

Case Study 1: An Evidence-Based Practice Review Report

Do internet-based parent training programs lead to improved behaviour in children with conduct disorder/behavioural difficulties?

Summary

This systematic literature review considers the current evidence relating to internet delivered behavioural parent training and seeks to establish its effectiveness in terms of reducing problem behaviours in children with identified behavioural difficulties or conduct disorder. The interventions included in this review were delivered mainly or entirely via the internet and were all based on already existing, evidence based behavioural parent training programs. Behavioural Parent Training (BPT) is a form of psychoeducation that encourages positive parenting skills, behaviour management techniques, positive relationships, parent modelling of emotional regulation and positive parent thinking patterns. There is a strong evidence base to support the efficacy of BPT when delivered face to face, impacting on both parental confidence and child behaviour. This review critically evaluates five studies that assessed the effectiveness of online behavioural parenting interventions with a total of 1067 target children. The primary outcome for these studies was child behaviour, as reported by their parents, using either the Eyberg Child Behaviour Inventory or the Child Behaviour Checklist. All studies found the

intervention had a significant positive impact on child behaviour ratings, although for some this effect was seen immediately after the intervention, and for others it was seen at follow up, approximately 4-6 months later. Recommendations and further research needs are outlined.

Introduction

The National Institute for Clinical Excellence (NICE) reports that Conduct Disorder is the most common type of mental and behavioural difficulty for children, affecting up to 5% of the population (NICE, 2013) and that more broadly, problem behaviours and especially externalizing behaviour, have a high prevalence rate affecting up to 20% of young children. Externalising behaviours are outwardly directed manifestations of problem behaviour such as non-compliance and aggression. Additionally these early behavioural difficulties are an important predictor of later more serious conduct problems including delinquency and substance abuse in adolescence (Poulou, 2015). While many therapeutic approaches exist to support children with mental health and behavioural difficulties, evidence points to large numbers of young children being identified with mental health problems but not receiving treatment (McGoron & Ondersma 2015).

One factor contributing to child behavioural difficulties is believed to be the family context, where relationships and interactions may cause and maintain these difficulties, especially where parenting skills are weak (Poulou, 2015). In line with this, working to support change at a systemic family level is seen as an important route to reducing behavioural difficulties. Behavioural parent training (BPT) is a well-established intervention for families with a child with behavioural difficulties or conduct disorder. BPT consists of parent education

that seeks to improve both parenting knowledge and skills which is then hoped to bring positive outcomes for children in terms of reduced behavioural difficulties.

Established BPT programs draw on social learning theory (for example encouraging parents to model good emotional self-regulation and promoting positive relationships through adaptive communication approaches), cognitive-behavioural theory and behavioural approaches (for example managing the child's behaviour through reinforcements such as praise/rewards and targeted consequences such as 'time out'). They make use of psycho-education to improve parental understanding of child development and to target and change maladaptive parental thinking (Porzig-Drummond, Stevenson & Stevenson, 2015).

BPT programs are traditionally carried out face to face, led by a professional, for either individual families or groups of parents. There are a number of such programs with a strong evidence base (Eyberg, Nelson & Boggs, 2008, and Gardener and Leijten, 2017). Systematic reviews of psychosocial treatments for child and adolescent disruptive behaviour have concluded that Behavioural Parent Training should be recommended as the first line approach to supporting younger children with behavioural difficulties, while direct therapeutic approaches may be better suited to older children and adolescents (Eyberg et al., 2008, and Poulou, 2015).

While there is a strong evidence base for the efficacy of face-to-face behavioural parent training, weaknesses have been identified in terms of the potential to reach all families in need of such support. Issues include

reluctance by parents to take part, limited resources within primary care settings to offer courses and problems surrounding fidelity and training for program facilitators (Breitenstein, Gross and Christophersen, 2014). For parents, the reluctance appears to be both due to logistical issues (childcare needs, timing and location of sessions) and psychological barriers such as the stigma of seeking help and reluctance to discuss problems in front of others (McGoron & Ondersma, 2015).

