THE EFFECT OF SOCIAL PROBLEM-SOLVING ABILITY ON THE ADJUSTMENT OF THIRD-GRADE CHILDREN

By

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ABSTRACT

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Susan Gies Keys, Doctor of Philosophy, 1983

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Many children experience interpersonal problems and frequently these children lack the necessary skills to successfully resolve such issues. Social problem-solving training programs have recently evolved as a means for developing specific cognitive problem-solving skills. The primary question investigated in this study was whether or not problem-solving ability affects adjustment as measured by teacher ratings. The effect of problem-solving training on specific problem-solving skills was also assessed.

Children were randomly selected and assigned to either a problem-solving program or a career awareness control group. The treatment and control conditions were administered by 10 elementary school counselors in 10 different elementary schools. A small group format was used with eight students per group. One hundred and fifty-seven subjects, 78 experimental and 79 control, participated in the study.

All students were posttested on a set of 17 dependent variables. Twelve of these were problem-solving variables (conflict identification; feeling identification; goal identification; quantity of alternatives; alternative decision; quality of chosen alternative; quantity of consequences; quantity of means-end steps; quality of means-end steps; persistency; quantity of problem-solving steps; and sequencing of problem solving steps) and five were adjustment variables. The adjustment variables correspond to the five factors of the Health Resources Inventory: gutsy; good student; rules; peer sociability; and frustration tolerance.

A significant multivariate F ($p < .001$) for treatment suggests that problem-solving training had a significant impact on the set of dependent variables. Additional univariate analysis of variance results for each dependent variable reflected a significant difference between experimentals and controls on seven of the problem-solving variables and two of the adjustment variables. The multivariate F tests for sex and interaction were not significant.

These results suggest that social problem-solving ability can significantly affect the adjustment of third-grade children. The effect of problem-solving training on problem-solving skills supports this result. This study also discusses these two sets of results in relationship to the findings of prior research and addresses implications for future research and practice.

DEDICATION

To all the members of my family, who made the completion of this project a family goal.

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CHAPTER I

STATEMENT OF THE PROBLEM

Importance of the Study

When assessing the guidance needs of elementary school-children, Celotta and Jacobs (1982) discovered that children identified a need for better interpersonal relationships and a need for better self-management as two of their primary concerns. As part of these two need areas, children indicated that people tease them too much, that they get too angry, that they are left out of activities, and that they have difficulty making decisions.

Stiltner (1978) also conducted a needs assessment of elementary school age children. Her findings were similar to Celotta and Jacobs in that the needs children frequently identified were in the areas of interpersonal relations and problem solving. Stiltner also surveyed teacher opinion of children's needs. Apart from academic needs, teachers felt students needed to develop conflict management skills.

Parents have also pinpointed interpersonal relations and thinking skills as need areas for children. Recently a Gallup Poll identified "learning to think for oneself" and "the ability to get along with others" as the two primary qualities parents wanted developed in their children in home and at school (ASCA Newsletter, 1981).

Based on the responses of these three groups, it is apparent that children experience varied interpersonal problems and often lack the appropriate skills to solve such problems.

Theoretical Rationale

A cognitive-behavioral model of human behavior perceives man as "an active element in his own growth and development. He is both a controlled and a controlling organism; a product and a producer of environmental forces" (Mahoney, 1974, p. 146). This model does not ignore environmental variables, but man's cognitions are also felt to play a vital role in understanding and changing his behavior.

Problem-solving training is one cognitive-behavioral strategy which teaches individuals a specific cognitive process to facilitate effective functioning. The focus of problem solving can be either impersonal tasks such as anagrams, puzzles or arithmetic tasks, or interpersonal problems that arise during the normal course of everyday life. This study is concerned with interpersonal or social problem solving.

Mahoney (1974) asserts that the overall objective of therapy is to train "personal scientists." By this he means,

> individuals who are skillful in the functional analysis and systematic improvement of their own behavior. We should model and teach an "intimate empiricism" replete

> with skills training in problem analysis, hypothesis generation, evaluative experimentation and so on. (Mahoney, 1974, p. 247).

Problem-solving training is one means of developing such personal scientists. The goal of problem-solving training is not to provide solutions per se to specific problems, but rather to develop within the individual a cognitive framework for use in a variety of situational problems.

According to Meichenbaum, "behavior therapy is shifting from an emphasis on discrete situation-specific responses and problem specific procedures to a concern with coping skills that can be applied across response modalities, situations and problems" (Meichenbaum, 1974, p. 144). Problem-solving represents an example of such skills.

Several researchers have also noted the importance of social problem-solving skills for positive adjustment.

D'Zurilla and Goldfried suggest that:

> What we view clinically as "abnormal behavior" or "emotional disturbance" may be viewed as ineffective behavior and its consequences, in which the individual is unable to resolve certain situational problems in his life and his inadequate attempts to do so are having undesirable effects. (D'Zurilla & Goldfried, 1971, p. 107)

In addition, they assert that training in problem solving is a relevant strategy for facilitating more effective behavior (D'Zurilla & Goldfried, 1971).

Cowen (1977) views problem-solving training as a preventive approach which encourages healthy human functioning. Cowen believes that people who possess the skills needed to

resolve problems are less likely to acquire maladaptive behaviors.

Jahoda (1953) and Gesten et al. (1978) have noted the importance of problem-solving skills for positive adjustment.

Spivack, Platt and Shure (1976) have also linked social problem-solving skills with adjustment and propose a theory of cognitive problem solving which suggests that there are a group of interpersonal cognitive problem-solving skills that mediate healthy social adjustment.

It is the main purpose of this study to add further clarification to the cause and effect relationship between problem-solving ability and adjustment.

Research

Several researchers have demonstrated that certain social problem-solving skills can be taught successfully to an elementary-age population. Social problem-solving training has been effective consistently across studies in increasing alternative solution thinking ability (Allen et al., 1976; Camp et al., 1977; Gesten et al., 1982; Le Capitaine, 1975; McClure, 1975; Poitras-Martin & Stone, 1977; Rains, 1978; Russell & Roberts, 1979; Stone, Hinds & Schmidt, 1975; Stone & Noce, 1980; Weissberg, 1980; Weissberg et al., 1981b). The ability to generate consequences has shown positive training effects in some studies (Gesten et al., 1982; Rains, 1978; Russell & Roberts, 1979; Weissberg, 1980), but not in others (Allen et al., 1976; McClure,

1975). Problem identification has also shown mixed results across studies (Allen et al., 1976; Gesten et al., 1982; Rains, 1978; Russell & Roberts, 1979; Weissberg, 1980). Although studied less frequently, means-end thinking has shown positive training effects (Allen et al., 1976; McClure, 1975; Weissberg, 1980).

Researchers have also described the relationship between social problem-solving skills and social adjustment in preschool and elementary-age children. Results across studies are inconsistent (Gesten et al., 1982; Hopper, 1978; McKim et al., 1982; Shure & Spivack, 1975a, 1975b). This pattern of inconsistency continues in studies which looked at levels of adjustment as a consequence of change in social problem-solving skill development. When working with children, Shure and Spivack (1975a, 1975b), Elardo and Caldwell (1979), Weissberg (1980), Shure (1980), and Weissberg (1981b) report adjustment gains in students upon completion of a social problem-solving training program. Such gains were not apparent in the work of Allen et al. (1976), Camp (1977), Flores de Apodaca (1979), Gesten et al. (1982) and Meijers (1978). A study by Rains (1978) yielded mixed results, with a small subgroup showing a correlation between gains in skills and gains in adjustment.

From these avenues of research, we can conclude that important questions remain regarding the relationship between problem-solving behavior and adjustment. Furthermore, evidence to support the trainability of problem-solving

skills other than the ability to generate alternatives is not conclusive.

Problems

In a review of recent research, Weissberg and Gesten (1982) assert that if a social problem-solving program fails to promote children's adjustment then deficiencies in the treatment process and delivery may be at fault.

These reasons are also valid considerations in explaining why results pertaining to problem-solving skill development have been inconsistent. Several of the issues mentioned by Weissberg and Gesten are: (1) the age-appropriateness of the curriculum; (2) the competence of the trainers; (3) the suitability of the program itself in facilitating skill acquisition and adjustment gains, and (4) the quality of trainer supervision.

Others feel that design inadequacies and assessment weaknesses attributed to the inconsistency of results (Elias, 1980, in Weissberg & Gesten, 1982; Gesten & Weissberg, 1979; Shure & Spivack, 1982; Urbain & Kendall, 1982).

Gesten and Weissberg (1979) also emphasize that if researchers are attempting to establish a link between problem-solving ability and adjustment, then they must not limit their focus to the generation of alternative solutions as their sole emphasis for problem-solving training. Although results have been the most positive and consistent

for this skill, these authors suggest that other age-appropriate problem-solving skills be emphasized in training programs.

Hence, varied reasons prevail for why research results have failed to confirm consistently a causal tie between problem-solving training and problem-solving skill development, and problem-solving ability and adjustment.

Purpose of Study

Previous research has failed to confirm consistently a cause and effect relationship between problem-solving ability and adjustment. The main purpose of this study is to remediate some of the weaknesses of earlier studies, and to then investigate this relationship.

Although not the major focus of this study, this research also evaluated the effect of problem-solving training on problem-solving skills. This secondary question is raised as a validity issue which must be resolved prior to undertaking the primary investigation.

This study attempted to correct some of the deficiencies of earlier studies in the following ways:

1. The treatment of this study is based on a curriculum guide resulting from a series of research studies at the University of Rochester (Flores de Apodaca, 1979; Gesten et al., 1982; Rains, 1978; Weissberg, 1980; Weissberg et al., 1981b). This curriculum utilizes a variety of interaction modes such as modeling, role playing, discussion and games.

Emphasis is also given to the four main cognitive problem-solving skills pertinent for the elementary-age child: problem identification, generation of alternative solutions, means-end thinking and generation of alternative consequences. Not all studies interested in the effect of social problem-solving ability on adjustment have included all four of these skills in their treatment package (Camp et al., 1977; Elardo & Caldwell, 1979; Flores de Apodaca, 1979; Gesten et al., 1982; Meijers, 1978).

2. Most previous studies have used teachers to administer the problem-solving treatment to an entire classroom of students (Allen et al., 1976; Elardo & Caldwell, 1979; Gesten et al., 1982; McClure, 1975; Rains, 1978; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b). Treatment was administered in this study by practicing elementary school counselors in a small group setting. All counselors had prior experience in conducting small group counseling and guidance programs.

3. Many studies failed to randomly assign subjects to treatment conditions, thereby jeopardizing the internal validity of their findings (Allen et al., 1976; Gesten et al., 1982; Rains, 1978; Shure & Spivack, 1975a; Weissberg, 1980; Weissberg et al, 1981b). This study randomly assigned subjects to treatment and control conditions within schools.

4. All studies except Camp et al. (1977) failed to check teacher/trainer fidelity to the training program. In this study, each trainer completed a checklist of objec-

tives at the end of each session as a means of determining whether or not the curriculum was taught as intended.

5. Studies have also failed to report rater reliabilities for teacher rated adjustment instruments (Allen et al., 1976; Camp et al., 1977; Elardo & Caldwell, 1979; Gesten et al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b). This study established intra-rater reliabilities by having a sample of teachers rate several subjects a second time two to three weeks after the first rating.

6. Previous studies have had the same teachers who administered the treatment also perform adjustment ratings (Elardo & Caldwell, 1979; Gesten et al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b). In this study teachers remained blind to students' group membership.

7. Data analysis procedures were strengthened in this study. A multivariate analysis of variance was the principal data analysis method for this study. Several prior studies weakened their findings by using gain scores from pre to posttesting in their data analysis procedures (Gesten et al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b).

As a result of these changes this study adds further clarification to whether or not a cause and effect relationship exists between problem-solving ability and adjustment. From an

evaluative standpoint, this study also clarifies the effect of this treatment program on problem-solving skill development.

Definition of Terms

The following terms are defined relative to the purposes of this study.

Problem

A problem is a perplexing state that needs to be resolved.

Solution

A solution is a response or pattern of responses which alters the situation so that it is no longer problematic to the individual (D'Zurilla & Goldfried, 1971, pp. 108-109).

Problem Solving

There are many acceptable definitions of problem solving. The following definition was chosen because it not only reflects the purposes of this study, but also originates from a research-based model of problem solving with children.

Problem solving is defined as "a behavioral process which may be overt or cognitive in nature" (D'Zurilla & Goldfried, 1971, p. 108). This process entails several steps:

1. Say exactly what the problem is. (Problem identification) (Weissberg et al., 1980)

2. Think ahead to how you want things to end up. (Goal

identification. (Weissberg et al., 1980)

3. Stop and think before you act. (Weissberg et al., 1980)

4. Think of as many solutions as you can. (Alternative solution thinking) (Weissberg et al., 1980)

5. Think ahead to what might happen next. (Consequential thinking) (Weissberg et al., 1980)

6. Decide on a solution. (Weissberg et al., 1980)

7. Think of a plan to implement the solution. (Means-end thinking) (Weissberg et al., 1980)

8. Try the solution, and if it doesn't work, try another solution. (Weissberg et al., 1980)

Interpersonal or Social Problem Solving

Interpersonal or social problem solving is the use of the aforementioned problem-solving process in mediating conflicts that happen between people.

Adjustment

Adjustment is defined as personal and social competence; more specifically, adjustment reflects effective learning in school, adaptive assertiveness, effective interpersonal functioning, ability to function within the limits of the school environment and the ability to cope with failure and social pressures (Gesten, 1976).

CHAPTER II

REVIEW OF THE LITERATURE

Problem Solving: The Process

Children experience interpersonal problems at home, in school and at play (Celotta & Jacobs, 1982; Stiltner, 1978). Being teased, being left out of a group activity, fighting, and name calling are examples of common everyday problems confronted by children. It has been suggested that children can be taught a set of interpersonal cognitive problem solving-skills to use in problematic situations so that they can increase the efficiency and effectiveness of their problem solving (Spivack, Platt & Shure, 1976). In so doing it is felt that maladaptive behavior will decrease and social adjustment will be promoted (Allen et al., 1976; Gesten et al., 1978; Little & Kendall, 1979; Spivack, Platt & Shure, 1976).

For the purpose of study and training, D'Zurilla and Goldfried (1971) have organized the problem-solving process into a series of stages. These five stages are:

1. General Orientation. This refers to the general attitude with which one approaches the problem situation. D'Zurilla and Goldfried posit that the type of orientation which is likely to facilitate independent problem solving includes: (a) acceptance of problematic situations as a

normal part of life and that one can cope with such situations; (b) recognition of problematic situations when they occur; they further state that a key identifying feature of problematic situations is an individual's affective reaction to it. This emotional reaction should be used as a cue for the individual to shift his focus from the emotional response to the situation causing that response; and (c) inhibition of the tendency to respond either on first "impulse" or to "do nothing," essentially this means "stop and think" before acting.

2. Problem Definition and Formulation. This includes defining the situation in concrete, specific terms and classifying "elements of the situation appropriately so as to separate relevant from irrelevant information," identifying goals, and specifying major issues and conflicts (D'Zurilla & Goldfried, 1971, p. 113).

3. Generation of Alternatives. At this stage the problem solver's main task is to think of as many different solutions to the problem as possible.

4. Decision Making. This stage involves the selection of the most appropriate solution based upon a prediction and evaluation of possible consequences.

5. Verification. At this point the problem solver must act on the decision that has been made and then evaluate the extent to which the problem has been resolved.

D'Zurilla and Goldfried state that problem solving rarely takes place in such an orderly fashion; typically

they claim the stages overlap and interact. What is essential about their stage conceptualization is that it is a way of organizing problem-solving procedures for training purposes.

Another approach to problem solving, similar to the model set forth by D'Zurilla and Goldfried is the interpersonal cognitive problem-solving theory developed by Spivack, Platt and Shure (1976). Whereas the emphasis of D'Zurilla and Goldfried's model is on stages of problem solving, Spivack et al. focus upon specific cognitive skills they feel are integral to the problem-solving process. Some of these skills correspond to D'Zurilla and Goldfried's stages.

These interpersonal cognitive problem-solving skills are:

1. Interpersonal Sensitivity: an ability to perceive that a problem exists.

2. Alternative Solution Thinking: an ability to think of varied solutions to problems.

3. Means-End Thinking: an ability to generate a step-by-step plan to carry out the solution to any interpersonal problem. This often includes the recognition of obstacles that must be overcome, an awareness of others and how they may react, and an awareness that a solution may take time to carry out.

4. Consequential Thinking: an ability to consider the effects of one's social acts, in terms of impact on self and others.

5. Causal Thinking: an ability to understand that how one feels and acts may have been influenced by (and, in turn, may have influenced) how others feel and act. In a general sense, this skill reflects an awareness of social and personal motivation in oneself and others and an awareness that current interpersonal events have a continuity with past events (Spivack, Platt, & Shure, 1976, pp. 4-7).

Problem Solving Skills: Research

Research results suggest that social problem-solving training programs can increase children's problem-solving skills.

Shure and Spivack (1975a, 1975b) conducted an extensive two-year research study with inner city preschool and kindergarten children in which these children participated in an interpersonal cognitive problem-solving training program. Their results indicate that experimental four-year-old subjects generated significantly more alternative solutions, consequences and causes of behavior than control subjects. Results for the five-year-old subjects were similar except that experimental subjects' ability to generate causes of behavior did not significantly increase over control subjects.

Stone, Hinds and Schmidt (1975) demonstrated with a combined third-, fourth- and fifth-grade urban, lower-middle class population that experimental subject significantly increased their problem-solving behavior over a

control group. Criterion behaviors consisted of the number of facts, choices, and solutions verbally generated by subjects while viewing videotaped social problem situations. When analyzed by grade the treatment appeared to be most effective for fourth grade.

The actual treatment was composed of three parts: a modeling videotape demonstrating problem-solving skills; an interaction tape which allowed subjects to "talk back" to the model; and a group problem-solving game. The treatment was conducted for one week, five days per week, one hour per day.

Poitras-Martin and Stone (1977) and Le Capitaine (1975) found that sixth graders exposed to an experimental condition significantly increased their ability to generate alternative solution to interpersonal problems over students involved in a control condition. Poitras-Martin and Stone's treatment emphasized a videotaped modeling approach, whereas Le Capitaine's study was a discussion format.

Stone and Noce (1980) were also successful in teaching middle-class first graders to generate alternative solutions to social problems. Alternative solution thinking was measured by the Preschool Interpersonal Problem-Solving Test. This test was devised by Shure and Spivack to assess the number of alternative solutions preschool children can verbally generate to pictorially presented social problems.

