REACH Journal of Special Needs Education in Ireland, Vol. 18.1 (2004), 39-49

Implementation of a Cooperative Learning Program With a Child With an Autistic Spectrum Disorder

The aim of this study was to evaluate the social and academic benefits of implementing a Cooperative Learning Program for a child with an Autistic Spectrum Disorder (ASD). The child's levels of social and academic engagement during baseline and CL sessions were measured. Observation data indicated substantial rises in social engagement with peers. Parents and the teacher reported that the program had social benefits for the target child confirming results from behavioural data. The teacher also reported that levels of academic engagement were maintained during CL sessions. Recommendations for future interventions are outlined.

ELLEN MURPHY is a Research Assistant in the Department of Psychology Trinity College, Dublin. IAN M. GREY is a Senior Clinical Psychologist with Stewarts Hospital Services and Trinity College Dublin. RITA HONAN is a Senior Lecturer in the Department of Psychology, Trinity College, Dublin.

INTRODUCTION

Cooperative Learning (CL) is a tool which has been found to be successful in increasing levels of social and academic engagement between special needs students and typically developing peers in the classroom (McMaster and Fuchs, 2002; Jenkins and O'Connor, 2003). Central to CL is the implementation of a small number of essential elements to ensure that students work not simply as a group but also in an interdependent manner whereby each student contributes equally (Mercer and Mercer, 1998).

The major advantages associated with Cooperative Learning are its dual emphasis on academic and social learning along with its ability to accommodate heterogeneous groups (Antil, Jenkins, Wayne and Vadasy, 1998). The Conceptual Approach/ Learning Together Model (Johnson and Johnson, 1991; 1994) is one of the more popular and basic models of Cooperative Learning. This model is not tied to any specific curriculum and emphasizes five elements as being essential to the implementation of Cooperative Learning: positive interdependence, individual accountability, face-to-face interaction, cooperative skill training and group evaluation (Putman, 1998).

While CL has been advocated as a tool that produces both academic and social benefits, a recent large scale review examining the academic benefits of CL produced ambiguous results (Tateyama-Sniezek, 1990; McMaster & Fuchs, 2002). Earlier studies however often only used formal academic tests to assess academic outcomes. In recent studies, multi-faceted evaluation methods have been used to determine the efficacy of CL programs. These have utilized observational methods of evaluation and have generally reported increased levels of academic and social engagement (Piercy, Wilton and

Townsend, 2002; Nixon, 1999; Dugan, Kamps, Leonard, Watkins, Rheninberger and Stackhaus, 1995; Kamps, Leonard, Potucek and Harell-Garisson, 1989). Teacher interviews suggest however that social benefits are more pronounced than academic gains (Jenkins and O'Connor, 2003). Evaluation of CL programs using peer acceptance measures have produced ambiguous results (Nixon 1999; Piercy et al., 2002).

In respect of inclusion of children with special needs, factors characteristic of effective groups include careful selection of typically developing peers, teaching cooperative learning social skills to all group members and supervising group functioning during group work. In particular, two practices seem to disrupt group functioning: adult assistance and modifying assignments during group work. According to Walters (2002), implementation of models of CL that promote interdependent work and individual accountability are consistently found to lead to gains in social and academic engagement. It was revealed by Antil et al. (1998) in their review of how twenty-one teachers implemented cooperative learning that many teachers failed to implement basic elements. It is therefore impossible to conclude whether an intervention is successful or not when it is not implemented correctly in the first place.

Within special education circles, CL is one of the most frequently recommended teaching methods for aiding inclusion of students with disabilities in regular education classrooms (Jenkins and O'Connor, 2003). Only two previous empirical studies however could be located in which CL was implemented specifically with children with an Autistic Spectrum Disorder ASD (Kamps et al., 1989; Dugan et al., 1995). The purpose of this study therefore is to investigate the social and academic benefits of CL for a child with an ASD.

METHOD

Subjects

An eight year old boy with an ASD was chosen to be the focus of the intervention. While Tom[1] does not exhibit behavioural difficulties, he lacks confidence and can be shy around unfamiliar peers. Three typically developing children were selected from a class at a similar academic level to Tom. Two girls aged seven years and one boy aged eight years were chosen as participants. Parental consent was sought and granted in each case.

