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A comparative study of the impact of mainstream and special school placement on the behaviour of children with Autism Spectrum Disorders

Phil Reed*, Lisa A. Osborne and Emma M. Waddington
Swansea University, UK

The current study examined the impact of school placement in mainstream or special settings on the behavioural functioning of children with Autism Spectrum Disorders (ASD). Children were assessed at the start of the school year and then again at the end of the school year using the Strengths and Difficulties Questionnaire and the Vineland Adaptive Behavior Scale. Children with ASD made improvements in both types of placements; however, those children in specialist provisions made greater improvements in areas of conduct and socialisation. These results confirm other recent demonstrations of superior performance in special schools for children with ASD. The need to re-address specialist school placement as a viable alternative to mainstream education for children with ASD is discussed.

Introduction

Current legislation often encourages the inclusion into mainstream schools of children with special educational needs, including those with Autism Spectrum Disorders (ASD). ‘Inclusion’ can refer to a very wide variety of practices—in a broad sense, it refers to the placement of children into mainstream schools who would otherwise have been placed and educated in special schools (DFEE, 1997; DfES, 2001, 2004), although the precise nature of this placement is often undefined and, in practice, can vary from full placement in a mainstream school setting to integration only at particular times. However inclusion is operationalised, the drive to

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place children in mainstream schools has gained great momentum and has been fuelled by many sources, certainly including a ‘rights’ agenda, encouraged by UNESCO through the Salamanca statement (UNESCO, 1994), which forms an important basis for current policy both in the UK (DfES, 2001, 2004) and in the USA (IDEA, 1997).

Educational practice has developed on the basis of such an inclusion agenda and substantial numbers of pupils with ASD are now placed in mainstream education settings as a response to this movement. Barnard et al. (2000), in a survey of parents of children with ASD in the UK, reported that around 50% of pupils with ASD are now placed in mainstream classes. Similarly, Waddington and Reed (in press), in a survey of the archive records of Local Education Authority in the UK, noted that nearly 60% of children with ASD are placed in mainstream educational settings. Despite such de facto inclusive practices through placement, there remain concerns regarding whether such mainstream placements actually meet the children’s needs (see Lindsay, 2003; Norwich, 2005; Norwich & Lewis, 2005; Ofsted, 2006). For example, Norwich and Lewis (2005) have argued that the distinct needs of particular groups of individuals, such as those with ASD, are not always best met by placement in mainstream schools. This view finds some support from the very high levels of school exclusion (see Bernard et al., 2000) and emotional and behavioural problems (Asburner et al., 2010), reported for pupils with ASD who attend mainstream school placements.

In fact, empirical evidence on whether placement in mainstream schools is the most effective educational strategy for children with ASD is scarce and this continues to represent a significant and important gap in the knowledge base (Davis et al., 2004; Humphrey & Parkinson, 2006). Of those studies that have directly compared general developmental gains in children with ASD across school settings, the evidence is mixed. Strain (1983) focused on preschool and primary school children with ASD and found that those children attending mainstream settings exhibited more pro-social behaviours than those in special schools. However, several other comparative studies have shown no such pattern of gains (e.g. Harris et al., 1990; Durbach & Pence, 1991; Waddington & Reed, in press). Additionally, a recent study of the impact of special versus mainstream school placement showed greater gains in a variety of areas for pupils in a specialist school placements compared to those in a mainstream schools (Panerai et al., 2009) although this effect was overcome when the teaching practices of the special school were imported into the mainstream school.

It has been argued that social behaviours, rather than academic and general developmental outcomes, may be the domain with the greatest potential to benefit from mainstream placements (see Harris & Handleman, 1997; Connor, 2000); in particular, it has been suggested that the main benefit of placing children with ASD in mainstream settings is the potential for social gains through modelling their typically developing peers (see Boutot & Bryant, 2005; Knight et al., 2009). For example, Buysse and Bailey (1993), in a study of children with a variety of disabilities, documented greater improvements in social skills (defined as social
behaviour and play skills) in mainstream school settings, compared to segregated settings. However, these gains may well be limited to children with Down’s syndrome who, in particular, appear to benefit greatly from mainstream placement in most areas (see Buckley et al., 2006). Other studies, focusing specifically on children with ASD, have shown significant improvements in social skills for children placed in special placement (Reed et al., 2009) and several studies have shown particularly poor performance for children with ASD placed in mainstream schools (Ashburner, Ziviani, & Rogers, 2008; Zingerevich & LaVesser, 2009; see also Waddington & Reed, 2009).

