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UK parents' beliefs about Applied Behaviour Analysis as an approach to autism education

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### **Abstract**

Research into factors underlying the dissemination of evidence-based practice is limited within the field of Applied Behaviour Analysis (ABA). This is pertinent, particularly in the UK where national policies and guidelines do not reflect the emerging ABA evidence base, or indeed policies and practices in other parts of the world. Within autism education there is evidence to suggest that parents are amongst the key decision makers – often not necessarily by choice but because of a lack of, or contradictory, information provided by professionals. Theories of evidence based practice in education and public services suggest that the ‘perceptions’ of decision makers are significant facilitators of, and barriers to, research utilisation. Whereas education and health professionals tend to view evidence in more scientific terms often regarding randomised control trials as ‘gold standard’, for others, including parents, experiential and anecdotal evidence can be as important. This study is the first to try to identify and quantify UK parents’ beliefs about ABA in the education and support of children with autism. We developed and tested, using an internet survey method, the Parental Beliefs about ABA and Autism scale (P-BAA). Current and/or past use by parents of any behaviorally based approach including ABA was a significant predictor of P-BAA scores as were parent education, household income and child diagnosis: experience of a behaviorally based approach, higher levels of education and income and children at the more ‘severe’ end of the autism spectrum were associated with more positive beliefs about ABA.

*Key words: autism, applied behaviour analysis, parental beliefs, evidence based practice*

## UK parents' beliefs about Applied Behaviour Analysis as an approach to autism education

The Research Autism website in the UK (Research Autism, n.d.), at the time of writing, lists 1320 'Interventions, Treatments and Therapies' for autism. These are not all designed to address the same issues but, even when biological and medical approaches are excluded, educators and parents of children with autism are faced with a bewildering array of options.

There is increasing consensus amongst researchers that the majority of effective interventions for building skills in children with autism are 'behavioural and educational' in method/orientation (Lai et al., 2014), and there is an emerging evidence base for early/intensive behavioural intervention (Salomone et al., 2016; Eldevik et al., 2012; Warren et al., 2011; Dawson et al., 2010). However, this evidence is slow to be reflected in national policies and guidance (McPhilemy & Dillenberger 2013), although the recent revision of Scottish guidance for autism interventions does recommend behavioural approaches (SIGN, 2016). In the United States, Applied Behaviour Analysis (ABA) is endorsed as an intervention approach for children with autism by a number of state and federal agencies, including the U.S. Surgeon General and the New York State Department of Health ([www.autismspeaks.org](http://www.autismspeaks.org)); similarly, in Canada intensive behaviour interventions are the publicly funded intervention of choice in most provinces (Norris, Paré, & Starky, 2006).

Recent changes in special education in the UK brought about by the Children and Families Act (2014) specifically provide for the role of parents in decision making in relation to the support that their child receives. Empowering parents to make decisions is thus important. However, in the absence of national/professional guidance, parents of children with autism in the UK often have to research interventions and take decisions alone, relying

on a variety of sources of unknown provenance (Tzanakaki et al., 2012; McPhilemy & Dillenburger, 2013). Therefore, more research is needed to understand factors that may be associated with parents' choices. In the present research, given the international evidence base for behavioural educational interventions, we focus on parents' beliefs about ABA.

Before considering the role of parental decision making in relation to ABA interventions, it will be helpful to understand what we mean by 'ABA' because this is a term that we believe is widely misunderstood. ABA is one branch of behavioural science (also known as behaviour analysis) that uses what we know about human learning, and what motivates people, to address issues that are of concern to society (Baer, Wolf, & Risley, 1968). Practitioners using this approach use the principles of learning to teach skills that are important to individuals or groups of people, and skills that enable, them and their families, to have a better quality of life (Fisher, Piazza, & Roane, 2011). Building positive and supportive environments around a person is at, or should be at, the heart of all behavioural interventions.