Procedures

The special needs teacher, the mainstream teacher and one of the researchers held an initial meeting. The teachers chose Science as the target subject because it was felt this subject would be suitable for group work. The teachers chose a number of topics from the Science curriculum and agreed to conduct seven classes on these topics at the same class times over a four-week period. Therefore, the typically developing peers left their classroom for seven thirty-minute sessions and covered the same academic topics as their classmates in the mainstream classroom. This procedure ensured that while the three typically developing children were being taught in a different manner, they would not lose out academically.

[1] Pseudo name of Tom has been used to protect child's identity.

Baseline
Tom and the three typically developing peers attended three thirty minute classes in the special needs classroom taught by the special needs teacher in a traditional teaching style (i.e. there was not an emphasis on child interaction). These three classes covered the topic of seasons of the year. All sessions were videotaped.

Cooperative Learning Sessions
The authors made a proposed plan for implementation based on their review of the research on CL. The lesson plan (See Table 1) was discussed with the special needs teacher. The plan incorporated all the elements which should be included in a CL lesson (see Table 1). Implementation of each element was also discussed with the teacher.

Insert Table 1 About Here

The researchers constructed the plan based on the 'learning together'/'conceptual' approach (Johnson and Johnson, 1991; 1994). The special needs teacher implemented the four cooperative learning sessions using four different activities, a cutting and pasting exercise, a group experiment, a group worksheet and an object arrangement exercise. Each of the four activities addressed a particular Science topic. All sessions were videotaped.

Typically a cooperative learning session consisted of three subsections: the introductory period, group work and group evaluation. The first part of a cooperative learning session was typically spent creating the conditions for cooperative learning. The teacher explained that the students would be working together as a group towards a common goal. The group was then encouraged to choose a group name, each child's group role was decided on and the children were asked to decide what they would like their group reward to be on completion of task. Children often chose ten minutes of playing a certain sport together at the end of the session. After the cooperative learning conditions were put in place, the group task was explained. The aforementioned procedures usually took a minimum of ten minutes. During the next ten to fifteen minutes, group work took place. The teacher usually went to another area of the room and did not interfere with group work. During the final five to ten minutes the teacher returned and helped the group to evaluate their group work using an evaluation sheet.

Evaluation Methods
Three thirty-minute baseline sessions and four thirty-minute cooperative learning sessions were videotaped. Each thirty-minute session was broken down into 180 ten- second intervals. Each interval was analysed for the absence or presence of two dependent measures: (i) social engagement, and (ii) academic engagement. Social engagement was defined as engagement with another child/other children in conversations or seeking/receiving/giving help, task materials, affection or praise (Piercy et al., 2002). Academic engagement was defined as task participation, either verbal or non-verbal, which was of a passive and/or active nature. Active academic engagement behaviours included writing, task participation, reading aloud, talking about academic material or answering relevant questions. Passive academic engagement was defined as passive listening or

observation of lesson but without an overt student response (i.e verbally or physically initiating or responding). Students were required to be looking either at the teacher or at the task in hand. The benefits of CL were also assessed through semi-structured interviews with the special needs teacher, with Tom's parents and with the parents of the typically developing children.

RESULTS

Insert Table 2 About Here

Table 2 details Tom's social and academic engagement during each observation session. During baseline sessions Tom's levels of social engagement with typically developing peers ranged from 1% to 9% and averaged at 4%. Percentages of social engagement during each stage of cooperative learning sessions are detailed. Cooperative Learning group work essentially occurred in the middle section of each session. The figures marked in bold are the primary figures of interest. Tom's levels of social engagement increased substantially during CL sessions. During CL group work Tom's levels of social engagement ranged from 17% to 73% and averaged at 52%. As Figure 1 illustrates, levels of engagement during the third CL session are considerably lower than in the other three sessions. Levels of social engagement dipped to 17% during the third session. Unlike the other three sessions a worksheet format was used. However, Tom's reading and writing skills are weak and he withdrew and did not get involved.

Insert Figure 1 About Here

Tom's levels of academic engagement and on-task behaviour ranged from 88% to 99% and averaged at 92% during baseline sessions. Academic engagement dropped somewhat during cooperative learning group work ranging from 64% to 91% and averaging at 82%. The figures demonstrate that levels of academic engagement were more variable during CL sessions than during baseline sessions.