The positive results of this study are particularly interesting in light of the fact that the length of the

treatment intervention was minimal; treatment groups met for three, 20-minute sessions per week for two weeks.

This study also evaluated whether or not the addition of self-instructional training to a cognitive modeling procedure would increase problem-solving ability over and above the cognitive modeling procedure alone. Findings were inconclusive.

When working with fourth graders, Russell and Roberts (1979) discovered that children who received problem-solving training using a programmed text and audiotaped materials attained significantly higher scores on generating alternative solutions, generating consequences, and decision making over a control group.

No significant difference was found, however, between experimental and control subjects for problem identification. Russell and Roberts conclude that this outcome resulted from the fact that both groups of children correctly identified 90% of the problems at both pre and posttest.

Problem-solving behavior in this study was assessed by verbal response to audiotaped problem stories. Like Stone, Hinds and Schmidt (1975) and Stone and Noce (1980) this study also had a brief training intervention which consisted of four, 1-hour group sessions.

McClure (1975) demonstrated with a combined third and fourth grade rural population that problem-solving training was effective in significantly increasing experimental

subjects' ability to generate alternative solutions as well as the effectiveness rating of such solutions when measured by the Problem Solving Measure. This instrument is composed of open-middle stories in which the subject listens to the beginning and end of the story and is asked to make up the middle of the story. These findings, however, were not consistent across different assessment conditions. McClure devised two additional problem-solving assessment conditions in which subjects engaged in real life problem solving in response to a contrived problem situation. In one of these simulated conditions, treated fourth graders significantly increased their solution generating skill and ability to evaluate steps for solution implementation. Experimental treatment effects did not exceed the control group effects in any of the three assessment conditions for consequence identification or for problem identification.

McClure's study also evaluated the impact of different treatment methods on problem-solving skills. Videotaped modeling alone, videotaped modeling plus role playing, and videotaped modeling and discussion comprised the three experimental conditions. Both the discussion and modeling, and the role playing and modeling groups improved over the modeling alone and control groups on the Problem Solving Measure. However, the modeling alone treatment group showed a stronger performance in the simulated assessment conditions. McClure hypothesizes that this discrepancy may have resulted from the subjects in the dual approach treatment

groups having an inadequate amount of time to integrate their cognitive problem-solving strategies with their repertoire of behavioral responses.

Allen et al. (1976) also used the Problem Solving Measure with intact classes of third and fourth graders to assess problem-solving behavior. His results, like McClure's (1975) suggest that problem-solving training is a successful strategy for improving children's ability to think of alternative solutions and steps for solution implementation. Also consistent with McClure was the fact that no treatment difference was found between experimental and control subjects for ability to identify consequences.

Allen et al. also assessed subjects' ability to generate alternative solution in a structured real life problem situation. Results were consistent with those found by using the Problem Solving Measure in that significantly more experimental children generated more than one solution to the problem.

The format for training in this study consisted of: (1) modeling of the particular problem-solving behavior via videotape; (2) small group exercises in which the teacher shaped the behavior; (3) follow-up exercises in which the children practiced the behavior; and (4) in-classroom assessment of that behavior (Allen et al., 1976, p. 94).

Elardo and Caldwell (1979) found that experimental subjects from a fourth- and fifth-grade inner city and suburban population showed more growth in respect and concern

for others as well as generating alternative solutions to social problem situations following a treatment which included a problem-solving component.

The treatment format consisted of structured discussion activities in which problem situations were presented and children were encouraged to think of alternative solutions and consequences of alternatives. On occasion, role playing was incorporated into the training sessions.

The ability to generate alternatives was assessed by the Story Alternatives Test; a test developed by Elardo in which children are asked to verbalize alternative solutions to orally presented, hypothetical problem situations. Although a part of the treatment format, consequential thinking was not assessed.

In working with a group composed primarily of third graders from a predominately white, middle-class neighborhood, Rains (1978) concludes that problem-solving training is effective in increasing children's ability to generate alternative solutions and consequences. Training failed to enhance problem identification ability.

Rains' treatment format was related to D'Zurilla and Goldfried's (1971) problem-solving stages. The training of problem-solving skills was integrated with a five-step, problem-solving process: (1) Know exactly what the problem is, (2) Decide on your goal, (3) Stop and think before you act, (4) Think of as many different solutions as you can, and, (5) When you think of a good solution, try it!

Rains also compared the effect of a "full" 17-lesson curriculum consisting of discussion, videotaped modeling, small group exercises and role playing on problem-solving ability, with a videotaped modeling group and a control group. Results suggest that the full curriculum group showed significant skill acquisition over the other two groups.

Problem-solving behavior was assessed in this study with the Interpersonal Problem Solving Measure, an individually administered structured interview instrument that uses cartoons to present problematic situations.

Like Allen et al (1976), McClure (1975), and Rains (1978), Gesten et al. (1982) found training improved the alternative solution thinking of third graders when assessed in an interview format. Unlike McClure and Allen et al., but consistent with Rains, Gesten et al. also found significant results for consequence identification. Neither Gesten et al. nor Rains trained or assessed means-end thinking. Gesten et al. also found no significant treatment effect for problem identification.

As Allen and McClure et al., Gesten et al. also used a simulated real life problematic situation as a second problem-solving assessment device. In this instance, ability to generate solutions failed to distinguish experimental subjects from controls following treatment. Experimental subjects did, however, offer significantly more variations of prior solutions. Experimental subjects also recalled

more problem-solving principles at posttreatment than controls.

Gesten et al. also assessed problem-solving behavior at a one-year follow-up. At this point experimental subjects continued to exceed controls on consequence identification.

Gesten et al.'s training curriculum is similar to Rains (1978). Seventeen, 30- to 40-minute lessons were taught per week for nine weeks as part of a "full" curriculum package consisting of discussion, videotaped modeling, role playing and a variety of learning games. When compared with a videotape-only and a no treatment control, the subjects in the full curriculum group performed significantly better on measures of problem-solving skills. Gesten et al.'s skill training was also integrated within the same five-step process used in Rains' (1978) study.

Weissberg (1980) adds additional support to the premise that third graders can learn specific problem-solving skills.

Like Allen et al.(1976), Gesten et al. (1982), McClure (1975) and Rains (1978), Weissberg demonstrated that a problem-solving training program is effective in increasing subjects' ability to generate alternative solutions to social problems when assessed within an interview format. Ability to generate consequences also showed improvement.

As in McClure's (1975) study, the effectiveness of the alternative solutions was also rated higher for treat-

ment subjects when compared to controls. Consistent also with Allen et al. (1976) and McClure (1975) is the fact that means-end thinking also showed a significant improvement for experimental subjects when scored in the same manner as Allen et al. and McClure's studies. These subjects also scored higher on problem identification, but not feeling identification.

In a simulated problem situation experimental subjects also attempted more alternative solutions. This finding is also similar to Allen et al. (1976).

Like Gesten et al. (1982) experimental subjects also recalled more problem-solving principles at posttreatment than controls.

Weissberg's training program consisted of a highly structured, 52-lesson curriculum which utilized role playing, videotape modeling, workbooks, games, and discussion as processes for teaching problem-solving behavior. A six-step process similar to Rains (1978) was used as a framework for teaching the specific skills.

Weissberg et al.'s (1981b) results with suburban and urban second-, third-, and fourth-grade children are consistent with earlier research. Findings indicate that after treatment experimental subjects generated more alternative solutions to problems, verbalized more problem-solving principles and suggested alternatives which were judged to be more effective. Problem identification, consequential thinking and means-end thinking were not assessed.

The training curriculum for this study was similar to Weissberg (1980). Problem-solving assessment occurred in interview and simulated formats. Results in both conditions were consistent, with experimental subjects outperforming controls.

Unlike the aforementioned studies, Camp et al. (1977) and Flores de Apodaca (1979) did not draw their research subjects from a normal population of elementary-age children.

In working with aggressive second-grade boys, Camp et al. found that the aggressive experimental subjects gave more solutions to problems than aggressive controls and normal controls. At the same time, however, aggressive experimental subjects verbalized a higher proportion of aggressive solutions than the other two groups. Experimental subjects received daily individual training for six weeks with a heavy emphasis on the modeling of cognitive strategies and developing answers to four questions: What is my problem? What is my plan? Am I using my plan? How did I do? The study also used both impersonal and interpersonal problem situations.

Flores de Apodaca attempted to evaluate the effectiveness of a problem-solving training program for second- and third-grade children identified as maladjusted. Training failed to enhance problem-solving skills when measured by type of verbal response to pictorially presented situations. In a real life simulated problem-solving situation experimental subjects verbalized more steps for solution

implementation than control subjects.

The training program for this study consisted of a 14-lesson, one-lesson-per-week, structured curriculum which utilized discussion, games, pantomime and role playing. Program units emphasized feelings and problem identification, generation of alternative solutions, consideration of consequences and integration of the problem-solving process.

A major problem in the study, however, was the fact that aides, trained by the experimenter to teach the training program, experienced group management difficulties and felt uncomfortable with the curriculum. No check was made to determine if subject actually received the treatment as intended.

Problem-Solving Skills: Research Summary

Research results offer mixed support for the success of teaching children cognitive problem-solving skills for use in problematic social situations.

The most frequently taught skill and the skill which showed the most consistent treatment effect across studies is alternative solution thinking (Allen et al., 1976; Camp et al., 1977; Elardo & Caldwell, 1979; Gesten et al., 1982; McClure, 1975; Rains, 1978; Russell & Roberts, 1979; Shure & Spivack, 1975a, 1975b; Stone et al., 1975; Stone & Noce, 1980; Weissberg, 1980; Weissberg, et al., 1981b).

Means-end thinking and consequential thinking were

also studied, but less frequently than alternative solution thinking.

Several researchers were successful in training means-end thinking (Allen et al., 1976; McClure, 1975; Shure & Spivack, 1975a, 1975b; Weissberg, 1980).

Results are inconsistent for consequential thinking. Allen et al. (1976) and McClure (1975) failed to find improvement in experimental subjects over controls for this skill. However, other researchers' results suggest that training in consequential thinking is possible (Gesten et al., 1982; Rains, 1978; Russell & Roberts, 1979; Shure & Spivack, 1975a, 1975b; Weissberg, 1980)

Research results are also mixed regarding problem identification. Allen et al. (1976) and Weissberg (1980) relate a positive treatment effect for this skill. Both Gesten et al. (1982) and Rains (1978) suggest that inadequate training time for this specific skill may account for their failure to find a significant effect. McClure (1975), and Russell and Roberts (1979) also failed to find a significant treatment effect for problem identification. Unlike Rains and Gesten, however, Russell and Roberts suggest that this skill may have already existed at optimal levels prior to treatment in both experimental and control groups.

Treatment methods have varied from study to study. Although most studies included a videotaped modeling component (Gesten et al., 1982; Poitras-Martin & Stone, 1977; Rains, 1978; Stone, Hinds, & Schmidt, 1975; Weissberg, 1980;

Weissberg et al., 1981b), other studies demonstrated positive results without this component (Elardo & Caldwell, 1979; Le Capitaine, 1975; Russell & Roberts, 1979; Shure & Spivack, 1975a, 1975b). Camp et al.'s (1977) treatment involved modeling of skills by the teacher administering the treatment but it did not contain a videotaped modeling component.

Rains (1978) and Weissberg (1980) suggest that a multi-faceted treatment consisting of discussion, practice exercises, role playing and modeling is optimal. McClure (1975) further emphasizes a need for modeling and role playing in order to assist subjects to fully integrate the problem-solving skills behaviorally as well as cognitively.

Assessment of problem-solving skills has taken two separate approaches: (1) a structured interview format in which subjects respond to orally and/or pictorially presented problems, and (2) contrived real life problems in which subjects engage in actual problem-solving behavior. Results across assessment conditions have been inconsistent (Allen et al., 1976; Gesten et al., 1982; McClure, 1975).

The most frequently used measure of problem-solving behavior has been the Problem Solving Measure, or adaptations of this instrument, either alone or in conjunction with the simulated problem situations.

Some design and analysis problems have existed in some of the aforementioned studies. Shure and Spivack (1975a, 1975b), Rains (1978), Caldwell (1979), Elardo and Caldwell (1979), Weissberg (1980), and Gesten et al. (1982) used a

pre-post gain score for their data analysis procedures. A multivariate analysis of covariance procedure would have been more appropriate. Likewise, McClure (1975) used a univariate analysis of variance rather than a multivariate approach when measuring several different problem-solving dependent variables.

Limited sample size (Camp et al., 1977; Poitras-Martin & Stone, 1977; Stone & Noce, 1980) and assignment of treatment to intact groups (Allen et al., 1976; Elardo & Caldwell, 1979; Gesten et al., 1982; Rains, 1978; Weissberg, 1980; Weissberg, 1981b) are two other problems apparent in these particular studies.

In summation, it can be concluded that evidence is inadequate to support the premise that social problem-solving training programs are successfully teaching children varied social-cognitive problem-solving skills.

Problem Solving and Adjustment

Shure and Spivack suggest that "behavioral adjustment and the ability to adapt to one's environment is closely related to a cognitive capacity to solve the kinds of problems encountered in everyday life" (Shure & Spivack, 1972, p. 348).

Jahoda feels that "psychological health or its absence manifests itself in the way a person handles the problems and conflicts of life (Jahoda, 1953, p. 351). She further specifies that when assessing psychological health, the

individual must not be viewed in isolation, but seen rather within the context of his social milieu.

Several others have also noted that social problem-solving skills are integral to positive adjustment (Cowen, 1977; D'Zurilla & Goldfried, 1971; Gesten et al., 1978).

Researchers have investigated the relationship between problem solving and adjustment. Some studies have investigated the correlation between problem-solving skills and adjustment, while others have attempted to establish a causal link between the two. Both groups of studies are examined here.

Problem Solving and Adjustment: Descriptive Studies

Some of the earliest research in this area with children has been conducted by Shure and Spivack. In a study with children aged 10-12 years from both inner city and middle-class neighborhoods, Shure and Spivack (1971) decribed the relationship between means-end thinking and adjustment. Seventy-four children classified as normal and 34 classified as disturbed participated in this study. In both the economically advantaged and disadvantaged groups, "normal" children showed a significant superiority to the "disturbed" group in means-end thinking. This difference persisted when the effects of I.Q. were controlled.

Shure and Spivack (1975a, 1975b) conducted another study with inner-city four- and five-year-old preschool and kin-

dergarten children. For the purposes of this study they defined three behavioral categories: inhibited, adjusted, and impulsive. These groupings reflect the degree of adjustment or aberrance displayed in the classroom with regard to impatience, emotionality and aggression. The Hahnemann Preschool Behavior Rating Scale was designed by Shure and Spivack as a means of assessing these behaviors and establishing subjects' adjustment group membership.

Shure and Spivack's research with this age group demonstrated that number of solutions generated to hypothetical problem situations is the single best predictor of adjustment group classification. Adjusted subjects were also found to generate the most number of solutions, while subjects identified as inhibited generated the least. This was also true for number of consequences. Additional finding suggest that subjects who gave the highest number of solutions were not those who simply talked the most while being tested.

Factors other than number of alternatives that were considered as possible significant predictors of adjustment status were: number of consequences, number of causal statements, problem sensitivity (kindergarten group only) and I.Q. (nursery group only). When evaluated individually, the number of consequences and number of causal statements failed to add predictive power over and above that provided by number of alternatives alone. When the consequence test results for four-year-olds were added to the prediction equation with the number of alternatives, the predictability

of subject classification was significantly increased over and above the the predictive power of number of alternatives alone.

I.Q. was found to significantly predict group classification, but the addition of the number of alternative solutions to the prediction equation significantly increased the predictive power of I.Q. Furthermore, data suggest that number of alternatives accounted for nearly all of the variance provided by I.Q.

A study by Hopper (1978) assessed the relationship between social problem-solving skills and social competence in sixth grade students. Hopper used two separate instruments to measure social competence:

1. the A-M-L, is a teacher rating instrument designed to identify children who show school maladaptation. Items reflect three factors. These are aggressive-acting out, moody-withdrawn and a one-item learning disability factor.

2. The Health Resources Inventory, a teacher rating instrument developed by Gesten (1976), assesses personal and social competence in primary children (first, second, and third grade children). Items cluster around five factors:

   a. Good Student, which contains items related to effective learning

   b. Gutsy, which includes items reflecting adaptive assertiveness

   c. Peer Sociability, which consists of items reflecting effective interpersonal functioning

   d. Rules, which reflects ability to function within the constraints of the school environment

   e. Frustration Tolerance, which measures ability to cope with failure and other social pressures

A sixth score, Sum Factors, is also used as a composite index of competence computed by adding the individual factor scores.

The results of Hopper's study suggest that variability in the quality of alternative solutions is the single best predictor of social competence. Essentially what this means is that students who produced ideas which have a wide variation in quality were more likely to be rated by teachers as less competent. In addition, the maximum effectiveness rating of alternatives was positively related to social competence. Hence, socially competent sixth graders generally produced ideas of higher quality.

Quantity of alternatives and consequences was found to be unrelated to competence. This finding contradicts Shure and Spivack's (1975a, 1975b) work with preschool and kindergarten children that suggested that the number of alternatives generated by subjects to problem solutions was the single best predictor of adjustment.

Hopper's results also suggest that quantity of alternatives is unrelated to quality. McClure's (1975) findings are inconsistent with this result. McClure found that quantity of alternatives was the single best predictor of response effectiveness.

Hopper's data also indicated that socioeconomic status is unrelated to social problem solving and social competence. This was not the case for I.Q. and achievement. Results suggest that I.Q. and achievement scores are related

to the number of alternatives generated, number of consequences generated and ability to self-evaluate response effectiveness. I.Q. and achievement did not relate to the quality of problem-solving responses. Hence, Hopper concludes, "that the more intelligent children tend to produce more, but not necessarily better responses," and are "better evaluators of alternatives and consequences" (Hopper, 1978, p. 99).

I.Q. and achievement scores were also related to teacher ratings of social competence. However, in problem-solving situations where students were asked to generate as many alternative solutions as they could to hypothetical problems, the number of alternatives, the effectiveness of these alternatives and the standard deviation of effectiveness were the variables which related to social competence over and above I.Q. This finding is consistent with Shure and Spivack's (1971, 1975a, 1975b) results which indicated that a relationship exists between problem-solving skills and adjustment with the effects of I.Q. controlled.