As noted by Norwich and Lewis (2005), there may well be special considerations that need to be given to some populations, such as those with ASD, when considering their school placement. These considerations may make these groups less susceptible to benefits from attendance at mainstream school. For a population with ASD, it appears that social interactions may well be the domain that is most vulnerable to negative impact by mainstream placement (cf. Connor, 2000; Humphrey & Lewis, 2008; Knight et al., 2009; Ashburner et al., 2010; Osborne & Reed, 2011). Knight et al. (2009) noted that there were special difficulties concerning involving children with ASD in out of school social schemes and Ashburner et al. (2008) noted reduced levels of social participation in mainstream classes in pupils with ASD (see also Osborne & Reed, 2011). There may be multiple reasons for these effects, including problems with teacher training (Robertson et al., 2003), unrealistic teacher expectations (Frederickson et al., 2004), and the impact of parent confidence and stress on their children’s performance (Kasari et al., 1999; Osborne et al., 2008). In fact, several reports have suggested that it is the social aspects of mainstream school placement that children with ASD find most stressful (Humphrey & Lewis, 2008), perhaps due to the opportunity for negative social comparison, especially in older and higher functioning individuals (Bellini, 2006; Browning et al., 2009). These difficulties may be exacerbated by unpredictable mainstream school environments (Ashburner et al., 2008, 2010; Humphrey & Lewis, 2008) and they may underlay the high levels of behavioural problems noted for children with ASD in mainstream school (see Ashburner et al., 2010). It is this, rather than any academic difficulties (Church et al., 2000), that leads to the high exclusion rates from mainstream schools (Bernard et al., 2000; Frederickson et al., 2004).

Given the above review it could be said, at best, that the research on the benefits of placing a child with ASD in a mainstream school placement is not conclusive (e.g. Humphrey & Parkinson, 2006). The lack of substantial and consistent evidence for the social and educational gains anticipated by the proponents of inclusion in general (see Davis et al., 2004; Humphrey & Parkinson, 2006), have allowed critics of inclusion to argue that the movement of children into mainstream schools has been primarily driven by ideological arguments and not in terms of what is best for the child (see Lindsey, 2003; Norwich, 2005). Thus, more data are required on the impact of school placement, especially concerning the area, often highlighted by proponents of inclusion, of social functioning (see Church et al., 2000; Connor, 2000; Boutot & Bryant, 2005).
To this end, the current study aimed to compare the progress of children with ASD who were placed in mainstream schools with the progress of children with ASD in special schools. Although a focus on school placement is only one definition of inclusion, and may not capture the full range of inclusive practices, using this metric as an independent variable has some advantages, not least because the notion of ‘inclusion as a process’, rather than a ‘placement’ (see Cigman, 2007; Humphrey, 2008), involves almost insurmountable difficulties in definition and measurement for quantitative purposes. Moreover, given the dearth of knowledge, at even such a basic level as school placement, a direct comparison of mainstream and special school placement seems warranted and important, especially given the recent evidence emerging from such comparisons (see Panerai et al., 2009). Thus, the current study was solely concerned with establishing whether there were any differences in the effects of school placement on social behaviours of children with ASD.

The children in the study were followed over one full school year in each type of setting. This design allows the initial level of ability of the children to be assessed (given the likely prevalence of higher severity autism in special placements [Eaves & Ho, 1997; Waddington & Reed, in press]) and the re-assessment will identify any improvements, due to the placement, over the year in comparison to that baseline. A very wide range of school settings was studied to allow maximum generality about any statements concerning the impact of school placement to be made and to ensure the results were not the direct result of a particularly good, or bad, individual school (see Buckley et al. [2006] for a similar discussion). Moreover, at least one mainstream and one special school were selected from each authority to equate the overall socioeconomic levels between the two samples.

Methods

Participants and recruitment

In order to be included in the study the children had to have a diagnosis of ASD made by an independent paediatrician using a combination of the DSM-IV and their clinical judgment prior to their inclusion in the study and a statement of special educational needs from the local education authority containing reference to ASD. The children had to be attending a mainstream school or a special school and they had to be in their particular provision full-time (i.e. they had to spend 100% of their school time in that provision).

