The maintenance of cooperative and helping behaviours in cooperative groups

Robyn M. Gillies*

Graduate School of Education, University of Queensland, Australia

Background. This study was a full-year investigation of whether children, who had previously been trained to cooperate and help each other, were able to use these behaviours in reconstituted groups without additional training one year later.

Aims. (i) To examine whether children who have previously been trained to cooperate demonstrate more cooperative and helping behaviours in their groups than children who had not been trained and (ii) to determine the effect of prior training on children’s learning.

Sample. The study involved 144 Grade 2 children (mean age = 94.5 months; third year of schooling), from nine schools in a similar socio-demographic area of Brisbane, Australia. Sixty-four children, who had been trained in cooperative group behaviours in the previous year, were assigned to the Trained groups and 80 children, who had not received any training, were assigned to the Untrained groups.

Method. The children worked in four-person, mixed-ability (high-, medium-, and low-ability), gender-balanced groups (2 males, 2 females) for one six-week social studies unit of work each term for three school terms. Videotaping occurred in the 5–6 week of each work unit. Videotapes were coded for behaviour and verbal interactions. Learning outcomes data were also collected.

Results. The children in the trained groups exhibited more cooperative behaviour and they provided more explanations, both in response to explicit and implicit requests for help across the three periods of time. The children in the trained groups used higher level cognitive strategies such as providing specific concrete facts and reasons in their interactions and they also obtained higher scores on the learning outcomes questionnaire than their untrained peers.

Conclusion. Young children who have been trained to cooperate and help each other are able to demonstrate these behaviours in reconstituted groups without additional training a year later.

Cooperative learning has been used successfully as a classroom strategy that promotes learning and achievement across different curriculum areas from mathematics under-
standing and problem-solving (Wicker, Nunnery, & Bol, 1997; Terwel, Herfs, Mertens, & Perrenet, 1994), conceptual learning in science (Howe, Tolmie, Greer, & McKenzie, 1995; Lonning, 1993) to narrative writing in small groups (Mathes, Fuchs, & Fuchs, 1997; Zammuner, 1995). In the affective area, cooperative learning fosters social skills in students of all ages (Jordan & LeMetals, 1997), self-esteem (Lazarowitz & Karsenty, 1990), positive attitudes towards others in the group (Bennett, 1991), motivation to learn (Sharan & Shaulov, 1990) and social acceptance of children who are disabled by their non-disabled peers (Slavin, Madden, & Leavey, 1984). In the interpersonal area, cooperative learning facilitates interactions among students (Cowie & Rudduck, 1990; Sharan & Shachar, 1988; Webb, 1985) including students with disabilities (Putnam, Rynders, Johnson, & Johnson, 1989).

Interactions among students are crucial to the success of cooperative learning because research has shown that it is the interactions that occur in groups that facilitate learning (Bennett, 1991; Webb, 1989, 1991). Bales (1970) demonstrated that when students interact with each other and seek information, they generally attract five times as many information exchanges for each request, hence increasing the possibility that group members will exchange more relevant information. It is this information which is believed to be related to learning gains. Sharan and Shachar (1988), in a study of the language interactions of 351 eighth-grade students who worked in cooperative groups, found that increased participation in group discussions resulted in more intellectually valuable contributions to these discussions, and the quantity of speech included high-level contributions and not just a larger flow of words. Similarly, Deering and Meloth (1993) in a study of children’s verbal interactions in six elementary classes (two third-, two fourth-, and two sixth-grade classes) found that 93.99% of the children’s interactions involved procedural and academic talk. Moreover, 53.16% of the discussion within their groups focused on academic content, the type of interaction most closely associated with achievement (Johnson & Johnson, 1990; Webb, 1992).

Types of interactions
Webb (1985, 1991, 1992) examined children’s interactions as they worked together in groups and found it was the explanations that children received in response to requests for help that were positively related to achievement whereas non-explanatory statements were not. Providing explanations in response to requests for help benefits both the giver and the receiver. Giving explanations requires the reorganisation and clarification of the material to be learned which may help the explainer to develop new perspectives, construct more elaborate cognitive understandings, and, in so doing, often learn the material better than before (Doise & Mugny, 1984; Wittrock, 1990). In contrast, giving non-explanatory help does not involve as much cognitive restructuring and is not strongly related to achievement (Webb, 1992).

