Interpersonal Problem Solving as a Mediator of Behavioral Adjustment in Preschool and Kindergarten Children*

Myrna B. Shure
George Spivack

Hahnemann Community Mental Health/Mental Retardation Center

An experimental model tested the mediating function of interpersonal cognitive problem solving skills on behavioral adjustment in preschool and kindergarten children. Relative to controls, nursery-trained youngsters improved in three such skills, kindergarten-trained in two. In both the nursery- and kindergarten-trained groups, increased ability to conceptualize alternative solutions to interpersonal problems significantly related to improved social adjustment. Consequential thinking also emerged as a clear behavioral mediator, especially among kindergarten-aged youngsters. Improvement in behavior could not, however, be attributed to change in causal thinking skills. Having identified two significant behavioral mediators in young children, a beginning has been made to isolate specific thinking skills, which, if enhanced, can contribute to healthy social adjustment and interpersonal competence at an early age.

This research concerns social adjustment of young children and how certain cognitive skills play a key role in guiding that adjustment. The purpose is to test the theoretical position that there are a set of interpersonal cognitive problem-solving (ICPS) skills that mediate healthy human functioning (Spivack, Platt & Shure, 1976), and to determine whether it is possible to identify such mediating skills in children four and five years of age.

To date, ability to generate different solutions to interpersonal problems has consistently differentiated preschool and kindergarten youngsters who display varying degrees of behavioral maladaptation from those who do not (Shure &

*This research was supported by the Applied Research Branch, National Institute of Mental Health (MH-20372). Requests for reprints should be sent to Myrna B. Shure, Hahnemann Mental Health/Mental Retardation Center, 314 N. Broad Street, Philadelphia, PA 19102.

With descending strength, ability to conceptualize consequences of an act (e.g., grabbing a toy) and a spontaneous tendency to think about cause-and-effect in social situations (e.g., a child is crying) having also distinguished behaviorally adjusted youngsters from those displaying behaviors more maladaptive in nature (Shure et al., 1973; Spivack & Shure, 1974). Relationships between ICPS thinking and adjustment have been confirmed in other age groups as well: in latency-age youngsters (Shure & Spivack, 1972; Larcen, Spivack & Shure, 1972), in adolescents (Spivack & Levine, 1963; Platt, Spivack, Altman, Altman & Peizer, 1974) and in adults (Platt & Spivack, 1972). In no studies to date has intellectual functioning (IQ) accounted for a significant proportion of the relationship between ICPS and adjustment.

The assumption drawn from these studies is that individuals showing behavioral difficulties suffer from an interpersonal cognitive problem-solving deficiency which gets them into difficulties with others. One who can conceptualize a variety of solutions, who can think of potential consequences of his actions, and who sees the prior causal dynamics of interpersonal events is less likely to suffer the frustration of repeated failure and possible subsequent maladaptive functioning.

Whether availability of ICPS skills is an antecedent condition to adjustment cannot, however, be ascertained from correlational studies alone. Intervention has been instituted to investigate a linkage between ICPS ability and behavioral adjustment by experimentally altering ICPS skills, then observing changes in the child's display of behaviors characteristic of impulsivity or inhibition. If ICPS ability does mediate such behaviors, the present experiment will pinpoint those ICPS skills which play the most significant role in the behavior adjustment of youngsters four and five years of age. The critical question is whether those who most improved in the trained ICPS skills were the same youngsters who most improved in manifest behavioral adjustment, and whether evidence of such linkage is independent of general intellectual functioning (IQ).

METHOD

Subjects and Design

The entire study was conducted over a two-year period.

In the nursery year, (Year 1) 219 black children attending federally funded day care were available for pre-and posttesting (x pretest age, 4.3). One hundred thirteen (47 boys and 66 girls) from ten centers were exposed to intervention while 106 (50 boys and 56 girls from ten different centers served as controls.