Gesten et al. (1982) examined the relationship between social problem-solving skills and adjustment and I.Q. Behavioral adjustment was measured by the Classroom Adjustment Rating Scale, the Health Resources Inventory, a classroom sociogram and a self-esteem inventory. The Classroom Adjustment Rating Scale is a teacher rating instrument composed of three factors and one overall index of school maladjustment. The three factors are: acting out, shy

anxious, and learning difficulty.

In examining the relationship between problem-solving skills and adjustment prior to the administration of the problem-solving treatment program, Gesten et al. discovered that the maximum effectiveness of alternatives correlated with positive adjustment on the Classroom Adjustment Rating Scale's acting out and learning difficulty factors as well as the total problems score. The maximum effectiveness rating also correlated with positive ratings on the good student, rules and summary factors of the Health Resources Inventory, as well as sociometric likeability and I.Q. These results are similar to Hopper (1978) and inconsistent with Shure and Spivack (1975a, 1975b) who found quantity rather than quality of alternatives to be the best predictor of adjustment.

McKim et al. (1982) have also examined the relationship between social problem-solving ability and adjustment. Results suggest differences between suburban and urban populations. Suburban children's adjustment was found to be related to means-end thinking and social role taking ability. This relationship did <u>not</u> exist after I.Q. effects were controlled. Urban children's adjustment, however, related significantly to alternative solution thinking ability even with I.Q. effects controlled. This finding for urban children supports Shure and Spivack's (1975a, 1975b) earlier results with inner-city black four- and five-year-olds.

Inconsistencies across studies are apparent in the aforementioned results. Research, however, does support alternative solution thinking as a predictor of adjustment. Whether quantity or quality of alternatives is the best predictor remains an issue; the value of means-end thinking, problem sensitivity and problem identification as predictors of adjustment in children requires further investigation.

Problem Solving and Adjustment: Experimental Studies

Several research efforts have attempted to establish a causal link between problem-solving skills and behavioral adjustment.

Once again Shure and Spivack were early leaders in this endeavor. In the same study (Shure & Spivack, 1975a, 1975b) in which they described the pretreatment relationship of problem-solving skills and adjustment, they also assessed the posttreatment effect of problem-solving ability on adjustment group classification. Their results indicated that a greater percentage of trained subjects as opposed to controls were classified as adjusted at posttest, and that trained subjects initially rated as either impulsive or inhibited were rated more frequently in the adjusted category at posttest.

Shure and Spivack also attempted to assess the extent to which improvement in problem solving and improvement in

adjustment were related. By comparing problem-solving gain scores of trained children who were initially rated as either impulsive or inhibited but adjusted at posttest, with the scores of children who remained in the aberrant categories, Shure and Spivack determined that children who improved in adjustment also significantly increased their alternative and consequential thinking abilities.

Questions about the certainty of Shure and Spivack's results are raised due to a contamination of adjustment rating caused by having teachers who were not blind to the treatment and in actuality were the administrators of the treatment, conduct the pre and postratings. These researchers also failed to establish inter-rater reliabilities in order to verify the accuracy of teachers' adjustment ratings.

Furthermore, a multivariate analysis of covariance would have been a more appropriate data analysis procedure as opposed to the use of a *t* test on gain scores.

Meijers (1978) looked at the effects of a 15-session problem-solving intervention on socially anxious sixth-grade girls. The cognitive-emotional aspects of anxiety were measured with the Social Anxiety Scale for Children and the Negative Self-Evaluation Scale for Children. The Behavioral Rating Scale for Parents was used to assess behavioral consequences of anxiety, and in particular the degree of social interaction with peers in and around the house. Thirty-three

subjects were randomly assigned to one of three conditions: problem-solving therapy, placebo therapy (a social skills group) and a waiting list control.

Results suggest that the problem-solving condition was not effective in reducing social anxiety, behavioral ratings of social isolation, social desirability or negative self-evaluation. However, the "placebo" social skills condition did show a significant decrease on anxiety and behavioral ratings from pre to posttest. In addition, these subjects showed significant improvement over the control subjects, but not over the problem-solving therapy group.

At a two-month follow-up, the placebo group maintained this significant decrease in anxiety, and the problem solving group at this point in time also evinced less anxiety than the control group.

No follow-up data was collected for behavioral ratings. Meijers' limited sample size suggests that his results be viewed cautiously.

Meijers also attempted to explain the surprising superiority of the placebo condition. One reason he set forth was that the placebo condition developed during the course of treatment into a social skills program. Although problem solving was not a part of this condition, many group activities centered around social skills and social interaction. Meijers suggested that "problem-solving may not be a <u>necessary</u> element in therapy for socially anxious girls," but he concluded that a combination of problem solving and social

skills training may provide an optimal strategy.

In Elardo and Caldwell's (1979) research study, teachers rated fourth- and fifth-grade students who participated in a social development program as more creative in verbal expression and more willing to share experiences with the group, more patient, more self-reliant, and more self-controlled than students in a no-treatment control group.

Classroom adjustment was assessed with the Devereux Elementary School Behavior Rating Scale. Items on this scale reflect 11 factor scores: classroom disturbance, impatience, disrespect-defiance, external blame, achievement anxiety, external reliance, comprehension, inattentive-withdrawal, irrelevant responsiveness, creative initiative, and need for closeness to teacher.

Two problems inherent in this study are: lack of inter-rater reliabilities and teacher awareness of and participation in the administration of the treatment condition. Assignment of treatment to intact groups also threatens the internal validity of this study.

Although the results of Camp et al.'s (1977) study reflected a positive change in problem-solving behavior following treatment, teacher ratings of aggressive behavior failed to indicate a posttreatment difference between aggressive experimental subjects and aggressive control subjects. No inter-rater reliabilities are reported by Camp et al.

Allen et al. (1976) also failed to find that training

in social problem solving affected children's adjustment as measured by the Walker Problem Behavior Identification Checklist and the Ohio Social Acceptance Scale. The Walker Problem Behavior Identification Checklist is a teacher rating scale which yields a total score as well as five subscale scores. These subscales are: acting out, withdrawal, distractability, disturbed peer relations, and immaturity. The Ohio Social Acceptance Scale is a sociometric device used to assess peer acceptance.

Allen et al. suggest that rater bias in the guise of a "labeling process" which is resistant to change even when observable changes exist may explain the lack of adjustment changes at posttreatment. Efforts were made by Allen et al. to disguise treatment group membership from teachers completing the rating forms; also, teachers performing the ratings were not the same as those administering the treatment. No inter-rater reliabilities are reported.

As reviewed in the problem-solving behavior section of this chapter, Gesten et al.'s (1982) study suggested an increase in problem-solving behavior following a problem-solving training program. The full curriculum treatment involving role playing, videotaped modeling and discussion was also felt to be superior to the videotaped modeling only curriculum and the no-treatment control.

Teacher ratings on the Classroom Adjustment Rating Scale and the Health Resources Inventory at posttreatment indicated that the no-treatment control group improved more

than the subjects in the other two groups.

More specifically, on the Classroom Adjustment Rating Scale, control subjects showed greater improvement on the shy-anxious subscale when compared to subjects in the "full package" experimental group. In addition, control subjects as well as subjects in the videotaped modeling group, showed greater improvement on the total maladjusted component of the rating scale when compared with the "full curriculum" group.

On the Health Resources Inventory, teachers once again favored control subjects over one or both of the experimental groups on rules, frustration tolerance, and total score. The "full curriculum" group and the control group improved over the videotaped modeling group on peer sociability.

Gesten et al. also conducted a one-year follow up. Results at this time were more favorable for the experimental groups.

From both pretesting to follow-up and posttesting to follow-up, the videotaped modeling group improved more than the "full curriculum" group, which stayed the same and the control group which deteriorated on the acting out subscale of the Classroom Adjustment Rating Scale. The control group also deteriorated on the shy-anxious and total scale score as well.

Follow-up data on the Health Resources Inventory in general showed greater improvement for the two experimental groups than control subjects on several factors.

On peer sociability the videotaped modeling group improved more than control and "full curriculum" subjects. On rules, both experimental groups remained unchanged from their postadjustment ratings, but control subjects were found to deteriorate. Control group subjects' scores also reflected a deterioration at follow-up for summary score. "Full curriculum" subjects were found to improve signifi- cantly over controls and videotaped modeling subjects on frustration tolerance.

What appears to stand out with regard to these adjustment results in addition to the surprise positive ratings of control subjects is the lack of a consistent relationship between treatment group membership and adjustment categories. Furthermore, the full curriculum group showed the most positive results in terms of change in problem-solving ability, but subjects in this group reflected the least adjustment improvement. Gesten et al. (1982) suggests several reasons for why this may have occurred. First, they suggest that social problem solving may make children less well adjusted. This explanation is questionable since positive results have been reported in other studies (Elardo & Caldwell, 1979; Shure & Spivack, 1975a, 1975b; Weissberg et al., 1981b).

A second explanation reasons that children's behavior patterns immediately after treatment may reflect some temporary adjustment difficulties while children are "trying out" new conflict resolution strategies. Such disequilib-

rium may exist until new behaviors are strengthened.

A third explanation suggests that teacher bias may have affected adjustment ratings. In this study as in others (Elardo & Caldwell, 1979; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b.) the same teachers who rated student adjustment also conducted the problem-solving training programs. Gesten et al. states that in order to reduce the likelihood of teacher bias, "experimental teachers were urged to rate harshly, i.e., not to be influenced by positive feelings for the program or trainers" (Gesten et al., 1982).

Problems of response bias were lessened at follow-up, however, since different teachers who had not participated previously in the study performed the follow-up ratings. This change of raters, however, adds new problems of inconsistency to this study.

Flores de Apodaca (1979) looked at the effect of a social problem-solving training program on the behavioral adjustment of second- and third-grade subjects judged to be maladjusted. In this respect, Flores de Apodaca's study resembles the research of Camp (1977) and Meijers (1978) in that the target of the treatment condition was not a normal population.

Results indicated no significant difference between experimental and control subjects on behavioral adjustment as measured by the Classroom Adjustment Rating Scale and the Health Resources Inventory. Because this study failed to

increase problem-solving behavior, these adjustment results are expected.

Weissberg (1980) used two teacher rating instruments, the Health Resources Inventory and a modified version of the Devereux Elementary School Behavior Rating Scale; the Class Sociometric and the McDaniel Piers Young Children Self-Concept Scale to assess the effects of a social problem-solving training program on the behavioral adjustment of third-grade children from suburban and urban neighborhoods.

The only factor on the Health Resources Inventory which reflected a treatment main effect was the good student factor. In this case, however, control subjects improved significantly over experimental subjects.

In other instances training had contrasting effects in suburban and urban locations. Urban control subjects significantly improved their adjustment ratings over experimental urban subjects for the Health Resources Inventory summary score, and gutsy and frustration tolerance factors. For these latter two factors, suburban experimental subjects were also rated more adjusted than suburban controls.

Results are also inconsistent for the Devereux rating scale. Inattentive-withdrawn and acting out were the only two factors which reflected a treatment main effect. Control subjects improved significantly over experimental subjects on the inattentive-withdrawn factor, while experimentals outperformed controls on the acting out factor.

No significant treatment effects were apparent for

either the self-concept scale or the peer sociogram.

Teacher turnover during Weissberg's study raises several questions about the validity of his results. Because of a change in personnel for the urban teacher positions, different teachers completed the pre and postadjustment test forms. Differences in teacher rating inputs could, therefore, have jeopardized detection of changes in subjects' behavior. Weissberg's sampling process was also disturbed by this teacher changeover.

In order to counteract some of the error due to sampling mismatches, Weissberg completed a reduced suburban analyses of data based only on suburban teachers who completed both pre and postforms. These analyses indicated that suburban experimental subjects improved more than suburban controls on seven of nine teacher rated behaviors: the Health Resources summary factor, gutsy, frustration tolerance, and rules; and the Devereux summary factor, inattentive/withdrawn and acting out. Weissberg cautions that nested class effects also existed, and therefore differences may be due to class as opposed to treatment variables.

This study also fails to report inter-rater reliabilities; furthermore, the same teachers who have completed behavioral ratings have also administered the treatment condition. In addition, Weissberg's main data analysis procedure was multivariate analysis of variance using change scores based on pre-postscore differences. A multivariate

analysis of covariance would have been a more appropriate technique since this study involved pre and posttesting on both problem-solving skills and adjustment.

In a later study, Weissberg et al. (1981b) examined the impact of a social-problem solving training program on the behavioral adjustment of second-, third- and fourth-grade children.

Adjustment was measured by the Child Behavior Rating Scale. This teacher rating scale consists of items felt to be relevant to social problem-solving training. The actual items were derived from the Classroom Adjusment Rating Scale and the Health Resources Inventory. Scores on this scale fall into three categories: problem behaviors, competence behaviors and a global rating of likeability and overall school adjustment.

Results suggest that experimental subjects improved more than controls on several factors: problem behavior total, shy-anxious behavior, competence total, global likeability and overall school adjustment. Peer sociometric ratings were also used as a measure of adjustment. No significant group differences were observed for this variable. Once again, Weissberg et al. used a multivariate analysis of variance procedure on gain scores; a better choice of analysis procedures would have been a multivariate analysis of covariance. Teacher bias is also a factor since the same teachers who administered the treatment also served as the adjustment raters. No inter-rater reliabilities are

reported for adjustment ratings.

Relationship Between Change In Problem-Solving Behavior And Change in Adjustment

As mentioned earlier, Shure and Spivak's (1975a, 1975b) research with four- and five-year-olds suggested that children who improve in adjustment are also those children who significantly improve in problem-solving behavior.

Rains (1978), Weissberg (1980), Weissberg et al. (1981b) and Gesten et al. (1982) also attempted in their studies to establish a relationship between change in problem solving behavior and change in adjustment. For the most part, results are inconclusive. Gesten et al. and Rains did establish some significant correlations between gains in skill and gains in adjustment for second graders. Their limited sample sizes, however, jeopardize these findings.

Problem Solving and Adjustment: Summary

This chapter has reviewed two types of studies relevant to problem solving and adjustment: descriptive studies and experimental studies.

Several studies support alternative solution thinking as a predictor of adjustment for children (Gesten et al., 1982; Hopper, 1978; McKim et al., 1982; Shure & Spivack, 1975a, 1975b).

Shure and Spivack (1971) have also demonstrated such a relationship between means-end thinking and adjustment.

Evidence remains inconclusive for consequential thinking, problem sensitivity, and problem identification.

Studies have also evaluated the effect of I.Q. in the prediction of adjustment. I.Q. was found to be a significant predictor, but the predictive value of problem-solving ability remained after the effect of I.Q. was controlled (Shure & Spivack, 1975a, 1975b; Hopper, 1978). This was not the case in a study by McKim et al. (1982). Results initially showed a relationship between means-end thinking and adjustment. After I.Q. effects were controlled, however, this relationship did not exist.

Research attempting to establish a cause and effect relationship between problem solving and adjustment in children has had mixed results.

Several studies have demonstrated that children who participate in a problem-solving training program also improve in behavioral adjustment (Elardo & Caldwell, 1979; Shure, 1980; Shure & Spivack, 1975a, 1975b; Weissberg et al., 1981b). Other studies have failed to make this connection (Allen et al., 1976; Camp et al., 1977; Gesten et al., 1982; Meijers, 1978). Gesten et al.'s (1982) one-year follow-up data did, however, suggest more positive adjustment for experimental subjects. Results for Weissberg's (1980) study were mixed.

When working with four- and five-year-olds, Shure and Spivack (1975a, 1975b) found a correlation between gain in skill and gain in adjustment. Other studies have failed to

verify this relationship with elementary-age students (Gesten et al., 1982; Rains, 1978; Weissberg, 1980; Weissberg et al., 1981b). Gesten et al. (1982) and Rains (1978) did find a significant correlation between these two sets of gains for second grade only. However, their small sample sizes limit their findings.

Varied problems have hampered the interpretation of the results of these studies:

Several studies used improper analysis procedures. In situations where experimenters had pre and posttested on problem-solving skills and behavioral adjustment a multivariate analysis of covariance would have been the most appropriate analysis procedure. Instead, repeated measures analysis of variance on gain scores (Shure & Spivack, 1975a, 1975b), multivariate analysis of variance on gain scores (Weissberg, 1980; Weissberg et al., 1981b) and analysis of covariance and analysis of variance using gain scores (Gesten et al., 1982) were used.

Limited sample size (Camp et al., 1977; Meijers, 1978) and assignment of treatment to intact groups (Gesten et al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b) are two other problems affecting these studies.

Assessment deficiencies are also apparent. The main method of behavioral adjustment assessment was the use of various teacher rating instruments. Many studies failed to establish rater reliabilities to verify rater consistency

(Allen et al., 1976; Camp et al., 1977; Elardo & Caldwell, 1979; Gesten, et. al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b).

Results were also contaminated by teacher bias due to participation in the administration of the treatment program, or by awareness of subjects' treatment group membership (Camp et al., 1977; Elardo & Caldwell, 1979; Gesten et al., 1982; Shure & Spivack, 1975a, 1975b; Weissberg, 1980; Weissberg et al., 1981b). Changes in raters from pre to posttesting also occurred (Gesten et al., 1982; Weissberg, 1980).

Restatement of the Problem

Research has failed to affirm consistently an experimental relationship between problem-solving ability and adjustment. Furthermore, the premise that social problem-solving training programs do in fact positively affect problem-solving skills other than the ability to generate alternatives has not been supported consistently across studies. Because of this inconsistency of problem-solving results, it is important to validate that the treatment in this particular study did have a significant impact on social problem-solving skills. It is only in the light of these results that the main investigation of the cause and effect relationship between problem-solving ability and adjustment is meaningful.

In designing this study, careful consideration was

given to the weaknesses of earlier research. In order to remedy some of these problems, this study: (1) used a research developed curriculum that stresses the four major cognitive problem-solving skills of problem identification, generation of alternative solutions, means-end thinking, and generation of alternative consequences; (2) used practicing school counselors to administer the treatment in a small group setting; (3) randomly assigned subjects within schools to treatment and control conditions; (4) checked trainer fidelity to the treatment program; (5) established intra-rater reliabilities for adjustment ratings; (6) kept adjustment raters blind to subjects' treatment group membership; and (7) used appropriate statistics and analysis procedures.

Independent Variables

The following variables were used in this study.

Problem-solving training. A structured 29-session problem-solving curriculum emphasizing four problem-solving skills: problem identification, alternative solution thinking, consequential thinking, and means-end thinking. A more detailed description of this variable can be found under the treatment procedures section of Chapter III.

Career awareness training. A structured 29-session program using varied materials which were void of problem-solving or decision-making lessons.

Sex. Subjects were identified as male or female.