Almost 30 years ago, Lovaas (1987) published the evaluation of an intervention that used teaching methods derived from the science of learning with a group of children with autism. Almost half (49%) of those children showed significant IQ gains and were able to enter mainstream classes following intervention. The therapists predominantly used a teaching technique known as discrete trial teaching (DTT) and delivered the intervention over a period of two years in home-based sessions for up to 40 hours per week. The length of this intervention approach, methods of teaching, and its intensity in terms of teaching hours, was the first and early example of what we now refer to as Early Intensive Behavioural Intervention (EIBI). Although there was criticism of the research methodology used to evaluate this early example of EIBI, it sparked a growth in the number of behavioural and educational 'interventions' or 'packages' offered in the support and education of people with autism (Dawson et al., 2010). Some, such as Positive Behavioural Support (PBS) (Gore et al.,

2013) and the Early Denver Start Model (EDSM) (Dawson et al., 2010) have developed for specific age groups and populations; others have developed to address specific areas of concern such as communication, for example the Picture Exchange Communication System (PECS) (Frost & Bondy, 2002), numeracy (Tzanakaki et al. 2014) and literacy (Grindle et al. 2013). Additionally, the methods of teaching used in the Lovaas study (i.e., DTT) are regarded now as only one way to teach skills, and modern approaches based on the science of learning use a variety of techniques to help teach important life skills. Examples of specific teaching methods that are routinely used in EIBI include Natural Environment Teaching (NET) (Mosier, 2011), DTT (Lerman, Valentino, & LeBlanc, 2016), and Pivotal Response Training (PRT) (Koegel, Ashbaugh, & Koegel, 2016).

Comprehensive educational interventions, and teaching methods derived from behavioural principles are sometimes categorised, described, or even marketed as alternatives to 'ABA'. However, we believe this is a category error (Keenan et al., 2010). We regard the term 'ABA' as an umbrella term that describes a number of different approaches and procedures that have all derived from use of basic human learning principles and are all aimed at building positive and supportive environments to enable people to fulfil their potential. This is not always recognised, even within the academic world. For example, Dawson et al. (2010), the research team behind the EDSM, describe their model as 'early intensive behavioural intervention' (p.17) and yet Salomone et al. (2016) classify EDSM as a 'developmental' rather than a 'behavioural' approach. How do parents and educators make sense of these apparently different behavioural educational methods?

The history of ABA-based approaches in UK is relatively recent with the first home-based programme recorded in 1994 (Denne et al., 2011). Early programmes were parent sourced, home-based and, because there were no UK based certified behaviour analysts until 2002 (Hughes & Shook 2007), were typically established with consultation from overseas

practitioners. TreeHouse, the first school in the UK using an ABA-based approach, was established in 1997. By 2012, a UK census identified 14 'ABA' schools that catered for almost 250 children ranging in age from 3 to 18 years, employing 310 staff trained in ABA (Griffith et al., 2012). As of October 2016, there were 243 certified behaviour analysts in the UK registered on the BACB® website (although it is not clear how many of these work in autism education) and ABA-based interventions are delivered within a variety of settings including nurseries, playgroups, schools, after school clubs, and from a number of provider organisations. It is important to note that these settings invariably describe their provision as 'ABA' but their respective service delivery models include a range of behaviourally based approaches as described earlier and may look very different to one another. It is also important to note that the historic growth of ABA-based approaches to autism education in the UK has been predominantly parent-driven and that parents also tend not to distinguish between ABA and specific interventions or service delivery models based on behavioural science or behaviour analysis.

Behaviour analysis has not historically been included in mainstream UK psychology or education training and, perhaps as a result, ABA-based approaches have not been routinely adopted as part of UK autism education. So, how have parents come to know about ABA-based methods in autism education and how do they make their decisions? Data from an internet survey (Green et al., 2006) support the proposition that experiential and anecdotal evidence influences parental decision making. Green et al. (2006) found that the availability of empirical evidence did not make any difference between the uptake of commonly used and rarely used autism interventions. And, in a follow up qualitative interview study with 19 of the survey respondents, Green (2007) found that the sources of information used by those who had chosen what they described as 'ABA' included: anecdotal evidence from other

parents (38.5%), information from books (30.8%), and the internet (30.8%). At the other end of the scale, information from health professionals was 0% and from school/teachers 7%.