Receiving explanations in response to requests for help also benefits the receiver. Webb and Farivar (1994) suggested that children who need help can benefit from these interactions because their peers are often more aware than their teachers of what other students do not understand, can focus on the main aspect of the problem, and can give explanations that can be easily understood. However, Ross and Cousins (1995) argue that the benefits of receiving an explanation are contingent on the helpee requesting
appropriate help, receiving the appropriate explanation, and being able to apply it to the learning task and obtaining corrective feedback. Webb, Troper, and Fall (1995), in a study of student behaviours that best predicted mathematics learning in small groups, found that students had to receive explanations instead of less elaborated help and they had to have the opportunity to apply that help in a constructive, problem-solving activity. In fact, the more a student was engaged in generating a solution to a problem, the more he or she was likely to obtain a high score on the post-test. The sequence of behaviours necessary for learning when a student needs help included receiving explanations instead of non-explanatory help and using the explanation received in a constructive, problem-solving activity.

Receiving unsolicited explanations can also benefit the receiver. When children work together in groups, they often develop an intuitive sense of other’s needs and provide help when they perceive it is necessary (Gillies & Ashman, 1996). Such help may be beneficial because it is timely, relevant to the student’s need, correct, and in sufficient detail to be useful to the recipient (Webb et al., 1995). Forman (1989) referred to this as ‘proleptic instruction’ (p. 57) or teaching that occurs when a more able student perceives another student is ready to learn and will be able to do so when assistance is provided. Gillies and Ashman (1998) proposed that this type of helping behaviour may denote groups in which members are more empathic, more committed to each other, and hence, more willing to support each other’s endeavours.

_Type of task_

The type of task assigned to the group determines how members interact. Cohen (1994) argues that when the task is well structured so that the procedure for finding the solution is clearly explicated, then children only need to exchange information and explanations or request assistance as they work together. For example, many mathematical and computational tasks are well structured but requiring low levels of cooperation, essentially because students do not need to negotiate how to work on the task.

In contrast, when the task is ill structured, students need to discuss how to proceed, the division of labour, and the content required to complete the task. When students work on activities which are more open and discovery-based and where there are no clear solutions, it could be expected that they would demonstrate high levels of cooperative engagement as they worked together on problem-solving tasks (Cohen, 1994). In a study of 782 children’s interactions in Grades 3–8, Hertz-Lazarowitz (1989) reported that when the task required high level cooperation (i.e., interaction was important for productivity), 78% of the interaction involved higher level thinking behaviours (i.e., applicative or evaluative comments), while in low level cooperative tasks, only 44% of the interaction involved higher level thinking behaviours. Shachar and Sharan (1994) found that when students were involved in cooperative activities that encouraged them to use language as a medium with which to represent their ideas, relate to others, discuss how to proceed, and to restructure their ideas in the light of the different perspectives of others, they used a more divergent range of thinking strategies including more sophisticated thinking strategies. These strategies ranged from thinking about abstract and hypothetical topics through to the more extensive strategies required for organising and structuring their thoughts and the ideas of their peers with
whom they are communicating. In effect, these studies suggest that high level cooperative tasks promote greater levels of interactions and higher level thinking behaviours.

While the type of task is important for promoting children’s interactions in groups and interactions are important for learning, many of the studies on cooperative learning focus on children in the upper primary grades with few focusing on children in the lower grades. This is a concern because research on young children’s relationships in their families indicates that they demonstrate the ability to cooperate with others before two years of age, to offer unsolicited help, and to participate in cooperative play involving shared goals. In essence, they become attuned to social rules and demonstrate an intuitive sense of the needs of others at a very early age (Cooper & St. John, 1990; Dunn, 1988; Dunn & Kendrick, 1982).

As they mature, children help others by expertly scaffolding and providing hints and guidance on how to solve problems (Cooper & St. John, 1990). Certainly, others (e.g., King, 1994; Gillies & Ashman, 1996) have observed such helping interactions when children work together and Yackel, Cobb, and Woods (1991) have reported that such interactions were observed among second-grade students working on problem-solving tasks in small groups.

