

Effects of ICT group work on interactions and social acceptance of a primary pupil with Asperger's Syndrome

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Abstract

The aim of this study was to ascertain whether collaborative group work on a computer, facilitated by an adult, could provide a means for a primary schoolboy with Asperger's Syndrome (AS)—moderately-highly affected in all areas of the “triad of impairments”—to develop appropriate task-related interactions with his peers. Data were gathered before, during, and after group work sessions. A combination of interviews and questionnaires established background data and concerns of parent and teachers. Sociometric testing of classmates was used to determine social acceptance and friendship grouping among the child's immediate peer group. During the adult-facilitated ICT sessions an interaction process schedule (IPS) was used to record interactions of the three children involved. The results indicate moderate improvements in the child's ability to interact with his peers, both in social and task-related contexts, as well as a raised social profile among his classmates in general. Although this was a discrete setting, the findings are encouraging and this strategy may be replicated in schools to support mainstream inclusion for children with AS.

Introduction

The ideal of inclusive education envisages children with disabilities participating fully in the social and academic lives of their local neighbourhood schools (Knight, 1999, p. 3). Real participation, however, is problematic: research consistently reports that “students with mild disabilities are not well accepted when included in general education classrooms” (Cook & Semmel, 1999, p. 50).

A child with mild disabilities and without noticeable physical impairments may be rejected by other children on the basis of his or her atypical behaviours (Cook & Semmel, 1999, p. 51). Such rejection may be experienced by a child with an autistic spectrum

disorder (ASD) such as Asperger's Syndrome (AS): four out of five children with AS being educated in mainstream schools were reported to be unhappy, whether because of bullying (21%) or because of teasing (61%) (Cann, 1998, p. 19). Additionally, incidents of exclusion are particularly high for this group of children with reported figures as high as 29% (NAS, 2000, p. 19).

The diagnostic criteria for AS are based on the autistic spectrum triad of impairments: impairment of social interaction; impairment of social communication; and impairment of social imagination, imaginative play and flexible thinking (Cumine *et al.*, 1998, pp. 2–4). The prevalence of AS and other ASDs has apparently increased over the past two decades, but this has been attributed to greater awareness among professionals and increased willingness to diagnose ASD in preschool children (Tebruegge *et al.*, 2004). Despite variation in diagnostic criteria, difficulty in developing interpersonal skills is probably the most noticeable feature of children with ASD:

These children are not antisocial. Rather, they are asocial—at times wanting to be part of the social world, but not knowing how to enter it. But children with Asperger's Syndrome do not pick up social skills incidentally, they need to be specifically taught. (Cumine *et al.*, 1998, p. 39)

The provision of opportunities for a child with ASD to participate in regular structured interactions with more socially competent peers has been strongly advised (Roeyers, 1995). An effective way to achieve such interactions is to involve a child with ASD and a small number of peers in an enjoyable and meaningful activity which should be structured and procedurally facilitated by an adult (Harrison, 1998). The role of the adult facilitator has been stressed in a number of studies (Fisher, 1993; Mercer, 1994; Scrimshaw & Perkins, 1997; Wegerif & Dawes, 2004). The activity needs to be structured, to be consistent with clear expectations and to have a balance between verbal and non-verbal tasks. Computer-centred group work can offer a suitable environment: while children may engage in verbal and non-verbal tasks, the computer provides a third party focus which may alleviate pressure on the child with ASD to interact directly with peers.

Gross (1996) and Loughrey (1991) conducted studies of children with special educational needs (SEN) which found that being involved in collaborative work increased the status of a child with SEN providing that they played a key role in a special project in which they could be successful. Loughrey (*ibid.*, p. 26) noted that teachers claimed:

the children with SEN had gained respect from other pupils and were no longer the class isolates—other children wanted to associate with them and they in turn wanted to participate.

Informative studies have been conducted with children exhibiting emotional and behavioural difficulties using “bubble dialogue” and “social skills training” programmes (Jones, 1996; Jones *et al.*, 1998; Margalit, 1995). However, such programmes require a child to think abstractly in the third person or apply “Theory of Mind”—a core

difficulty for children with ASD (Cumine *et al.*, 1998, p. 21)—rendering these programmes inappropriate for this study.

Crook (1994, p. 181) noted that adventure games are likely to result in more equitable participation when he wrote:

The appeal and accessibility of the narrative structure effectively motivates mutual engagement in the task. Moreover, the pre-set nature of the underlying adventure provides an external authority for evaluating the decisions that collaborators make. Under these circumstances, it seems less likely that asymmetries in the working arrangements will arise.