These findings are also echoed in two recent UK studies; one of which (Tzanakaki et al., 2012), explored the factors behind parental choice of EIBI, and the other (McPhilemy & Dillenburger, 2013) of parents' experience of 'ABA'. Tzanakaki et al. (2012) found that the decision to use EIBI was based on both empirical and anecdotal evidence: the testimony of other parents was cited by 55% of those interviewed as a factor, and reading books by 48.3%. One of the books cited by a number of respondents was 'Let me hear your voice' by Catherine Maurice (Maurice, 1993), a mother of a child with autism, which details her family's experience of ABA. The majority of parents in Tzanakaki et al.'s research reported that they had not been given any information about interventions, let alone behavioural interventions, at the time of diagnosis: 50% were given no information, and 13% were told that 'nothing can be done'. Tzanakaki et al. (2012) point out that this absence of information from professionals leaves parents with no choice but to research interventions for themselves. The McPhilemy and Dillenburger (2013) study showed that this was indeed the case for the cohort of parents they interviewed.

All three studies described above point out that some of the information upon which parents base their information is unrealistic. A significant minority (40%) of parents in the Tzanakaki et al. (2012) study, for example, expected their child to be 'cured' or to achieve 'normal functioning' such that they would enter mainstream school within two years. In the McPhilemy and Dillenburger (2013) study, the majority of parents reported that their expectations since starting what they described as 'ABA' had become more realistic and that the emphasis had shifted from 'curing' to seeing ABA as a way of managing challenging behaviour. In addition to over-optimistic perceptions, Tzanakaki et al. (2012) found some 'negative' perceptions including concerns about the rigidity of a behaviourally based



intervention, the potential use of aversives, the impact on family life, the costs of running an 'ABA programme', and of the potential isolation of the child from peers.

While there is some research into parental decision making and their experiences of behavioural autism interventions (Green, 2007; Grindle et al., 2009; Tzanakaki et al., 2012), there is little research within the behaviour analysis literature towards understanding the factors that underpin the dissemination of evidence based practice. Approaches to evidence based practice from medicine (Rycroft-Malone, et al., 2004), education (Gough, 2004) and public services (Davies, Nutley, & Smith, 2000) point out that what constitutes 'evidence' is a complex matter that depends upon the person reviewing that evidence, their role, and their motives. In addition, experiential and anecdotal evidence can be as equally or more important to the decision-making process as evidence, such as randomised control trials, that the scientific community might regard as more robust. Critically, the 'perceptions' of decision makers are often the most significant facilitators of, and barriers to, research utilisation. Given the facts that there is a growing body of evidence around behavioural and educational approaches, and that parents play a significant role in the decisions on how to educate their child, understanding their beliefs (whether they have used behavioural education interventions or not) is potentially very important. We could find no research focused on this issue.

Our main aim in the current study was to describe beliefs about ABA in the education and support of children with autism using a sample of parents in the UK. We also explored whether there were any differences in the beliefs of those parents who had experience of behaviorally based interventions and those who had not. Additional demographic data were gathered and associations between these variables and parental beliefs were also explored.

## **Method**

## Participants

One hundred and seventy-six parents of children with autism agreed to take part in an internet survey; 25 respondents were excluded from the analysis for the following reasons: three of the questionnaires were not completed beyond the consent form; two did not complete the questionnaire beyond the demographics section; nine did not complete the parental perceptions section; and 11 questionnaires were outside of the parameters set by the study (of these, five participants had children over the age of 19; four lived outside of the UK, and two of the questionnaires were not completed by parents). The remaining 151 participants were drawn from all four nations of the UK (England, Wales, Scotland and Northern Ireland), from 101 different local authority/local government areas.

The majority of participants were mothers of children with autism ( $n = 134$ , 89%), 12 (8%) were fathers, three people described themselves simply as “parents” and there were two adoptive parents. The modal age range category of participants was 35—44 years of age (44% of the sample). Educational level was high, with 77 % of participants having an undergraduate degree or post-graduate qualification or equivalent. 75 (49%) participants were in full or part-time paid employment and 53% of participants reported an annual household income of £45,000 (~ €50,000) and above.