Ten local authorities were approached and agreed to participate in this research, no authority that was approached refused to participate. The authorities were chosen as they were geographically spread across the UK (including authorities in north-east England, south-east England, London, south-west England, Wales and the midlands of England). This geographical spread ensured that a wide range of socioeconomic levels were sampled. Each authority was asked to directly contact 15 to 20 parents whose children fulfilled the above inclusion criteria, with the additional constraint that not more than two children should attend the same
school as one another. These children were chosen at random from the list of children in each authority who fulfilled the criteria above. In total, 158 parents were initially contacted through the local authorities. Of these parents, 3 initially refused to take part in the study and a further 15 children were excluded during the course of the study as they changed school during that period. Of the remaining 140 children, 54 attended mainstream school and 86 attended a special school.

As previously noted by Eaves and Ho (1997; see also Waddington & Reed, in press) the autistic severity of the children, as measured by the Gilliam Autism Rating Scale (GARS), was more severe in special school. To produce greater compatibility between the groups in terms of autistic severity, those children with more severe autism symptoms at the special school placements were excluded (see Buckley et al. [2006] for discussion of a similar procedure). To this end, a median split was performed on the children in special school and the 43 children with the highest severity of autism were excluded.

Table 1 displays the group-mean baseline data for the remaining children in the two placements, including their ages, autistic severity (GARS) and scores on the Strengths and Difficulties Questionnaire (SDQ) and the Vineland Adaptive Behavior Scale (VABS). The 54 children in mainstream school placement had a mean age of 8.8 (± 3.5) years and a GARS Autism Quotient of 82.0 (±16.4) and the 43 children in special school had a mean age of 8.2 (± 2.7) years and an Autism Quotient of 81.1 (± 12.0). These scores did not differ significantly between the two groups, ts < 1. Similarly, there were no statistically significant group differences in terms of the behavioural and emotional problems of the children, as measured by the SDQ. However, as previously noted for such samples by Eaves and

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mainstream</th>
<th>Special</th>
<th>t(95)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>8.8 (3.5; 4–16)</td>
<td>8.2 (2.7; 4–16)</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Autism (GARS)</td>
<td>82.0 (16.4; 45–127)</td>
<td>81.1 (12.0; 58–105)</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>SDQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17.7 (7.0; 4–37)</td>
<td>18.9 (5.2; 9–29)</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Emotion</td>
<td>3.4 (2.9; 0–10)</td>
<td>2.9 (2.5; 0–9)</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Conduct</td>
<td>2.7 (2.1; 0–9)</td>
<td>3.1 (2.4; 0–8)</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Hyper</td>
<td>6.6 (2.1; 1–10)</td>
<td>7.1 (2.0; 2–10)</td>
<td>1.16</td>
</tr>
<tr>
<td>Peer Prob.</td>
<td>5.1 (2.3; 0–10)</td>
<td>5.8 (2.0; 1–10)</td>
<td>1.60</td>
</tr>
<tr>
<td>VABS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>62.5 (20.2; 20–112)</td>
<td>50.0 (18.9; 20–104)</td>
<td>3.09*</td>
</tr>
<tr>
<td>Comm.</td>
<td>61.9 (27.9; 20–127)</td>
<td>52.9 (21.0; 20–128)</td>
<td>1.76</td>
</tr>
<tr>
<td>DLS</td>
<td>56.8 (20.2; 20–101)</td>
<td>40.3 (17.2; 20–3)</td>
<td>4.62*</td>
</tr>
<tr>
<td>Social.</td>
<td>67.9 (18.0; 20–116)</td>
<td>49.3 (14.4; 20–94)</td>
<td>5.45*</td>
</tr>
</tbody>
</table>

Note: *p < 0.001.
Ho (1997), there were some differences between the groups in terms of their overall adaptive behavioural skills, daily living skills and socialisation, with the children in mainstream schools scoring more highly than those in the special schools.