The focus of the study reported below was on developing peer group participation for a child with AS rather than social skills “training,” so the use of an adventure style game supported by an adult facilitator was deemed appropriate. The study investigated whether computer group work facilitated by an adult could affect the task-related interactions of a child with AS. The adult facilitator, in this instance, was experienced in interacting with children with ASD which was a necessary attribute considering the specific nature of the communication difficulties that such children experience.

Method

The child who is the focus of this study is Ben, a 7.5-year-old boy in year 3 at a mainstream primary school. Following discussions with an Educational Psychologist and Ben's parents, it was agreed “in principle” that Ben could potentially benefit from the group work and his school was then approached with the proposal for this project.

A brief summary of Ben's developmental history provided by his parents and teachers helps to highlight the difficulties he faced. Ben had been diagnosed as having AS and as being moderately-highly affected in all areas of the “triad of impairments.”

Ben was a “model” baby who became unmanageable and aggressive around the age of two. He was unable to socialise at playgroup and was unhappy and fretful. Ben was assessed by the health and education authorities only after the Autumn term of his reception year. Because of unmanageable behaviour, Ben was transferred to a referral unit for the Spring and Summer terms of his reception year and the Autumn term of year 1. During this period, Ben was diagnosed by a paediatrician as having Attention Deficit Hyperactivity Disorder (ADHD). Ben returned to his school for the Spring term of year 1 but was permanently excluded by half term. Ben was home tutored until half-term of the Summer term when he was admitted to another primary school. Ben was diagnosed as having AS at the onset of year 2. Ben received, and continues to receive, 25 h of statemented support for his classroom time each week.

Academically, Ben had particular difficulties with mathematics and creative writing. He was described by his teacher and learning support assistant (LSA) as very vocal but a

personable, friendly boy who attempted to engage his classmates. His greatest difficulties in school were recognised as being able to “pick up” on social cues, form appropriate friendships and to react and participate appropriately in group situations.

Data for the study were collected during 11 weeks by the following methods:

- | | |
|--------------|---|
| Week 1 | Interview with subject child’s parents; questionnaire and interviews with teachers. |
| Week 2 | Sociometric testing of class. |
| Week 4 | Subject child and peer group help to install software and discuss conduct of the computer-centred activity. |
| Week 5 to 10 | Observations of six once-a-week 45-min sessions of computer group work. |
| Week 11 | Interview with subject child’s parents; questionnaire and interviews with teachers; sociometric testing of class. |

Interview, questionnaire and sociometric data

The semi-structured interview (Opie, 2004, p. 118) with the subject child’s parents, conducted in the family’s home, was cordial and informative. Questions were posed to determine the parents’ perceptions of the child’s social skills, level of inclusion by peers and any particular difficulties the child had with children in his class.

A questionnaire was distributed to the classroom teacher and LSA for independent completion prior to the computer sessions. The questionnaire featured two attitude scale items adapted from an observation profile developed by Cumine *et al* (1998, p. 73). These items, concerning social interaction and social communication, are intended to assist teachers to clarify their perceptions of a child’s social skills and level of inclusion by peers.

Further to the initial questionnaire, the teacher and LSA were interviewed in an informal and flexible manner (Opie, 2004) to collect remarks not only concerning the subject child’s social skills and inclusion by his classmates and but also to ascertain appropriate group dynamics for the computer work.

Sociometric testing was conducted, prior to the computer sessions, with those pupils ($n = 19$) who had returned parental permission slips from the class. The sociometric tests featured peer nomination (Ochoa *et al*, 1995, p. 3) to gather information about the popularity of the children involved in the study. Members of the class were approached individually—in an attempt to counteract any effects of peer pressure—and were asked to give the names of two of their classmates for each of the following questions:

1. Who do you like to play with at lunchtimes?
2. If you were going on a school trip, who would you like to sit next to on the school coach?
3. Who do you like to do work with in your class?

A variety of data from a range of sources—sociometric peer nominations and teacher and parent interviews—were collected, analysed and reported to counter potential “Hawthorne” effect.

Adult-facilitated computer group work

Interaction process schedules (IPS) were kept of computer group work throughout six once-a-week 45-min sessions during the Spring term. Two pupils were chosen to work with Ben based on interviews with parents and teachers during week 1 and the sociometric peer nominations given by classmates during week 2. The children selected, Danny and Rob, were two boys who had previously demonstrated acceptance of Ben and whom the teachers felt would be suited to the group work.