In the kindergarten year (Year 2), 35 of the 106 Year 1 nursery-controls (15 boys, 20 girls) were trained for the first time in kindergarten. Their controls
were 27 children from the same pool of 106 nursery controls (12 boys, 15 girls), children who therefore served as controls both years. The 44 unaccounted for Year 1 controls were lost to the study due to normal attrition plus a lengthy school strike that caused more than the usual number of children to be placed in parochial schools. Of the 113 Year 1 nursery-trained youngsters, 69 were still available in the second year. Thirty-nine of these were trained both years (to evaluate length of training) and 30 were tested but received no further training in the second year (to examine the program's holding power). Because the questions of length of training and its holding power are beyond the scope of this paper, the 69 children who comprised these groups are excluded from this report. (These data, and the rationale for group selection both years are described in detail, in Shure & Spivack, 1975a; 1975b; 1979).

Nursery intervention data from Year 1, portions of which were originally presented in Spivack and Shure (1974), are reported here for easy examination of consistencies with results obtained from the kindergarten intervention study conducted in Year 2.

**Intervention**

Given that previous correlational research found ICPS-efficient youngsters to be among the better adjusted, the goal of intervention was to determine whether behavior of ICPS-deficient youngsters could be improved by teaching them how to think. The format of the program was a script developed by Shure and Spivack, presented in full in Spivack and Shure (1974). It consisted of daily 20-minute games and dialogues through which teachers and children interact in small groups over a period of about three months. The concepts taught were essentially the same in both the nursery and kindergarten years, though the content was more sophisticated for the older children (Shure & Spivack, 1973;
Early games consisted of word concepts building toward association for later use in problem solving. For example, the word *different* was taught to help children later think about *different* ways to solve a problem (alternative solution thinking). The words *not, because* and *might* were taught to help children later think about whether an idea is or is *not* a good one, for example, "If I hit him, he *might* hit me back" (consequential thinking), and "He hit me *because* I hit him first" (causal thinking). Subsequent games focused on recognition and awareness of the children’s own and other people’s feelings, cognitions which could enrich the range and nature of solution and consequential thinking. Through pictures, puppets and simple role-playing techniques the aim was to develop in children a problem-solving style of thinking. Children were never told specific solutions, consequences or causal connections. Rather, they were encouraged to generate their own ideas, and then to think about how people might feel or what they might do. In addition, teachers and their aides were trained to use these concepts during the day when children were having actual problems in the classroom. The goal of training was to teach children to think, not what to think, so they could choose and evaluate for themselves what and what not to do.

Pre–Post Intervention Measures

The following ICPS and behavior measures were obtained each year immediately prior to and following the three-month intervention. Each measure, illustrated in detail in Shure, Spivack and Jaeger (1971); in Spivack and Shure (1974) and in Shure and Spivack (1975b) is described briefly, below.

**Preschool Interpersonal Problem Solving (PIPS) Test.** The PIPS Test was designed to elicit from the child as many alternative solutions as possible to typical age-relevant interpersonal problems. The child was given a series of situations wherein one child character wants to obtain a toy from another, and then a second series depicting a child as having damaged something important to his mother. With the help of pictures, the subject child was told: “Johnny (A) wants a chance to play with his shovel but Jimmy (B) keeps on playing with it.” He was then asked: “What can (A) do so he can have a chance to play with the shovel?” After one relevant solution such as “ask” was given, the child was then shown new characters with a new toy, and the procedure was repeated. Each child was shown a minimum of seven toys, and with each toy he was asked: “Can you think of another (new different) way this boy (girl) could get a chance to play with the toy?” If seven different, relevant solutions were given, additional toys were presented until the child could no longer name a new solution. In the second series, the subject child was asked what the child character could do so his mommy would not be mad at him/her for having damaged something (broken a window). Switching specific content within each story type maintained the child’s interest while eliciting as many solutions as the child could offer to the same general type of problem.
The total PIPS solution score was the number of different, relevant solutions given to the peer and mother stories (correlated at .01). To allow for repetitions and enumerations of earlier stated relevant solutions, and irrelevant statements as "He doesn't want the toy," each child was allowed four opportunities (probes) per toy and per stated object damaged. All statements were recorded to control for the extent to which a child verbalized to the test. (For a complete manual of the PIPS Test, its development, administration, norms, reliability and validity and scoring procedures see Shure & Spivack, 1974b).

**What Happens Next Game (WHNG).** The WHNG was designed to elicit from the child as many consequences as possible to an interpersonal act. In the first series one child was depicted as having grabbed a toy from another and the subject child was asked: "What might happen next in the story?" or, if needed, "What might (A) do or say when (B) takes that toy from him?" After one relevant consequence was offered such as "He'll grab it back," new toys and new characters were shown and the procedure repeated, using a minimum of five toy situations.