Although research indicates that very young children cooperate and assist each other’s learning, there is only one study known to the author that has documented these behaviours in young elementary children as they work together in groups. Gillies and Ashman (1998), in a study on the behaviour and interactions of 184 children in Grade 1 (i.e., the second year of schooling), reported that children who were trained to work together exhibited more cooperative and helping behaviours than their untrained peers and these behaviours were maintained across the school year. The purpose of this study is to build on this research and determine if children who have been trained to cooperate and help each other exhibit these behaviours in reconstituted groups in the following school year without additional training (see Gillies & Ashman, above, for details of the initial year’s cooperative experience). The specific questions this study sought to answer were: (a) Do children who have previously been trained to cooperate demonstrate more cooperative and helping behaviours in their groups than children who have not been trained? (b) What is the effect of prior training on children’s learning?

**Method**

**Participants**

One hundred and forty-four children in Grade 2 (third year of schooling) from nine schools in a similar socio-demographic area of Brisbane, Australia, participated in the study. The children were identified as having high (males 20, females 16, mean age = 95.9 months), medium (males 40, females 40, mean age = 95.2 months), or low ability (males 12, females 16, mean age = 93.0 months) based on their performance scores on the Otis-Lennon School Ability Test (Otis & Lennon, 1993). Stratified random assignment occurred within each class so that each group consisted of one high ability student (top quartile), two medium ability students (quartiles 2 & 3), and one low ability student (bottom quartile). All groups were gender balanced. Previous research had shown that children are more likely to facilitate each other’s learning in heterogeneous
ability groups (high, medium, low ability) than they are in other gender and ability compositions (Gabbert, Johnson, & Johnson, 1986; Webb, 1985, 1992).

Sixty-four children who had participated in trained group work from the previous year were assigned to the Trained condition and 80 children, who had not previously been trained in cooperative group skills, were assigned to the Untrained condition (all groups were subject to the stratified random assignment procedures outlined above). All the groups in the Trained condition were reconstituted groups drawn from the pool of children who had been in Trained groups from the previous year. None of the Trained groups remained intact from the previous year but all trained groups consisted of individuals who had previously been trained in cooperative group behaviours.

Trained groups
The children who participated in the Trained group activities had previously received training in cooperative group behaviours believed to facilitate group interaction. The specific behaviours the children had been taught included: learning how to share tasks fairly so each group member had a smaller task to complete as part of the larger group task, encouraging each member to accept responsibility for their task, using appropriate interpersonal skills, and sharing resources fairly.

These behaviours had been taught to the children in the previous school year by their teachers in two training sessions designed to teach small group procedures and the interpersonal behaviours believed to facilitate cooperation. Each training session lasted one hour and was conducted by the classroom teachers over two consecutive days. The children had then worked together in their groups for a six-week period over three school terms. However, these groups did not remain intact in the following year (the year of the current study) and the children were reassigned to reconstituted groups. The children in the reconstituted groups did not receive additional training apart from the general guidelines for appropriate group behaviour given by their teachers. However, the teachers did provide the children with the opportunity to work together in their groups and generate their own list of behaviours which would be appropriate for working together. These behaviours were recorded on a group summary sheet and later shared with the whole class (Webb & Farivar, 1994). Following this activity, the teachers provided information about the social studies activities the children would undertake in their groups and the resources available. The teachers provided the children with the opportunity to work in their groups for a minimum of three sessions per week for the duration of each social studies work unit (approximately six weeks).

Untrained groups
The children who participated in the Untrained groups had not previously received any specific training in cooperative group behaviours. However, the children were given the opportunity to work together and generate their own list of group behaviours that they thought would be appropriate for working together. These behaviours were recorded on a group summary sheet and discussed with the whole class. The teachers also provided the children with general classroom guidelines for appropriate group behaviour as well as information about the social studies activities the children would undertake in their groups and the resources available.
**Small group activities**

The small group, social studies activities were informed by Bloom’s (1956) taxonomy of educational objectives and were designed to encourage the children to think about different ways of solving problems. For example, a problem-solving activity on learning about other cultures involved the following types of tasks: List the name of a country that you have learned about recently (Recall); Why do you think it is important to learn about other countries? (Comprehension); What benefits have we obtained from working with our Asian neighbours (countries)? (Application); How are we the same and how are we different from the Asian countries? (Analysis); Imagine you have the opportunity of visiting one of these countries for a time. What would you say when you came back? (Evaluation). This last activity requires the children to consider different experiences, situations, and perspectives and is more difficult cognitively than the previous questions. All group activities were open-ended (i.e., no correct answer) and the children were required to discuss not only the content but also the processes involved in completing the activity.

