1984). A more recent extension of the Anger Coping Program is the Coping Power Program, which has demonstrated effectiveness in initial studies. The Coping Power Program has a parent training component as well as the child component, and the program has produced reductions in aggressive children's delinquency and substance use and improvement in behavioral problems at school in comparison to untreated aggressive

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control children (Lochman, Barry, & Pardini, in press; Lochman & Wells, in press-a, in press-b). Because all of these treatment studies were conducted with hearing populations, it is unclear if these programs would improve the social functioning of deaf children with aggressive and disruptive behavior problems. Consequently, the purpose of the current investigation is to evaluate the effectiveness of an adapted Coping Power Program in reducing social-cognitive deficits, communication difficulties, and behavior problems in a community of deaf children.

Hypotheses

It is first hypothesized that, in comparison to a randomly-assigned wait-list control group, aggressive deaf children who received the adapted Coping Power Program will exhibit less aggressive behavior and conduct problems (Hypothesis 1a), and more behavioral improvement (Hypothesis 1b), by post-intervention. Second, it is hypothesized that children who have received Coping Power will exhibit improvements on putative mediating variables, including generation of appropriate solutions to social problems (Hypothesis 2a), improved communication skills (Hypothesis 2b), improved social adjustment (Hypothesis 2c), and improved self-competence (Hypothesis 2d).

Method

Sample

Participants included 49 youth (33 males; 16 females) with an age range of 9 to 16 years (M = 12.5, SD = 2.3). Participants were full time students in a residential school for the deaf. Three students were classified with mild to moderate hearing loss, 44 students were classified with moderate to profound hearing loss, and 2 students were not classified. All 49 students used manual communication and, therefore, were able to communicate with one another during the group meetings. Students lived in dormitories with residential staff during the school week and typically returned home on weekends. The sample was approximately 64% African American, 32% Caucasian, and 2% Hispanic. Fifty-one percent of the sample used American Sign Language (ASL), with little or no use of signed English. The remainder of the sample used a mixture of ASL and signed English to communicate.

Selection of Sample

Permission was obtained from state, regional, and local school officials prior to conducting the study. Study participants were identified by teachers and dormitory staff as aggressive based on screening scores. Each child in the entire school from the 4th grade through high school was evaluated for aggressive behavior using a three-item screening measure completed by teachers and dormitory staff. The three items assessed physical aggression, verbal aggression, and disruptiveness and were rated on five-point scales. The three items were summed separately for teachers and dormitory staff, the highest of these two scores (teacher, dormitory staff) was chosen as the screen score, and children who received scores of

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five or greater were identified as having moderate to severe aggressive behavior problems within the ENCSD sample. Consent forms were sent to parents through the school and only those children who were given consent were allowed to participate. Children were randomly assigned to receive the group intervention in either year one (intervention group) or year two (control group). All children were evaluated prior to the start of the intervention by interviewers who all were deaf and native American Sign Language users and were able to communicate across languages (ASL/signed English) and modes depending on the preference of the student. Three out of four of the interviewers were certified Signed Communication Proficiency Interview (SCPI) evaluators. All interviews were videotaped, transcribed, and then coded for responses to the PSM-C. Interviewers completed the LIMCC at the end of the interview.

In year one, 26 (17 boys, 9 girls) children participated in the coping power intervention. At the end of year one all children were evaluated again in a manner similar to the pre-testing assessment. A total of 8 children did not complete post-testing at the end of year one. Six of these children had withdrawn from the school prior to the post-assessment, one child graduated early and one child refused to complete the post-testing. Attrition rates in year one were similar across experimental groups (5 control and 3 intervention). In year two, the 23 (16 boys, 7 girls) children in the year one control group received the group intervention.