The boys used “The Clue Finders—years 4 & 5 Adventures” (The Learning Company, 2000), an adventure game requiring users to solve a mystery by collecting clues which are given following problem solving activities. The program was selected as the setting, Ancient Egypt, was compatible with the curriculum and topic that the pupils were following at school. Although in year 3, the pupils coped with the curricular aspects of the program. The three participants each took turns at controlling the mouse for 5 min at a time during each session. The observer, in the role of procedural facilitator or tutor, supervised the participants’ turn taking, intervened to reinforce positive behaviour and communication and praised group achievements at the close of the session (see Littleton, 1999, p. 184). There was no substantive facilitation or intervention—eg, providing directions or guidance—by the observer.

The IPS was informed by research conducted by Mercer (1994)—on quality of talk—and Allen (1988) who noted that during computer-centred small group work, facilitated by a teacher, instances of collaboration between children doubled over a 5-week period and significant increases in social talk was also recorded (see Appendix for a copy of the IPS). The IPS devised for this study was consistent with the attitude scales on the teacher questionnaire regarding peer group interaction of the child with ASD, specifically how well the child responded to social cues with other children, followed other children and imitated other children. The IPS recorded who initiated interaction, at whom it was directed, and who responded for the following three categories:

1. pupil-initiated non-task-related social interaction (verbal and non-verbal);
2. pupil-initiated task-related interactions—ideas; and
3. pupil-initiated task-related interactions—instructions.

The interactions were recorded for the first 5 min that each child was in command of the mouse, ie, for 15 of the 45 min of each session. Recordings were not made during the first computer session—week 4—when Ben and his peer group helped to install software and discussed conduct of the computer-centred activity.

Findings

Data are presented, as collected, in chronological order.

Ben's classroom profile

The data reported below were compiled from the responses from the teacher and LSA to the questionnaire and interview. The questionnaire adapted an observation profile developed by Cumine *et al* (1998) which enables teachers to identify social and academic "at risk" factors of children with ASD in educational settings. The responses of his teacher and LSA to observation profile elements in the pre-questionnaire indicated the following "serious" causes for concern:

- ability to follow social cues in 1 : 1 classroom and social interaction with other children;
- ability to follow social cues in group interaction;
- ability to share in others' enjoyment/pleasure; and
- ability to imitate other children.

Furthermore, there was "mild" cause for concern for Ben's ability to give a simple sequence of instructions.

Intervention to assist Ben with social skills development, in a non-confrontational manner, was deemed appropriate by both his parents and his teacher and LSA: the notion of constructing a carefully selected small group of peers to work with Ben on the computer appeared to be a viable means for facilitating peer interaction and co-operation. Importantly, this method could be less anxiety provoking for Ben than more traditional direct approaches such as "forced" collaboration with schoolwork or games.

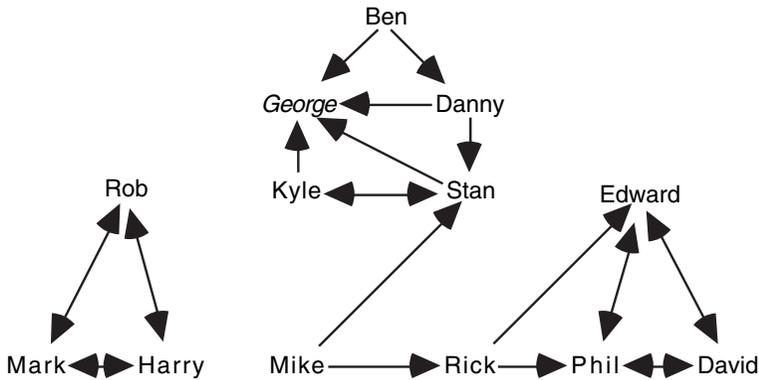
The social situation: sociometric testing

Sociograms were constructed following the pre-test of children in the class. The sociograms represent only boys as nominations were gender-oriented. Notably, prior to the sociometric test, parents, teacher, and LSA had remarked that Ben was rather "obsessed" with his classmate Danny.

First, children were asked to "Name two children in your class that you like to play with at lunchtimes." Ben selected Danny and George but was not selected by anyone (see Figure 1).