Most of the children described were male ( $n=125$ , 83%) and the mean age was 10.34 years (range: 2-19; mode = 11 years). The majority of children ( $n = 99$ , 66%) were described as having a diagnosis of autism; 52% were reported also as having an intellectual disability, and 25% were non-verbal (as opposed to having single word or phrase speech). 54% of children attended a mainstream school or a specialist unit within a mainstream school.

For the purposes of this study (see survey development, below), ABA was deliberately listed as an intervention approach alongside other approaches that fall within

ABA (NET, PRT etc.) as this reflects the information parents may find on the internet and the terminology that parents may use to describe the intervention approach used with their child. Participants were divided into groups according to their reported use of behaviourally based approaches. Parents who described use of a behavioural approach including ABA, current and past (n= 97, 64%) were compared to those who had never used a behaviourally based approach (n=54, 36%) See Denne et al., (2016, manuscript submitted for publication) for details.

### **Survey development**

The survey items used to identify parents' beliefs about ABA were developed by the authors. These were part of a wider questionnaire which also included standard demographic questions about the parent and their child with autism (see Participants) and a section 'Common approaches to autism intervention', which sought to identify and describe the interventions currently used by parents of children with autism in the UK. A detailed analysis of the number and type of interventions used was the basis of a separate report (Denne et al., 2016, manuscript submitted for publication).

In developing the items on parents' beliefs about ABA, three types of statements were considered: a) beliefs which may reflect a 'negative', 'poor practice' or erroneous view of ABA such that they may pose a potential barrier to dissemination; b) beliefs that are broadly positive and may facilitate dissemination; and, c) beliefs that may be positive or negative in relation to ABA depending upon one's point of view. Forty-three statements were generated from anecdotal accounts of common perceptions of ABA gathered through the authors' own experiences, and reports in newspapers and on television. The themes about behavioural interventions developed through these media included: an individualised vs. prescriptive approach, using treats as reinforcers, normalisation or not of autism behaviours, population

focus, intensity of intervention, generalisation of skills, problem behaviour, use of punishment procedures, the approach as a 'fad', 'too American', impact on family life, nature of the curriculum, and availability/access. The initial 43 statements were tested against suggestions generated by a small group of stakeholders within the behaviour analysis community, which included parents and professionals. The 17 statements that mapped most closely onto the ideas generated by the stakeholder group were chosen. These final 17 items were subsequently tested in a pilot study of 6 parents. Participants were asked to rate each of the 17 items on a 4-point response scale (strongly agree, agree, disagree, strongly disagree). Each of these items was perceived to be easy to understand and possible to rate in terms of agreement. Thus, all were retained for the main study. A 'not sure' response option was subsequently included at the suggestion of participants of the pilot study.

### **Procedure**

Ethics approval was given by the University of Bangor School of Psychology Research Ethics and Governance Committee. Parents provided informed consent before completing the survey. Participants were recruited via the internet using email distribution to a variety of parent support groups and via the mailing lists of autism organisations in the UK. Eligible participants included all parents of children and young people up to the age of 19 with a diagnosis of autism, any autism spectrum disorder, or Asperger's syndrome. The survey was open for five months from the end of August 2014 to the end of January 2015.

### **Treatment of data**

Four participants left gaps in the data: three were missing a response to one belief item and one was missing responses to two items. Participants rated each statement on a 5-point agreement scale (strongly agree, agree, not sure, disagree, strongly disagree). To initially test the direction for scoring each item, we assigned low scores to agreement with

potential barriers, and high scores to agreement with potential facilitating factors. Those items that could be either were initially scored as if they were barriers. Based on this initial scoring we calculated a sum total score and then we removed five items with a corrected item-total correlation of below +/- 0.39. This left us with the 12 items shown in Table 1 that constituted the Parental Beliefs about ABA and Autism scale (P-BAA). Those items that are reverse scored are indicated in Table 1.