Intervention

Coping Power Child Group and Training. The Coping Power program is described in detail elsewhere (see Lochman, Wells, & Murray, 2001) and the reader is referred there for more information. The Coping Power child component consists of 33 group sessions. The Coping Power child component sessions include a focus on: behavioral and personal goal setting (several initial sessions, plus continued check-ins throughout the intervention), awareness of feelings and associated physiological arousal, use of coping self-statements, distraction techniques and relaxation methods when provoked and made angry, organizational and study skills, perspective-taking and attribution retraining, social problem-solving skills (including sessions in which children created their own problem-solving video-tapes, and in which they applied the problem-solving steps to a variety of problem topics, such as conflict with teachers, group entry skills, peer negotiation, and sibling conflict), and dealing with peer pressure by using refusal skills (focusing on competent use of assertiveness skills to handle peer pressure, on persistent use of back-up solutions when first ideas do not work, and on anticipating obstacles to using assertion skills in specific situations). Although the intervention is largely focused on coping with peer-related problems, some sessions directly deal with perspective-taking and problem-solving with teachers and parents.

The Coping Power Program was adapted to meet the unique needs of deaf and hard of hearing children. The adapted Coping Power Program places greater focus on learning the basic social-cognitive skills considered to be the foundation for more advanced social problem solving. Deaf

students participated in extended sessions on affective education, physiological awareness, perspective taking, and anger management. In addition, specialized materials were developed to help teach the basic social-cognitive skills for both in-group instruction and also for use in the classroom and dorm setting to help generalize skills learned.

Group leaders used a variety of visual materials to teach complex coping skills to the students. For example, the Coping Power Program focuses on "self-talk" as one technique for dealing with anger during social conflict. This technique was taught to the students in a stepwise fashion. Group facilitators used visual drawings of speech bubbles with written comments to introduce the idea of self-talk. Students could choose from a variety of prewritten statements to insert into a character's speech bubble to show what that character was saying to him/herself in response to a certain situation. Groups then differentiated between "positive thoughts" and "negative thoughts" and the feelings that could result from each. These techniques supported later use of speech bubbles in role-playing common school or dorm situations to emphasize the coping power of self-talk. Both negative and positive coping statements were presented to show the students that both have an impact on how a situation is resolved.

To help with the concept of physiological cues, group leaders developed human figure drawings and drawings of different physical body cues related to the basic emotions of happy, sad, scared, and mad (e.g., pictures of ice cubes, fire, broken heart, as well as drawings of respective facial features, such as raised eyebrows, clinched teeth), which could be pasted to the appropriate physical area on the human figure. A word bank was kept as different physical cues were introduced to assist the students in their language development. Teaching words to describe various facial expressions (e.g., furrowed brow, pursed lips, squinting eyes, "puppy dog eyes") not only helped language development, but also reinforced awareness of differential cues.

Group leaders used the concept of spatial perspective to help students understand what perspective meant. Activities used concrete objects that provided group members the opportunity to visually and physically experience different perspectives. For example, in one activity, a box was placed in the middle of a table with two students seated on opposing sides. Each side of the box had the same number and types of shapes but in different colors. The two students took turns describing what he or she saw and were surprised to learn that, while they were looking at the same box, their descriptions were not the same. Another activity involved placing a variety of objects on a table and having each student sit in different angles from the table. They were to draw what they saw on the table and then share their drawings. The pictures emphasized the different views of the same set of objects. These concrete spatial activities helped to establish the concept of perspective from which social perspective activities could be built upon.

A significant part of the program involves use of the PICC (Problem Identification, Choices, Consequences) model, a social problem-solving model. This model pulls together the concepts and skills taught in

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preceding activities. Additionally, a variety of visual activities were used to help the students to understand the sequence of thought and action in the PICC model. A "PICC Road" was created to use with the students as a visual and tactile reinforcement of the skills. The students were able to walk on it and manipulate the problems, choices, and consequences along the way. The road split at one point to emphasize that different choices lead to different "paths" and consequences. A variety of problems, choices, and consequences were presented visually through written and signed language, pictures, and drawings.

Four separate Coping Power groups ran during Year 1. Group membership ranged from four to six members and consisted of two co-leaders. Each pair of co-leaders included a deaf leader and a hearing leader who was proficient in sign language. Each pair included at least one senior licensed mental health professional.

Sessions were held in large empty classrooms or large offices on a weekly basis. Several alterations to group membership and participation were made over time. First, one child who was clearly struggling with age-appropriate concepts was switched early on in the group sessions to a group with younger participants to facilitate his learning and adjustment. Second, several children who had significant comorbid psychiatric problems also took part in adjunctive individual therapy. In addition to the comprehensive teacher and residential staff consultation intervention described below, group leader consultation with teachers occurred as well. This was typically handled via weekly in-person contact from one of the group co-leaders regarding behavioral goal setting and group members' progress on chosen behavioral goals.