**Instruments**

The Otis-Lennon School Ability Test (OLSAT) (Otis & Lennon, 1993). This is a group administered test designed to measure verbal, quantitative, and figural reasoning skills that are closely related to school achievement. This complex of abilities is assessed through performance on such tasks as detecting similarities and differences, solving analogies and matrixes, classifying, and determining sequence. The OLSAT comprises seven levels (Levels A-G) and two forms that collectively assess the range of abilities from Kindergarten through to Grade 12.

Level C (Grade 2) involves both verbal comprehension and reasoning tasks and figural and quantitative reasoning tasks. Reliability coefficients for alternative forms of the test range from .90 to .94. Raw scores were obtained by counting the number of correct answers and the total scores were converted into stanine scores. Stanine scores were used to reduce the likelihood of overestimation of small unreliable differences as may occur in finer scales such as IQ points and percentiles. For the purposes of this study, children with the following stanine scores were categorised as low ability (stanine 1–3), medium ability (stanine 4–6), high ability (stanine 7–9).

**Group observations.** Two schedules were developed to compile information on student behaviour states and verbal interactions during recorded group sessions. The Behaviour States schedule examined the following behaviours: (a) Cooperative behaviour (broadly defined as all positive social activity such as task-oriented, socially-oriented, and active listening); (b) Non-cooperative behaviour (non-compliance); (c) individual task-oriented behaviour (working on task alone); and (d) individual non-task behaviour (confusion and non-participation). Momentary time sampling was used to record the occurrence of behaviour within each category at 10-second intervals for group members over a period of 10 minutes. Only the behaviour that was observed at each 10-second interval for the child who was being observed was recorded. In total, 15 observations were recorded for each group member.

The Verbal Interaction schedule identified student interactions which occurred in the group activity. The seven interaction variables were: (a) directives (e.g., points finger and says ‘Look, there; Do it this way’); (b) unsolicited explanations (explanations
provided when they were not requested); (c) unsolicited terminal responses (usually monosyllabic responses); (d) interruptions (calling out and disrupting others); (e) solicited explanations (requests for help that are detailed and elaborate); (f) solicited terminal responses (short ‘yes’ or ‘no’ responses following requests for help); and (g) non-specific interactions (all other speech which could not be categorised into any of the previous categories). The occurrence of verbal interactions according to interaction type was tallied and coded according to frequency across the recorded group session (10 minutes). Two observers, blind to the purposes of the study, coded a common three hours of videotape. Inter-observer reliability ranged from 89–93% across the Behaviour States and 80–87% across the Verbal Interactions.

**Cognitive language strategies** This schedule (adapted from Sharan & Shachar, 1988) focused on the cognitive language strategies used by students during the group sessions. These strategies were more content-oriented than the student interaction categories which focused more on the frequency of the use of specific verbal interactions. The six cognitive category variables coded were: (a) repeats information (i.e., repeats, almost mechanically, what someone else has said); (b) unstructured idea (states a relevant fact); (c) concrete idea (states a relevant fact); (d) explanation with evidence (provides a reason); (e) generalises information (explicates a conclusion or principle based on current information discussed); (f) evaluative comment (considers and evaluates multiple sources of information to arrive at an answer). Three hours of common videotape was coded by the observers mentioned above to establish inter-observer reliability. Inter-observer reliability on the frequency of different categories in children’s language ranged from 73–81% across the cognitive language strategy variables.