The second series, a revision of that first reported in Shure et al. (1971) depicted a child character as having taken an object from an adult without first asking, e.g., a flashlight. In each instance the subject child was asked what might happen next or what the adult might do or say as a result of the child character having taken something without permission. The test stimuli were also changed. In the 1971 study, pictures used were the same as those used in the PIPS Test. To dissociate the two tests, small wooden stick figures were used for the WHNG. As in the PIPS Test, the child was given four opportunities per toy grabbed and per object taken, and repetitions, enumerations and irrelevancies were recorded as nonscored verbalizations.

A child's score consisted of the total number of relevant consequences that could occur as a result of having taken something from a child and from an adult (correlated at .01).

**Causal Test.** In the nursery year, the causal test identified youngsters who demonstrated a spontaneous tendency to conceptualize cause-and-effect when presented with a stated outcome. In one story for example, the subject child was told: "(A) is crying. He is talking to his mother." Responses as "Someone hit him" were scored as causal, while those as "He needs a kleenex" were not because they did not specify a causal antecedent to the stated event. In the kindergarten year, a different process of causal thinking was tested. The measure was changed because pretest relationships between spontaneous causality and behavior was weak, and because change in this skill did not relate to behavior change as a function of training. To further investigate the concept of causal thinking, a different approach to measurement was taken. The child was specifically asked "why" an event might have happened. Using small wooden dolls to represent child characters, the child was told: "This is (A) and this is (B). (A) is
hitting (B)." and then asked: "Why is (A) hitting (B)??" As in the PIPS and WHNG tests, new characters were presented as soon as the child gave one relevant causal statement. After a minimum of five situations depicting one child hitting another, the story switched to a series of pictures with children laughing. With four opportunities per situation to state an antecedent cause, any repetitions, enumerations and noncausal statements were recorded as nonscored verbalizations.

Each test, administered on separate days, required fifteen to thirty minutes per child. Data from Year 1 nursery youngsters is based on the battery of three tests having been administered twice—before and after the period of intervention (Fall and Spring). The kindergarten-trained group and their controls had been given the battery of three tests four times—in the Fall and Spring of the nursery year (when all were Year 1 nursery controls) and at comparable times again in kindergarten. Effects of repeated testing for Year 2 kindergarten youngsters are eradicated because control as well as trained children received an equal number of testing sessions. Altogether, nine males and eight females, unaware of the children's experimental group placement served as testers, and as closely as possible, administered the battery to an equal number of boys and girls.

Interrater reliability was obtained for each component of all measures, and percent agreement for the present sample ranged from .92 to .99. The lowest occurred in judgments of irrelevancies in the WHNG, the highest in repetitions and relevant solutions in the PIPS.

Behavior Adjustment. Behavior adjustment was assessed through teacher ratings adapted from Spivack and Spotts (1966) for use with young children. Earlier research revealed that for children comparable to those in the present study (e.g., Shure, Spivack & Jaeger, 1971), seven items define three overt behavioral factors. On factor (impatience) defines the extent to which the child has difficulty delaying gratification. Teachers rated observed amounts of nagging and demanding of adults, and of inability to wait, e.g., grabbing toys, when interacting with children. A second factor (emotionality) describes the extent to which the child displays anger or distress with peers and/or adults. The third factor (dominance-aggression) includes items of physical aggression toward peers, e.g., hits, pushes, and of verbal dominance, e.g., bosses, threatens.

With scores for each item ranging from 1 (very little or none) to 9 (much more than average) and a score of 5 representing the "average" child the same age and sex, the social adjustment level of each child was assessed before and after intervention. A child was judged to be overly inhibited if all items in any one factor were scored a "1" or a "2", scores which fall well below the scale point denoting "average child." These ratings represent excessive control of behavior, or of feelings, or too much timidity to display even normal amounts of aggression. A child whose average score for all seven items exceeded 5 was
considered to be displaying *impulsivity*. Any child whose ratings did not include inhibition, and whose scores for the seven items fell within the "average" range were judged to be *adjusted*. The scale, named the Hahnemann PreSchool Behavior (HPSB) Rating Scale has differentiated children efficient and deficient in ICPS skills in a number of studies (see 1975b). HPSB ratings have also correlated significantly with the PIMM scale (Pimm & McClure, 1967), the latter found to predict emotional disturbance in young children.