**School provision**

Table 2 displays some comparative data for the mainstream and special schools included in this study. All of the schools in this study were supported by their local authority, that is, there were no private, fee-paying pupils included in this study. Most of the schools provided one pupil for the study, although some did provide two (no school provided more than this). Inspection of Table 2 shows that the mainstream schools, generally, were much larger than the special schools and had greater numbers of pupils per teacher. The percentage of pupils receiving free-school meals at each type of school placement was broadly similar, indicating similar socioeconomic backgrounds for the two samples. As the focus of the investigation was on the impact of school placement, the selection procedure adopted attempted to establish as broad a selection of schools as possible, to ensure that particular practice in individual schools was not responsible for the results, and that they reflected the general impact of placement. Some broad aspects concerning the provision within each type of placement are given below.

**Mainstream schools.** A total of 47 mainstream schools took part in the study. The mainstream schools were generally of a similar size to one another (smallest = 212, largest = 498) and there was a comparable number of students with statements attending each school. Each class in the mainstream schools was under the supervision of a teacher with postgraduate qualifications in teaching and each class had at least one educational support staff member, who supported the teacher and those students who needed more help (including the children with ASD included in this study). All curriculum practices in these schools were approved by the Ofsted reports (UK government inspection reports given regularly to all schools). Children attended the school placements daily and would typically commence the school day with registration (and carpet time for the primary schools) and would later go to their first lesson. The teachers would then supervise the children’s activities with the support of the teaching assistant.

**Special schools.** A total of 39 special schools took part in the study. The special schools in the study were smaller in size than the mainstream schools (range

<table>
<thead>
<tr>
<th>School type</th>
<th>n</th>
<th>Size (std)</th>
<th>Student : teacher (std)</th>
<th>Percentage Statement (std)</th>
<th>Percentage free meals (std)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstream</td>
<td>47</td>
<td>321 (106)</td>
<td>21.1 (5.1)</td>
<td>2.4 (1.4)</td>
<td>21.2 (17.9)</td>
</tr>
<tr>
<td>Special</td>
<td>39</td>
<td>74 (45.4)</td>
<td>5.5 (0.9)</td>
<td>96.7 (5.8)</td>
<td>12.9 (16.4)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard deviations.
22–99 pupils). Each class was under the supervision of a teacher with postgraduate qualifications in teaching and specialist training in special educational needs. All curricula and practices had been approved by Ofsted reports. In addition to the teacher, each class had two or three learning support assistants, who would work with the children in small groups, and most teaching was conducted in small groups, rather than individually. The children attended the school daily. The approach adopted in these schools was 'eclectic' and did not follow any one particular model (see Osborne et al. [2008] for a description of similar schools). Typically, a session would start and end with 8–10 children in a group with the teacher at the front. The teacher usually guided a song (for younger children) or other introduction and the children were encouraged to take turns in answering their names or responding, often involving doing an individual activity, whilst the other pupils were encouraged to respond and comment. Much of the schools’ environments, and many of the tasks given to the children, were presented using highly structured visual methods, as outlined by the TEACCH methodology (see Mesibov et al., 1994; Panerai et al., 2009).

**Measures**

*The Gilliam Autism Rating Scale.* The Gilliam Autism Rating Scale (GARS: Gilliam, 1995) was used to measure autistic severity. The GARS is a 44-item checklist with four sub-scales: behaviour, communication, social interaction and developmental disturbances. The sum of the sub-scale scores can be converted into an Autism Quotient, which is a standard score that has a mean of 100, and a standard deviation of 15:100 represents average autistic severity, scores above this represent greater than average severity and scores below 100 represent less than average autistic severity. The scale is appropriate for persons aged 3–22 years and is completed by parents or professionals in about 10 minutes. Its internal reliability is 0.96 and it has high criterion validity with the Autism Behavior Checklist (0.94). While it is not an instrument that would be suitable for establishing a diagnosis, in a research setting it can be used to compare between the severities of two groups of participants.

*Strengths and Difficulties Questionnaire.* The Strengths and Difficulties Questionnaire (SDQ: Goodman, 1997) is a behavioural screening questionnaire that asks about 25 attributes, some positive and others negative. The 25 items are divided into sub-scales; conduct problems, hyperactivity, emotional symptoms, peer problems and prosocial behaviour. All but the last sub-scale are summed to generate a total difficulties score. The scale for each item is ‘not true’, ‘somewhat true’ and ‘certainly true’. For each of the subscales the score can range from 0 to 10 if all items are completed. Scores in the total difficulties score between 0 and 13 are in the normal range, scores between 14 and 16 are deemed to be borderline and scores of 17 to 40 are abnormal. The internal consistency of the SDQ is 0.73 (Goodman, 2001). The questionnaire correlates highly with the Rutter Child
Questionnaires (Goodman, 1997). Farmer and Oliver (2005) used the SDQ to discriminate between children diagnosed ASD and children with a language disorder and it has been used in studies of outcome effectiveness for participants with ASD (Hastings, 2003; Osborne & Reed, 2009), making the SDQ a useful index for the current purposes.