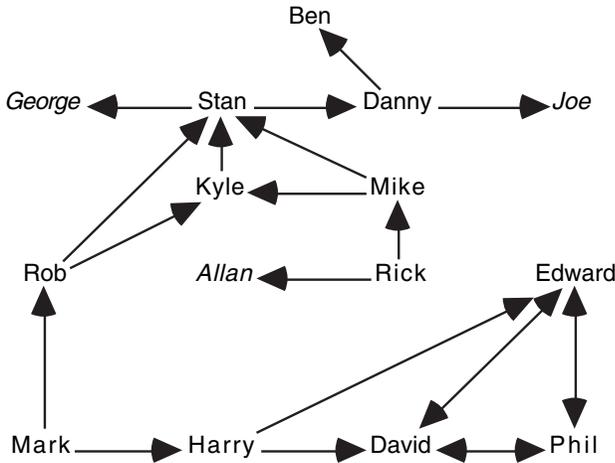
Second, children were asked to "Name two children in your class whom you would like to sit next to on a school coach trip." Ben was unable to answer this question, responding "It doesn't matter who I sit with: I'd sit with anyone." When the question was paraphrased, Ben responded "It doesn't matter." Ben was selected by Danny (see Figure 2).

Third, children were asked to "Name two children in your class you like to do schoolwork with." Ben chose only Danny and was unable to provide a second choice maintaining that "I only like to work with Danny." Ben was not chosen (see Figure 3).



NB pupils named in italics did not participate in the sociometric exercise.

Figure 1: Sociogram of preferences for lunchtime play—pre-task

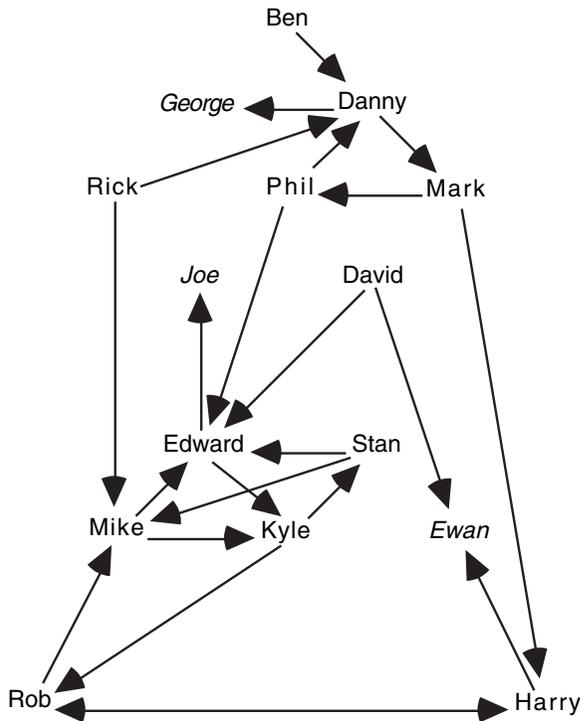


NB pupils named in italics did not participate in the sociometric exercise.

Figure 2: Sociogram of preferences for coachtrip seating—pre-task

Observations of group work: interaction process analysis

Computer group work sessions were held in the school library during lunch hours. Initially, during the first three sessions, weeks 5 to 7, Ben appeared to believe that each member of the group was meant to take turns at the computer: once Ben had controlled the mouse, he would stand up and ask, “Am I finished now? Should I go outside?”



NB pupils named in italics did not participate in the sociometric exercise.

Figure 3: Sociogram of preferences for schoolwork—pre-task

Data are reported from the IPS from week 5 to week 10. Overall interactions by categories throughout these 6 weeks were:

- all pupils' non-task-related social interaction—mean 73.5 (SD 13.62);
- all pupils' task-related idea generation—mean 39.5 (SD 11.66); and
- all pupils' task-related instruction—mean 21.33 (SD 1.75).

Social and task-related interactions initiated by Ben relative to those of his group were examined. Ben did not intuitively grasp the purpose of the three boys working together. He did not engage with his peers in a collaborative sense and his interaction with peers was primarily “off task.” Through adult praise of appropriate behaviours, Ben began to interact with his peers in a manner more appropriate to the task. Notably, from week 5 to week 10, non-task-related interactions decreased (see Figure 4) while task-related idea generation and instruction increased (see Figures 5 and 6).

The session in week 6 was marked by collaboration between Ben and Danny which the observer praised:

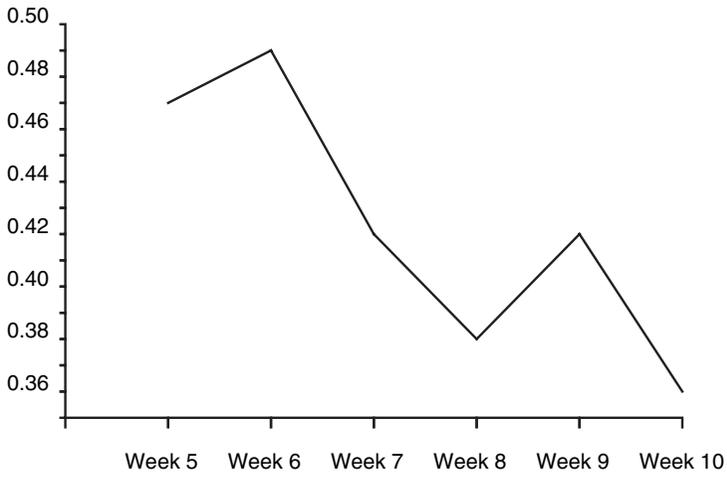


Figure 4: Non-task-related social interaction: subject child's social interactions as a proportion of all social interaction