**Learning outcomes questionnaires.** A set of question stems, adapted from a set of generic questions developed by King (1990, 1991, 1994) which formed part of a pool of question stems developed by Gillies and Ashman (1998), was used to assess how the children were using different problem-solving skills to make connections between information presented during their small group activities. Some question stems required the children to integrate content presented to arrive at a conclusion while others required the children to integrate new information into previous understandings and knowledge. For example, the following question stems were used to tap basic details or facts ‘What is . . .?; List as many . . .’ (What is the name of an Asian country to the north of Australia?). Questions designed to assess the children’s understanding of a problem began with the following: ‘What do you think . . .? Why . . .? Explain how . . .?’ (What would have happened if there had been a land-bridge from Asia to Australia?). Questions designed to assess the children’s abilities to apply information began with the following stems: ‘Examine the . . .; How was . . . different from . . .?’ Questions which required the children to analyse information began with the stem ‘Compare . . . with . . .’ (Compare the different ways the Chinese and Australians compare food. How are they different?). A question that required the children to synthesise information was: ‘If you were going to live in China for a year, what planning would you need to do?’ An evaluative question (based on this theme) would begin with the stem: ‘Select and justify . . .’ (Select the things you would take with you for your stay. List your reasons for taking these things. Be prepared to justify your selection.). The set of generic question stems were used as a guide to help the class teachers to develop
their own set of six, hierarchically ordered questions to assess the children’s capacities to integrate new information presented in the group activities to develop new understandings and learnings. The questionnaires were examined by three experienced teachers who reported that they covered equivalent content, accurately reflected the material within the social studies programme, and were representative of the six levels of Bloom’s taxonomy. All questionnaires were marked by the class teachers as part of their regular assessment process; however, all responses were checked by two teacher raters. Inter-rater (class teachers and two teacher raters) agreement on the marks obtained was initially 98%. However, when disagreements arose, the teacher raters discussed the marking with the teachers concerned so that both the teachers and the raters were in full agreement.

Children were assigned a learning outcome score from 1 (basic recall of fact/s) to 6 (more complex evaluative response) depending on the highest level response they were able to generate that was correct. For example, if a child was able to answer a comprehension question correctly but was unable to answer questions at a higher level, then a learning outcome score of 2 (indicating the second level of response) was assigned.

Procedure
Discussions were held with participating classroom teachers on the assignment of students to groups (e.g., groups were to consist of one high, two medium, and one low ability student), the procedure for establishing the groups (e.g., four-person, gender-balanced groups) and the planned small-group activities based on the social studies curriculum. The general ability test (Otis & Lennon, 1993) was administered by two experienced teacher raters (not the class teachers) to those children who had not participated in the previous year’s study (mentioned previously). Three experienced teachers examined the comprehension questionnaires (mentioned above) for equivalence and accuracy. This questionnaire was administered twice, once prior to the commencement of the study, but following an introductory work unit, and again following the final work unit. The class teachers marked the children’s responses although all responses were checked by the two teacher raters.

The teachers of the children in the Trained and Untrained conditions did not receive any specific training in cooperative group behaviours needed for children to work successfully in small groups; however, the author did spend time talking to them individually about small group activities, the importance of the children cooperating, and the procedures for monitoring the groups’ progress. Four of the teachers of the children in the Trained condition had received training in the previous year in the skills needed to sustain cooperative group behaviours.

The children in both conditions worked in their groups for a minimum of three times per week (approximately 1 hour) for one unit of work each school term over three terms. Each teacher was asked to follow the same procedures for introducing the activity, modelling approaches to working on it, and providing follow-up practice (Webb et al., 1995). The teachers also reminded the children of the importance of working together to help each other and only seeking help from the teacher when others in the group were unable to help.

The children were videotaped for 10 minutes once each term (i.e., Times 1–3) as they
worked in their groups. Videotaping usually occurred in the final 5–6 week of each unit of work.

**Unit of analysis.** Like Webb and Farivar (1994), I believe that interest lies in investigating the effects of the group experience on the individual, particularly the effects of previous training on children’s behaviours and interactions in their new groups. Hence, the unit of analysis in this study is the individual rather than the group.

### Results

**Table 1.** Means and standard deviations of the frequency of Behaviour States for the Trained and Untrained conditions across Time (1–3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Trained condition</th>
<th>Untrained condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 64)</td>
<td>(N = 80)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cooperation</td>
<td>M</td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.6</td>
</tr>
<tr>
<td>Non-cooperation</td>
<td>M</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.5</td>
</tr>
<tr>
<td>Individual task-oriented</td>
<td>M</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.4</td>
</tr>
<tr>
<td>Individual non-task</td>
<td>M</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.7</td>
</tr>
</tbody>
</table>

To determine if there were significant changes in the Behaviour States of the Trained and Untrained groups over time, a group × time multivariate analysis of variance (MANOVA) with a repeated measure on the last dimension was run on the data. The MANOVA for the Behaviour States was not significant, $T^2 = .05, F(8, 284) = 1.80, p > .05$, indicating that there were no changes in the students’ behaviour states over the duration of the study.