The Vineland Adaptive Behavior Scale. The Vineland Adaptive Behavior Scale (VABS: Sparrow et al., 1984) was used to assess the personal and social day-to-day abilities of the participants. It is a 297-item checklist, consisting of three adaptive behaviour domains: communication, daily living skills and socialisation. For each of the domains an adaptive level and age equivalent is calculated by converting the raw scores into standardised scores. A composite score can be derived by adding the sum of the standard scores for each of the subscales ($M = 100; SD = 15$). The internal reliability of the composite score is 0.93 (Sparrow et al., 1984). The VABS was used by Charman et al. (2004) to measure progress made by pupils with ASD in special schools and units which specialised in ASD.

The VABS is the most widely accepted instrument for the assessment of adaptive behaviour. It aids in clinical diagnosis of a variety of disorders and disabilities, including ASD, and provides in-depth and quick assessment of the individuals. The VABS can contribute to the development of individual educational, rehabilitative and treatment programmes and can monitor progress during such programmes. It has also widely been used in research on autism (e.g. Howard et al., 2005; Reed et al. 2007). This constitutes an additional reason that the VABS was chosen for the current studies.

Procedure

Following recruitment and consent, the children and their parents were visited at their home by a researcher. The researcher was blind to the school placement of the children. The baseline measures were taken with the help of the parent (GARS, SDQ and VABS). That is, the researcher obtained the required information from interviewing the parent and asking the questions contained in the forms. As an added incentive for helping to collect this information, the parents were automatically entered into a prize draw, the winner of which received £50 for toys or books for their child. This incentive was specified in the initial information letter. After 9–10 months, the follow-up child measures (SDQ and VABS) were taken by the same researcher, the GARS was not completed at follow-up.

The change scores over the 9–10-month period in the measures were the dependent variable (change scores were used to accommodate any differences in initial, baseline measures, see Osborne et al. [2008]) and these data were subject to two sets of analysis: between-groups and within-group comparisons. The between-group analysis examined whether the two school placement groups differed in the level of change noted from baseline to follow-up assessments. The within-group analyses compared the change scores across all the measures to a zero baseline for
each school placement group. This is a potentially sensitive measure and was used as it is important to understand the impact of each provision alone, as it may be that there are group differences for a variety of reasons such as one group improves but the other does not or that both groups improve but to different extents. The within-group comparisons helps to establish if improvements occur in each group irrespective of their relative impact on behaviours (see Waddington & Reed, 2009).

Results

The mean change scores (follow-up score minus baseline) were calculated for each of the overall scores of the SDQ (Total) and the VAB (Composite) and these are shown in Figure 1 (SDQ = left axis; VABS = right axis). For the SDQ, a decrease in the score suggests an improvement in problem behaviours and, for this reason, negative scores are represented as positive, and vice versa, to aid their ease of interpretation in the figure. The mainstream group showed a very slight increase in behaviour problems (indexed by a negative score) and the special school group showed a decrease in behaviour problems (indexed by a positive score). This difference between the two placements was statistically significant, $t(95) = 2.51, p < 0.05$. In terms of the VABS composite score, both groups made quite large improvements of around 20 to 25 points, but this group difference was not statistically significant, $p > 0.20$.

The change scores were analysed also by using paired samples $t$-tests, which compared the improvement scores to a zero baseline. These analyses highlighted whether any of the improvements, irrespective of group differences, were statistically reliable in themselves. For the mainstream group, there was no statistically significant change in the SDQ score relative to a zero baseline, $t < 1$, but a statistically significant improvement in the VABS composite, $t(53) = 7.65, p < 0.001$. For the special school group, there was a statistically significant improvement in

![Figure 1. Mean change scores (follow-up minus baseline) for the two groups of children for the total score of the SDQ (left axis, squares) and for the VLD (right axis, circles)]
the SDQ score, \( t(42) = 2.00, p < 0.05 \), and a statistically significant improvement in the VABS composite, \( t(42) = 5.50, p < 0.001 \).