Dependent Variables

A total of 17 dependent variables were used in this study. Twelve of these were problem-solving variables and five were adjustment variables.

Problem-Solving Dependent Variables

Conflict identification. Whether or not the subject specified the problem in the presented story was measured by the conflict identification subscale of a revised form of the Problem Identification/Consequences Test.

Feeling identification. Whether or not the subject specified protagonist feelings in the presented story was measured by the feeling identification subscale of a revised form of the Problem Identification/Consequences Test.

Goal identification. Whether or not the subject related how the protagonist in the presented story wanted things to end up was measured by the goal identification subscale of a revised form of the Problem Identification/ Consequences Test.

Quantity of consequences. The number of different events that the subject specified could happen after a particular solution was implemented was measured by the quantity of consequences subscale of a revised form of the Problem Identification/Consequences Test.

Quantity of alternatives. The number of different problem solutions specified by the subject was measured by

the quantity of alternatives subscale of the Open Middle Interview.

Alternative decision. Whether or not the subject chose a specific solution was measured by the alternative decision subscale of the Open Middle Interview.

Quality of chosen alternative. The social desirability and feasibility of the subject's chosen solution were measured by the quality of chosen alternative subscale of the the Open Middle Interview.

Quantity of means-end steps. The number of solution implementation steps specified by the subject was measured by the quantity of means-end steps subscale of the Keys' Revision of the Rochester Means-End Problem-Solving Test.

Quality of means-end steps. The social desirability and feasibility of the subject's solution implementation plan was measured by the quality of means-end steps subscale of the Keys' Revision of the Rochester Means-End Problem-Solving Test.

Persistency. Whether or not the subject persevered when faced with an obstacle to his (her) solution implementation plan was measured by the persistency subscale of the Keys' Revision of the Rochester Means-End Problem-Solving Test.

Quantity of problem-solving steps. Whether or not the subject could state a specific problem-solving process was measured by the quantity of problem-solving steps subscale of the Problem-Solving Process Test.

Sequence of problem-solving steps. Whether or not the

subject stated the problem-solving steps in the correct order was measured by the sequence of problem-solving steps subscale of the Problem-Solving Process Test.

Adjustment Dependent Variables

The following five adjustment variables were measured with the Health Resources Inventory.

Good student, which reflects effective learning;

Gutsy, which refers to adaptive assertiveness;

Peer sociability, which reflects effective interpersonal functioning;

Rules, which measures the ability to function within the limits of the school's environment;

Frustration Tolerance, which refers to the ability to cope with failure and other pressures.

Research Hypotheses

This study examined the following hypotheses using the variables described above.

Hypothesis #1

Ho: Experimentals and controls have equal centroids on the set of 17 dependent variables.

Ha: Experimentals and controls have unequal centroids on the set of 17 dependent variables.

Hypothesis #2

Ho: Males and females have equal centroids on the set of 17 dependent variables.

Ha: Males and females have unequal centroids on the

set of 17 dependent variables.

Hypothesis #3

Ho: There will be interaction between sex and treatment on the set of 17 dependent variables.

Ha: There will be no interaction between sex and treatment on the set of 17 dependent variables.

The level of significance used for all hypotheses tested was .05.

CHAPTER III

METHODOLOGY

Introduction

Many children experience interpersonal problems and frequently these children lack the necessary skills to successfully resolve such issues. Social problem-solving training programs have been developed to increase children's problem-solving efficiency and effectiveness. Researchers have also hypothesized that there is a relationship between social problem-solving ability and adjustment. Results from studies which have attempted to establish a cause and effect relationship between these two variables have been inconsistent. In order to clarify this theoretical premise this study taught third graders four problem-solving skills (problem identification, alternative solution thinking, consequential thinking, and means-end thinking); evaluated the effectiveness of a social problem-solving training program; and, examined the relationship between social problem-solving ability and adjustment.

Chapter III describes in detail the subjects, assessment measures, procedures, design and method of analysis used in this study.

Subjects

The subjects in this study were 157 third-grade children who attended public school in Charles County, Maryland. The county has 17 elementary schools, 10 of which participated in this study. The 10 largest schools were designated for inclusion in this project because each of these schools had an elementary school counselor on staff either three or five days per week. This time element was a critical criterion since the school counselor was responsible for administering the three-times-a-week problem-solving training program and control condition.

The 10 schools participating in this study are located throughout a county which is essentially rural, but in part becoming transformed by the effects of suburban sprawl. The population of the schools reflects this demographic diversity. Children come from all aspects of the economic continuum: upper class, upwardly mobile white collar, blue collar and rural poor. Racially, 16% of the sample was black.

Assessment Measures

This study used several instruments to measure different problem-solving skills, and one teacher rating scale to assess behavioral adjustment. A discussion of each instrument follows:

Problem Solving Instruments

Keys' Revision of the Rochester Means-End Problem Solving Test (K-R of R-MEPS). (see Appendix A) This test is an adaptation of the Rochester Means-End Problem Solving Test.

Both instruments share a mutual objective: to measure children's ability to conceptualize a step-by-step plan for solution implementation in order to accomplish a specified goal.

The two tests differ from one another in structure, story themes, administration format and scoring.

The Keys' test consists of two stories, whereas the Rochester test is composed of four stories. Two stories were felt to be sufficient for the posttest only purposes of this project.

The theme of story #1 is similar to the third Rochester story; however, story #2 of the Keys' revision involves a different story theme from the Rochester stories. It is felt that this change stimulates more effective means-end thinking. As with the Rochester instrument, story #1 depicts a child-child problem and story #2 a child-adult problem.

The administration format for this test represents a departure from the Rochester instrument.

As with the original Rochester test, this form of the instrument is administered on an individual basis. The information supplied to the subject by the examiner in this

modified version, however, is more extensive than that provided by the Rochester test.

In both tests the examiner reads the beginning and end of the story to the subject. The beginning story stem relates a problem situation involving a child of the same sex as the subject, while the end of the story reveals that the problem has been solved. Unlike the Rochester test, which at this point asks the subject to specify what events may have happened between the beginning of the problem and goal attainment, this instrument provides the subject with a possible solution. The subject is then asked to describe what the focal child in the story must do to make the given solution work.

It is felt that a non-contaminated assessment of means-end thinking occurs under these conditions, since the subject does not have to rely on his or her alternative solution thinking ability in order to respond. It is also felt that the child is given a clearer signal regarding what type of response is expected of him or her.

This test also measures problem-solving persistency in relatively the same manner as the Rochester test. At the end of the second story, the examiner presents an obstacle to some aspect of the subject's solution implementation plan. The subject is evaluated on whether or not he or she attempts to overcome the obstacle. The examiner tries to avoid offering obstacles that would require the child to develop a completely new implementation plan, or the genera-

tion of a new solution idea. A sample obstacle is provided for story #2 and is to be used by the examiner if it is relevant to the child's story. If it is irrelevant, the examiner is to create an obstacle that is appropriate.

The scoring procedure for this revised form of the Rochester instrument is different from the Rochester method. The child's responses for each of the two stories are scored for three components: 1) existence and quantity of steps for solution implementation; 2) quality of implementation plan; and 3) problem solving persistency. Points for each element are then summed across stories in order to obtain a subscale score for that component.

A revised form of the Problem Identification Consequences Test (R-PID/Cons). (see Appendix B) The Problem Identification/Consequences Test was developed by the Rochester Social Problem Solving Group (1977-1978) as a measure of elementary children's ability to (a) sense and define typical age-relevant peer problems, and to (b) anticipate the potential consequences of given interpersonal acts.

According to the test manual this test was based on two other measures: Spivack and Shure's "What Happens Next Game" and the Rochester Social Problem Solving Group's 1976-1977 Interpersonal Problem Solving Measure.

The Problem Identification/Consequences Test as used in this study is a modification of the Rochester instrument.

Two major changes have been made: (1) revision of administration format, and (2) simplification of the scoring system.

The test consists of two separate stories, with each story presented in a three-card picture sequence. The first card depicts a same-sexed protagonist as the subject involved in an interpersonal peer problem. In the second picture, the protagonist is shown solving the problem, and the third card asks the subject to tell all of the different things that could happen next, after the story character tries what is pictured in the second card.

Based upon a recommendation in the Rochester Category Scoring Manual, this researcher revised the questions following the first picture of the sequence. In this modified format, the child is first asked to tell in general terms, "what is happening in the picture," and then is specifically probed regarding what the problem is, what the goal is and what the feelings are of the protagonist. Questions for the consequences section of the test adhere to the original Rochester version.

The Rochester scoring system was felt to be time-consuming, complicated and irrelevant in part for the objectives of this study. For these reasons, a new scoring method was developed as part of this project. Many of the definitions of terms, examples and scoring criteria, however, are adopted from the Rochester system.

In this revised scoring system, the child's responses

for each of the two stories are scored independently for four components: (1) conflict identification, (2) feeling identification, (3) goal identification, and (4) quantity of consequences. Component points are then summed across stories to yield corresponding subscale scores. The scoring system itself consists of four questions: (1) Does the child identify the conflict occurring in the problem situation? (2) Does the child state a relevant feeling for the protagonist in the story? (3) Does the child specify a goal for the problem situation? and (4) Does the child specify consequences for the solution provided in the story? Points are awarded for each question based on specific criteria.

Open Middle Interview (OMI). (see Appendix C) The Open Middle Interview was developed by the Rochester Social Problem Solving Group in 1979 and 1980 (Polifka et al., 1981) as a means of assessing children's ability to generate alternative solutions to age-relevant, hypothetical peer problems. This test is based on three other tests that have been used to assess alternative solution thinking: (1) the Preschool Interpersonal Problem Solving Test developed by Shure and Spivack (1974); (2) the Interpersonal Problem Solving Measure developed by the Rochester Social Problem Solving Group, and (3) the Open Middle Test also developed by the Rochester Social Problem Solving Group.

The original Open Middle Interview consists of four problem stories which are individually administered by a

trained evaluator. This project used two of the four stories. Several reasons influenced this decision: (1) practice testing sessions with non-project third-grade children revealed that children became bored with the repetitive nature of the problem-solving task; (2) the practice test results suggested that no new information is added when using four stories as opposed to two; and (3) the administration of two stories is consistent with the number of stories contained in the other problem-solving instruments in this study.

When administering the test the evaluator shows the child a picture of a same-sexed protagonist who is feeling upset as a result of an interpersonal conflict. The evaluator describes the situation and asks the child to say all the different things that the protagonist could do to solve the problem. As a final question, the child is asked to specify which alternative he (she) would try if he (she) were the story character. The evaluator makes a written record of the child's response to all story questions.

The scoring system used in this project represents a simplification of the Rochester method. Many of the definitions of terms and examples, however, are drawn from the Rochester Manual.

Responses for each Open Middle Interview story are scored for three components: (1) quantity of alternatives, (2) quality of chosen alternative solution, and (3) ability to choose a solution. Points for each of these elements

are summed across stories in order to obtain three separate subscale scores.

Problem-Solving Process Test (PSP). (see Appendix D) The Problem-Solving Process Test is based on the Rochester Problem-Solving Interview. This test assesses whether or not children can verbally express a systematic problem-solving process. Children are asked to "tell me all of the steps you would follow when you have a problem."

Children's answers are scored for the ability to generate appropriate steps, and for the appropriate sequencing of steps. The specific problem-solving steps are also based on the work of the Rochester Problem Solving Group.

Adjustment Instrument

Health Resources Inventory (HRI). (see Appendix E) The Health Resources Inventory (Gesten, 1976) is a 54-item rating scale completed by the classroom teacher and used to assess competency-related behaviors within the school setting. Although originally developed for use with primary-grade children (grades 1-3), this instrument has also been used with fourth- (Weissberg et al., 1981b) and sixth-grade students (Hopper, 1978).

A factor analysis of the instrument produced five factors. These are: (1) Good Student, which includes items related to effective learning; (2) Gutsy, which includes items reflecting adaptive assertiveness; (3) Peer Sociability, which consists of items reflecting effective interper-

sonal functioning; (4) Rules, which refers to the child's ability to function within the limits of the school environment; and (5) Frustration Tolerance, which measures the child's ability to cope with failure and other social pressures (Gesten, 1974). A factor sum (Sum Factors) is also established as a composite index of competence computed by summing the individual factor scores. Higher factor and summary scores reflect greater competence.

Gesten reported a four- to six-week test-retest reliability of .87 for the Sum Factors score, with reliabilities for individual factors ranging from .72 to .91.

Validity of the measure was demonstrated by the ability of the factor and summary scores to significantly discriminate between normal and disturbed children, as well as between competency levels within normal classroom samples.

Procedures

Piloting Procedures

All modifications made to the content and scoring of the problem-solving instruments were piloted in a two-part process prior to use in the posttest phase of this study. In the first stage, changes were made to the test format and scoring system and then these changes were investigated by testing non-project third-grade children. Feedback from these testing sessions allowed for further revisions, and a final testing tryout with additional non-project third-grade children. In all, a total of 10 children participated

in this modification phase. More specific information regarding these modifications can be found in the preceding section of this chapter.

Sampling Procedures

Sixteen subjects per school, eight male and eight female, were randomly selected and randomly assigned to treatment and control conditions within the 10 schools.

Certain students were eliminated from the sampling pool prior to the selection process. Criteria for removal included: (1) academic weakness that would preclude dismissal from class three times a week (This criterion was originally specified by this researcher to be children one or more years below grade level in reading. This was done to assure that the selected subjects would be able to read the training material when necessary. Counselors, however, broadened this concept and screened from the list children who could not afford to miss class time due to any type of academic deficiency); (2) high rate of absenteeism; (3) plans to move from the school district; (4) nonEnglish speaking; and (5) disruptive behavior to the extent that small group interactions would be nonproductive. Since sampling occurred at the beginning of the school year, counselors solicited the aid of second-grade teachers in making elimination decisions.

Of a potential pool of 1,035 students, 201 were eliminated, or approximately 19% of the population. Academic

reasons prevailed as the most frequent cause of elimination; 59% of the 201 students which were eliminated were excused for academic reasons. Disruptive behavior accounted for 28% of those disqualified.

Despite this screening procedure, counselors in two of the 10 schools reported that some of the subjects in both the career and problem-solving groups were found during the course of the program to have academic difficulties that would have precluded their inclusion in the selection pool.

After the appropriate number of subjects were sampled from each school, alternate subjects were randomly selected as a safeguard in case a subject had to be dropped from the participant list for unanticipated reasons. Substitutions from the alternate list were allowed through the first unit of the treatment program. Seventeen alternates were used; 57% of the substitutions were made because subjects had either moved or were to be moving soon. Academic reasons accounted for the remaining substitutions. All counselors were sent a letter describing the process for selecting substitutes from the alternate list. (see Appendix F)

No subjects were eliminated at the onset because of parental objection. One subject, however, did drop out later in the program due to parental concern over the child missing academic time during group sessions. Another subject was lost during the program due to moving, and a third subject was eliminated at the conclusion of the program due to incomplete posttesting data. Attendance sheets kept by

the couselors verified that all subjects attended consistently. Hence, no one needed to be eliminated for absenteeism.

When the program terminated, the subjects totaled 157, with 78 experimental subjects and 79 control. There were 39 male experimental subjects, and 39 female; of the controls, 41 were male, and 38 female.

Obtaining parental permission for student participation in the program was left to the discretion of the individual school's principal and counselor. All counselors were given a sample parent letter. (see Appendix G) Three of the 10 schools decided not to send letters to parents, five schools sent a letter informing parents of their child's selection for participation in the program and asked to be called if there were any questions, and two schools requested written permission from parents.

Treatment Procedures

Overview. Subjects in this study were randomly sampled and randomly assigned to either a problem-solving treatment or career awareness control condition. Each of the 10 participating schools had both a treatment and control group. Sixteen students were involved in each of the schools; eight were assigned to the problem-solving group, and eight to the control group.

The counselor at each school was responsible for conducting the problem-solving training sessions, and meeting

with the control group. Each group met an average of three times a week for a total of 29 meetings. Sessions lasted approximately 30 minutes. Counselors were responsible for arranging group meeting times. Some chose to meet at recess time, while others pulled children from academic classes. Some counselor rotated group times, while others always met on the same days and at the same times.

Treatment time extended from September 13 to December 3. All counselors completed the problem-solving training program. One counselor omitted one problem-solving lesson, but the repetitive nature of the lessons suggests that the omission would not be detrimental.

In all but two schools, this researcher conducted some of the problem-solving and career awareness sessions. Three reasons prevailed for why this was necessary: (1) inability of counselors to make up missed group sessions after personally being absent, (2) inability of counselors to meet with groups when other priorities demanded their time, and (3) request by counselors for assistance with implementation of particular lessons.

Problem-solving curriculum: The treatment in this study consisted of a structured problem-solving curriculum which was administered to experimental subjects in a small group format. The treatment program was based on the Rochester Social Problem Solving Program (Weissberg et al., 1980) with some minor modifications made by this researcher. These changes consisted of eliminating some lessons, com-

bining others and adding new material where it was felt to be helpful. The development of the Problem Path Gameboard as a review technique for one of the concluding lessons represents the most significant addition of new material to the Rochester program. Since the Rochester program was written for use by teachers and whole classrooms, changes also reflect the counselor and small group format of this project.

The problem-solving curriculum is divided into five skill units: (1) Feelings In Ourselves and Others; (2) Problem Sensing and Identification; (3) Generation of Alternative Solutions; (4) Consideration of Consequences; (5) Integration of Problem Solving Behavior. The fifth unit contains lessons which teach students means-end thinking as well as activities which allow students to "practice" the problem-solving skills.

Six problem-solving steps are also taught as part of the aforementioned social problem-solving units. These steps are: (1) Say exactly what the problem is; (2) Decide on your goal; (3) Stop to think before you act; (4) Think of as many solutions as you can; (5) Think ahead to what might happen next; and (6) When you really have a good solution, try it! Steps #1-3 are introduced as part of problem-solving unit 2; step #4 is taught as part of unit 3; step #5 is introduced in unit 4; and step #6 is a part of unit 5. Once introduced, all steps are practiced within each succeeding unit.

The problem-solving material is taught through a varied medium. Roleplaying influences many of the lessons, although discussion, worksheets, art activities, contests and games provide a rich variety to the curriculum.

Career awareness curriculum. A variety of materials was screened for suitability of use in the career awareness curriculum. Care was taken to assure that materials did not emphasize problem-solving or decision-making skills. Counselors were free to pick and choose materials of interest to his or her group. It was initially intended to have all counselors follow the same curriculum, but counselors' lack of enthusiasm for the planned materials necessitated the use of a greater diversity of materials.