However, in order to determine if there were differences between the groups on the Behaviour States at Times 1, 2, and 3, three multivariate analyses of variance (MANOVAs) were conducted. A MANOVA conducted on the results at Time 1 was significant, $T^2 = .16, F(4, 142) = 5.90, p < .001$, demonstrating that there were clear differences between the groups after the first 5–6 weeks of interacting together even though the trained group had not received additional training in cooperative group behaviours. An examination of the univariate results showed that there were significant differences between the groups on Cooperation, $F(1, 142) = 18.60, p < .001$, Non-cooperation, $F(1, 142) = 6.60, p < .05$, Independent task-oriented, $F(1, 142) = 8.40, p < .01$, and Independent non-task, $F(1, 142) = 8.40, p < .001$.

These differences between the groups also were evident at Time 2 ($T^2 = .43, F(4, 142)$...
and again the univariate results were significant (Cooperation, $F(1, 142) = 54.10, p < .001$, Non-cooperation, $F(1, 142) = 37.10, p < .001$, Independent task-oriented, $F(1, 142) = 21.20, p < .001$, and Independent non-task, $F(1, 142) = 5.30, p < .05$).

Differences between the groups were also evident at Time 3 ($T^2 = .34, F(4, 142) = 12.00, p < .001$) and again the univariate results were significant (Cooperation, $F(1, 142) = 36.50, p < .001$, Non-cooperation, $F(1, 142) = 25.20, p < .001$, Independent task-oriented, $F(1, 142) = 20.10, p < .001$, and Independent non-task, $F(1, 142) = 6.30, p < .05$).

### Table 2. Means and standard deviations of the frequency of Verbal Interactions for the Trained and Untrained conditions across Time (1–3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Trained condition ($N=64$)</th>
<th>Untrained condition ($N=80$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1 2 3</td>
<td>Time 1 2 3</td>
</tr>
<tr>
<td>Directives</td>
<td>$M$ 2.6 2.8 2.9</td>
<td>$M$ 2.8 3.8 3.1</td>
</tr>
<tr>
<td></td>
<td>$SD$ 2.9 3.0 2.6</td>
<td>$SD$ 2.7 2.3 2.2</td>
</tr>
<tr>
<td>Unsolicited explanations</td>
<td>$M$ 1.9 2.1 2.1</td>
<td>$M$ 1.2 1.0 1.1</td>
</tr>
<tr>
<td></td>
<td>$SD$ 1.7 1.5 1.7</td>
<td>$SD$ 2.5 1.4 1.5</td>
</tr>
<tr>
<td>Unsolicited terminal</td>
<td>$M$ 5.1 3.9 4.5</td>
<td>$M$ 4.5 3.9 3.5</td>
</tr>
<tr>
<td></td>
<td>$SD$ 5.9 4.2 4.3</td>
<td>$SD$ 5.0 4.2 3.8</td>
</tr>
<tr>
<td>Interruptions</td>
<td>$M$ 2.5 2.3 2.9</td>
<td>$M$ 2.0 3.4 3.9</td>
</tr>
<tr>
<td></td>
<td>$SD$ 4.6 5.0 6.3</td>
<td>$SD$ 6.3 6.2 6.3</td>
</tr>
<tr>
<td>Solicited explanations</td>
<td>$M$ 1.3 1.4 1.5</td>
<td>$M$ 0.6 0.5 0.5</td>
</tr>
<tr>
<td></td>
<td>$SD$ 1.4 1.6 1.6</td>
<td>$SD$ 1.3 0.9 1.1</td>
</tr>
<tr>
<td>Solicited terminal</td>
<td>$M$ 7.9 8.0 7.1</td>
<td>$M$ 8.5 6.5 5.6</td>
</tr>
<tr>
<td></td>
<td>$SD$ 7.5 8.7 7.4</td>
<td>$SD$ 10.0 7.5 6.4</td>
</tr>
<tr>
<td>Non-specific interactions</td>
<td>$M$ 10.5 9.5 10.2</td>
<td>$M$ 9.3 9.3 8.9</td>
</tr>
<tr>
<td></td>
<td>$SD$ 8.2 7.8 8.0</td>
<td>$SD$ 8.0 6.8 6.8</td>
</tr>
</tbody>
</table>

An examination of Table 1 shows that the children in the Trained groups were more cooperative and less non-cooperative than their peers in the Untrained groups and they displayed less individual (working by self) and non-task behaviour than their untrained peers. Furthermore, they consistently demonstrated these behaviours across Times 1, 2 and 3.