Teachers, unlike the testers were not blind to the child’s training experience. This design could potentially create a serious methodological difficulty for assessing behavioral improvement, and was therefore controlled for in the statistical design. Internal analyses within the trained group would determine whether those who improved in separately tested ICPS scores would be the same children judged by their teachers to have most improved in overt behavior. This design not only tests the theory proposed by this research, but also tests for "ego involvement" of teachers’ ratings following training. In addition, control for a "halo" effect was incorporated by having teachers rate additional behaviors on the scale, behaviors which were, unbeknownst to them, unrelated to ICPS at pretest and would therefore not be expected to change as a function of training.

**RESULTS**

Prior to intervention, no pretest differences occurred between the two trained groups and their corresponding controls on any measure of ICPS ability, IQ, or behavioral adjustment level (Shure & Spivack, 1975b). Results of pre-post analyses for each ICPS skill and for behavioral adjustment of trained vs. control youngsters are presented, followed by comparisons of ICPS change by trained children whose behavior did and did not improve.

**Interpersonal Cognitive Problem Solving (ICPS) Skills**

The first question is whether ICPS skills were altered by systematic intervention. In the nursery year, ICPS enhancement was tested via a repeated measures unequal N 3 (behavior group) × 2 (experimental group) × 2 (pre-post time) ANOVA. In the kindergarten year, it was necessary to combine the pretrained impulsive and inhibited youngsters due to the small N of the latter, and a repeated measures 2 (behavior group) × 2 (experimental group) × 2 (pre-post time) ANOVA was employed. In all analyses, the Cochran test showed no differences in homogeneity of variance between groups, indicating that assumptions underlying the ANOVA were not violated. It was hypothesized that the trained groups would gain in each of the three studied ICPS skills significantly more than controls from pre- to posttesting, leading to a significant experimental group ×
pre-post interaction. Triple interactions which would suggest differential pattern of gain as a function of behavioral adjustment at pretest did not occur. Whether or not boys differed from girls in the overall percentage of those classified as normal or aberrant was not of present concern. Importantly, however, no sex differences occurred at pretest or in pre-post change for mean ICPS scores, or in the relationship between ICPS scores and behavior. Given this, and the composition of the training and control groups having comparable percentages of sex by behavior groups, results combine analyses of boys and girls.

**Alternative Solution Thinking.** As measured by the PIPS test, the means in Table 1 show that whether children were exposed to intervention in the nursery or the kindergarten year, trained youngsters improved in the number of alternative solutions given from pre- to posttesting in marked contrast to their corresponding controls: Nursery, $F (1, 213) = 106.90, p < .001$; Kindergarten, $F (1, 58) = 35.11, p < .001$. In both years, the amount of extraneous talk (repetitions, enumerations and nonrelevant statements) given by trained youngsters significantly decreased as the number of relevant solutions increased: Nursery, $r (111) = - .35, p < .001$; Kindergarten, $r (33) = - .39, p < .05$. It is clear that increase in PIPS solution score was not a function of mere increase in willingness or tendency to verbalize during testing.

**Consequential Thinking.** As measured by the What Happens Next Game (WHNG) the means in Table 1 show that, relative to controls, trained youngsters increased in the number of consequences generated in both the nursery, $F (1, 213) = 23.80, p < .001$ and in the kindergarten years, $F (1, 57) = 24.44, p < .001$. No significant change in amount of extraneous talk during testing occurred in either direction, suggesting the positive changes in consequential thinking by trained youngsters could not be attributed to sheer increase in verbosity.

**Causal Thinking.** Relative to controls, Table 1 shows that trained youngsters in the nursery year increased their spontaneous tendency to conceptualize cause-and-effect when presented with an interpersonal event, $F (1, 213) = 6.70, p < .01$. Simple effects revealed the apparently small increase of trained youngsters was significant, $F (1, 213) = 10.42, p < .01$. Analyses also revealed that increased causal scores were independent of general test verbosity. The smaller sample size of kindergarten youngsters did not allow a similar magnitude of causal increase to produce a significant training effect.