Training of counselors to administer treatment program. Ten elementary school counselors, nine female and one male, administered the treatment and control programs. All had worked as counselors for several years prior to this school year and had had varied experiences using psychological educational materials in a small group format. Because of the counselors' strong background and because of the highly structured nature of the problem-solving lessons, the training program devised to teach counselors how to administer the treatment was not extensive.

Three whole group workshops were held. The first workshop was held prior to the initiation of the program. Counselors were introduced to the program's content and to the specifics of how the program was to be implemented. As a

follow-up to this workshop, counselors were sent three items: criteria for screening third-grade students from the sampling list (see Appendix H); a set of general program implementation directions (see Appendix I); and a suggested format for presenting the guidance project to teachers (see Appendix J).

A second workshop was held two weeks into the treatment. At this time, specific questions regarding the material were discussed as well as the skills to be introduced in forthcoming lessons. Counselors reported feeling comfortable with the materials. The only difficulty appeared to be scheduling appropriate meeting times for group sessions so as not to interfere with critical academic class time. A third workshop for reviewing curriculum material and addressing counselors' needs relative to the program was held midway in the treatment program. Prior to this workshop, counselors were asked to fill out a checklist of possible activities. (see Appendix K)

In addition to these formal workshops, informal contacts between this researcher and individual counselors occurred weekly. Such contacts took the form of school visits, telephone conversations, observation of problem-solving and career awareness groups, and in some cases, team leading group sessions as a modeling experience for the counselor. The extent and type of contact varied from counselor to counselor, depending upon counselor request and need.

All counselors were asked to complete an objective checklist consisting of a set of behavioral objectives for

each problem-solving lesson. (see Appendix L) This measure helped to verify counselor fidelity to the treatment program. Two counselors failed to complete this form. In addition, counselors recorded comments about the lesson materials and concepts on this checklist.

Counselors also kept an attendance list for each session for both the problem-solving and career awareness groups. This served as a check on the rate of subject absenteeism during the program. All counselors completed the attendance forms.

Assessment Procedures

Overview. All subjects were posttested on problem-solving skills and adjustment.

Problem-solving posttesting. Posttesting of problem-solving skills occurred during the two weeks following the conclusion of the treatment program. The four problem-solving tests were administered in the following sequence: 1) the Keys' Revision of the Rochester Means-End Problem Solving Test (K-R of R-MEPS); 2) a revised form of the Problem Identification/Consequences Test (R-PID/ Cons); 3) the Open Middle Interview (OMI), and 4) the Problem-Solving Process Test (PSP).

These four tests were administered individually in a single 30- to 40-minute testing session. Testing time was divided into two sessions for a handful of students due to restlessness. All testing was conducted outside of the

classroom, usually in the counselor's office or another setting assuring similar privacy.

Five subjects were posttested four weeks after the conclusion of the treatment and control programs. Absenteeism during the scheduled posttesting time and Christmas vacation necessitated this extended time. This was not felt to be detrimental, however, since these subjects were a part of the career awareness control condition.

This researcher, the elementary school counselors, and an additional counselor from outside of the school system, administered the posttests. All counselors were trained by this researcher to administer the tests.

This training had three components: (1) participation in an individual or two-person overview of test objectives, components and procedures; (2) participation in a small group modeling exercise, where counselors observed a test administration roleplay; and (3) administration of all problem-solving tests to a nonproject third-grade child.

Counselors were also given a written set of test directions. (see Appendix M)

All counselors had been involved in individual testing situations in the past and felt comfortable with the project's testing format.

Adjustment. All subjects were posttested on the Health Resources Inventory, a teacher rating scale of behavioral adjustment. This posttesting occurred six weeks after the conclusion of the treatment.

Current classroom teachers were selected as raters. Although third-grade staff changes had occurred in some schools during the course of the program, all teachers doing the ratings had been with their students a minimum of four weeks prior to filling out the forms.

Teachers were asked to complete the rating forms by the counselors in their particular schools. Counselors were provided a written set of directions for the administration of the Inventory. (see Appendix N)

All teachers were blind to the program's objectives, to the existence of treatment and control group differences, and to their students' group membership.

In order to obtain an intra-rater (test-retest) reliability, some teachers were asked to fill out the rating form a second time after a two- to three-week interval. Because of other routine demands on teachers' time, counselors were asked to use their discretion in deciding whether to ask a teacher to fill out the inventory a second time. Five counselors declined to ask teachers, and the remaining five counselors asked only some teachers to fill out the form for only some of the subjects. In all, forms for 20 subjects were completed the second time. Prior to this second rating, teachers for five of these subjects had been inadvertently informed of the program's objectives and subject's treatment group membership.

Scoring Procedures

Problem-solving tests. This researcher scored all problem-solving tests for all subjects. All subjects were identified by code numbers prior to scoring. Code numbers were assigned by a third party who was not involved in any other way with this study. Two additional scorers were involved in scoring a random sample of 50 test sets in order to establish an inter-rater reliability for each test. A master's-level counselor scored the Means-End, Problem Identification/Consequences and Open Middle tests, while a Ph.D. counselor scored the Problem-Solving Process Test. Prior to scoring, these counselors reviewed the test structure, test purpose, scoring system format and process and previously scored sample tests.

Adjustment instrument. The Health Resources Inventory was scored with an exact factor computer scoring program devised for Ellis Gesten, the developer of the inventory. One subject was eliminated from the study when the majority of the items on the Health Resources Inventory were left blank by the rater. In 10 other cases, missing data was infrequent: eight of the 10 had one of the 54 items left blank, one had two items blank, and one subject had five items incomplete. Since the amount of missing data for these 10 subjects was minimal, it was decided not to eliminate them from the study. Instead, zero, or the most frequent score on the subject's inventory was supplied for missing data. In five of the 10 cases, zero was used;

four of these cases had one blank item, and one had five incomplete items. By using zero, a more conservative factor score would be produced since higher scores are considered to be more favorable. In the remaining five cases, one particular score on each subject's inventory was predominant across the inventory. In these cases that score was substituted for the missing data. Four of these cases involved one incomplete item, and one had two missing items.

Design

A posttest only control group design was used in this study (Campbell & Stanley, 1963).

$$R_2 \; X_1 \; O_1$$

$$R_1$$

$$R_2 \; X_2 \; O_2$$

R_1 = randomization; subjects were randomly selected from the population.

R_2 = randomization; subjects were randomly assigned to treatment and control conditions within schools stratified by sex.

X_1 = problem-solving treatment.

X_2 = career awareness control condition.

O_1 = posttest on problem-solving skills and adjustment for experimental subjects.

O_2 = posttest on problem-solving skills and adjustment for control subjects.

Analysis of Data

This section discusses the analysis procedures for six sets of data: (a) treatment effects; (b) reliabilities for

problem-solving instruments and the Health Resources Inventory; (c) inter-rater reliability for problem-solving subscales; (d) intra-rater (test-retest) reliability for the Health Resources Inventory factors; (e) intercorrelations among problem-solving subscales and the Health Resources Inventory factors; and (f) other validity data.

Method of Analysis: Treatment Effects

A multivariate analysis of variance was used to determine the effect of problem-solving training on 17 dependent variables. A fixed-effects model was used with treatment and sex as the two main effects. Nonorthogonal cells necessitated that the effect of sex be removed from the test of treatment as a main effect, and that the effect of treatment be removed from the test of sex as a main effect. The interaction effect between sex and treatment was also tested.

Univariate analysis of variance for individual dependent variables was also performed when the multivariate results indicated that this procedure was appropriate.

Data was analyzed with the University of Miami's MANOVA computer program.

Method of Analysis: Reliabilities for Problem-Solving Instruments

Coefficient alpha was generated for all problem-solving scales together, and for nine of the subscales alone. Establishing reliabilities for the three single item subscales was not possible. The SUMSCORE computer program developed

by C. Johnson of the University of Maryland was used for these analyses.

Method of Analysis: Reliability of the Health Resources Inventory

Coefficient alpha was calculated for the Health Resources Inventory. The SUMSCORE program was also used for this analysis.

Method of Analysis: Inter-Rater Reliability

Inter-rater correlation coefficients for all problem-solving subscales were calculated using the SPSS Pearson Correlation program.

Method of Analysis: Intra-Rater (Test-Retest) Reliability

Intra-rater correlation coefficients were calculated for the Health Resources Inventory factors using the SPSS Pearson Correlation program.

Method of Analysis: Intercorrelations Between Problem-Solving Subscales and the Health Resources Factors

Pearson product-moment correlations between problem-solving subscales, Health Resources factors and problem-solving subscales and Health Resources factors were calculated using the SPSS Pearson Correlation program.

Method of Analysis: Other Validity Data

Item product-moment correlations with the problem-solving scale as a whole, and item product-moment correla-

tions with individual subscales were calculated with the SUMSCORE computer program developed by C. Johnson of the University of Maryland.

Summary

This chapter has presented a description of subjects, assessment measures, procedures, design and analysis methods used in this study.

CHAPTER IV

RESULTS

Seven sets of results will be presented in this chapter: (a) multivariate and univariate analysis of variance tests related to the three research hypotheses; (b) internal consistency reliability data for the problem-solving subscales and the Health Resources Inventory; (c) inter-rater reliability data for the problem-solving subscales; (d) intra-rater (test-retest) reliability for the Health Resources Inventory factors; (e) intercorrelations between problem solving subscales and Health Resources Inventory factors; (f) other validity data; and (g) additional findings.

Tests of Hypotheses

Hypothesis #1

Ho: Experimentals and controls will have equal centroids on the set of 17 dependent variables.

Ha: Experimentals and controls will have unequal centroids on the set of 17 dependent variables.

In order to test this hypothesis, a multivariate analysis of variance was performed. As indicated in Table 1, the multivariate F was significant for treatment at the .001 level. These results suggest that it is appropriate to accept the alternate hypothesis.

Table 1

Multivariate Analysis of Variance for Treatment[a]

Source	df	F
Treatment	17, 137	42.227*

[a] n = 157

*p < .001

In order to explore the significance of individual variables, univariate analysis of variance for each of the 17 dependent variables was performed. Means and standard deviations for the problem-solving and adjustment variables by treatment group can be found in Tables 2 and 3, respectively.

In order to simplify the interpretation of the means and standard deviation tables for the problem-solving variables, the following description of the scale range for each problem-solving subscale is provided: conflict id. 0 to 2; feeling id. 0 to 2; goal id. 0 to 2; quantity of alternatives 0 to 24; alternative decision 0 to 2; quality of chosen alternative 0 to 4; quantity of consequences 0 to 24; quantity of M-E steps 0 to 16; quality of M-E steps 0 to 4; persistency 0 to 1; quantity of problem-solving steps 0 to 7; and sequence of problem-solving steps 0 to 1.

Table 4 depicts the univariate results for the 17 dependent variables. Nine of the 17 variables were sig-

Table 2

Means and Standard Deviations

For Problem-Solving Variables for Treatment

Problem-Solving Variables	Treatment Group			
	Experimental (n = 78)		Control (n = 79)	
	$\bar{X}$	SD	$\bar{X}$	SD
Conflict Id.	1.962	.194	1.646	.600
Feeling Id.	2.000	.000	1.886	.358
Goal Id.	1.705	.647	1.506	.677
Quantity of Alts.	9.423	2.965	7.873	2.835
Alternative Decision	1.744	.468	1.785	.472
Quality of Chosen Alternative	3.308	.984	3.367	1.052
Quantity of Cons.	8.936	4.040	7.076	3.257
Quantity of M-E Steps	5.718	2.772	4.646	2.788
Quality of M-E Steps	3.679	.730	3.418	.928
Persistency	.923	.268	.848	.361
Quantity of P.S. Steps	5.064	1.515	.089	.485
Sequence of P.S. Steps	.795	.406	.000	.000

Table 3

Means and Standard Deviations

For Adjustment Variables for Treatment

Adjustment Variables	Treatment Group			
	Experimental (n = 78)		Control (n = 79)	
	$\bar{X}$	SD	$\bar{X}$	SD
Good Student	2.737	1.087	2.742	.881
Gutsy	3.266	1.080	3.246	.922
Peer Sociability	4.734	1.013	4.405	.979
Rules	3.671	1.033	3.401	.974
Frustration Tolerance	3.151	.935	2.803	1.021

Table 4

Univariate Analysis of Variance

For Treatment for 17 Dependent Variables[a]

Variable	df	MS	F	p
Conflict Id.	1, 153	3.929	19.435	.001
Feeling Id.	1, 153	.516	8.036	.005
Goal Id.	1, 153	1.519	3.443	.065
Quantity of Alts.	1, 153	96.153	11.664	.001
Alternative Decision	1, 153	.069	.307	.580
Quality of Chosen Alternative	1, 153	.141	.134	.715
Quantity of Cons.	1, 153	136.037	10.004	.002
Quantity of M-E Steps	1, 153	44.613	5.736	.018
Quality of M-E Steps	1, 153	2.603	3.758	.054
Persistency	1, 153	.218	2.133	.146
Quantity of P.S. Steps	1, 153	971.807	763.085	.001
Sequence of P.S. Steps	1, 153	24.789	298.218	.001
HRI Good Student	1, 153	.003	.003	.956
HRI Gutsy	1, 153	.011	.011	.918
HRI Peer Sociability	1, 153	4.146	4.185	.043
HRI Rules	1, 153	2.655	2.797	.096
HRI Frustration Tolerance	1, 153	4.644	4.826	.030

[a] n = 157

nificant at the .05 level or less. Seven of these nine variables were problem-solving variables, and two of the nine were adjustment variables. The significant variables were: conflict identification; feeling identification; quantity of alternatives; quantity of consequences; quantity of means-end steps; quantity of problem-solving steps; sequencing of problem-solving steps; peer sociability; and frustration tolerance.

Hypothesis #2

Ho: Males and females will have equal centroids on the set of 17 dependent variables.

Ha: Males and females will have unequal centroids on the set of 17 dependent variables.

A multivariate analysis of variance was used to test this hypothesis. As indicated in Table 5, sex was not a significant main effect in the multivariate analysis. Further investigation of the significance of individual variables using a univariate analysis of variance procedure would have been inappropriate. Tables 6 and 7 present means and standard deviations for the 12 problem-solving and five adjustment dependent variables by sex.

Hypothesis #3

Ho: There will be interaction between sex and treatment for the set of 17 dependent variables.

Ha: There will be no interaction between sex and treatment for the set of 17 dependent variables.

Table 5

Multivariate Analysis of Variance for Sex[a]

Source	df	F
Sex	17, 137	1.221*

[a]n = 157

*p < .256

Table 6

Means and Standard Deviations

For Problem-Solving Variables for Sex

Problem-Solving Variables	Sex			
	Male (n = 80)		Female (n = 77)	
	$\bar{X}$	SD	$\bar{X}$	SD
Conflict Id.	1.812	.453	1.792	.496
Feeling Id.	1.962	.191	1.922	.315
Goal Id.	1.550	.710	1.662	.620
Quantity of Alts.	9.037	3.220	8.234	2.699
Alternative Decision	1.750	.516	1.779	.417
Quality of Chosen Alternative	3.325	1.077	3.351	.957
Quantity of Cons.	8.037	3.827	7.961	3.740
Quantity of M-E Steps	5.012	2.795	5.351	2.860
Quality of M-E Steps	3.438	.912	3.662	.754
Persistency	.875	.333	.896	.307
Quantity of P.S. Steps	2.55	2.723	2.571	2.765
Sequence of P.S. Steps	.387	.490	.403	.494

Table 7

Means and Standard Deviations

For Adjustment Variables for Sex

Adjustment Variables	Sex			
	Male (n = 80)		Female (n = 77)	
	$\bar{X}$	SD	$\bar{X}$	SD
Good Student	2.631	.984	2.852	.980
Gutsy	3.184	1.009	3.331	.992
Peer Sociability	4.449	1.024	4.692	.979
Rules	3.278	1.047	3.803	.901
Frustration Tolerance	2.877	1.027	3.077	.949

Again, a multivariate analysis of variance was used to test this hypothesis. Insignificant results suggest that the null hypothesis be retained. Table 8 presents the multivariate results; Tables 9 and 10 contain the means and standard deviations for the problem-solving and adjustment variables for the interaction effect.

Insignificant multivariate results indicate that univariate analysis of variance relative to the 17 dependent variables would have been inappropriate.

Table 8

Multivariate Analysis of Variance

For Interaction Between Treatment and Sex[a]

Source	df	F
Treatment X Sex	17, 137	.465*

[a] n = 157

*p < .964

Internal Consistency Reliability

Problem-Solving Instruments

Internal consistency reliability coefficients were calculated using all items from the four problem-solving tests combined into a single problem-solving scale, and using items comprising subscales within individual problem-solving tests.

Single problem-solving scale. When combining all items from all four problem-solving tests into a single problem-

Table 9

Means and Standard Deviations

For Problem-Solving Variables for Interaction

Problem-Solving Variables	Treatment X Sex							
	Experimental Males (n = 39)		Experimental Females (n = 39)		Control Males (n = 41)		Control Females (n = 38)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Conflict Id.	1.974	.160	1.949	.223	1.659	.575	1.632	.633
Feeling Id.	2.000	.000	2.000	.000	1.927	.264	1.842	.437
Goal Id.	1.641	.707	1.769	.583	1.463	.711	1.553	.645
Quantity of Alts.	10.154	2.952	8.692	2.830	7.976	3.134	7.763	2.509
Alternative Decision	1.744	.498	1.744	.442	1.756	.538	1.816	.393
Quality of Chosen Alternative	3.282	1.025	3.333	.955	3.366	1.135	3.368	.970
Quantity of Cons.	8.846	4.075	9.026	4.055	7.268	3.450	6.868	3.068
Quantity of M-E Steps	5.718	2.828	5.718	2.752	4.341	2.623	4.974	2.954
Quality of M-E Steps	3.615	.847	3.744	.595	3.268	.949	3.579	.889
Persistency	.897	.307	.949	.223	.854	.358	.842	.370
Quantity of P.S. Steps	5.108	1.392	5.026	1.646	.122	.640	.053	.226
Sequence of P.S. Steps	.795	.409	.795	.409	.000	.000	.000	.000

Table 10

Means and Standard Deviations

For Adjustment Variables for Interaction

Adjustment Variables	Treatment X Sex							
	Experimental Males (n = 39)		Experimental Females (n = 39)		Control Males (n = 44)		Control Females (n = 38)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Good Student	2.606	1.066	2.868	1.105	2.655	.913	2.835	.848
Gutsy	3.134	1.106	3.397	1.051	3.231	.919	3.263	.937
Peer Sociability	4.606	1.044	4.863	.978	4.301	.995	4.517	.962
Rules	3.459	1.130	3.883	.891	3.106	.943	3.720	.916
Frustration Tolerance	3.062	1.013	3.239	.855	2.702	1.023	2.911	1.022

solving scale, coefficient alpha equaled .742.