In order to determine if there were differences in Interactions between the two groups over the duration of the study, a group × time MANOVA was run on the data and a significant result was obtained, $T^2 = .09, F(14, 284) = 1.90, p < .05$. However, only one univariate result was significant, Solicited terminal, $F(2, 284) = 4.00, p < .05$, indicating there were few changes in the students’ interactions over time.

In order to determine if there were differences between the groups in Interactions at Times 1, 2, and 3, three MANOVAs were conducted. A MANOVA conducted on the results at Time 1 was significant, $T^2 = .18, F(4, 142) = 3.50, p < .01$, demonstrating that there were clear differences between the groups from early in the study. An examina-
tion of the univariate results showed that Solicited explanations was significant, $F(1, 142) = 10.40, p < .01$.

Differences between the groups were again evident at Time 2 ($T^2 = .40, F(7, 142) = 7.90, p < .001$), permitting an examination of the univariate results. The following results were significant: Directives, $F(1, 142) = 4.80, p < .05$, Unsolicited explanations, $F(1, 142) = 21.50, p < .001$, and Solicited explanations, $F(1, 142) = 33.30, p < .001$.

Differences between the groups were also found at Time 3 ($T^2 = .22, F(7, 142) = 4.30, p < .001$), permitting an examination of the univariate results. Two univariate results were significant: Unsolicited explanations, $F(1, 142) = 16.40, p < .001$, and solicited explanations, $F(1, 142) = 16.60, p < .001$.

An examination of Table 2 shows that the children in the Trained groups gave more solicited and non-solicited explanations than their peers in the Untrained groups. Furthermore, they consistently demonstrated these differences in interactions across the three observation points (Times 1–3).

**Cognitive language strategies.** To determine if there were differences in the frequency with which the children in the Trained and Untrained groups demonstrated different cognitive strategies in their language as a result of the group experience, a MANOVA was conducted on the data collected at Time 3 (six hours of video data). The MANOVA yielded a significant multivariate statistic, $T^2 = .18, F(6, 142) = 4.43, p < .001$, allowing for an examination of the univariate results (see Table 3 for a summary of the univariate results). An examination of Table 3 shows that while the children in the Untrained group more often repeated information (lowest level cognitive strategy) than their peers in the Trained group, it was the children in the Trained groups who provided more concrete ideas, explanations with evidence, and evaluative statements (higher level cognitive strategies).

**Learning outcomes questionnaire.** The children’s scores on learning outcomes questionnaires were analysed in two, one-way analyses of variance (ANOVA). While the ANOVA at Time 1 was not significant, $F(1, 63) = .80, p > .05$, the ANOVA at Time 2 was significant, $F(1, 63) = 7.50, p < .01$. An examination of the means of the pre- and post-test learning outcomes scores (Pretest: Trained group $M = 4.20, SD = .80$; post-test: $M = 4.70, SD = .80$) shows that the children in the Trained group made significantly greater gains in learning outcomes than their peers in the Untrained group.

### Table 3. Means and standard deviations of the frequency of Cognitive Language Strategy Behaviours for the Trained and Untrained conditions at Time 3

<table>
<thead>
<tr>
<th>Category</th>
<th>Trained condition</th>
<th>Untrained condition</th>
<th>$F$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Repeats information</td>
<td>1.2</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Unstructured idea</td>
<td>0.8</td>
<td>1.4</td>
<td>0.7</td>
</tr>
<tr>
<td>Concrete idea</td>
<td>3.6</td>
<td>3.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Explanation with evidence</td>
<td>0.9</td>
<td>1.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Generalises information</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Evaluates</td>
<td>0.1</td>
<td>0.3</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* $p < .05$; *** $p < .001$
Untrained group $M = 4.00, SD = 1.20$; Post-test: Trained group $M = 5.10, SD = 0.95$; Untrained group $M = 4.20, SD = 1.50$) showed that the children in the Trained group obtained higher outcome scores than the children in the Untrained group.