**Behavior Adjustment**

With independent interrater reliability (teachers’ aides) ranging from 84 percent to 96 percent agreement, a significantly greater percentage of trained than control youngsters’ behavior improved in both nursery and kindergarten. In the nursery year, 22 of 44, or 50 percent of trained youngsters displaying impulsive be-
### TABLE 1
Means and SDs of Three ICPS Skills by Pre–Post Test and Experimental Group in Nursery and in Kindergarten

<table>
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a PIPS and consequences tests, no ceiling.
b Number in parentheses represent N.
c In both experimental and control groups, one S left before consequences testing, two before causality testing.
d Based on spontaneous tendency to state cause-and-effect in nursery, possible range 0–10; on specific question "why" in kindergarten, no ceiling.

Note: No significant pretest differences occurred either year on any measure.
haviors at pretest were judged to be well adjusted at posttest, as compared to only eight of 39, or 21 percent of the controls, $X^2 (1) = 6.56, p < .01$. Among initially inhibited youngsters, 21 of 28, or 75 percent of trained youngsters moved into the adjusted behavior category as compared to only six of 17, or 35 percent of controls, $X^2 (1) = 5.39, p < .05$. In the kindergarten year 11 of 16, or 69 percent of initially impulsive youngsters were rated adjusted at posttest as compared to only one of 13 controls. Combining the three of four initially inhibited trained youngsters who improved as compared to none of three comparable controls, 14 of 20, or 70 percent initially maladaptive trained children were judged to be adjusted following intervention and only one of 16 controls, $X^2 (1) = 12.36, p < .01$. Thus far it appears that in general, ICPS skills improved with training and that exposure to systematic ICPS training also improved observed behaviors characteristic of impulsivity and inhibition. Because techniques focused upon ICPS skills, the question of real importance is whether change in the outcome behaviors was really a function of newly acquired thinking skills in initially ICPS-deficient children.

**ICPS as Behavioral Mediators**

Though trained groups improved more than controls in ICPS skills as well as in behavior, it was still not known whether ICPS change directly mediated behavioral change. It was possible the children learned to think because they were taught how, and that their behavior improved for independent reasons.

To examine the significance of ICPS skills as behavioral mediators, relationships of change were examined within the trained groups. ICPS change of those whose pretraining behaviors were judged to be maladaptive, and whose posttraining behaviors were within the adjusted range, was compared to ICPS change of youngsters whose initial behavioral maladaptation did not improve. Analyses combined the two initially aberrant behavior groups (impulsive and inhibited) for several reasons: (1) ICPS scores, especially solution scores of the two aberrant groups at pretest were in the same direction, and significantly lower than those of adjusted youngsters; (2) planned comparisons (Winer, 1962) revealed no significant differences in mean ICPS change between initially impulsive and initially inhibited children; (3) the success rate of the training left an insufficient nursery population of still inhibited children available for separate pre-post analyses; and (4) the number of initially inhibited youngsters available for study in the kindergarten year were few in number.

Table 2 shows that the strongest linkage between ICPS behavioral improvement occurred for alternative solution thinking (PIPS solutions). In both the nursery and the kindergarten years, those who improved in behavior adjustment were significantly more likely to also improve in trained solution thinking skills than those whose behavior did not change: Nursery, $t (70) = 6.78, p < .01$; Kindergarten, $t (18) = 3.05, p < .01$. The relationship between increase in
consequences score and behavior change was also significant, though this link-age was considerably less dramatic than that found for solution thinking: Nurs-ery, $t(70) = 1.61, p = .06 \{\text{one tailed}\}$; Kindergarten, $t(17) = 2.54, p < .05$. These findings also suggest that consequential thinking is a stronger behavioral mediator in the kindergarten than in the nursery year.

For causal thinking, mean differences shown in Table 2 revealed no direct link. Significant improvement in causal thinking skills in the nursery year is not sufficient evidence to assume that the observed improvement in behavior was a function of improvement in measured causal thinking. Children who improved in the trained causal thinking skills were not necessarily the same as those improved in behavior. Therefore, as presently measured, causal thinking as an independent mediator of adjustment has not been empirically demonstrated.