In recognition of these issues with the face to face delivery format, over the past decade behavioural parent training programmes have been adapted for remote delivery in various ways. This includes delivery via a self-help manual (Sanders, Dittman, Farruggia & Keown, 2014), telephone and DVD (Olthuis et al., 2018, Porzig-Drummond et al., 2015), app for smartphone (Feil, Sprengelmeyer & Leve, 2018), app for iPad (Breitenstein, Fogg, Ocampo, Acosta & Gross, 2016) and internet (e.g. Sanders, Bakers & Turner, 2012). Internet has been found to be the most common format for remote delivery (Corralejo & Domenech Rodríguez, 2018).

The availability of self-delivered and remote options fits well with user needs and preferences, especially utilising web based technology. When offered the choice most parents expressed a preference for self-delivered methods of BPT such as online programs rather than home visits or multi-week parenting groups (Metzler et al., 2012). Internet delivered BPT has been found to have high consumer acceptance (Corralejo & Domenech Rodríguez, 2018) and could potentially bring psychological benefits too in terms of reducing barriers to seeking help caused by stigma and issues around social acceptance; for example, adults with depression have been shown to be more likely to admit

to suicidal feelings to a computer than to a human being (Carlbring & Andersson, 2006). Over 90% of UK households now have access to the internet and 95% of adults under 35 years own a smartphone with internet capabilities making internet based delivery of services a very widely accessible option, including the potential to reach families of lower SES and minority groups.

Given the potential importance of internet delivered BPT, this review considers the current evidence base for the effectiveness of parent training delivered in this way. The studies included in this review all include an evaluation of a behavioural parent training program delivered primarily via the internet. In all cases the intervention program was adapted from an established, evidence based program originally designed for face to face delivery. The five studies included in this review all use a randomized controlled trial design and compare outcomes for an internet based BPT group with a 'no treatment' control group. One study (Day & Sanders 2018) compares two different versions of internet based BPT (with or without therapist support) with a 'no treatment' control group. While internet based BPT programmes targeting secondary school age pupils do exist, the focus of this review is on the potential for early intervention via internet based BPT programmes and all of the studies selected therefore focus on children of primary age. The intervention programs covered in each of the five studies are outlined in Appendix A.

This critical review investigates the effectiveness online behavioural parent training and seeks to answer the specific question: "Do internet-based parent training programs lead to improved behaviour in children with conduct disorder/behavioural difficulties?"

Critical Review of the Evidence

On 18th January 2019 a literature search was conducted using the electronic databases Web of Science Core Collection, PsycINFO and Pubmed. Table 1 outlines the search terms used. Searches were restricted to the title and abstract or topic.

Table 1

Search Terms Used for Database Searches

Intervention	Delivery	Population	Study Design
"parent* training"	online	behavio?r	trial
OR	OR	OR	OR
"parent* education"	internet	conduct	evaluat*
	OR	NOT	OR
	web	autism	outcome*
	OR	NOT	OR
	remote	"ASD"	pilot
		NOT	OR
		"brain injury"	randomi?ed
("parent* training" OR "parent* education") AND ("behavio?r" OR "conduct") AND (online OR internet OR web OR remote) AND (trial OR evaluat* OR outcome* OR pilot OR randomi?ed) NOT (autism OR "ASD" OR "brain injury")			

The initial search yielded 144 studies (PsycINFO=68, Web of Science Core Collection=67, Pubmed=9). Of these studies, 96 were excluded through title screening based on the criteria outlined in Table 2 below. Additionally, 16 studies were excluded due to being duplicates. The title and abstract of the remaining 32 articles were reviewed and those not meeting the inclusion criteria specified in Table 2 were excluded. An ancestral /citation search was then conducted on each of the remaining 8 papers, screening for titles that contained relevant terminology. These additional 5 records were added to the

remaining studies from the electronic database search making 13 studies to be screened at full text level. Any papers that did not meet the inclusion criteria specified in Table 2 were then excluded. After removal of unsuitable studies, 5 papers remained and these were included in the review. The flow diagram depicted in Figure 1 below summarises this process.