Table 3 displays the change scores for the four problem behaviour sub-scales from the SDQ (positive scores indicate improvements at follow-up compared to baseline). Inspection of these data shows little difference between the groups in terms of emotional problems, or peer problems, both \( ts < 1 \). However, there was a greater reduction in both conduct problems, \( t(95) = 2.95, p < 0.05 \), and hyperactivity, \( t(95) = 2.54, p < 0.05 \), for the children in special school compared to the children in the mainstream placements.

The change scores were analysed also by using paired samples \( t \)-tests, which compared the improvement scores to a zero baseline. These analyses revealed that for the mainstream group there were no statistically significant changes, relative to baseline, for the sub-scales of the SDQ, all \( ts < 1 \). In contrast, for the special school group there were statistically significant improvements, relative to baseline, for the conduct and peer problems sub-scales, smallest \( t(42) = 1.99, p < 0.05 \).

Table 4 displays the change scores for the three sub-scales from the VABS, for children in the two placements, but none of these group differences were statistically significant, all \( ps > 0.20 \). The change scores were analysed also by using paired samples \( t \)-tests. These analyses revealed that for the mainstream group there were statistically significant improvements in each of the VAB sub-scales, smallest \( t(53) = 2.07, p < 0.05 \). There were also statistically significant improvements in each of the VAB sub-scales for the special school group, smallest \( t(42) = 1.80, p < 0.05 \).

**Discussion**

The aim of the current study was to compare the social and behavioural outcomes of children diagnosed with ASD, who were placed in mainstream and special school provision. The sole focus of the report was to examine the impact of placement and not provision, although this is an admittedly crude variable (see Humphrey, 2008), there are only a few reports focusing on this important decision for a child with ASD (cf. Harris et al., 1990; Panerai et al., 2009; Waddington & Reed, in press; Osborne & Reed, in press) and this represents a major gap in knowledge (Davis et al., 2004; Humphrey & Parkinson, 2006). The current results demonstrated that children placed in special schools made greater improvements in their behaviour problems (conduct and hyperactivity) than children in the mainstream schools. The current study suggests that children with ASD can make

<table>
<thead>
<tr>
<th>Group</th>
<th>Emotional</th>
<th>Conduct</th>
<th>Hyperactivity</th>
<th>Peer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstream</td>
<td>-0.09 (2.15)</td>
<td>-0.02 (2.11)</td>
<td>-0.22 (2.14)</td>
<td>0.22 (2.32)</td>
</tr>
<tr>
<td>Special</td>
<td>-0.28 (2.34)</td>
<td>0.73 (2.46)</td>
<td>0.40 (1.69)</td>
<td>0.54 (1.83)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard deviations.
progress in areas of adaptive behaviours when placed in mainstream and special schools. However, they do not make greater progress than children placed in special school in socialisation, which is often the main thrust of the argument of placing a child in mainstream in the first instance (Boutot & Bryant, 2005; Knight et al., 2009).

This pattern of results supports the growing set of findings that mainstream school placement may not always offer the best prospects for a child with ASD. For example, many reports have noted either no enhanced gain from mainstream placement (e.g. Harris et al., 1990; Durbach & Pence, 1991; Reed et al., 2009), including in terms of academic achievement (see Waddington & Reed, in press). Other reports (e.g. Panerai et al., 2009) have found outcomes similar to the current report, and provide support for the efficacy of special school placement (see also Osborne et al., 2008; Ashburner et al., 2010). These outcome data support the perceptions of many children with ASD placed in mainstream schools, who find them stressful (Humphrey & Lewis, 2008) and suggest that they have the potential to provoke negative social comparison (see Browning et al., 2009).