Insert Table 3. About Here

Table 3 provides a breakdown of percentage engagement in different types of academic behaviours across observation sessions. Group work percentages during cooperative learning sessions again are the primary figures of interest. As expected, Tom's levels of passive academic engagement declined across conditions from an average of 40% during baseline to an average of 18% during CL group work. Tom's levels of active academic engagement increased somewhat across conditions from an average of 51% during baseline to an average of 68% during CL sessions. Academic engagement with other children is a subcategory of active academic engagement. Most change was evident with this academic engagement subcategory. Average levels of academic engagement with other children increased from an average of 3% during baseline to an average of 44% during CL group work. To summarise, levels of social engagement increased substantially during CL group work and levels of academic engagement were almost maintained.

In terms of parental and teacher reports, the teacher who implemented the program reported that Tom had "certainly benefited socially." More specifically he stated that Tom "understood that work needed to be done, yet was able to have great chats whilst the work was carried on." The teacher felt that he had covered the same amount of academic material as the mainstream class had and even more 'hands-on' academic work. Tom's parents reported that he had enjoyed the experience and developed new friendships. Furthermore, both the teacher and Tom's parents felt his self-esteem had increased as a result of the program. Parents of the three typically developing peers reported their children enjoyed taking part in the program.

DISCUSSION

The intervention demonstrated that CL was a successful strategy for augmenting levels of social engagement for a child with an ASD. Multiple evaluation methods confirmed the effectiveness of the intervention. Observational data indicated that Tom's levels of social engagement increased from an average of 4% during baseline to an average of 52% during CL group work. Levels of social engagement were considerably lower in the third CL session than in the other three sessions. The reasons for lower levels of social engagement during this particular session are easily identifiable. The particular session in question was the only one in which a written worksheet format was used. It emerged that Tom's reading and spelling were not as strong as those of the other group members and he was unable to complete the worksheet. As a consequence, he withdrew from the group and remained on the periphery despite encouragement from the others to become involved. This finding demonstrates how essential it is to assign group tasks that children can complete successfully. Establishing the target child's reading and writing levels at the outset of the intervention is also essential.

While Tom's levels of academic engagement did not increase during CL sessions, levels remained almost as high as in baseline sessions except during the second cooperative learning session. The group task took the form of an experiment during that particular session. Group roles were less well defined during this session than in other sessions. While social engagement was relatively high during this particular session, it may have been at the expense of academic engagement. In general, academic engagement remained at a relatively high level across CL sessions.

Previous literature has revealed the importance of implementing certain essential elements of CL. While the teacher implemented a number of the essential elements and followed the lesson plan guide during each CL session, during no CL session were all elements implemented as planned. CL sessions certainly ran more successfully the more carefully the teacher followed the plan during a particular session. This finding suggests that when a teacher is implementing CL and while they may aspire to including all essential elements, it may not always be possible.

A number of factors were identified as being associated with successful implementation of CL throughout this evaluation. It emerged that children should be assigned roles as opposed to letting them choose roles because assigning roles saves time and gives the teacher the opportunity to assign the target child to a particular role. The target child should be assigned a strong role that places him/her at the centre of the group task. In addition the target child should be physically placed in the middle of the other children. Peripheral physical placement often led to less involvement. The children should also be very clear as to what their roles are at the outset and roles should be created that make the children interdependent on each other. It should be ensured that the group task chosen is a task that children are capable of completing, so they will not have the need to consult with the teacher too regularly. At the outset it was stated that both monitoring the group and standing back from the group to let children interact without interference are two factors associated with success. In reality however, it is difficult to achieve a balance between these two factors. Throughout this program, the teacher went to another area of the room with other children while group work was taking place. This certainly facilitated the high levels of social engagement observed. However monitoring is also important to ensure children stay on task. During this program, the teacher let the children choose ten minutes of playing a particular sport at the end of the session as a group reward. These rewards were extremely popular and created a good group spirit amongst the children. Finally, the teacher chose Science as the target subject as she felt this would lend itself to group work. It is important to choose a subject which lends itself to group work.