Training regarding the delivery of the Coping Power child groups was provided through biweekly meetings between the group leaders and the first two authors. Typical consultation sessions covered basic implementation issues of the group session's content, discussions of transforming the session content into activities or language that would better suit the deaf and hard-of-hearing population, and clinical consultation regarding specific children's group behavior or progress.

Coping Power Teacher and Residential Supervisors Consultation. In addition to providing direct intervention with children, the Coping Power Program addresses the context around the children by providing training to teachers and caretakers. The Coping Power consultation for teacher and residential supervisors included the fifth author, group leaders, teachers, residential supervisors and Sign Language interpreters. The teachers and residential supervisors were chosen from the elementary, middle and high school levels depending upon the student(s) involved in the weekly group intervention. This consultation intervention took place across the intervention year. The program coordinator at ENCSD was responsible for scheduling and providing the agenda for the meetings for the monthly meetings.

This consultation model was designed to provide training and support for teachers and residential supervisors and is derived from

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portions of the parent training component of the Coping Power Program (Wells, Lenhart & Lochman, 1996). Three main objectives were: to enhance the development of anger coping and problem solving skills; to promote generalization and maintenance of skills; and to monitor the student's progress in the reduction of their aggressive behavior.

The intervention depended on the effective and consistent monitoring of the student's target behavior by the teachers and residential supervisors. These staff provided feedback to the group leaders and discussed any problems related to monitoring of goals during the monthly two-hour consultation meeting. The consultation meetings primarily focused on training and secondarily on providing support.

Training of teachers and dormitory staff included: a description of the Coping Power Program and of the skills being taught in the groups; examples o f v erbal a nd p hysical a ggression p articularly d istinguishing between instrumental (proactive) and hostile (reactive) aggression; use of the problem-solving PICC Model (Problem Identification, Choices and Consequences Model) with their students; and how to effectively write and monitor measurable goals. The consultation group meetings also focused on: (1) limit setting within the academic and residential milieus; (2) different types of reinforcement and reinforcement schedules to increase compliance; (3) disciplinary procedures, especially self-directed timeouts; (4) skill transfer; (5) nonverbal language; (6) levels of anger and behaviors associated with each level; (7) range of negative and positive feeling states; and (8) strategies to encourage and increase goal attainment. Also, numerous resources were provided to staff members at each meeting to foster their understanding of the various concepts, skills and practices that were critical to enhance the development and maintenance of the student's skill attainment.

The supportive aspects of the consultation meetings occurred because this was an opportunity for staff to share effective techniques and to provide mutual support for each other, particularly those teachers or residential supervisors who had group members that were experiencing difficulty achieving targeted behavior. Teacher and residential supervisor discussions helped identify additional training topics and materials to enhance student success. This was an opportunity to convey to teachers and residential supervisors the importance of their role in the Coping Power intervention.

Measures

Before pre-testing, four deaf children were chosen from the school for the deaf to pilot the assessment measures. Modifications were developed prior to and during the piloting phase to ensure students' understanding of the tasks. Modifications included: (1) translation of English task instructions and information to appropriate signed communication; (2) development of visual cues such as cartoon-style pictures to use during verbal vignette items on measures such as the Problem-Solving Measure for Conflict; and (3) interpretation of written measures that were read to participants using each students' spoken

language preference. In addition, the interviewers adapted their language to be appropriate to the individual student, and all assessment interviews were videotaped and reviewed to ensure that students appeared to understand the tasks.

Behavioral Outcomes

Behavioral Assessment System For Children (BASC). The BASC (Reynolds & Kamphaus, 1992) is a 109-item behavioral checklist that surveys children's internalizing, externalizing, and adaptive behavior. The BASC has a parent, teacher, and child version. Each is quite similar in its construction and item pool. In this study, the teacher version was used. The BASC yields a Total Problems Scale as well as several internalizing and externalizing scales. Scales of interest for this study included the Aggression and Conduct Problems externalizing scales. Coefficient alphas for these two scales for the study age range were .83 and .71, respectively.