**ICPS, Behavior and IQ**

Changes in solution and consequential skills clearly reflect an ability in the thinking process beyond that tapped by the Stanford-Binet Intelligence Test (long form L-M). Pretest IQ scores ranged from 70–147, and low, but significant correlations in the .30s with ICPS occurred. With the exception of spontaneous causal thinking, however, covariance analyses showed that a significant portion

<table>
<thead>
<tr>
<th>ICPS Skill</th>
<th>Nursery Behavior</th>
<th>Kindergarten Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$I_a$</td>
<td>$N_{I_a}$</td>
</tr>
<tr>
<td>Solutions</td>
<td>(43)</td>
<td>(29)</td>
</tr>
<tr>
<td>$\bar{x}$</td>
<td>7.83</td>
<td>4.14</td>
</tr>
<tr>
<td>SD</td>
<td>2.14</td>
<td>2.46</td>
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<tr>
<td>Consequences</td>
<td>(43)</td>
<td>(29)</td>
</tr>
<tr>
<td>$\bar{x}$</td>
<td>3.12</td>
<td>1.97</td>
</tr>
<tr>
<td>SD</td>
<td>2.92</td>
<td>2.05</td>
</tr>
<tr>
<td>Causesc</td>
<td>(43)</td>
<td>(29)</td>
</tr>
<tr>
<td>$\bar{x}$</td>
<td>1.12</td>
<td>.38</td>
</tr>
<tr>
<td>SD</td>
<td>2.78</td>
<td>2.48</td>
</tr>
</tbody>
</table>

*a I = Improved Behavior; NI = Not Improved Behavior.

b Number in parentheses represent N.

c Based on measures of two different processes of causal thinking in nursery and kindergarten years.

†one-tailed.
of relationships between ICPS and behavior was independent of IQ. Increased ICPS skills (with training) were statistically independent of IQ change. The magnitude of correlations between change in scores of each of the three measured ICPS skills and IQ score change ranged from $-0.15$ to $+0.09$ (Shure & Spivack, 1975b).

Although it is clear that IQ change did not account for ICPS change, the possibility existed that behavior improvement might have been a function of initial IQ. Of the 69 initially aberrant nursery youngsters given the Stanford-Binet, the mean IQ of the 41 behaviorally improved children was 104 (SD = 10.33, range = 73–126), not significantly different from a mean of 102 (SD = 10.80, range 70–117) among the 28 whose behavior remained aberrant, $t(67) = 0.96$.

The above findings demonstrate unequivocally that ICPS cognitive processes are not merely what is measured by IQ tests, and that obtained improvements in the quality of social adjustment from training were not a function of the child's level of intellectual functioning.

**DISCUSSION AND CONCLUSIONS**

Interpersonal cognitive problem solving (ICPS) skills which mediate healthy adaptive functioning as observed in young children have been identified through the mechanism of experimental manipulation. Of the ICPS skills altered, the clearest mediator of behavior in both four- and five-year-olds is ability to conceptualize alternative solutions to peer and authority problems, followed by ability to conceptualize potential consequences. These ICPS skills related to behavior before and after intervention in a consistent way, and these relationships were not due to uncontrolled factors such as general intelligence. Within a wide IQ range, preschool and kindergarten children who benefitted from ICPS training became better able to cope with typical everyday problems than those who did not. Those who initially displayed behaviors characteristic of impulsivity could think of only a few solutions to a problem and were unaware, or at best unconcerned about the effects of their actions upon others. As they learned to consider more solutions and consequences, they became better able to cope with frustration, better able to wait, and less overemotional and aggressive when goals could not be satisfied immediately. Youngsters initially displaying excessive inhibition or timidity no longer tended to retreat or shy away from others. Their own increased problem solving ability gave them the skills needed to participate rather than withdraw from interpersonal confrontation.

There is evidence that the obtained mediating relationships are not due to superious factors. Teachers (and aides) rated behavior unaware of the youngsters' cognitive test scores prior to and following intervention. It could be asserted, however, that behavior ratings made by the teachers could have been influenced by the children's performance during the alternative and consequen-
tial training sessions and accounted for the relationship between these improved thinking skills and behavior. If this were the case, a significant relationship between improved causal thinking and behavior would have also occurred.