The conclusions that can be drawn from this study are limited, due to the relatively brief duration of the intervention. In addition, the intervention was implemented with only one child with an ASD. It is not possible to conclude whether these results would generalize to the same extent to other children with an ASD. The results of this study suggest, however, that Cooperative Learning is potentially a very useful tool for increasing the social engagement with their peers of children with an ASD. The extra academic benefits of CL over traditional teaching are somewhat questionable. Clearly, further studies that incorporate the factors identified above and that address the issue of generalization to other subjects, students and settings are needed.

Acknowledgements
The authors would like to thank the staff, parents and pupils of Lucan Educate Together School who participated in this intervention.

REFERENCES

Antil, L.R., Jenkins, J.R., Wayne, S.K. and Vadasy, P.F. (1998) Cooperative Learning: Prevalence, Conceptualisations, and the Relation Between Research and Practice, *American Educational Research Journal*, Vol. 35 (3), pp. 419-454.

Dugan, E., Kamps, D., Leonard, B., Watkins, N., Rheninberger, A. and Stackhaus, J. (1995) Effects of Cooperative Learning Groups During Social Studies for Students

with Autism and Fourth-Grade Peers, *Journal of Applied Behaviour Analysis*, Vol. 28 (2), pp. 175-188.

Jenkins, J.R., Antil, L.R., Wayne, S.K. and Vadasy, P.F. (2003) How Cooperative Learning Works for Special Education and Remedial Students, *Exceptional Children*, Vol. 69 (3), pp. 279-292.

Jenkins, J.R. and O'Connor, R.E. (2003) Cooperative Learning for Students with Learning Disabilities: Evidence from Experiments, Observations, and Interviews. In Graham, S., Harris, K., and Swanson, L. (eds) *Handbook of Learning Disabilities*, New York: Guilford, pp. 417 –430.

Johnson, D.W. and Johnson, R.T. (1991) *Learning Together and Alone: Cooperative, Competitive, and Individualistic Learning* (3rd ed), Boston: Allyn & Bacon.

Johnson, D.W. and Johnson, R.T. (1994) *Learning Together and Alone: Cooperative, Competitive and Individualistic Learning* (4th ed), Boston: Allyn & Bacon.

Kamps, D.M., Leonard, B., Potucek, J. and Harell-Garrison, L. (1989) Cooperative Learning Groups in Reading: An Integration Strategy for Students with Autism and General Classroom Peers, *Behavioural Disorders*, Vol. 21 (1), pp. 89-109.

Koegel, L.K., Koegel, R.L. and Dunlap, G. (2001) *Positive Behavioural Support: Including People with Difficult Behaviour in the Community*, Baltimore: Brookes.

McMaster, K.N. and Fuchs, D. (2002) Effects of Cooperative Learning on the Academic Achievement of Students with Learning Disabilities: An Update of Tateyama-Sniezek's Review, *Learning Disabilities Research and Practice*, Vol.17 (2), pp. 107-117.

Nixon, E. (1999) *A Classroom-Based Intervention for Children with Attention Deficit Hyperactivity Disorder: Effects on Social and On-Task Behaviour and Self-Esteem*, M. Litt., University College Dublin.

Piercy, M., Wilton, K. and Townsend, M. (2002) Promoting the Social Acceptance of Young Children with Moderate-Severe Intellectual Disabilities Using Cooperative-Learning Techniques, *American Journal of Mental Retardation*, Vol. 107 (5), pp. 352-360.

Tateyama-Sniezek, K.M. (1990) Cooperative Learning: Does it Improve the Academic Achievement of Students with Handicaps? *Exceptional Children*, Vol. 56, pp. 426-437.

Wolford, P.L., Heward, W.L. and Alber, S.R. (2001) Teaching Middle School Students with Learning Difficulties to Recruit Peer Assistance During Cooperative Learning

Group Activities, *Learning Disabilities Research & Practice*, Vol. 16 (3), pp. 161-173.