Behavioral Improvement Rating. Teachers rated children's behavioral improvement at school during the intervention year (Conduct Problems Prevention Research Group, 1999). This measure was the mean of two items indicating children's improvement in behavioral problems and in their problem-solving and anger management, using a 0 to 6 rating scale (from has gotten worse to great improvement). Teachers completed this scale at the end of the intervention.

Mediator Variables

Language Independent Measure of Communicative Competence (LIMCC). The LIMCC is designed to assess the linguistic and communicative competence of deaf children and adults without regard to the particular language variety, mode, and/or unique intermixing of these which may be used by a deaf individual. This measure was developed for a specific study (Lou, 1987-b) and produces four scale scores for Communicative Ability, Linguistic Ability, Organizational Ability, and Interactional Ability. Communicative Ability assesses communication at the level of conversation, Linguistic Ability assesses skills at the sentence and word level, Organizational Ability assesses skills at the paragraph or topic level, and Interactional Ability assesses the ability to establish rapport for effective communication. The interviewer rated each child on 16 items (four items per subscale) with 1-to-4 scales following the assessment interview. The interrater reliability on the separate scale scores ranged from .83 to .97. The LIMCC was modified in the current study by not using the original interview protocol because it was a 45-minute interview about conversational topics (friends, his/her house etc.) that attempted to elicit a range of grammatical constructions. We felt that the demands of the PSM-C interview, which is mostly conversational, would meet this need. The advantage of this measure is its concern with functional communication skills. Whereas most other tests measure only one language (ASL, signed English) or components of a language, this measure is designed to depict a broader conceptualization of a person's overall conversational competence. One way it accomplishes this goal is to not penalize the person

for alternating between ASL and signed English or for using some combination of the two languages. In this study, the Total LIMCC score was used as an overall measure of Communicative Competence in the primary analyses, and the four subscale scores were used in secondary analyses.

Meadow-Kendall Social-Emotional Assessment Inventory. The Meadow-Kendall is a 59-item teacher-completed measure of children's social and emotional functioning (Meadow-Orlans, 1983). This measure was designed specifically for deaf and hard-of-hearing samples and contains three subscales: Social Adjustment, Self-Image, and Emotional Adjustment. Test-retest reliability coefficients are .80 for the Social Adjustment scale, .86 for the Self-Image scale, and .79 for the Emotional Adjustment scale. The measure also demonstrates reliability across informants with correlations between teacher and counselor ratings equaling .94 for the Social Adjustment scale, .88 for the Self-Image scale, and .76 for the Emotional Adjustment scale (Greenberg & Kusche, 1993).

Piers-Harris Self Concept Scale. The Piers Harris (Piers & Harris, 1984) is an 80-item true-false self report on thoughts, feelings, and behaviors related to self competence. The Piers-Harris yields a Total score and 6 subscales labeled: Behavioral, Intellectual, Appearance, Anxiety, Popularity, and Happiness. Reliability studies report internal consistency coefficients ranging from .88 to .93 on the Total scale with subscales coefficients ranging from .73 to .81. In this study, the Total scale was used.

Problem-Solving Measure for Conflict (PSM-C). The PSM-C assesses a child's ability to construct solutions to presented social conflicts. Six vignettes depicting a child protagonist facing a social problem are presented. Two separate vignettes are presented each for child-child, parent-child, and teacher-child conflicts. Subjects are asked to listen to the presented conflict (e.g., several children are playing with the ball of the protagonist) and its ultimate solution (e.g., the protagonist walks home with the ball) and then to describe what happened in between these events to produce the achieved outcome. After all vignettes have been presented and a child's initial responses recorded, the child is prompted for any other possible solutions to the described conflicts.