There are, of course, many reasons that might underlay these effects and the results concerning the impact of placement should be interpreted with these issues in mind. In the present investigation, there are many variables that differ between the placements and that may lead to the children who are placed in special schools making greater improvements than the children in the mainstream schools. Key amongst these issues are factors such as the size of the school and better student/teacher ratio in special schools compared to mainstream schools or that students in mainstream schools may exhibit more behavioural problems because they are in a more demanding setting. The potential for lack of appropriate teacher training in mainstream schools (see Robertson et al., 2003), teacher expectations (Frederickson et al., 2004) and the impact of parent confidence and stress on their children (Kasari et al., 1999; Osborne et al., 2008). As noted by Norwich & Lewis (2005), these difficulties may be exacerbated by the unique characteristics of children with ASD, meaning that noisy and sometimes unpredictable mainstream school environments could produce many problems for such included children (see Ashburner et al., 2008, 2010; Humphrey & Lewis, 2008). Therefore, it needs to be clearly stated that there are numerous reasons why there are smaller improvements in behavioural challenges in one setting versus another, while these reasons may be independent of the setting, they are often closely associated with such placements.

### Table 4. Mean change scores for the sub-scales of the Vineland

<table>
<thead>
<tr>
<th>Group</th>
<th>Communication</th>
<th>Daily living</th>
<th>Socialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstream</td>
<td>40.0 (38.9)</td>
<td>8.4 (26.9)</td>
<td>8.8 (29.8)</td>
</tr>
<tr>
<td>Special</td>
<td>30.8 (43.1)</td>
<td>5.9 (22.2)</td>
<td>13.2 (21.3)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard deviations.
in a manner that cannot be changed, for financial reasons, for example, and these do need to be taken into consideration when discussing the issue of the appropriateness of particular placements.

These issues of provision at a school require further investigation and their resolution may lead to the development of appropriate mainstream provision for children with ASD (see Humphrey, 2008 for a review). However, the current study and several similar previous studies (e.g. Panerai et al., 2009; Ashburner et al., 2010) raise important considerations for practitioners and policy makers who are committed to placement in mainstream schools as part of inclusive practice on philosophical and moral grounds. While it is extremely important to be aware of the implications of any form of special (in effect, segregated) education, the results of many current studies suggest that children with ASD are making significant progress in special schools and, in terms of externalising behaviours, they are making more progress in special schools than in mainstream schools. These areas of development are particularly important as social skills have been found to be predictive of positive school outcomes (Church et al., 2000; McIntyre et al., 2006; Ashburner et al., 2010). Moreover, children with emotional and behavioural problems, who, in addition, have poor social skills, may go on to have academic and/or socio-behavioural difficulties (Gresham, 1998; Kupersmidt & DeRosier, 2004). Such social-emotional deficits are one hallmark impairment in ASD and, therefore, enhancing social skills development is not only relevant to academic progress, but to overcoming obstacles that the disorder itself presents. At the very least it will be important to address what needs to be provided in mainstream schools that is currently not being offered to children with ASD in these placements.

Of course, there are limitations to this study that do need to be recognised and discussed. Firstly, the groups were not randomly selected for each of the school placements. Instead, the groups were receiving the school placement either offered to them by their LEA or, in the case of some special schools, chosen by the parents. Although this decreases the internal validity of the study, in turn, it increases its external validity significantly. There has been much criticism in the literature of the low external validity of many studies of teaching interventions and placements (see Connor, 1998), arguing that many studies do not reflect the reality of provisions and, moreover, that children in LEA provisions across the country are not being randomly allocated to these different provisions (actually limiting the generality of randomised studies). However, this in turn will decrease the internal validity of the study further as there are more variables that may be having an impact on the outcomes.

Secondly, while the measures used in this study have good psychometric properties and have been widely used previously there are issues with both measures that should be mentioned. The SDQ is admittedly short, which can aid completion rates, but may impact its dependability, especially as only two of the sub-scales (10 statements in all), showed a significant difference between the two placements. Moreover, this scale was initially designed to identify children at risk of mental health problems and, although it has been employed in this manner, it was not
initially designed as a measure of change in mental health functioning. The VAB scale, while very widely employed, does contain generalised statements that are often couched in terms that are appropriate to children in the USA. Thus, further work along these lines could extend the current findings usefully by employing a further range of psychometric tools.

In summary, the current study found that children with ASD placed in special schools are making greater gains in areas of conduct, relative to children in mainstream schools. This suggests the need for a careful examination of the current impetus to place children with ASD into mainstream schools and to consider the importance of having a range of provisions available. Moreover, the current legislative context and the commitment by the current governments to continue to include children with ASD into mainstream schools makes critical the identification of how inclusion will take place and what is currently working in mainstream schools and special schools across the country. Future research will need to answer questions concerned with implementation and, therefore, answer questions of how rather than why.

References