Subscales. Coefficient alpha was calculated for nine problem-solving subscales. Three subscales were omitted from this analysis because they were composed of single items. Table 11 contains the coefficient alpha correlation coefficients for each subscale. The coefficients ranged from .242 for alternative decision to .777 for quantity of consequences.

Health Resources Inventory

When using all items on the Health Resources Inventory, coefficient alpha equaled .989.

Inter-Rater Reliability

Problem-Solving Subscales

Pearson product-moment correlations for each problem-solving subscale are reported in Table 12. These correlations are based on a random sample of 50 sets of problem-solving tests. Each of the 50 subjects' tests were independently scored by two scorers. Correlations for all subscales ranged from .5906 to .9956. Correlations for those subscales showing a significant treatment effect ranged from .6539 to .9959.

Intra-Rater (Test-Retest) Reliability

Health Resources Inventory

Pearson product-moment correlation coefficients for each Health Resources Inventory factor based on two separate

Table 11

Coefficient Alpha for Problem-Solving Subscales[a]

Subscale	Coefficient Alpha
Conflict Identification	.468
Feeling Identification	.377
Goal Identification	.571
Quantity of Alternatives	.601
Alternative Decision	.242
Quality of Chosen Alternative	.654
Quantity of Consequences	.777
Quantity of Means-End Steps	.543
Quality of Means-End Steps	.565

[a] n = 158

Table 12

Inter-Rater Correlations for Problem Solving Subscales[a]

Subscale	Correlation Coefficient*
Conflict Identification	.7219
Feeling Identification	.6539
Goal Identification	.6877
Quantity of Alternatives	.8714
Alternative Decision	.6313
Quality of Chosen Alternative	.5906
Quantity of Consequences	.7886
Quantity of Means-End Steps	.8857
Quality of Means-End Steps	.7255
Persistency	.8435
Quantity of P.S. Steps	.9959
Sequence of P.S. Steps	.8253

[a] $n = 50$

*$p < .001$ for all correlation coefficients

ratings of 20 subjects by the same rater are reported in Table 13. Correlations for all factors ranged from .7781 to .9046. Correlations for the two factors showing a significant treatment effect were .7887 (peer sociability) and .7781 (frustration tolerance).

Intercorrelations Between Problem-Solving Subscales and Health Resources Inventory Factors

Pearson product-moment correlation coefficients for problem-solving subscales ranged from -.1824 to .8616. The majority of the correlations between subscales were low and fell within a range of $\pm$.0001 to $\pm$.1999. Several subscales, however, were more strongly related. These were: quantity of means-end steps with quality of means-end steps (.4597); quantity of means-end steps with quantity of consequences (.4792); quantity of means-end steps with quantity of alternatives (.4172); quantity of consequences with quantity of alternatives (.6011); alternative decision with quality of chosen alternative (.8543); and quantity of problem-solving steps with sequence of problem-solving steps (.8616). The intercorrelation matrix for these subscales can be found in Appendix O.

Intercorrelations Between Health Resources Inventory Factors

Pearson product-moment correlation coefficients for factors of the Health Resources Inventory ranged from .2776 to .7137. Good Student and Gutsy showed the strongest relationship (.7137) and Rules and Gutsy the least (.2776). The

Table 13

Intra-Rater Correlations

For Health Resources Inventory Factors[a]

Factor	Correlation Coefficient*
Good Student	.9046
Gutsy	.8788
Peer Sociability	.7887
Rules	.8069
Frustration Tolerance	.7781

[a] n = 20

*p < .001 for all correlation coefficients

intercorrelation matrix containing these factors can be found in Appendix O.

Intercorrelations Between the Problem-Solving Subscales and the Health Resources Inventory Factors

Pearson product-moment correlation coefficients for problem solving-subscales and factors of the Health Resources Inventory ranged from -.0143 to .2626. The majority of coefficients were low, and fell within a range of ±.0001 to ±.1999. Appendix O contains the intercorrelation matrix for these variables.

Other Validity Data

Product-moment correlations of problem-solving items with the problem-solving subscales combined into a single scale are reported in Appendix P. These correlations ranged from .027 to .761. The majority of the item correlations fell within a high to moderately high range of .300 to .800, or a moderate range of .200 to .299.

Product-moment correlations were also calculated between problem-solving items and the problem-solving subscales containing those items. These correlations ranged from .532 to .915 and are reported in Appendix Q.

Additional Findings

The spontaneous comments of teachers and parents about the social problem-solving program provided an informal data source. In all instances, these comments were positive.

One parent observed "overwhelming" change in her

daughter's ability to solve problems for herself. Another parent requested more information about the problem-solving steps after overhearing her child's verbalization of the steps when solving a problem.

After being informed of the program's objectives and children's group membership, some teachers reported observ- ing children's use of the problem-solving steps in the classroom and, in some instances, commented that the impul- sive nature of specific children had changed. Some teachers also requested more information about the problem-solving program.

A counselor also stated that future counseling with children who have the problem-solving skills as part of their cognitive-behavioral repertoire would be more produc- tive.

Summary

This chapter reported seven sets of results related to this study. The most important finding pertains to the significant relationship between social problem-solving ability and two adjustment factors. The effect of treatment on problem-solving skills is also an important result. Additional data pertaining to instrument reliability and validity, rater-reliability and informal findings were also presented.

Chapter V focuses on implications of these findings, limitations of the study, and directions for future research.

CHAPTER V

DISCUSSION

This section addresses the following points: a) the purpose of the study; b) a summary of major findings; c) a summary of additional findings; d) general conclusions; e) reliability findings; f) a discussion of the study's limitations; g) suggestions for future research; and h) implications for practice.

Purpose of the Study

The purpose of this study was to teach investigate the cause and effect relationship between social problem-solving ability and adjustment. Twelve problem-solving dependent variables and five adjustment dependent variables were measured at the conclusion of a problem-solving treatment program. The problem-solving variables were: conflict identification; b) feeling identification; c) goal identification; d) quantity of alternatives; e) alternative decision; f) quality of chosen alternative; g) quantity of consequences; h) quantity of means-end steps; i) quality of means-end steps; j) persistency; k) quantity of problem-solving steps; and l) sequencing of problem-solving steps. The factors of the Health Resources Inventory constituted the adjustment variables. These factors were: a) good

student; b) gutsy; c) rules; d) peer sociability; and e) frustration tolerance.

Major Findings

The major findings of this study are discussed in two sections: a) the effect of problem-solving training on problem-solving behavior, and b) the relationship between social problem-solving ability and adjustment.

The Effect of Problem-Solving Training on Problem-Solving Behavior

According to the problem-solving theory of Spivack, Platt and Shure (1976), it is possible to teach children a set of interpersonal cognitive problem-solving skills for use in problematic situations.

The results of this study affirm this theoretical perspective. More specifically, after completing a social problem-solving training program, experimental subjects were found to be significantly different from control subjects on seven problem-solving variables. These variables were a) feeling identification; b) conflict identification; c) quantity of alternatives; d) quantity of consequences; e) quantity of means-end steps; f) quantity of problem-solving steps; and g) sequencing of problem-solving steps.

For the most part, these problem-solving results are consistent with the findings of other researchers. The ability to identify a number of alternative solutions to a particular problem was found to have been significantly

affected by training in this and other studies (Allen et al., 1976; Camp et al., 1977; Elardo & Caldwell, 1979; Gesten et al., 1982; McClure, 1975; Rains, 1978; Russell & Roberts, 1979; Shure & Spivack, 1975a, 1975b; Stone et al., 1975; Stone & Noce, 1980; Weissberg, 1980; Weissberg et al., 1981b).

Like Allen et al. (1976), McClure (1975), Shure and Spivack (1975a, 1975b), and Weissberg (1980), this study was also successful in training means-end thinking.

Past research has had mixed results regarding the effect of training on consequential thinking and the ability to identify problems. Most studies' findings support a positive training effect for consequential thinking (Gesten et al., 1982; Rains, 1978; Russell & Roberts, 1979; Shure & Spivack, 1975a 1975b; Weissberg, 1980), but others failed to find a significant difference between experimentals and controls for this skill (Allen et al., 1976; McClure, 1975). The results from this study add additional support to the trainability of consequential thinking.

Previous research has offered less support to the premise that problem-solving training can affect students' problem identification ability. Some studies have found a positive training effect (Allen et al., 1976; Weissberg, 1980) while others have not (Gesten et al., 1982; McClure, 1975; Rains, 1978; and Russell & Roberts, 1979). Various reasons were discussed in the review of literature for this disparity. This study's results support the findings of

Allen et al. (1976) and Weissberg (1980). Similarity of treatment and assessment may account for this study's consistency with Weissberg's findings.

This study also found a positive effect for feeling identification. Few studies have assessed the effect of social problem-solving training on this variable. Weissberg (1980) did measure this variable, but failed to find a significant difference between experimentals and controls. The inconsistency of these results is puzzling since the treatment materials for both studies were similar. A possible explanation may rest in Weissberg's failure to randomly assign subjects to treatment condition. An additional consideration is difference in testing procedure. This study used a revised form of the Problem-Identification/Consequences Test. The original version of this test was used by Weissberg. A major difference between these two forms of the test is the administration format. In the form used in this study, subjects were specifically asked to identify the feelings of the protagonist in the presented story. In the original version of the test, subjects are not directly asked to specify feelings, but only to specify what the problem is in the story. The expectation of a feeling response is not represented clearly to the subject. Consequently, although the subject may have been taught to identify feelings as part of Weissberg's training program, the skill may not have been measured adequately.

Like Gesten et al. (1982) and Weissberg (1980), experi-

mental subjects in this study related more problem-solving principles than controls.

Variables stressing quality of response (quality of means-end steps and quality of chosen alternative) were not significant in this study. This result was not entirely unexpected since these dimensions were not a component of the treatment package.

The persistency and alternative decision variables were also not significant in this study. Although taught as part of the problem-solving curriculum, these variables received less emphasis.

These results are critical to the second but most important investigation undertaken in this study, which is the relationship between social problem-solving ability and adjustment. If one wants to ascertain that if children who are taught specific problem-solving skills are rated as more adjusted by teachers, then verification that the skills have been taught is imperative. These results supply that verification.

The Relationship Between Social Problem-Solving Ability and Adjustment

According to Mahoney (1974), man's cognitions are an important variable in understanding and changing his behavior. Problem-solving training represents a specific cognitive intervention which some feel not only facilitates more effective behavior but also plays a critical role in

healthy adjustment (D'Zurilla & Goldfried, 1971; Gesten et al., 1978; Jahoda, 1953).

This cognitive-behavioral link has been supported by various research efforts. More specifically, studies have demonstrated that children who participated in a social problem-solving training program also improved in adjustment (Elardo & Caldwell, 1979; Shure, 1980; Shure & Spivack, 1975a 1975b; Weissberg, 1980; Weissberg et al., 1981b). The findings of this study also support this position. In this study, problem-solving ability was shown to be significantly related to two of five adjustment variables. More precisely, experimentals were rated more positively than controls on peer sociability and frustration tolerance. Of the five Health Resources Inventory factors, it seems these typify the type of adjustment characteristic one would expect to be affected by social problem-solving training.

Use of varied assessment instruments has complicated a study-by-study comparison of adjustment results. Two studies, however, have used the factors of the Health Resources Inventory as adjustment dependent variables (Gesten et al., 1982; Weissberg, 1980). Although these studies demonstrated a positive treatment effect for various problem-solving skills, they failed for the most part to provide strong evidence in support of a positive relationship between adjustment and problem solving.

Gesten et al. (1982) reported a significant effect for frustration tolerance for experimentals over controls at a

one-year follow-up. This difference was not evident immediately following treatment.

Weissberg (1980) found a significant difference for the good student factor, but in this case controls were rated higher than experimentals. Because of staffing changes during the course of his program, Weissberg also conducted a reduced sample analysis using only subjects whose teachers had completed both the pre and posttesting forms. In this analysis, three factors showed a significant effect: gutsy, frustration tolerance, and rules.

The significant effect that the present study found for treatment on frustration tolerance is consistent with Gesten et al.'s (1982) follow-up results and Weissberg's (1980) work. This study's impact on peer sociability, however, stands alone. Again, non-random assignment of subjects to treatment condition in the former studies may account for this disparity. Additionally, the fact that teachers were aware of program objectives and subjects' group membership prior to completing ratings, may have introduced error into Gesten et al.'s initial findings and Weissberg's results. Teachers' personal beliefs about which items on the Health Resources Inventory should or should not be influenced by problem-solving training may have biased their ratings. This potential for error was controlled in the present study by having teachers remain unaware of program objectives and students' group membership prior to completing the rating forms.

In summation, we may conclude on the basis of this study's adjustment results, that the theoretical perspective which links social problem-solving ability to adjustment continues to be tenable. Ratings of adjustment, however, are not in the purest sense the most accurate means of assessing overt behavior. Nevertheless, they do represent an acceptable beginning. Additional studies which use other means of assessment are imperative to further clarify this viewpoint.

Additional Findings

Sex Effect

The overall multivariate F for sex was not significant. This suggests that no difference existed for males and females on the set of dependent variables. Univariate analsis of variance for each variable would have been inappropriate and was, therefore, not conducted. Few studies have investigated sex as a main effect. Weissberg (1980), however, did look at sex as an independent variable, and his results also failed to find sex to be a significant main effect.

Interaction Effect: Sex X Treatment

The overall multivariate F for interaction was not significant. This result was expected, although previous research has not focused on this issue.

General Conclusions

It can be concluded from the results of this study that a social problem-solving training program can significantly affect problem-solving skills and, more importantly, that problem-solving ability relates to adjustment. We can further conclude that treatment effects are similar for males and females.

Reliability Findings

Internal Consistency Reliability

Coefficient alphas were calculated for all problem-solving subscales and for all problem-solving items combined into a single problem-solving scale. The coefficient alpha for all items together (.742) suggests that these items are strongly intercorrelated and thus a consistent measure of a common characteristic. This is also a valid premise for most problem-solving subscales (conflict identification, goal identification, quantity of alternatives, quality of alternatives, quantity of consequences, quantity of means-end steps, and quality of means-end steps) in which subscale coefficients ranged from. 468 to .777. The reliability of subscales with lower coefficients (feelings identification, .377, and alternative decision, .242) is questionable.

Inter-Rater Reliability

Pearson product-moment correlations were calculated for each problem-solving subscale based on the scoring of two independent raters. These correlation coefficients fell

within a range of .5906 and .9959; the majority fell within the moderately high range of .7000 to .8999. This suggests that for the most part the scoring criteria were consistently applied to subjects' responses, but that some instability was present. The subjectivity of the scoring system may account for some of this variation.

Intra-Rater (Test-Retest) Reliability

Since it was impossible to have two different teachers rate the same student at the same time on the Health Resources Inventory, the same teacher rated the same child a second time a short period after the first rating. Correlation coefficients for each of the factors of the Health Resources Inventory ranged from .7781 to .9046. Correlations for four of the five factors fell within the moderately high range of .7781 to .8999. This suggests that for the most part teachers' ratings are consistent over time, but correlations were not high enough to rule out some inconsistency. This may be accounted for by a change in students over the two- to three-week interim between ratings, or by the fact that some teachers inadvertently became aware of the program objectives and students' group membership prior to performing the second rating.

Limitations

This study has the following limitations:

Test Administrator Bias

The counselors who conducted the treatment program and

were consequently aware of subjects' group membership were also responsible for the problem-solving posttesting of a large portion of the subjects. It is assumed that these counselors followed the given standardized testing procedure, but the possibility exists that the test administrators were biased. Counselors' unfamiliarity with the scoring procedures for the various problem-solving tests is an additional factor which decreases the likelihood of a testing bias.

Ideally, people unfamiliar with the subjects' group membership should perform the posttesting. This, however, was not possible for this study due to time and school system restraints.

Generalizability

Since the academically low and behaviorally disruptive students were screened from the third-grade class lists prior to sampling, this study's results may not be generalized to those subgroups.

In addition, the purely cognitive nature of the training and assessment procedures raises questions as to whether or not problem-solving skills generalize to real-life problem-situations.

Instrumentation

The stories comprising the social problem-solving tests are a representative sample of possible stories children could be given. If different stories were used it is not clear that results would be the same.

Suggestions for Future Research

Suggestions for future research are discussed as they relate to population, treatment and assessement.

Population

Subjects used in this study were drawn from a normal third-grade population. Atypical students were eliminated from the sampling pool. Future research should focus on determining the effects of problem-solving training on small groups of behaviorally disruptive students, as well as those students experiencing academic deficiencies. If significant treatment effects were observed in problem-solving ability and behavioral adjustment between groups of "normal" children, then the expected difference should be even greater for those subjects having a greater potential for change.

Future research may also want to focus on the impact of social problem-solving training programs for different age groups.

Treatment

Although the treatment package used in this study was effective, it is hypothesized that the difference between groups would be even greater if the following curriculum changes were made: First, more lesson time should be spent on allowing children to discuss personal interpersonal problems, and then as a group use the problem-solving steps to "solve" the problem. Second, more time should be used to

allow children to discuss their use of the problem-solving steps with problems they have encountered outside of the group. Third, problem situations should be staged by the group leader as part of various group lessons to allow for spontaneous problem solving within the group. These changes involve real-life problem solving, as opposed to a more purely cognitive treatment program. An approach which integrates both components may be optimal.

In implementing these three changes, the actual problem-solving steps would need to be introduced to the students at an earlier point in the curriculum. Additional studies could compare the effectiveness of the revised curriculum with the original version.

Future research efforts may also focus on investigating the effects of problem-solving training in a study which uses a no-treatment control group. The findings of the current study are conservative; the control group did meet with the counselor for the same period of time as the experimental group although with a different focus. Some changes, however, could be expected in the control subjects merely as an effect of group dynamics, or as an effect of counselor attention. Although care was taken to screen from use materials related in any way to problem solving, the counselors' familiarity with the problem-solving process may have subtly affected interaction patterns.

Assessment

Although the reliability of the problem-solving instru-

ments was investigated as part of the present study, validity questions remain. A principle components analysis of the battery of problem-solving subscales is a critical next step.

Effort should also be made to develop a more formal procedure for collecting parent and teacher responses to the social problem-solving program. Input from both of these sources regarding subjects' problem-solving behavior is an important means for beginning to determine the generalizability of this behavior. Survey instruments and/or problem-solving behavior rating forms for both groups could be developed.