Responses are coded according to type of solution, party responsible for solution, and logical appropriateness of solution. Solutions can be verbal or nonverbal. Within each of these categories both aggressive and nonaggressive solutions are possible. For example, aggressive verbal solutions include threatening or intimidating others. Nonaggressive verbal solutions include appropriate verbal assertion or attempts to compromise. Aggressive nonverbal solutions include physically striking another or forcible negative direct action (e.g., grabbing the ball back from peers). Nonaggressive nonverbal solutions might include direct action (e.g., taking the ball once it rolls in the protagonist's direction). Responses are also coded according to whether the protagonist or someone other than him or her generates the solution to the problem. Finally, the logical appropriateness of the response is judged. For example, indicating that the child whose ball is being played with by peers "should not have brought the

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ball to school in the first place" would be coded as an irrelevant solution since it ignores the premise of the presented problem (see Dunn, Lochman, & Colder, 1997 and Lochman & Lampron, 1986, for more information on the PSM-C).

For this study, a Competent Cluster of solutions was calculated by summing all solutions involving verbal assertions, direct action, and compromise. An Incompetent Cluster of solutions was calculated by summing all solutions involving negative verbal assertions, negative direct action, and physical aggression. In addition, data were collected on Nonconfrontational solutions, as well as the number of Protagonist Solutions (overall number of solutions used by the protagonist in the story to solve the problem) and the number of Irrelevant Solutions made.

Results

Relation Between Behavioral Problems and Mediator Variables

Correlational analyses were conducted to explore the relation between behavioral problems (specifically, aggression and conduct problems as measured on the BASC) and the mediator variables of interest at Time 1 and Time 2 (see Table 1). Results at Time 1 indicated that communicative competence was negatively correlated with both types of behavioral problems and approached significance for conduct problems, $r = -.29$, $p < .10$. In addition, difficulties with social adjustment was significantly related to aggression, $r = -.70, p < .001$, and conduct problems, $r = -.57$, $p < .001$. Although self-image was negatively correlated with behavioral problems, this did not reach significance.

Time 1 self-competence (measured by the Piers-Harris Total Score) yielded a positive correlation with conduct problems, but this relation was not significant. Aggression and conduct problems were negatively correlated with competent problem-solving, whereas these behavioral problems w ere p ositively c orrelated w ith i ncompetent p roblem-solving (none significant). Finally, children generating more irrelevant solutions on the problem-solving measure exhibited greater aggression, $r = .41, p < .01$, and conduct problems, $r = .47, p < .01$.

At Time 2, the relation between communicative competence and conduct problems was strengthened in that lower communication skills were associated with both higher aggression, $r = -.33, p < .05$, and higher conduct problems, $r = -.49, p < .01$. Social adjustment continued to exhibit a strong negative correlation with both aggression, $r = -.84, p < .001$, and conduct problems, $r = -.67$, $p < .001$. The inverse relation between self-image and behavioral problems was more evident at Time 2. Specifically, lower levels of self-image were associated with higher aggression, $r = -.51$, $p < .001$, and conduct problems, $r = -.40, p < .05$.

Table 1. Correlations Between Behavioral Problems and Mediator Variables at Time 1 and Time 2.

Mediators	Time 1 [b]		Time 2 [c]	
	Aggression	Conduct Problems	Aggression	Conduct Problems
Communicative Competence				
Total Score	-.16	-.29[a]	-33*	-.49**
Meadow Kendall				
Social Adjustment	-.70***	-.57***	-.84***	-.67***
Self-Image	-.25	-.19	-.51***	-.40*
Emotional Adjustment	.04	-.08	-.12	-.10
Piers-Harris				
Total Self-Competence	-.10	.23	.13	.34*
PSM-C				
Competent Cluster	-.12	-.22	-.25	-.41*
Incompetent Cluster	.13	.03	.02	-.05
Nonconfrontation	.11	.18	.25	-.01
Irrelevant Solutions	.41**	.47**	.34*	.40*
Protagonist Solutions	.23	.15	-.16	-.35*

*	$p < .05$
**	$p < .01$
***	$p < .001$
[a]	trend; $p < .10$
[b]	Correlations between Time 1 BASC scores and Time 1 mediators.
[c]	Correlations between Time 2 BASC scores and Time 2 mediators.

The positive relation between self-competence and conduct problems reached significance at Time 2, $r = .34$, $p < .05$. As at Time 1, aggression and conduct problems were negatively correlated with competent problem-solving, and this finding was significant for conduct problems, $r = -.41$, $p < .05$. In addition, greater levels of conduct problems were associated with less protagonist solutions, $r = -.35$, $p < .05$. However, there was no clear relation between behavioral problems and incompetent problem-solving at Time 2. Finally, as was found at Time 1, children generating more irrelevant solutions on the problem-solving measure exhibited greater aggression, $r = .34$, $p < .05$, and conduct problems, $r = .40$, $p < .05$.