**Discussion**

This study investigated whether children who had been trained to cooperate and help each other demonstrated these behaviours in reconstituted groups in the year following training without additional training. The results show that there were very clear differences between the Trained and the Untrained groups and these differences were maintained over the duration of the study. The children who had been trained to cooperate and help each other were more cooperative than their untrained peers. They were more willing to attend to each other as they spoke, share ideas and resources, and generally behave in a way that helped each other to learn. Comments such as ‘Here they are’, ‘Let her have a go’, and ‘He’s going to pass it round’ (i.e., pass the book around for all to see and use) were typical of the remarks made by the children as they worked in their groups. In contrast, the children in the Untrained groups were less cooperative and exhibited more non-task or individual (working away from the group) behaviours. They showed less willingness to be involved in the group, possibly because there appeared to be less warmth and intimacy in the group which may have affected members’ attachment to each other and group cohesion (Smith, 1996). Furthermore, these differences in behaviour between the two groups were maintained across time.

Similarly, there were differences in the interactions of the children in the Trained and Untrained groups. The children who had been trained to cooperate and help each other provided more solicited and unsolicited help in the form of explanations and detailed help. These helping behaviours are often indicative of groups where the children feel more ‘switched on’ to each other’s needs and will pre-empt requests for help by providing assistance before it has been requested (Gillies & Ashman, 1996). When children do this they demonstrate an empathic awareness of each other’s situation, a commitment to each other, and a willingness to facilitate each other’s learning (Gillies & Ashman, 1998). The children in the Trained groups not only initially gave more explanations in response to requests for help, but they also broadened their helping responses by the second and third observation periods to include explanations which were not explicitly requested. In essence, not only demonstrating an intuitive sense of the need to help and support others with whom they worked but also providing scaffolding and guidance for solving the problem on which they were working. Comments such as ‘Maybe you could get this (item) and put it like this (hands used to help position perspective) and it might be OK? If we get these pieces (information from books) and put them here (pointing to where the information needs to be added), it might be right. What do you think?’ were examples of how the children attempted to scaffold and guide each other’s learning without providing the answer. As the helpee responded to the prompts, the helper often stepped back and allowed the learner to try to get it right. Hence, through a process of guidance, modelling, and support, and then gradually tapering off on the support, the learner was able to develop competence with the task (Rosenshine & Meister, 1994). In fact, Webb et al. (1995) argue that if learning is to occur group members should be encouraged to give each other explanations and
not answers, ensure the explanations are understood, and provide the opportunity to solve problems without assistance.

An examination of the language showed that the children in the Trained groups used higher level language strategies, such as providing ‘concrete ideas to explain a point’, ‘explanations with evidence’, and ‘evaluative statements’, than their peers in the Untrained groups. This may have been because they gave more solicited and unsolicited explanations which may have required them to use language differently as they sought to explain new ideas and experiences. In fact, Barnes (1969) argues when this happens students often discover new ways of thinking and feeling.

The benefits of being able to use more sophisticated cognitive language strategies were demonstrated in the responses the children generated on the learning outcomes questionnaire. The results show that the children in the Trained groups used higher level thinking skills to respond to specific problem-solving questions. In fact, many of the children were able to synthesise and integrate information as part of the problem-solving process to develop new understandings and learnings which many of their untrained peers were unable to do.

The class teachers of the children in the Trained groups commented on the ease with which the children worked together, shared ideas and resources, and helped each other. These were behaviours which they believed generally contributed to the learning that occurred. Certainly, when children work cooperatively together, they discuss issues and consider the different perspectives of others which can lead to the construction of new meanings and understandings (Cowie & Rudduck, 1990; Shachar & Sharan, 1994). A limitation of this present study, however, is that it is not clear whether these cooperative behaviours will generalise to other small group activities in other subject areas. This matter is to be raised in future studies.

This study has shown that young children who were have been trained to cooperate and help each other are able to maintain and use these behaviours in reconstituted groups without additional training a year later. The children in the Trained groups were more cooperative and willing to help each by providing explanations to assist other’s understanding even when this help was not explicitly requested. When children work cooperatively together, they develop an implicit understanding of the needs of other group members and actively coordinate their behaviours to ensure these needs are met. In so doing, they may create a group environment that encourages discussion and exploration of ideas as they work together to confront different problem-solving tasks (Smith, 1996). The benefits that emanate include being able to use higher level cognitive language strategies and more sophisticated ways of thinking about issues (Shachar & Sharan, 1994). The results reported here should be encouraging for teachers who express concerns about implementing cooperative group work in classrooms (Cowie & Rudduck, 1990) or the long-term benefits of cooperative group learning.

References


Maintenance of cooperative behaviours


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