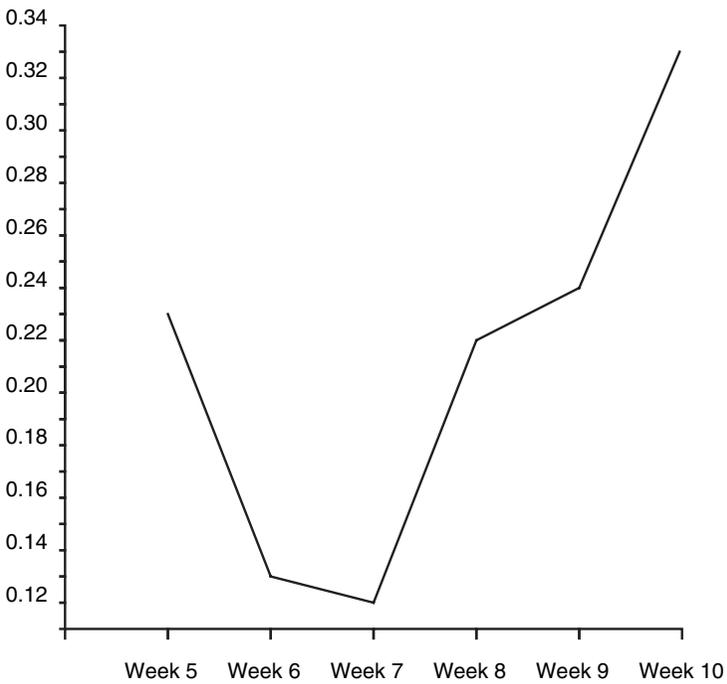


Figure 5: Task-related idea generation: subject child's idea generations as a proportion of all idea generations

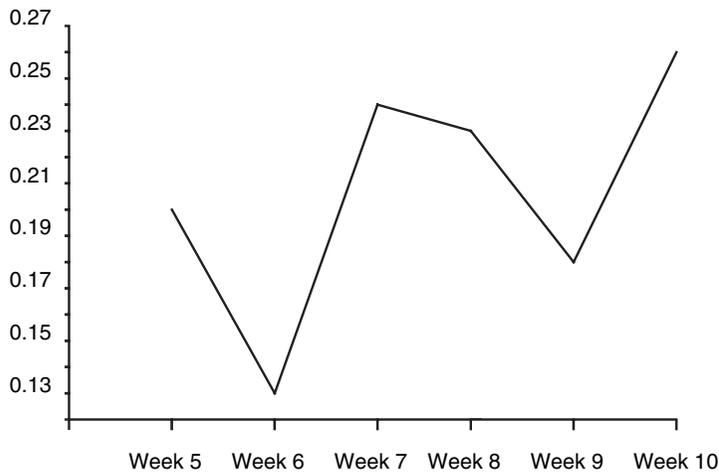


Figure 6: Task-related instruction: subject child's instructions as a proportion of all instructions

It was really good how Ben and Danny worked together on the word puzzle. Together you solved it quickly. That was good teamwork.

Unfortunately, the session in week 7 was marred by Ben's "tetchiness" and anxiety: interaction between Ben and Danny became quite strained. As a result, the session was forfeited after 10 min and the adult facilitator took the boys outdoors to play, encouraging consensus in the choice of activity. Notably, Ben's idea generations had declined dramatically in the sessions in weeks 6 and 7 (see Figure 5). Ben did not engage with the concept of "group work" initially: when taking his turn controlling the mouse he would largely ignore the other boys; and when he finished his turn he would get up to leave the group asking the adult facilitator if he "was finished for today." The adult facilitator had to encourage him to stay during the early weeks explaining that he was needed to work as a team with the other two boys. However, in week 8, Ben became more overtly involved in group work: while controlling the mouse he turned to Danny and Rob and asked, "What do you guys think?" Thereafter, Ben's idea generations increased steadily.