Intervention Effects on Behavioral Outcomes

An analysis of variance (ANOVA) showed that intervention positively impacted behavioral improvement across the intervention year, $F(1, 41) = 2.94$, $p = .09$. Specifically, children receiving the intervention tended to display more behavioral improvement ($M = 3.26$, $SD = 1.25$) than children in the control condition ($M = 2.55$, $SD = 1.47$). In contrast, analyses of covariance (ANCOVA), controlling for behavior at Time 1, revealed no intervention effects at Time 2 for outcome variables on the BASC (see Table 2).

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Table 2. Intervention Effects on Behavioral Outcomes.

	Intervention				Control				*F*
	Time 1		Time 2		Time 1		Time 2		
	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	
Behavioral Improvement BASC	---	---	2.55	(1.47)	---	---	3.26	(1.25)	2.94 [a]
Aggression	69.9	(14.92)	61.45	(11.40)	64.00	(13.17)	56.89	(10.80)	0.33
Conduct Problems	63.33	(16.26)	55.10	(9.84)	57.83	(17.37)	52.72	(13.22)	0.02

[a] trend; p<.10

Intervention Effects on Mediator Variables

ANCOVAs were conducted to determine the effect of intervention on each of the mediating variables, controlling for the level of each variable at Time 1. These results revealed that intervention positively impacted the total communicative competence measured by the Language Independent Assessment o f C ommunicative C ompetence, $F(1, 3 4) = 6.72, p < .01$. Specifically, children in the control condition displayed a greater decrease from pre-intervention to post-intervention than did the children receiving the intervention (see Table 3). When examined at the subscale level, children receiving the intervention tended to display the best performance on the interaction scale, $F(1, 37) = 3.47, p < .08$, and the linguistics scale, $F(1, 35) = 3.86, p < .06$, when compared to control children. A weak trend for an intervention effect was found for both social adjustment on the Meadow Kendall, $F(1, 27) = 2.10, p = .15$, indicating improved social adjustment for the intervention children, and total self-competence on the Piers-Harris, $F(1, 36) = 2.08, p = .15$, indicating a g reater increase in perceived self-competence for the control children.

Table 3. Intervention Effects on Mediator Variables.

	Intervention				Control				F
	Time 1		Time 2		Time 1		Time 2		
	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	
Communicative Competence									
Total Score	57.85	(11.86)	47.20	(9.71)	65.13	(9.46)	46.73	(8.88)	6.72 *
Meadow Kendall									
Social Adjustment	2.55	(0.62)	2.67	(0.69)	2.85	(0.73)	2.62	(0.48)	2.10 [a]
Self-Image	2.92	(0.32)	3.01	(0.36)	3.03	(0.41)	2.99	(0.23)	0.23
Emotional Adjustment	3.37	(0.33)	3.40	(0.37)	3.32	(0.47)	3.30	(0.49)	0.23
Piers-Harris									
Total Self-Competence	55.61	(10.59)	56.70	(9.77)	54.19	(8.94)	58.44	(9.91)	2.08 [a]
PSM-C									
Competent Cluster	4.87	(2.55)	6.61	(1.95)	4.50	(2.42)	4.50	(2.28)	11.04 **
Incompetent Cluster	0.61	(1.08)	0.61	(1.03)	0.88	(1.63)	1.69	(1.25)	8.03 **
Nonconfrontation	0.39	(0.58)	1.09	(1.04)	0.38	(1.09)	0.25	(0.45)	8.91 **
Irrelevant Solutions	3.00	(2.20)	2.09	(1.59)	1.75	(1.57)	1.94	(1.61)	0.17
Protagonist Solutions	5.96	(3.31)	8.30	(2.34)	8.38	(7.23)	7.13	(2.33)	4.61 *

[a]   trend; $p = .15$
* $p < .05$
** $p < .01$

Finally, intervention positively impacted problem-solving from Time 1 to Time 2. Specifically, children receiving the intervention displayed a