## Results

Using a summed total of all 12 items (including appropriate reverse scoring of the items shown in Table 1), the P-BAA was examined for internal consistency and re-examined for corrected item-total correlations. Cronbach's alpha was very good at 0.91, there were no corrected item-total correlations below 0.78, and all items were positively correlated with the corrected total score. The 12-item P-BAA therefore had a maximum possible score (most positively disposed to ABA) of 60 and the lowest possible score was 12. The mean score of all participants in the current study was 42.81 and the scores ranged from 23 – 60.

Beliefs overall for the sample of parents were first examined descriptively for all of the P-BAA items (Table 1). There were only two items for which more than half of the participants recorded either 'agree'/'strongly agree' or 'disagree'/'strongly disagree': 62 % of all participants disagreed or strongly disagreed with the statement '*I am uncomfortable, or would be uncomfortable, using ABA because it is not "approved" by the education or health local authorities in the UK.*'; and 61% of all participants agreed or strongly agreed with the item '*ABA is highly individualised and tailored to meet a child's needs.*'

The item which resulted in the greatest uncertainty with 83 (55%) participants choosing 'not sure' was: '*ABA can be used successfully with older children and teenagers.*'; and the item over which there was the most divergence was: '*ABA places pressure on family*

*life.*' in which 40% of participants either strongly agreed or agreed with the statement, 40% were not sure, and 20 % disagreed or strongly disagreed.

Statistical analysis was carried out in two stages. First, we explored differences in parental beliefs about ABA by intervention use and by parent and child characteristics. We found a significant difference ( $p < 0.001$ ) and large effect size on the total P-BAA score between parents using a behaviorally based approach including ABA either currently or in the past ( $n=97$ ) and those who had never experienced a behaviorally based approach ( $n=54$ ) ( $t=7.775$ , Cohen's  $d = 1.14$ ). Repeating the analysis for each individual P-BAA item level we found a significant difference ( $p < 0.001$ ) for all items except *The focus of ABA programmes is on increasing positive behaviour rather than on behaviour problems*. For the remaining 11 items, those parents with current or past experience of a behavioral intervention had more positive beliefs towards ABA.

Associations between dichotomized demographic variables and the total P-BAA score were examined using t tests (see Table 2). In terms of parent characteristics, significant associations were found between total P-BAA scores and parent education (higher scores for those with an undergraduate degree and above). Exploring child characteristics, significant associations were found between total P-BAA scores and child diagnosis (higher scores for those with an 'autism' diagnosis), child intellectual disability (higher scores for those with an additional intellectual disability), and similarly with child language skills (higher scores for those described as non-verbal). Child age was also negatively correlated with the total P-BAA score ( $r = -.16$ ,  $p = .049$ ), and total family income was positively associated with the total P-BAA score ( $r = .30$ ,  $p < .001$ ).

In the second stage of the analysis, multiple regression analysis was used to explore predictors of total P-BAA scores within the sample. We used all demographic variables that showed significant univariate associations with total P-BAA scores along with a single

dichotomous variable summarizing their experience with behavioural educational approaches (see earlier) (Table 3). From Table 3 it can be seen that experience with behavioral educational approaches, the child's diagnosis, total household annual income, and parental education were significant predictors of total P-BAA scores.

## Discussion

Using a new scale (the Parental Beliefs about ABA and Autism scale [P-BAA]) developed by the authors, this study was a first attempt to identify and quantify parents' beliefs about ABA as an approach to the education and support of children with autism in the UK. Using these data, we explored whether there were any differences in the beliefs of those parents who had experience of behavioral educational interventions and those who had not, and whether it was possible to identify other demographic predictors of P-BAA scores. Parental perceptions may play a part in the dissemination of evidence based practice in general and there is anecdotal evidence to suggest that some of the beliefs about ABA held by parents in the UK may act as barriers to the dissemination of behavioural educational approaches.

It is interesting that the P-BAA item to which the majority of responses were most similar (disagree/strongly disagree) across all parents was: *'I am uncomfortable, or would be uncomfortable, using ABA because it is not "approved" by the education or health local authorities in the UK'*. This finding is consistent with the experiences described in Grindle et al. (2009) of parents trying to get funding for ABA programmes, often having to resort to taking their local authorities to tribunal because they could not agree. In addition, some parents may be reluctant to use potentially evidence-based ABA interventions if they perceive that statutory services do not approve.