The collection of problem-solving and adjustment pretest data is an additional recommendation for future research efforts. Subjects could be selected for program participation based on need as identified by pretest scores. Subjects may also be grouped for purpose of analysis based on high, medium or low pretest scores in order to ascertain for which of these three group training was most effective.

Future studies emphasizing a long-term follow-up are also imperative. The complexity of the cognitive process involved in problem-solving suggests that immediate results may be less significant than those collected by at six- to 12-month intervals.

Implications for Practice

From a theoretical perspective, this study made a significant impact on a complex cognitive process in a relatively short period of time. From an evaluative standpoint,

however, additional studies are needed to determine if this is the most efficient way to develop problem-solving skills.

Several evaluative studies could be designed to compare varied training strategies. Some possibilities might include infusing problem-solving lessons within the regular curriculum so that problem solving is taught throughout the academic year; development of an on-going K-6 problem-solving curriculum; training school staffs to model the problem-solving steps by "thinking aloud" when helping to resolve in-school problems; creation of problem-solving step displays in classrooms and hallways as visual reminders; or by continuing to train small groups of students but also teach students how to help others learn the skills.

This study's major interest was whether or not problem-solving ability related to adjustment. The positive adjustment results of this study suggest a cause and effect relationship exists between problem-solving ability and adjustment. This is not to say, however, that problem solving ability is the only factor contributing to the healthy adjustment of children. Academic success, positive feelings of self-worth, and social acceptance are additional examples of such elements. The implications of these results for schools, however, are important. If schools charge themselves with providing programs to facilitate the development of the total child, then the value of problem-solving as a life skill which contributes positively to adjustment cannot be denied.

APPENDIX A

KEYS' REVISED FORM OF THE ROCHESTER MEANS-END PROBLEM SOLVING TEST

#1

Evaluator's Name _____

Child's Name _____

Teacher's Name _____

Date _____

School _____

KEYS' REVISED FORM OF THE R-MEPS

(FOR MALES ONLY)*

Evaluator Says:

"I'M INTERESTED IN THE WAY CHILDREN LIKE YOU THINK ABOUT THINGS. WHAT WE ARE GOING TO DO IS NOT A TEST. IN OTHER WORDS, THERE ARE NO RIGHT OR WRONG ANSWERS. OKAY? WHAT YOU ARE GOING TO DO IS MAKE UP SOME STORIES AND I'M GOING TO HELP YOU. I WILL BEGIN EACH STORY FOR YOU BY TELLING ABOUT A PROBLEM SOMEONE IS HAVING. I WILL READ TO YOU WHAT THE PROBLEM IS, AND HOW THE PERSON IN THE STORY DECIDES TO SOLVE HIS PROBLEM. WHAT I WANT YOU TO DO IS MAKE UP THE PART OF THE STORY THAT TELLS ME WHAT THE STORY CHARACTER MUST DO TO GET HIS IDEA TO WORK.

"WHAT YOU SAY IS IMPORTANT TO ME, SO SPEAK SLOWLY."

*The female form of this test is exactly the same except for the use of female names and pronouns.

REVISED R-MEPS STORY #1

HERE'S THE FIRST STORY:

"AL HAS JUST MOVED INTO THE NEIGHBORHOOD. HE DOESN'T KNOW ANYONE AND FEELS VERY LONELY. AL WANTS TO MAKE FRIENDS. AL DECIDES TO MAKE FRIENDS BY ASKING THE OTHER KIDS IF HE CAN PLAY. TELL ME WHAT AL MUST DO IF ASKING THE OTHER KIDS IS GOING TO WORK."
(Evaluator may repeat the story if necessary.)
(Pause)

(If in doubt about child's being finished, ask, "ARE YOU THROUGH?")
(Compliment the child's efforts--say something like, "KEEP UP THE GOOD WORK!")

REVISED R-MEPS STORY #2

ERIC BORROWED HIS TEACHER'S FAVORITE MARKING PEN AND LOST IT. ERIC IS UPSET THAT HE LOST THE TEACHER'S FAVORITE PEN. HE DECIDES TO BUY THE TEACHER A NEW ONE. TELL ME WHAT ERIC MUST DO IF THIS IDEA IS GOING TO WORK.
(Evaluator may repeat the story if necessary.)
(Pause)

(After the child completes his response, offer an obstacle as indicated on the next page.)

Obstacle to Revised R-MEPS Story #2

YOU SAID THAT ERIC WOULD _____.
(Repeat the most important element in the child's story. For example: "YOU SAID THAT ERIC WOULD BUY A NEW PEN AT THE STORE.")

WHAT IF _____? (Present a specific obstacle; for example: "WHAT IF WHEN ERIC GETS TO THE STORE HE FINDS THE STORE HAS CLOSED EARLY."

(Only if there is no response, say:) WHAT IF _____?
THEN WHAT MIGHT HAPPEN?

(Again, praise the child's efforts; for example: "THANKS A LOT," [child's name]. "YOU REALLY CAME UP WITH SOME GOOD STORIES AND HELPED ME OUT A LOT.")

APPENDIX B

A REVISED FORM OF THE
PROBLEM IDENTIFICATION/CONSEQUENCES TEST

Child's Name _____

Teacher's Name _____

Date _____

School _____

Evaluator's Name _____

A REVISED FORM OF THE

PROBLEM IDENTIFICATION/CONSEQUENCES TEST

(FOR MALES ONLY)*

Evaluator Says:

"WHAT WE'RE GOING TO BE DOING NOW IS LOOKING AT SOME PICTURES AND I'M GOING TO BE ASKING YOU SOME QUESTIONS SO I CAN GET YOUR IDEAS. THIS IS NOT A TEST, SO THERE ARE NO RIGHT OR WRONG ANSWERS."

(Pause briefly to be sure child understands.)

"WHAT YOU SAY IS IMPORTANT TO ME, SO PLEASE SPEAK SLOWLY."

General Notes:

In the consequences section of this test, if the child offers a single-chained story and not discrete consequences, record the entire response, draw a line under the story and offer the appropriate chainbreaker (refer to bottoms of pages). Record subsequent responses below the line. Only one chainbreaker per story should be offered.

*The female form of this test is exactly the same except for the use of female names and pronouns.

(Select appropriate 3-card sequence.)

"FIRST I'M GOING TO SHOW YOU A PICTURE ABOUT SOME CHILDREN." (Show first picture of 3-card sequence.) "IT WAS ROBERT'S (point) TURN TO BE FIRST IN THE LUNCH LINE, AND JIMMY (point) TRIED TO GET IN FRONT OF HIM."

"I WANT YOU TO LOOK AT THIS CAREFULLY AND TELL ME WHAT YOU THINK IS GOING ON. WHAT DO YOU THINK IS HAPPENING IN THIS PICTURE?"

"CAN YOU TELL ME WHAT THE PROBLEM IS IN THIS STORY?"

If the child does not include a feeling component for Robert in his previous answers, ask: "HOW DO YOU THINK ROBERT FEELS?"

If the child has not specified a goal in his previous responses, ask: "HOW DO YOU THINK ROBERT WANTS THINGS TO END UP?"

Record the child's responses and judge the quality before proceeding.

A If the child's responses indicate an understanding of the problem situation, say: "YES, IT LOOKS LIKE ROBERT WAS MAD BECAUSE JIMMY TRIED TO GET IN FRONT OF HIM IN THE LUNCH LINE, AND HE ALSO HAD TO DECIDE WHAT TO DO."

B If the child's responses indicate no understanding or a misunderstanding of the problem situation, say: "YOU'VE TOLD ME SOME OF THE THINGS THAT COULD BE GOING ON, BUT I GUESS THERE IS ONE OTHER THING IT COULD BE. IT KIND OF LOOKS LIKE ROBERT IS MAD BECAUSE JIMMY TRIED TO GET IN FRONT OF HIM IN THE LUNCH LINE, AND HE ALSO HAD TO DECIDE WHAT TO DO. DO YOU SEE THAT?" (If the child says, "NO" or gives some other indication that he does not understand, paraphrase the picture description and the problem statement and proceed.)

"THIS PICTURE SHOWS WHAT ROBERT DECIDED TO DO." (Show second picture of 3-card sequence while keeping the first picture visible.) "HE TOLD JIMMY TO GET BACK IN PLACE SINCE IT WASN'T HIS TURN TO BE FIRST."

"WHAT I'D LIKE YOU TO DO IS (show third picture of 3-card sequence while keeping the first and second pictures visible) TELL ME ALL THE DIFFERENT THINGS THAT COULD HAPPEN NEXT, AFTER ROBERT TOLD JIMMY TO GET BACK IN PLACE."

"ARE YOU THROUGH?"

Chainbreaker: "THAT'S AN INTERESTING STORY YOU TOLD ME. BUT REMEMBER, I'D LIKE YOU TO TELL ME ALL THE DIFFERENT THINGS THAT COULD HAPPEN NEXT, AFTER ROBERT TOLD JIMMY TO GET BACK IN PLACE."

Probe PID/CONS #1 MALE

"OKAY, THOSE WERE SOME THINGS THAT COULD HAVE HAPPENED. REMEMBER, THE OBJECT OF THIS GAME IS TO THINK OF LOTS OF DIFFERENT THINGS THAT COULD HAPPEN NEXT. WHAT OTHER THINGS CAN YOU THINK OF THAT MIGHT HAPPEN NEXT, AFTER ROBERT TOLD JIMMY TO GET BACK IN PLACE?"

Praise the child's efforts by saying: "YOU'RE DOING FINE. YOU REALLY HAVE A LOT OF IDEAS."

(Select appropriate 3-card sequence.)

"NOW I'M GOING TO SHOW YOU ANOTHER PICTURE ABOUT SOME CHILDREN." (Show first picture of 3-card sequence.) "DAVE (point) WAS SHARPENING HIS PENCILS WHEN HE SAW TED EAT THE CUPCAKE DAVE HAD BROUGHT FOR HIS SNACK."

"I WANT YOU TO LOOK AT THIS CAREFULLY AND TELL ME WHAT YOU THINK IS GOING ON. WHAT DO YOU THINK IS HAPPENING IN THIS PICTURE?"

"CAN YOU TELL ME WHAT THE PROBLEM IS IN THIS STORY?"

If the child does not include a feeling component for Dave in his previous answer, ask: "HOW DO YOU THINK DAVE FEELS?"

If the child has not specified a goal in his previous responses, ask: "HOW DO YOU THINK DAVE WANTS THINGS TO END UP?"

Record the child's responses and judge the quality before proceeding.

A If the child's responses indicate an understanding of the problem situation, say: "YES, IT LOOKS LIKE DAVE WAS UPSET BECAUSE TED ATE THE CUPCAKE DAVE HAD BROUGHT FOR SNACK, AND HE ALSO HAD TO DECIDE WHAT TO DO."

B If the child's responses indicate no understanding or a misunderstanding of the problem situation, say: "YOU'VE TOLD ME SOME OF THE THINGS THAT COULD BE GOING ON, BUT I GUESS THERE IS ONE OTHER THING IT COULD BE. IT KIND OF LOOKS LIKE DAVE IS UPSET BECAUSE TED ATE THE CUPCAKE DAVE HAD BROUGHT FOR SNACK AND HE HAD TO DECIDE WHAT TO DO. DO YOU SEE THAT?" (If the child says, "NO" or gives some other indication that he does not understand, paraphrase the picture description and the problem statement and proceed.)

"THIS PICTURE SHOWS WHAT DAVE DECIDED TO DO." (Show second picture of 3-card sequence while keeping the first picture visible.) "HE TOLD TED 'YOU'D BETTER GIVE ME SOMETHING IN RETURN OR I'LL PUNCH YOU'."

"WHAT I'D LIKE YOU TO DO IS (Show third picture of 3-card sequence while keeping the first and second pictures visible) TELL ME ALL THE DIFFERENT THINGS THAT COULD HAPPEN NEXT, AFTER DAVE SAID, 'GIVE ME SOMETHING IN RETURN OR I'LL PUNCH YOU'."

"ARE YOU THROUGH?"

Chainbreaker: "THAT'S AN INTERESTING STORY YOU TOLD ME. BUT REMEMBER, I'D LIKE YOU TO TELL ME ALL THE DIFFERENT THINGS THAT COULD HAPPEN NEXT, AFTER DAVE SAID, 'GIVE ME SOMETHING IN RETURN OR I'LL PUNCH YOU'."

"OKAY, THOSE WERE SOME THINGS THAT COULD HAVE HAPPENED. REMEMBER, THE OBJECT OF THIS GAME IS TO THINK OF LOTS OF DIFFERENT THINGS THAT COULD HAPPEN NEXT. WHAT OTHER THINGS CAN YOU THINK OF THAT MIGHT HAPPEN NEXT, AFTER DAVE SAID, 'GIVE ME SOMETHING IN RETURN OR I'LL PUNCH YOU'?"

Praise the child's efforts by saying: "I THINK IT'S GREAT YOU'RE WORKING SO WELL."

APPENDIX C

OPEN-MIDDLE INTERVIEW

Evaluator's Name _____

Child's Name _____

Teacher's Name _____

Date _____

School _____

OPEN-MIDDLE INTERVIEW

(FOR MALES ONLY)*

Evaluator Says:

"NOW LET'S LOOK AT SOME OTHER PICTURES. REMEMBER THIS IS NOT A TEST, SO THERE ARE NO RIGHT OR WRONG ANSWERS."

Pause briefly to make sure the child is paying attention and understanding you.

"WHAT YOU SAY IS IMPORTANT TO ME, SO SPEAK SLOWLY."

GENERAL NOTES:

--If the child offers a single-chained story and not discrete solutions, record his entire response, draw a line under the story and offer the appropriate chainbreaker (refer to bottoms of pages). Record subsequent responses below the line and on the back of the page, if necessary. Only one chainbreaker per story should be offered.

--Each successive prompt is to be given after a 10-second period of no response or when a child indicates he is through responding.

--When 12 responses have been given for any one story, acknowledge the child's productivity by saying: " I CAN SEE YOU REALLY HAVE A LOT OF IDEAS," and then ask for the solution choice (Prompt #3).

*The female form of this test is exactly the same except for the use of female names and pronouns.

(Show only first card of the OM #1 male set of pictures.) "FIRST, I'M GOING TO SHOW YOU A PICTURE. (pause)

"PAT (point) WAS HOPING TO TAKE THE CLASS GERBIL HOME OVER THE WEEKEND, WHEN CHRIS (point) CAME UP AND SAID THAT HE WANTED TO TAKE THE GERBIL HOME, TOO. THIS MADE PAT UPSET BECAUSE HE REALLY WANTED TO TAKE THE GERBIL HOME."

(Show both cards and point to the second.)

"I'D LIKE YOU TO TELL ME ALL THE DIFFERENT THINGS PAT COULD DO TO TAKE THE GERBIL HOME."

Chainbreaker: THAT'S AN INTERESTING STORY YOU TOLD ME, BUT REMEMBER, I'D LIKE YOU TO TELL ME LOTS OF DIFFERENT WAYS THAT PAT COULD SOLVE HIS PROBLEM.

Prompt #1: "OKAY! YOU'RE DOING WELL. TELL ME ALL THE DIFFERENT THINGS YOU CAN THINK OF--EVERYTHING THAT PAT COULD DO TO TAKE THE GERBIL HOME."

Prompt #2: "TELL ME, (child's name), IF NONE OF THESE THINGS WORKED (if that didn't work), WHAT ELSE COULD PAT DO TO TAKE THE GERBIL HOME?

Prompt #3: "OKAY, NOW I'D LIKE TO KNOW WHICH ONE OF ALL OF THESE IDEAS YOU WOULD TRY IF YOU WERE PAT."

(The evaluator is permitted to read the child's aforementioned responses.)

(Praise the child's efforts before proceeding.)

"LET'S TAKE A LOOK AT SOME OTHER PICTURES. (Show only first card of the OM #2 male set of pictures.)

"JERRY (point) JUST GOT HIS HAIR CUT, AND AARON (point) THOUGHT IT LOOKED FUNNY SO HE BEGAN TO MAKE FUN OF HIM. JERRY (point) FELT UPSET BECAUSE HE DIDN'T WANT TO BE TEASED ANYMORE."

(Show both cards and point to the second.)

"I'D LIKE YOU TO TELL ME ALL THE DIFFERENT THINGS THAT JERRY COULD DO SO THAT HE WOULDN'T BE TEASED ANYMORE."

Chainbreaker: "THAT'S AN INTERESTING STORY YOU TOLD ME. BUT REMEMBER, I'D LIKE YOU TO TELL ME LOTS OF DIFFERENT WAYS THAT JERRY COULD SOLVE HIS PROBLEM."

Prompt #1: "OKAY! YOU'RE DOING WELL. TELL ME ALL THE DIFFERENT THINGS YOU CAN THINK OF--EVERYTHING THAT JERRY COULD DO SO THAT HE WOULDN'T BE TEASED ANYMORE."

Prompt #2: "TELL ME, (child's name), IF NONE OF THESE THINGS WORKED (if that didn't work), WHAT ELSE COULD JERRY DO SO THAT HE WOULDN'T BE TEASED ANYMORE?

Prompt #3: "OKAY, NOW I'D LIKE TO KNOW WHICH ONE OF ALL OF THESE IDEAS YOU WOULD TRY IF YOU WERE JERRY."

(The evaluator is permitted to read the child's aforementioned responses.)

APPENDIX D

PROBLEM-SOLVING PROCESS TEST

Evaluator's Name _____

Child's Name _____

Teacher's Name _____

Date _____

School _____

PROBLEM-SOLVING PROCESS TEST (PSP)

Evaluator Says:

"TELL ME ALL OF THE STEPS YOU WOULD FOLLOW WHEN YOU HAVE A PROBLEM?"

Record the child's response below.