Table 2

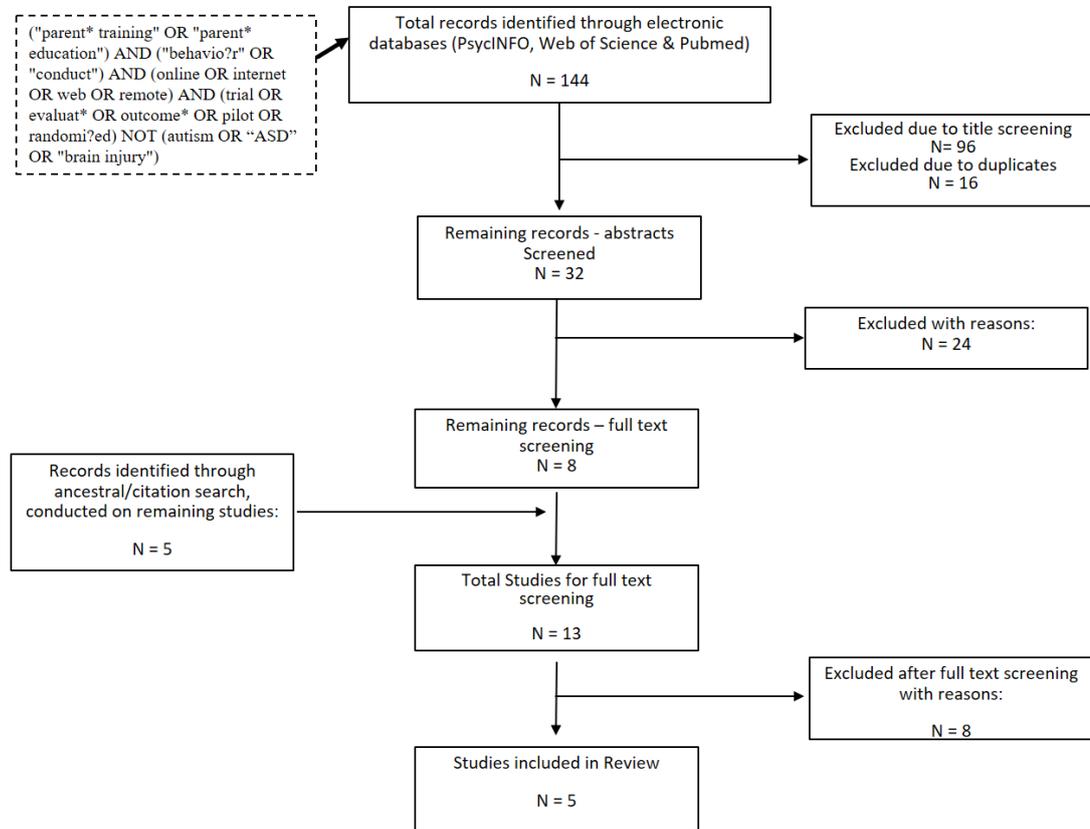
Inclusion/Exclusion Criteria for Selected Studies

	Inclusion Criteria	Exclusion Criteria	Rationale
<i>Intervention type and goal</i>	Behavioural parent training program Designed to (support parents to) improve child behaviour	Not BPT/ not a formalised program Intervention Not designed to specifically to improve child behaviour	The focus of this study is on parent mediated interventions specifically targeting child problem behaviour
<i>Delivery Mode</i>	The intervention delivery must be mainly or entirely internet based	The intervention is not mainly or entirely internet based	The focus of this study is on remote access to parent training accessed mainly via the internet.
<i>Participants (age)</i>	All or most of the participants to be age 4-11 years	All or most of the participants not age 4-11 years	BPT is recommended for younger children/ early intervention
<i>Participants (problem experienced)</i>	Target child is identified as having behavioural difficulties	Target child is not identified as having behavioural difficulties. Target child has accompanying diagnosis of ASD, ADHD, FASD, brain damage.	This is study is concerned with behavioural disorders existing without other diagnosed conditions.

<i>Outcomes measured</i>	Child behavioural outcomes must be included in the study	No child behavioural outcomes included in the study	The focus of this review is the impact of parent training on child behaviour.
<i>Study Design</i>	Must be a RCT, including a 'no treatment' control group.	Not a RCT. Review or meta-analysis. No 'no treatment' control group. Only includes follow up data or secondary analysis data.	RCT design allows impact of the intervention to be assessed.
<i>Language/ Country</i>	Written in English. Conducted in OECD country	Not written in English. Not conducted in OECD country	Cost and time limit do not allow for translation. OECD countries allow for generalisation of findings to UK population.
<i>Data</i>	Data reported is not used in another study included in the review	Data reported is included in another study in this review	If two studies are reporting the same data, it would lead to replication during the review which could lead to a bias in findings
<i>Publication Type</i>	Published journal article	Literature is not in the form of a published journal article	Published journals will have undergone an ethics procedure

Figure 1

Flowchart Showing Literature Search Processes



A full list of the studies excluded during the abstract screening and full text screening stages is included in Appendix B, along with reasons for exclusion. The five included studies are listed below in Table 3 (Studies included in this Review) and details for each study are outlined in Table 4 (Summary Mapping of Key Information of Selected Studies).