The P-BAA item over which there was least agreement '*ABA can be used successfully with older children and teenagers*', suggests that a lack of understanding about the applicability of behavioural educational approaches across the lifespan and may serve as a barrier to dissemination.

Previous research has also identified perceptions around the rigidity of ABA programmes resulting in 'robotic' behaviour (Tzanakaki et al. 2012). In the current study, we found that few parents agreed or strongly agreed with the items '*Children who have been taught using ABA methods are often robotic in their responses*' and '*ABA is based on a highly structured curriculum that every child has to follow*' suggesting that these may not be widely held beliefs. Tzanakaki et al. (2012) also highlighted the intrusion of ABA on family life as a concern although the vast majority of families said that they would still recommend ABA to other parents because of the potential benefits. We found that less than half of the parents agreed or strongly agreed with the item '*ABA places pressure on family life*'.

A relatively large number of parents were unsure about their beliefs in response to several of the P-BAA items, and some parents did have negative beliefs about ABA. Further investigation into the qualitative nature and relative importance of parental beliefs about ABA is needed. Critically, we have no information concerning the relative weighting of parents' beliefs in decision making about interventions nor whether certain beliefs serve as barriers to dissemination of ABA approaches. For example, parents may agree that ABA places pressure on family life but for some this may be worth enduring because of the real or anticipated benefits (Tzanakaki et al., 2012) – for others this may be a decisive factor in deciding not to use ABA.

Previous or current experience of a behavioural education intervention was the strongest predictor of parents' beliefs about ABA and was associated with differences in



ratings for 11 or the 12 P-BAA items. Given that our design was a cross-sectional survey, we cannot be sure whether more positive beliefs about ABA contributed to parents' intervention choices or whether exposure to behavioural interventions may lead to more positive beliefs about ABA. However, if the latter is true it would suggest that additional education for parents about ABA intervention methods and perhaps experiential training in the intervention strategies may assist parents in making intervention choices. Indeed, such experience and training might be helpful for parents making a decision about any autism intervention approach.

In addition to exposure to ABA interventions, child diagnosis, parental education and household income were also significant predictors of parental beliefs about ABA. Green et al. (2006) found that ABA tended to be used by families of children at the more severe end of the Autism spectrum, and we found (Authors removed for blind review, in press) a similar association. Several studies suggest (Green 2007, Tzanakaki et al. 2012, McPhilemy & Dillenburger, 2013) that parents are having to seek out information about approaches to autism intervention themselves. Therefore, socio-economic factors such as parental education and family financial resources may influence parental understanding of, and beliefs about, the available intervention choices especially where there may be financial costs to the families themselves (Grindle et al., 2009).

This is the first study to describe and explore parental beliefs about ABA amongst parents of children with autism in the UK, and we reported preliminary data on a measure of parental beliefs (the P-BAA) that could be used in future research. To interpret the findings, a number of limitations need to be born in mind. First, although we used the term most likely to be familiar to parents ('ABA'), we do not know about parents' understanding or knowledge about ABA. Arguably, it is more important to understand their beliefs independent of a core understanding of ABA. Our data also suggest that improved understanding of ABA may be

associated with more positive beliefs about ABA (if we assume understanding is increased through direct exposure to behavioural educational interventions). Second, the present data are not likely to be representative of all parents of children with autism in the UK. The survey was internet-based, likely excluding some families. Although we did survey parents who were and were not using behavioural interventions, the survey itself was explicitly focused in several sections on behavioural interventions. Thus, parents with a reasonably positive perception of ABA may have been more likely to participate.

In light of the increased role that parents are having to make in respect of intervention choices it is clear that we need to understand the relevance of parental beliefs in decision making and the factors that influence this. The implications for educational practice and policy making are clear. Once we understand these factors we can more effectively provide parents with the information and experience that they need to be able to make informed decisions. Further investigation is needed.