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greater increase in competent solutions from pre-intervention to post-intervention than did the children in the control condition, $F(1, 36) = 11.04$, $p < .01$. Likewise, children in the control condition demonstrated more incompetent solutions at Time 2 when compared to Time 1, whereas the children in the intervention did not, $F(1, 36) = 8.03$, $p < .01$. Finally, following intervention, children used more nonconfrontational solutions, as well as a greater number of protagonist solutions; in contrast, those in the control condition, when compared to the intervention condition, did not show this increase in either nonconfrontational solutions or protagonist solutions, $F(1, 36) = 8.91$, $p < .01$, and $F(1, 36) = 4.61$, $p < .05$, respectively (see Table 3).

Discussion

The Coping Power Program, a social-cognitive intervention which has produced effects with hearing children in prior research, was adapted in this study for use with deaf children. Deaf children in a residential school were screened for aggressive behavior, using teacher ratings, and were randomly assigned by classroom to the Coping Power Program or to a wait-list control condition. The children in the multicomponent Coping Power Program attended group sessions, and their teachers and dormitory staff received training to influence the context around the children. The results provide partial support for this study's two hypotheses. Coping Power children tended to display behavioral improvement across the intervention year, according to teacher ratings, and the Coping Power children displayed improvements in their social problem-solving skills and in their communication skills.

Coping Power Program Effects on Mediator Variables

Two of the four hypotheses about intervention effects on mediator variables were supported. The Coping Power Program produced improvements in children's social problem-solving skills and in their communication abilities. Although the intervention did not have significant effects on the other two putative mediator variables, weak trends for intervention effects did exist for these variables. As expected, Coping Power children tended to have improved teacher-rated social adjustment over the course of the academic year, while control children became less socially adjusted over time. Counter to expectation, however, the control children tended to have greater increases in their perceptions of their social and personal competence across time than did the intervention children. Both groups had improved perceived competence, but the control group's increase was larger, despite the indications from other analyses that the control group over time actually had poorer behavioral improvement, poorer social adjustment, poorer problem solving skills, and poorer communication than did the Coping Power children. This unexpected weak trend may have been due to control children's excessive inflation of their perceived competence, in comparison to a more accurate moderate increase in perceived competence displayed by the Coping Power children. Prior research with hearing children has found that socially rejected children can

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overestimate their degree of social acceptance by peers (Hughes, Cavell, & Grossman, 1997; Pardini, Barry, Barth, Lochman, & Wells, 2002).

Children's social-problem solving skills are a direct target of the Coping Power intervention, and the current results indicate that the program successfully influenced these skills in several key ways. Through brainstorming discussions, activities, and role-plays, children are encouraged to think of a wider array of possible solutions to the social problems they encounter with their peers, teachers, and parents. Coping Power children had a thirty-nine percent increase in the so lutions that protagonists i n t he h ypothetical s tories c ould u se t o r esolve t he s ocial problems in the stories, indicating that Coping Power children had acquired, and could generate, a broader array of solutions. In addition, analyses of the quality of these solutions indicated that this increase was of competent, useful strategies. The Coping Power children displayed a thirty-seven percent increase over time in their active, competent problem-solving efforts, involving positive verbal assertion, positive direct action, and compromise. They had no change over time in their generation of incompetent solutions (negative verbal assertion, negative direct action, physical aggression). In contrast, the control children had an increase in the incompetent solutions they generated over time, whereas the number of competent solutions they considered remained the same. In addition, the Coping Power children had a two-fold increase in their nonconfrontational solutions, apparently using these strategies as a means for maintaining emotional regulation when confronted with frustrating, uncontrollable problems. These results indicate that intervention children are thinking of a range of new solutions to problems and can potentially respond to these problems with greater flexibility by using verbal assertion, positive direct action, compromise, or nonconfrontation, depending on the nature of the social problem they encounter.