APPENDIX E

HEALTH RESOURCES INVENTORY

Health Resources Inventory I

Child's Name _____ Child's Sex _____ Date _____

School _____ Counselor's Name _____ Teacher's Name _____

Please rate each of the listed behaviors according to how well it describes the child

1 = not at all 2 = a little 3 = moderately well 4 = well 5 = very well

___functions well even with distractions
___feels good about himself or herself
___applies learning to new situations
___has a good sense of humor
___is interested in schoolwork
___shares things with others
___is well-behaved in school
___is mature
___approaches new experiences confidently
___is a happy child
___does original work
___can accept things not going his way
___is pleased with his accomplishments
___defends his views under group pressure
___mood is balanced and stable
___resolves peer problems on his own
___copes well with failure
___follows class rules
___participates in class discussions
___is able to question rules that seem unfair or unclear to him
___uses teacher appropriately as resource
___is affectionate toward others
___is generally relaxed
___is a self-starter
___plays enthusiastically
___completes his homework
___has a lively interest in his environment
___anger, when displayed, is justified
___is trustworthy
___works well without adult support
___expresses ideas willingly
___carries out requests and directions responsibly
___uses his imagination
___well liked by classmates
___is good in arithmetic
___tries to help others
___is well-organized
___faces the pressures of competition well
___has many friends
___works up to potential
___thinks before acting
___accepts legitimate imposed limits
___knows his or her strengths and weaknesses
___adjusts well to changes in the classroom routine
___expresses needs and feelings appropriately
___accepts criticism well
___is a good reader
___is comfortable as a leader and follower
___functions well in unstructured situations
___is spontaneous
___works well toward long-term goals
___works for own satisfaction, not just rewards
___rarely requires restrictions or sanctions
___is polite and courteous

APPENDIX F

LETTER TO COUNSELORS DESCRIBING THE PROCESS FOR SELECTING SUBSTITUTES

September 7, 1982

Dear Counselors,

Enclosed are the names of the children that have been randomly selected for participation in our social problem-solving/career awareness guidance program. If for some reason a child from List #1 cannot participate in the project, please make a note of this for me, as well as the reason why the child was dropped. Choose a child from the alternate list to fill the vacancy in the group. If a boy was dropped, choose a boy; if a girl was dropped select another girl. If and when you select a child from the alternate list, you must select them in the order they are listed. Please save your group lists for me after your groups have been set up so that I may have them for future reference.

Do <u>not</u> replace any children with alternates once Unit 2 has begun. If a child drops out after the beginning of Unit 2, simply continue your meetings with one less student.

I have also included an attendance slip with this letter. Please check (✓) if the child missed a particular lesson.

Again, my thanks for your help and cooperation.

Sincerely,

Susan Keys

APPENDIX G

SAMPLE PARENT LETTER

September , 1982

Dear Parents,

This letter is to let you know that your child will be participating in our new problem-solving and career awareness guidance program. If you have any questions please give me a call.

Sincerely,

telephone #

days at school

APPENDIX H

CRITERIA FOR SCREENING
THIRD GRADERS

Criteria for screening third graders:

Please screen from the list:

(1) children that are known to be more than one year below grade level in reading

(2) children who are disruptive to the extent that they would be unable to participate in a group activity of this sort

(3) children who have an excessive rate of absenteeism, or whom you know will be moving within the course of the program

(4) children who do not speak English

APPENDIX I

PROGRAM IMPLEMENTATION

DIRECTIONS

GENERAL DIRECTIONS FOR SOCIAL PROBLEM-SOLVING AND CAREER AWARENESS PROGRAMS:

(1) Counselors will meet 3 times a week with eight children in Group #1, the Social Problem-Solving Group.

Counselors will also meet 3 times a week with eight children in Group #2, the Career Awareness Group.

Sessions for both groups last about 20 to 30 minutes.

(2) Counselors must follow the lesson format as specified and use all lessons in their proper sequence.

If you find that you are falling behind, or know that you will be absent please call me - 229-7683.

(3) The purposes of both groups must remain anonymous to your teachers. Let them know that you will be glad to share detailed information with them when the program is completed.

APPENDIX J

SUGGESTED FORMAT FOR PRESENTING GUIDANCE PROJECT TO TEACHERS

A SUGGESTED WAY FOR PRESENTING THE GUIDANCE PROJECT TO TEACHERS:

This fall the county elementary school counselors are initiating a new guidance program in order to study some of the competencies we identified last year.

My involvement requires that I work with 16 children from the third grade. These children will meet with me as two separate groups. We will be meeting 3 times a week for 20 - 30 minutes a session. I hope I can count on you for your cooperation.

I would like to share more of the specifics of the program with you, but because of the data we are trying to collect, I have to hold off talking about it until the project has been completed.

APPENDIX K

WORKSHOP CHECKLIST

MEMO

TO: ELEMENTARY SCHOOL COUNSELORS

FROM: Susan Keys

In order to develop a productive agenda for our meeting on October 18, I have developed a checklist of possible activities. These activities are related to the social problem-solving materials and/or training process. Please ✓ your choice and return the list to me in the enclosed self-addressed envelope.

Thank you.

☐ Roleplaying

This could include one or all of the following:

☐ Discussion and enactment of different role playing techniques

☐ Role Play of specific social problem-solving lesson

☐ Discussion of the role of the audience

☐ Use of problem-solving methodology with an in school problem

☐ Group management techniques/group process skills

☐ Review of social problem-solving test instruments

(Our December 1 meeting will be devoted to test administration preparation. However, if you would like to review copies before this date, please this box in addition to one of the other boxes.)

☐ Other, please specify _____

APPENDIX L

SOCIAL PROBLEM SOLVING OBJECTIVE CHECKLIST

Counselor's Name _____

Please complete the following checklist at the conclusion of each lesson in order to help me determine if the complete lesson was covered during the training session. Check the box at the right if the material listed was covered during the lesson

Unit One: Feelings in Ourselves and Others

Lesson #1: Introduction to Feelings

Discussed four key concepts related to feelings:

1. Everyone has feelings ☐
2. People can feel different ways about the same thing ☐
3. Sometimes we have good feelings; sometimes we have not so good feelings ☐
4. Feelings change ☐

Lesson #2: Feelings Role-Play

1. Reviewed concepts about feelings ☐
2. Discussed feelings as being inside the person, but one way to tell how someone is feeling is to look on the outside ☐
3. Role-played feelings ☐

Lesson #3: Recognizing Feelings in Others

1. Discussed listening and asking as two ways of telling how someone is feeling ☐

2. Completed feelings worksheets ☐

3. Summarized discussion of feelings ☐

Unit Two: Problem Sensing and Identification

Lesson #4: Introduction to Problems

1. Discussed the definition of problem as something that happens between people that gives someone an upset feeling ☐

2. Generated a list of problem and associated feelings ☐

Lesson #5: The First Three Problem Solving Steps

1. Demonstrated first three problem solving steps ☐

2. Practiced the first three problem solving steps using problems generated by the children ☐

3. Provided an additional explanation of the concept of "goal," if need to enhance children's understanding of this concept ☐ ☐ was not necessary

Lesson #6: Problem Solving Sequence Review

Discussed lesson posters using the question format provided in the lesson plan ☐

Lesson #7: Role-Playing Problem Solving Steps

1. Reviewed definition of "problem" ☐

2. Reviewed the first three problem solving steps ☐

3. Role played the first three problem solving steps ☐

Unit Three: Generation of Alternative Solutions

Lesson #8: Introduction to Solutions

1. Discussed "solution" as a way to solve or fix a problem and that there are lots of different ways to solve a problem ☐
2. Presented problem solving step #4: Think of as many solutions as you can ☐
3. Discussed Sarah's Problem Picture ☐

Lesson #9: Problem Story Discussion

1. Reviewed first four problem solving steps ☐
2. Discussed why it is important to think of as many solutions as you can ☐
3. Discussed Frank's Playground problem following the format provided in the lesson plan ☐

Lesson #10: Problem Solving Concept Review

1. Reviewed concept cards from previous lesson ☐
2. Conducted the lesson contest ☐

Lesson #11: Solution Role Play

1. Discussed the problem situation presented in lesson according to the lesson format ☐
2. Role played the problem presented in the lesson plan ☐

Lesson #12: Small Group Competitive and Cooperative Generation of Alternative Solutions

1. Reviewed two solution concepts ☐

2. Generated as teams alternative solutions for three problem situations ☐

3. Presented problem solving certificates ☐

Unit Four: Consideration of Consequences

Lesson #13: Introduction to Consequences

Discussed "Broken Toy" problem:

1. Reviewed problem solving steps #1-#4 ☐

2. Introduced problem solving step #5: "think ahead to what might happen next" ☐

Lesson #14: Defining and Practicing Consequences

1. Practiced the pairing of consequences and solutions using:

   a. the example problem provided in the lesson plan ☐

   b. problems generated by children ☐

2. Clarified the meaning of "consequences" as "what might happen next" ☐

Lesson #15: Consequences Review and Role Play

1. Completed the "What Might Happen Next Game" worksheet ☐

2. Role played the problem solving process using the problem situation presented in the What Might Happen Next Game ☐

Lesson #16: Introduction to Problem Solving Step #6

1. Completed "Solutions Decision Game" worksheet ☐

2. Introduced problem solving step #6: "When you have a really good solution, try it." ☐

3. Role played "trying out" solutions to the problem stated in the "Solution Decision Game" ☐

Lesson #17: Problem Solving Drawing Review

1. Had children state all six problem solving steps ☐

2. Completed problem solving workbooks and conducted follow-up discussion ☐

Unit Five: Integration of Problem Solving Behavior

Lesson #18: Problem Solving Skits

Enacted team-developed problem solving skits ☐

Lesson #19: Problems and Obstacles

1. Reviewed the six problem solving steps using the example problem presented in the lesson ☐

2. Introduced an obstacle to successful solution implementation for sample problem ☐

3. Emphasized "trying again" if the first solution didn't work ☐

4. Discussed timing as an important issue to consider when trying to implement a solution ☐

Lesson #20: Elaborating Solutions I: Nuances

1. Discussed reasons why good solutions might not work ☐

2. Completion of "Why do Good Solutions Fail?" worksheet ☐

3. Reviewed at conclusion of lesson factors that help good solutions to work ☐

Lesson #21: Elaborating Solutions II: Step-By-Step Planning

1. Generated a list of things needed to do to make the solution work for the example lesson problem ☐

2. Encouraged children to be persistent when carrying out their plan of action if faced with obstacles ☐

Lesson #22: Role Playing Effective Solutions

1. Generated a step-by-step plan for implementing the given solution to the example problem in the lesson ☐

2. Role played the problem solving process for the example problem, with the counselor posing some relevant obstacles to successful solution implementation ☐

Lesson #23: Problem Solving Show and Tell

Practiced the problem solving process using problems and feelings generated by the children ☐

Lesson #24: Spontaneous Problem Solving

Practiced problem solving on an individual spontaneous basis with student generated problems ☐

Lesson #25: Problem Solving Quiz Contest

Conducted problem solving quiz contest using questions provided in the lesson ☐

Lesson #26: Problem Solving Skits

Planned and presented problem solving skits 

Lesson #27: "Problem Path" Game Review

Played Problem Path Game 

Lesson #28: Wrap-Up

Discussed children's ideas and feelings regarding the problem solving program using the suggested question format 

APPENDIX M

DIRECTIONS FOR ADMINISTERING PROBLEM-SOLVING POSTTEST INSTRUMENTS

Memo

To: All elementary school counselors

From: Susan Keys

Re: Directions for administering problem-solving posttest instruments

The following directions should be adhered to when administering the four problem solving instruments:

A. The four tests should be administered in the following order: 1. The Keys' Revised Form of the Rochester Means-End Problem Solving Test; 2. the Problem Identification/Consequences Test; 3. the Open Middle Test; and 4. the Problem Solving Process Test. In order to assist the test sequencing, the first page of each test copy is numbered in the top left hand corner according to order of administration.

B. The four tests take approximately thirty minutes to administer, and should be administered in one session.

C. The evaluator should administer the male or female form of the test when and where applicable.

D. All responses should be recorded verbatim on the test copy. Do not omit punctuation marks.

E. When the child uses a pronoun in his or her response, indicate on the test copy to which story character the child is referring.

F. Use one copy of each test per child.

G. The evaluator should follow the directions provided on each test copy. Do not add story facts or embellish the story in any way. If the child asks questions in an attempt to get more story information, the evaluator may not specify any information other than that provided by the story stems.

H. Evaluators must fill out the identifying data on the cover of each test copy.

I. All post testing must be completed by December 16. I will pick up completed test package at your schools on December 17.

APPENDIX N

DIRECTIONS FOR ADMINISTERING THE HEALTH RESOURCES INVENTORY

MEMO

TO: Elementary School Counselors

FROM: Susan Keys

Enclosed are your copies of the Health Resources Inventory. This is a teacher rating instrument for measuring student adjustment. Please follow these directions:

1) Children in both the problem-solving and career groups will be rated by their classroom teacher.

2) If there has been a staff change, ask the current classroom teacher to fill out the form. Please note on the test copy if this teacher has been the teacher in charge for less than four weeks.

3) Please give out the form the week of January 10th. I will pick up completed forms at you school Monday, January 17th.

4) The rating form is self-explanatory. The teacher reads the behavioral description and writes the appropriate rating in the provided space. They must answer all items.

5) In order to establish a rater reliability, I would like to have a sample of teachers fill out the form again in a two-week follow-up. If you have a teacher or teachers who would be willing to fill out a second form, please give them the form the week of January 31st. I will pick up these forms the following week, February 7th.

APPENDIX O

INTERCORRELATION MATRIX FOR PROBLEM-SOLVING SUBSCALES AND HEALTH RESOURCES INVENTORY FACTORS

Intercorrelation Matrix for Problem-Solving Subscales

and Health Resources Inventory Factors*

	Quantity of M-E Steps	Quality of M-E Steps	Persistency	Conflict Id.	Feeling Id.	Goal Id.	Quantity of Cons.	Quantity of Alts.	Quality of Chosen Alt.	Alternative Decision	Quantity of P.S. Steps	Sequence of P.S. Steps	HRI Good Student	HRI Gutsy	HRI Peer Sociability	HRI Rules	HRI Frustration Tolerance
Quantity of M-E Steps	1.000																
Quality of M-E Steps	.4597	1.000															
Persistency	.2502	.2583	1.000														
Conflict Id.	.0890	.0640	.0613	1.000													
Feeling Id.	-.0297	-.0021	.0749	.2731	1.000												
Goal Id.	.1159	.1362	.2071	.0966	.0165	1.000											
Quantity of Cons.	.4792	.2801	.1595	.0467	.0787	.2011	1.000										
Quantity of Alts.	.4172	.2201	.0709	.0043	.0726	.0991	.6011	1.000									
Quality of Chosen Alternative	.0035	-.0077	.0607	-.0872	.0496	.0844	.0167	.1136	1.000								
Alternative Decision	.0223	-.0119	.0752	-.1824	.0464	.1514	.0399	.2047	.8543	1.000							
Quantity of P.S. Steps	.2411	.1801	.1033	.3142	.2084	.2098	.3163	.2751	-.0178	-.0163	1.000						
Sequence of P.S. Steps	.1942	.0781	.0862	.2555	.1792	.1270	.2599	.2407	-.0120	-.0108	.8616	1.000					
HRI Good Student	.2405	.2626	.0619	-.0016	.0154	.2383	.2027	.0606	.0521	.0269	.0665	.0456	1.000				
HRI Gutsy	.2108	.2421	.0991	.0289	.0347	.2066	.1676	.1139	.0211	.0140	.0750	.0269	.7137	1.000			
HRI Peer Sociability	.1480	.2304	.0684	.0583	.0532	.0614	.0677	.0429	.1046	.0772	.1625	.2460	.5502	.6423	1.000		
HRI Rules	.1171	.2310	.0246	-.0143	.0015	.1759	.0679	.0785	.1756	.1348	.1205	.1769	.4527	.2776	.4058	1.000	
HRI Frustration Tolerance	.0957	.1921	-.0142	.0261	.0805	.1365	.0260	.0491	.1010	.0793	.1865	.2100	.4214	.4313	.5666	.5336	1.000

*n=157

APPENDIX P

ITEM CORRELATIONS WITH THE PROBLEM-SOLVING SCALE SCORE

Item Correlations with the

Problem-Solving Scale Score[a]

Item	Correlation Coefficient
Item #1 (Quantity of M-E Steps)[b]	.503
Item #2 (Quality of M-E Steps)[b]	.375
Item #3 (Quality of M-E Steps)[b]	.379
Item #4 (Quantity of M-E Steps)[c]	.661
Item #5 (Quality of M-E Steps)[c]	.133
Item #6 (Quality of M-E Steps)[c]	.213
Item #7 (Persistency)[c]	.254
Item #8 (Conflict Id.)[c]	.109
Item #9 (Feeling Id.)[d]	.027
Item #10 (Goal Id.)[d]	.252
Item #11 (Conflict Id.)[e]	.178
Item #12 (Feeling Id.)[e]	.153
Item #13 (Goal Id.)[e]	.244
Item #14 (Quantity of Consequences)[d]	.761
Item #15 (Quantity of Consequences)[d]	.705
Item #16 (Quantity of Alternatives)[f]	.554
Item #17 (Alternative Decision)[f]	.152
Item #18 (Quality of Chosen Alt.)[f]	.106
Item #19 (Quality of Chosen Alt.)[f]	.174
Item #20 (Quantity of Alternatives)[g]	.709
Item #21 (Alternative Decision)[g]	.213
Item #22 (Quality of Chosen Alt.)[g]	.117

Item Correlations with the

Problem-Solving Scale Score (Continued)

Item	Correlation Coefficient
Item #23 (Quality of Chosen Alt.)[g]	.143
Item #24 (Quantity of P.S. Steps)[h]	.610
Item #25 (Sequence of P.S. Steps)[h]	.519

[a] n = 158

[b] Keys' Revision of the Rochester Means-End Problem-Solving Test, Story #1

[c] Keys' Revision of the Rochester Means-End Problem Solving Test, Story #2

[d] A Revised Form of the Problem Identification/Consequences Test, Story #1

[e] A Revised Form of the Problem Identification/Consequences Test, Story #2

[f] Open Middle Interview, Story #1

[g] Open Middle Interview, Story #2

[h] Problem-Solving Process Test

APPENDIX Q

ITEM CORRELATIONS WITH PROBLEM-SOLVING SUBSCALE SCORES

Item Correlations

With Problem-Solving Subscale Scores[a]

Subscale	Item	Correlation
Quantity of Means-End Steps	Item #1	.831
	Item #4	.826
Quality of Means-End Steps	Item #2	.776
	Item #3	.776
	Item #5	.532
	Item #6	.568
Conflict Id.	Item #7	.796
	Item #10	.820
Feeling Id.	Item #8	.724
	Item #11	.843
Goal Id.	Item #9	.835
	Item #12	.839
Quantity of Consequences	Item #13	.915
	Item #14	.895
Quantity of Alternatives	Item #15	.827
	Item #19	.864
Quality of Chosen Alternative	Item #17	.821
	Item #18	.768
	Item #21	.624
	Item #22	.563
Alternative Decision	Item #16	.867
	Item #20	.624

[a] n = 158

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