The task-related instructions of the group were examined, particularly those instructions given to Ben when he was controlling the mouse. Initially, in weeks 5 and 6, Ben complied with all of Danny's instructions but only 0.71 of Rob's instructions (see Figure 7). Notably, in week 7, Ben tended to be non-compliant with instructions: he complied with 0.40 of Danny's instructions and 0.33 of Rob's instructions. Thereafter, in weeks 8 to 10, Ben became more compliant to instruction.

The task-related idea generations of the group were examined, particularly Ben's affirmation—either verbal or non-verbal—of those ideas generated by his peers. Ben tended to be more affirmative of ideas generated by Danny than those generated by Rob (see

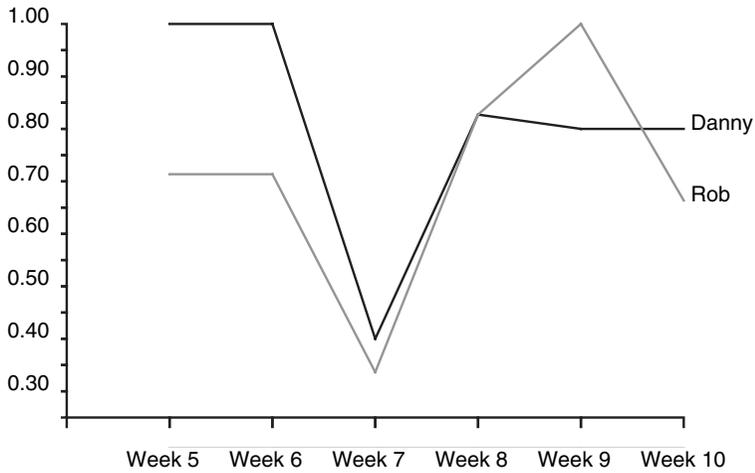


Figure 7: Task-related instruction: subject child's compliance with peer instruction

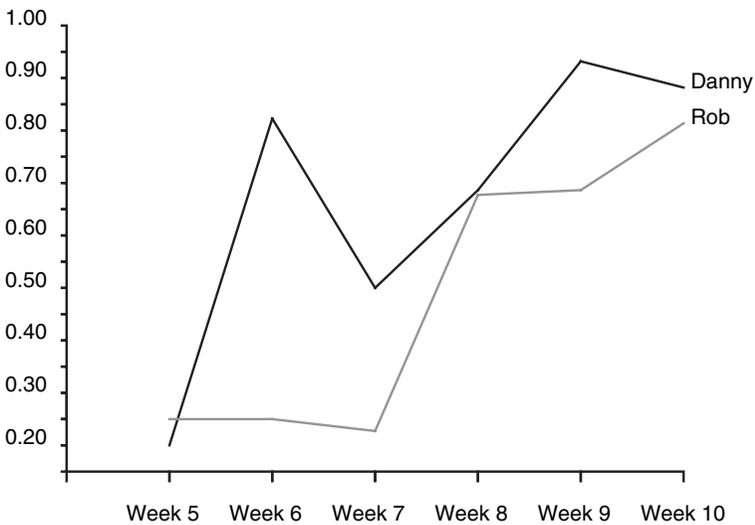
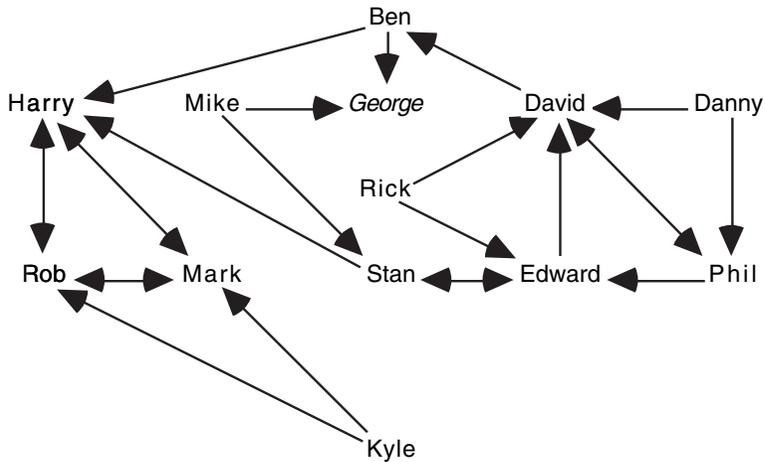


Figure 8: Task-related idea generation: subject child's affirmation of peer generated ideas

Figure 8): Ben appeared fixated with interacting with Danny and appeared to ignore Rob for much of the time. However, from weeks 8 to 10, Ben became more affirmative of Rob's ideas.