ESSENTIAL COOPERATIVE LEARNING ELEMENTS
Interdependence implemented in the form of: (i) Goal Interdependence (ii) Role Interdependence (iii) Resource Interdependence (iv) Identity Interdependence (v) Reward Interdependence
Individual Accountability implemented using (i) Individual tests (ii) Individual questioning
Students Encouraging Each Other to Complete Group Goal (i) Praise incidents in which children do encourage each other
Teaching basic group social skills to children
Evaluation implemented using (i) Group evaluation form

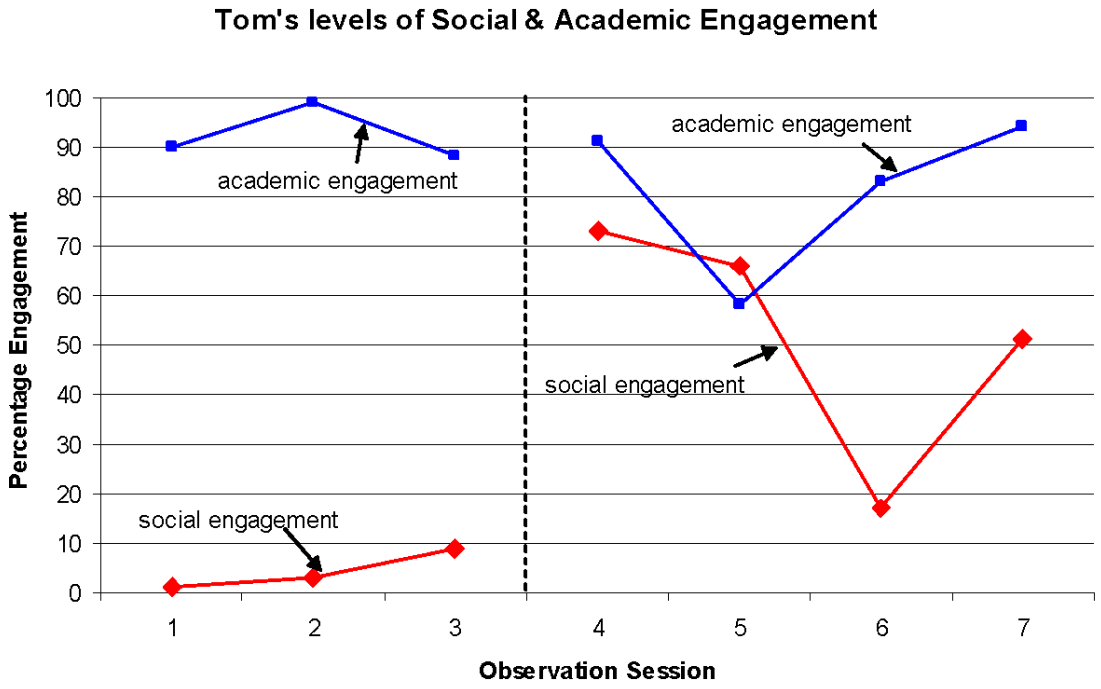
Table 1: List of essential cooperative learning elements

	Baseline 1	Baseline 2	Baseline 3	Average	CL 1	CL 2	CL 3	CL 4	Average
Social Engagement	1%	3%	9%	4%	37%	27%	13%	34%	28%
Introductory section					*9%*	*13%*	*10%*	*17%*	*12%*
Group Work					***73%***	***66%***	***17%***	***51%***	***52%***

Evaluation work					*13%*	*6%*	*11%*	*24%*	*11%*
Acad. Engagement	90%	99%	88%	92%	91%	64%	82%	91%	82%
Introductory section					89%	76%	86%	88%	85%
Group Work					**91%**	**58%**	**83%**	**94%**	**82%**
Evaluation work					88%	59%	72%	88%	75%

Table 2: Percentages of social & academic engagement across baseline and cooperative learning sessions

Figure 1:



	Baseline 1	Baseline 2	Baseline 3	Average	CL 1	CL 2	CL 3	CL 4	Average
Passive. Academic	68%	31%	20%	40%	41%	25%	49%	31%	37%
Introductory section					66%	46%	83%	37%	58%
Group Work					**23%**	**2%**	**29%**	**16%**	**18%**
Evaluation work					20%	28%	38%	49%	34%
Active Academic	24%	61%	67%	51%	53%	42%	39%	55%	47%
Introductory section					28%	37%	20%	31%	29%
Group Work					**76%**	**58%**	**59%**	**78%**	**68%**

Evaluation work					58%	33%	38%	46%	44%
Acad. Engagmt Other children	1%	4%	4%	3%	32%	17%	9%	34%	23%
Introductory section					3%	11%	3%	14%	8%
Group Work					**64%**	**42%**	**15%**	**53%**	**44%**
Evaluation work					21%	0%	11%	27%	15%

Table 3: Percentage academic engagement across baseline and cooperative learning sessions