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### Tables

Table 1: *Items from the Parental Beliefs about ABA and Autism (P-BAA) scale ranked in order of concordance of response*

|  | Strongly agree | Agree | Not Sure | Disagree | Strongly disagree |
|--|----------------|-------|----------|----------|-------------------|
| I am uncomfortable, or would be uncomfortable, using ABA because it is not “approved” by the education or health local authorities in the UK.(R) | 4              | 12    | 42       | 33       | 60                |
| ABA is highly individualised and tailored to meet a child’s needs.   | 50             | 42    | 49       | 7        | 3                 |
| ABA is relevant for children with autism in any Western culture.   | 50             | 42    | 49       | 3        | 7                 |
| ABA is simply trying to teach to children with autism the skills that all children need to learn.  | 49             | 36    | 55       | 9        | 2                 |
| ABA does not lead to proper learning because it is based on rewarding and bribing children to do things. (R)                                     | 3              | 19    | 46       | 36       | 47                |
| ABA is chosen by parents who want to cure their children instead of being happy with them just as they are. (R)                                  | 5              | 19    | 46       | 42       | 39                |
| The focus of ABA programmes is on increasing positive behaviour rather than on behaviour problems.   | 40             | 40    | 58       | 12       | 1                 |
| Once you start on an ABA programme, it is very difficult to reduce or stop the programme. (R)  | 1              | 12    | 69       | 39       | 30                |
| ABA is based on a highly structured curriculum that every child has to follow (R)  | 4              | 14    | 67       | 49       | 17                |
| Children who have been taught using ABA methods are often robotic in their responses. (R)  | 4              | 11    | 73       | 26       | 37                |
| ABA places pressure on family life. (R)  | 17             | 42    | 60       | 19       | 13                |
| ABA can be used successfully with older children and teenagers.  | 29             | 31    | 83       | 6        | 2                 |

(R) Items which have been reverse scored



Table 2: Mean, standard deviation, t-value and effect size for parental beliefs by parent and child characteristics

| <b>Groups</b>   | <b>N</b>  | <b>Mean</b>    | <b>SD</b>    | <b>t</b> | <b>Effect size<br/>Cohen's d</b> |
|---|-----------|----------------|--------------|----------|----------------------------------|
| Parent age 44 & under/<br>Parent age 45 & over                      | 78<br>73  | 43.96<br>41.59 | 8.50<br>8.86 | 1.674    | 0.27                             |
| Parent degree education &<br>above/<br>Education below degree level | 114<br>35 | 44.33<br>38.20 | 8.92<br>6.31 | 3.779**  | 0.73                             |
| In paid employment/<br>Not in paid employment                       | 75<br>76  | 41.84<br>43.79 | 8.08<br>9.28 | -1.379   | 0.22                             |
| Diagnosis autism/<br>Diagnosis "other"                              | 99<br>52  | 45.24<br>38.21 | 8.92<br>6.18 | 5.072**  | 0.92                             |
| Intellectual disability/<br>No intellectual disability              | 78<br>71  | 44.28<br>41.21 | 8.81<br>8.45 | 2.162*   | 0.35                             |
| Child non-verbal/<br>Single word & phrase speech                    | 38<br>112 | 46.12<br>41.74 | 8.26<br>8.67 | 2.724*   | 0.52                             |
| Mainstream school/<br>Special school & Other                        | 82<br>68  | 41.56<br>44.22 | 8.59<br>8.74 | -1.869   | 0.31                             |

\*\*  $p < 0.001$  \*  $p < 0.05$

Table 3: *Regression analysis of parental beliefs about ABA*

| <b>Predictor</b>   | <b><math>\beta</math></b> | <b><i>p</i></b> |
|--|---------------------------|-----------------|
| Use of a behavioural education approach<br>(current & past)          | -.409                     | <.001           |
| Child age  | -.092                     | .196            |
| Child's diagnosis  | -.232                     | .003            |
| Intellectual disability (yes/no)                                     | 0.036                     | .622            |
| Child's language use   | .029                      | .686            |
| Parental education   | -.158                     | .029            |
| Household annual income  | .223                      | .003            |
| Overall model: $F = 15.019$ ; $R = 0.658$ ; $R^2$ (adjusted) = 0.404 |                           |                 |