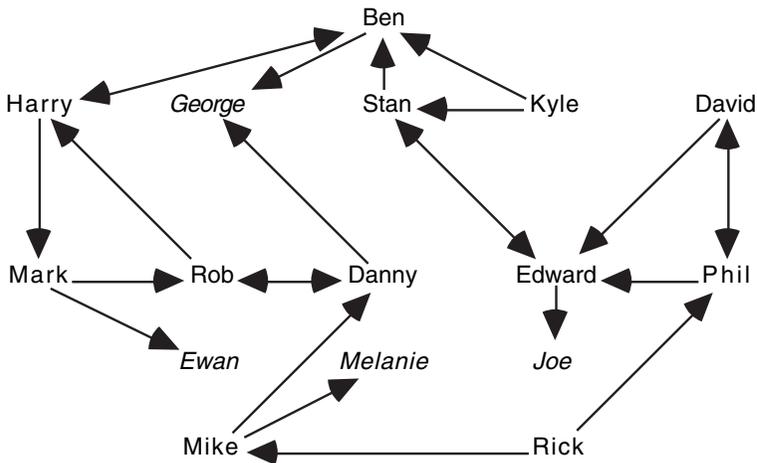
The social situation re-examined

Sociograms were constructed following the post-test of children in the class. The sociograms represent boys, with one exception, as nominations were gender-oriented.



NB pupils named in italics did not participate in the sociometric exercise.

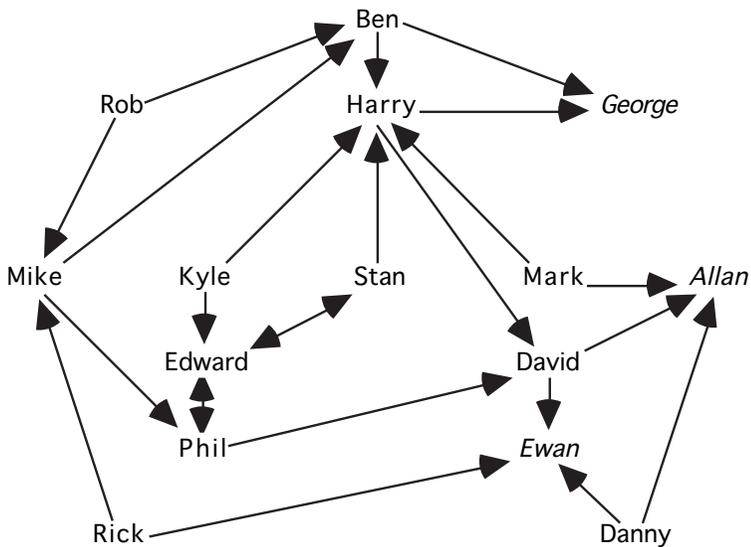
Figure 9: Sociogram of preferences for lunchtime play—post-task



NB pupils named in italics did not participate in the sociometric exercise.

Figure 10: Sociogram of preferences for coachtrip seating—post-task

When Ben was asked to name two children, he nominated George and Harry, whether for lunchtime play, coachtrip seating, or schoolwork. However, Ben was chosen by David for lunchtime play (see Figure 9), by Harry, Kyle, and Stan for coachtrip seating (see Figure 10) and by Mike and Rob for schoolwork (see Figure 11).



NB pupils named in italics did not participate in the sociometric exercise.

Figure 11: Sociogram of preferences for schoolwork—post-task

Parents' and teachers' reflection on Ben's participation in the project

Ben's parents stressed, in interview, Ben's pride at being "chosen" to participate in the computer sessions: Ben looked forward to the computer sessions and recounted what had happened when he came home. Notably, Ben's parents were aware that the session in week 7 had not progressed smoothly: Ben had reported that "Danny was stupid." Initially, Ben's parents had been concerned, but had decided that the incident demonstrated how easily things can go wrong for children like Ben.

Ben's parents expressed their concern for Ben's limited social skills development and his lack of friends. They are particularly worried that Ben is beginning to be teased and that he needs to develop skills to handle such situations.

Ben's teacher and LSA, in interview, remarked that, during week 11, Ben appeared to have fallen out with Danny although the teachers were not too concerned: such behaviour is often cyclical and Danny continued to be "tolerant" and supportive of Ben.

The teacher and LSA remarked that unstructured play remained problematic for Ben. However, Ben had been observed to play a game with rules with other children during a lunchtime in week 11. The teacher and LSA remarked that ruleful gameplay was a new development for Ben. Although Ben had participated well initially, he had become

upset when the rules had been changed by another child. Nevertheless, the teacher and LSA were pleased to note that Ben was attempting to participate in such playground games.