The Coping Power Program also has had a direct effect on the communication abilities of the aggressive deaf children who were in the groups. Because development of competent and accurate communication is such a key concern for deaf children, this intervention effect on communication is especially important. The communication scores for both the intervention and control children declined from pretest to posttest, possibly as a result of repeated exposure to the test situation or to somewhat different criteria applied by the examiners at the post-intervention assessment for communication skills. However, the decline was substantially more marked in the control group. When the components of the communication scale were examined, the Coping Power Program had significant effects on the children's interaction abilities and tended to assist their linguistics abilities. Of all the aspects of communication, the Coping Power Program would be expected to most impact children's abilities to communicate their ideas and needs in interactions with others in a less impulsive and more expressive manner, as the results, in fact, indicated.

Coping Power Program Effects on Behavioral Outcomes

One of the two hypotheses about the planned effects of the Coping

Power program on children's problem behaviors tended to be supported. The Coping Power Program did not have an impact on teachers' ratings of children's absolute levels of aggressive behaviors or conduct problems, using the BASC. However, teachers did rate that the Coping Power children tended to have greater behavioral improvement during the academic year than did the control children. Although this effect did not reach statistical significance at the $p = .05$ level, the effect size for Behavioral Improvement was .5, indicating a moderate effect size, similar to effect sizes on teachers' ratings of behavioral improvement in prior Coping Power outcome studies with hearing children (e.g., Lochman & Wells, in press-b) and similar to effect sizes for many empirically-supported interventions (Brestan & Eyberg, 1998). With a larger sample, this effect size would have reached statistical significance. Although the behavioral outcome effects were more modest than the Coping Power effects on mediator variables in the current study, the findings do indicate that intervention children are beginning to reduce their behavioral problems during the intervention year, relative to the control children. Prior research with the Coping Power Program with hearing children has found that the program has produced significantly lower levels of delinquency and substance use, as well as improved school behavior functioning, at follow-up assessments one year after the intervention (Lochman & Wells, in press-a; in press-b). The behavioral improvement evident in the current study, along with the significant intervention effects on children's social problem-solving skills and their communication abilities, suggests that the Coping Power children in the current sample are in a good position to display progressively greater improvements in subsequent years, similar to findings with hearing samples.

Relations Between Aggressive Behavior, Conduct Problems and the Mediator Variables

The correlational analyses between children's aggressive behavior and conduct problems and their scores on mediator variables provide results that are important in several ways. First, these results document clear associations between seven of the ten mediator variables and the behavioral variables. These findings help to clarify that these variables do serve as risk markers for behavioral problems in deaf children and are consistent with our model which suggests that these variables may be key causal agents for aggressive and conduct problem behaviors in deaf children. It is notable that these significant correlations were obtained even within the relatively restricted range of problem behavior scores that is evident among our sample of children, who were identified because of their elevation in aggressive behaviors on the screening instrument. The associations between variables were somewhat more pronounced at Time 2 than Time 1, possibly due to children displaying greater ranges of scores at Time 2 because of intervention effects on most of the mediator variables.

Certain mediator variables were associated with both aggressive behavior and with conduct problems, indicating their relation to general externalizing behavior problems. Within deaf children, higher levels of

externalizing behaviors are related to poorer communicative competence, poorer social adjustment, poorer self image, and more irrelevant solutions on the social-problem-solving measure. Higher levels of conduct problems among deaf children are associated with less competent problem solutions, fewer protagonist solutions, and higher perceived self-competence. The latter finding is particularly interesting because it is counter to initial expectations, but it is consistent with the direction for the trend intervention effect on this variable. The finding of higher perceived competence among more behaviorally-disturbed children provides further support for the possibility of inflated self-perceptions among deaf children with greater levels of conduct problems, similar to the pattern obtained among hearing children (Hughes et al., 1997; Pardini et al., 2002).

The second way in which these correlations between children's behavior and their mediator variables is important is that they further support the significance of many of the obtained intervention effects. Because children's poor communicative competence, poor social adjustment, higher and potentially inflated perceived self-competence, fewer competent problem solutions, and fewer overall problem solutions are all significantly related to the children's problem behaviors, then intervention-produced changes in these processes can have major effects on these children's future functioning. These relations between variables further indicate the potential for greater improvement in the intervention children's aggressive and conduct problem behaviors in the years ahead. Despite certain limitations evident in this study due to a relatively small sample size, the current findings indicate that the Coping Power Program is a promising intervention for deaf children with aggressive and conduct behavior problems.

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