Table 3

Studies included in this Review

Baker, S., Sanders, M.R., Turner, K.M.T., Morawska, A. (2017). A randomized controlled trial evaluating a low-intensity interactive online parenting intervention, Triple P Online Brief, with parents of children with early onset conduct problems. *Behaviour Research and Therapy*, 91, 78-90

Day, J.J., & Sanders, M.R. (2018). Do Parents Benefit From Help When Completing a Self-Guided Parenting Program Online? A Randomized Controlled Trial Comparing Triple P Online With and Without Telephone Support. *Behavior Therapy*, 49(6), 1020-1038.

Enebrink, P., Hogstrom, J., Forster, M., Ghaderi, A. (2012). Internet-based parent management training: A randomized controlled study. *Behaviour Research and Therapy*, 50(4), 240-249

Sanders, M.R., Baker, S., & Turner K.M.T. (2012). A randomized controlled trial evaluating the efficacy of Triple P Online with parents of children with early-onset conduct problems. *Behaviour Research and Therapy*, 50(11), 675-684.

Sourander, A., Mcgrath, P., Ristkari, T., Cunningham, C., Huttunen, J., Lingley-Pottie, P., . . . Unruh, A. (2016). Internet-Assisted Parent Training Intervention for Disruptive Behavior in 4-Year-Old Children: A Randomized Clinical Trial. *JAMA Psychiatry*, 73(4), 378-387.

Table 4

Summary Mapping of Key Information for the Selected Studies

Author	Study Type	Location	Participant Numbers	Participant Details	Intervention	Child Outcome Measures	Key findings
Baker et al. 2017	RCT	Australia (targeting lower SES suburbs)	200 Two groups: Intervention 100 Waitlist control 100	2-9 years Screening: SDQ total score 14+	Triple P Online Brief	Pre, post and +9mths Eyberg Child Behaviour Inventory Parent-Child Play Task Observation System	Intervention effect seen at follow up but not immediately post intervention No intervention effect in clinic observation data
Day & Sanders 2018	RCT	Australia	183 Three groups: 60 waitlist control, 57 TPOL, 66 TPOLe	1-8 years Screening: DSM-IV criteria – CD, ODD, ADHD	Triple P Online Triple P Online Enhanced	Pre, post and +5mths ECBI (Eyberg) intensity and problem scales	Intervention effect seen for both groups, but stronger for TPOLe (web/ phone support)

Author	Study Type	Location	Participant Numbers	Participant Details	Intervention	Child Outcome Measures	Key findings
Enebrink et al., 2012	RCT	Sweden	104 Two groups: Intervention 52 Waitlist control 52	3-12 years Screening: Eyberg Child Behaviour Inventory	iComet	Pre- Post- and +6mnths Eyberg Intensity and Problem scales/ SDQ	Intervention effect seen at post and maintained at follow up
Sanders et al., 2012	RCT	Australia	116 total Two groups: Intervention 60 Waitlist control 56	2-9 years Screening: Eyberg Child Behaviour Inventory	Triple P Online	Pre- post- and +6mnths Eyberg Child behaviour Inventory Clinic observation	Intervention effect seen at post and follow up (parent report data but not clinic observation data)
Sourander et al., 2016	RCT	Finland Recruitment via annual child health clinic check-ups	464 Two groups: Intervention 232 Education control 232	All 4 years old Screening: SDQ conduct problems score 5+ (very high)	Strongest Families Smart Website	+6 +12 from start of treatment Child Behaviour Checklist (externalising scale)	Significant intervention effect at follow up but not immediately post intervention

Critical Review of the Selected Studies

The included studies were evaluated using Gough’s (2007) weight of evidence (WoE) framework which uses three categories to assess the studies; methodological quality (WoE A), methodological relevance (WoE B) and relevance to the research question (WoE C). Scores on each dimension were given equal weight and then averaged to find an overall weight of evidence – WoE D. The studies were coded for methodological quality (WoE A) using Gersten et al.’s (2005) criteria for evaluation. Criteria for evaluation are included in Appendix C and completed coding protocols are in Appendix D.