Ben's teacher and LSA remarked that Ben was noticeably coping better both in structured group tasks and at "sharing" activities. For instance, Ben had been involved in a maths task which required the collection of information from other children. Ben and another boy had collected information and recorded this information on a clipboard. The other boy had had control of the clipboard but, rather than attempting to "control" the task, Ben had remained content to defer to the other boy. This was deemed to be a significant improvement for Ben.

The responses of the teacher and LSA to observation profile elements in the post-questionnaire indicated improvements in Ben's interactions. Causes for concern for the following abilities had decreased from "serious" to "moderate":

- ability to follow social cues in 1 : 1 classroom and social interaction with other children;
- ability to follow social cues in group interaction;
- ability to share in others' enjoyment/pleasure; and
- ability to imitate other children.

Furthermore, there was "no" cause for concern for Ben's ability to give a simple sequence of instructions.

These notable improvements suggest that Ben was able to interact in a more non-heterogeneous fashion with his peers and was able to express himself more clearly with regards to giving instructions.

Interpretation

The findings indicate modest beneficial results in a discrete setting insofar as—in computer-centred collaborative small group work facilitated by an adult—Ben demonstrated ability to interact appropriately with his peers, Danny and Rob, to accomplish a task. As indicated earlier (Fisher, 1993; Mercer, 1994; Scrimshaw & Perkins, 1997; Wegerif & Dawes, 2004), the role of the facilitator and appropriate context is crucial in ensuring productive educational interactions among children participating in computer-based group work.

Inappropriate non-task-related social interaction decreased while task-related idea generation and instruction increased from week 5 to week 10. Moreover, Ben's compliance with instruction and affirmation of idea generation of his peers, Danny and Rob, achieved greater parity from week 8 to week 10 whereas his initial reported preferences—and observed behaviour—favoured one peer, Danny. Notably, the achievement of greater parity was subsequent to Ben's perceiving Danny as "stupid"—and his non-compliance with the instructions of both Danny and Rob—in week 7. An inference

could be drawn that this crisis contributed to Ben's reappraisal of his fixation and of his mode of interaction.

Incidentally, the pre-task and post-task sociograms indicate that the social status of Ben had changed: pre-task sociograms indicate that Ben was not preferentially selected for the three contexts—lunchtime play, coachtrip seating and schoolwork—whereas the post-task sociograms indicate that Ben was preferentially selected by one peer for lunchtime play, three peers for coachtrip seating and two peers for schoolwork. Notably, Ben was selected for schoolwork by one peer, Rob, who had participated in the computer-centred collaborative group work.

However, there is no intended implication that computer-focused collaborative group work is the “remedy” for the asociality of a child with AS relative to the non-heterogeneous group of his classmates. Rather, the strategy of computer-centred collaborative group work may have benefited the child with AS by encouraging appropriate social and academic skills. Using a carefully selected peer group, school learning support staff could facilitate such group work within classroom settings. The adult facilitator would need to be aware of the communication and specific social difficulties of the particular child and adjust their level of support accordingly. The classroom observation profile (available in Cumine *et al.*, 1998) carried out in association with a class teacher or educational psychologist is recommended as being a useful tool for setting intervention goals. The researchers would recommend further study to establish the beneficial potential of computer-focused group work with children with AS and their peers.

Acknowledgement

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Appendix

Interaction Process Schedule

| Non-task related social interactions - VERBAL | | | | | | | | | |
|---|-----------|-----|-------|----------|-----|-------|----------|-----|-------|
| | Initiates | | | Aimed at | | | Response | | |
| | Ben | Rob | Danny | Ben | Rob | Danny | Ben | Rob | Danny |
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| Non-task related social interactions - NON VERBAL | | | | | | | | | |
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| | Initiates | | | Aimed at | | | Response | | |
| | Ben | Rob | Danny | Ben | Rob | Danny | Ben | Rob | Danny |
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| Task related interactions - INSTRUCTION | | | | | | | | | |
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| | Expressed by | | | Aimed at | | | Responded | | |
| | Ben | Rob | Danny | Ben | Rob | Danny | Ben | Rob | Danny |
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| Task related interactions - IDEAS | | | | | | | | | |
|-----------------------------------|--------------|-----|-------|----------|-----|-------|-----------|-----|-------|
| | Expressed by | | | Aimed at | | | Responded | | |
| | Ben | Rob | Danny | Ben | Rob | Danny | Ben | Rob | Danny |
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