Further evidence indicates that teachers rated honestly and objectively. Nineteen additional behavior items were rated. Only five of them significantly related to ICPS (independent of IQ) before training, and it was the same five which significantly improved as a function of the program. Two of these items described the children's level of autonomy, the other three his or her initiative, concern for others, and the extent to which the child was sought out and liked by peers. If teachers based their behavior ratings on training performance, one would expect that they would have rated children who developed greater ICPS ability as also improved on such behaviors as "ability to make himself understood with words," as showing less "obliviousness as to what is going on in class" and less "inattentiveness." Such was not the case; no halo effect seemed to be operating. These findings support the position that social adjustment behaviors which change with training are those most intimately linked to ICPS before intervention, and that teachers were making discriminating judgments about behaviors being rated.

Concern about teacher bias is further allayed by follow-up ratings of new teachers, unaware of the fact or nature of each child's earlier experience. At least 84 percent of children classified as adjusted by ratings of teachers immediately following nursery and kindergarten training were still classified as adjusted by ratings of new teachers one year later—indicating remarkably similar judgments by completely independent raters (Shure & Spivack, 1975b). In addition to these follow-up teachers, other independent raters add further evidence of validity. New groups of nursery teachers rated youngsters trained by their mothers at home—teachers unaware of the intervention and certainly unable to evaluate a child's training performance. The same ICPS and behavioral change emerged as in the teacher-training studies (Shure & Spivack, 1978).

There is a further important consideration that might well effect the extent to which training ICPS thinking will influence behavior. For maximum behavioral impact, it seems essential that the trainer of the formal lessons follow through with a problem solving training style called "dialoguing" when actual problems arise during the day (see examples in Spivack & Shure, 1974; Shure & Spivack, 1978). Dialoguing increases the child's opportunity to exercise his/her ICPS thinking. The trainer, through leading questions, guides the child to see the problem, generate different possible solutions, explore consequences, and so forth. Dialoguing may enhance training effects merely because it extends training beyond the limited period of formal training. It may also, by introducing a new en vivo quality to training, lead to a more effective utilization of ICPS thought when the child subsequently faces real problems on his or her own.

A question can be raised regarding the control groups having received no treatment, thereby limiting the efficacy of the research design in ruling out other important possible facilitators. For example, does practice simply in sitting,
listening, and communicating with a teacher and peers help children in posttest performance and/or in subsequent behavioral adaptation to the classroom setting? In this regard, all control teachers had children in small groups on a daily basis, with sitting, listening and communicating having been part of story time, of lessons on colors, shapes, numbers and the like. In kindergarten, mandated reading-readiness groups were part of every classroom curriculum, of which teacher-child interaction was a part. Also, in an earlier study, Shure, Spivack and Gordon (1972) studied small groups of children engaged in finger games, animal imitations and other nonproblem-solving activities, activities which were, as those of the ICPS training groups, designed to stimulate mutual teacher-child interaction. Children in this placebo group, just as those in the regular control classes, improved in ICPS skills and behavior significantly less than those in the ICPS-trained groups. Further, Wowkanech (personal communication) found that ICPS-trained children more often generated and acted upon a new solution of their own, when their prior attempt to solve a problem failed, as compared with children trained through teacher modeling and explanation of the "best" solutions. The latter were more likely to revert to previous (and often unsatisfactory) ways of behaving.

Nevertheless, inclusion of still different kinds of control groups could unquestionably add important information about behavioral mediators other than heretofore measured ICPS skills. No claim is made that ICPS skills are the only significant behavioral mediators, or that other kinds of intervention would not markedly enhance adjustment. The data do suggest, however, that ICPS skills add to our understanding of behavior, that learning of ICPS skills does not generalize from exposure to the forementioned impersonal cognitive training, and that the quality of social adjustment can be better understood in light of knowledge about interpersonal problem solving cognition.

Finally, it is noted that in addition to the identification of alternative solution and consequential thinking as significant mediators of social adjustment in young children, lack of such findings for causal thinking suggests an important consideration when interpreting training effects. Any training program that enhances a hypothesized mediating skill (e.g., ICPS) as well as a criterion skill (e.g., social adjustment) must at least demonstrate a relationship between change in the two before it is assumed that change in adjustment is a function of change in thinking. Had this not been done in the present instance, it might have been incorrectly concluded that increase in the trained causal thinking skills of nursery youngsters played a significant mediating role in their improved behavioral adjustment.

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