Table 5

Gough’s (2007) Weight of Evidence Framework

Weight of Evidence A	Weight of Evidence B	Weight of Evidence C	Weight of Evidence D
Methodological quality: comprehensive description, repeatable method, accurate presentation and analysis of results, appropriate data collection tools	Methodological relevance: Appropriateness of the research design to the review question	Relevance of findings to the review question	The overall average of scores for each of A, B and C – allows for decisions about the relative weight to award the findings of each study

Table 6 below presents the Weight of Evidence scores A, B, C and D, for each of the five studies.

Table 6

Weight of Evidence Awarded to Each Study

Studies	WoE A	WoE B	WoE C	WoE D
Baker et al. 2017	3	2.5	3	2.8
Day & Sanders 2018	1	2.5	3	2.2
Enebrink et al. 2012	1	2.5	0	1.2
Sanders et al. 2012	3	2.5	2	2.5
Sourander et al. 2016	1	3	3	2.3

WoE 'D' Scores have been rounded to one decimal place

Sample size and Power Calculations

The number of participants in the selected studies varied from 104 to 464. Meta-analyses of Behavioural Parent Programmes (Baumel, Pawar, Kane & Correll, 2016, Breitenstein et al., 2014, Gardener & Leijten, 2017) found effect sizes between 0.30 and 0.61, indicating that effect sizes are likely to be small to medium. Power analyses were conducted to determine appropriate sample sizes as recommended by Cohen (1992) using 0.05 as the level of significance; based on this, three of the studies were sufficiently powered (Baker et al., 2017, Day & Sanders, 2018, Sourander et al., 2016) and two had insufficient sample sizes (Sanders et al., 2012, Enebrink et al., 2012). The insufficient power of these two studies is reflected in Weight of Evidence A.

Participants

The target children in the selected studies were of pre-school or primary age (average ages varied from 3.5 to 6.8 years). In four studies, participants were 2 to 9 years old (plus a 1 year old included in error by Day & Sanders, 2018). One study included children up to 12 years old (Enebrink et al., 2012). The results of this review are therefore most relevant to children in the 2-9 years age range, making all five studies relevant in terms of evaluating internet based BPT as an early intervention measure, although generalizations beyond this age range cannot be made with confidence.

The participants in this study were all families with a child showing behavioural difficulties, based on parent report of their child's behaviour. Measures included the Strengths and Difficulties Questionnaire (Baker et al., 2017, Sourander et. al., 2016), the Eyberg Child Behaviour Inventory (Sanders et al., 2012, Enebrink et al., 2012) or criteria drawn from the DSM-IV (Day & Sanders, 2018). Three studies describe clearly the exact criteria used but the remaining two papers are less clear about the exact screening criteria and this was considered when making Weight of Evidence A judgements.

All five studies include demographic details and provide data to demonstrate consistency across groups in terms of gender, parental working status and SES. Overall, families in the studies were reported to have a relatively high educational status (between 56% and 63.3% with a university educated parent), even though steps were taken during recruitment for two studies to achieve a good representation of low SES families (Baker et al., 2017, Day & Sanders 2018), for example targeting lower SES suburbs. The overall higher than average educational status of parents included in all five studies is a

general weakness, making it difficult to generalise findings to lower SES groups who may benefit from participation in BPT in future.

Studies were conducted in Sweden, Finland and Australia. While none of the studies were conducted in the UK, these are all OECD countries with similar profiles to the UK in terms of education system, social welfare and socio-economic status. There no known differences between the countries and the UK in terms of internet usage and no reason why the findings cannot be generalised to the UK.

Study Design

All five studies included in this review used a randomized controlled trial design. The process of randomization was clearly described and care was taken to ensure that researchers were blind to condition when involved in data collection. Published evidence hierarchies place randomized controlled trial designs as the most appropriate way to judge effectiveness (surpassed by systematic reviews and meta-analysis). All five of the studies therefore provide a strong basis for drawing conclusions about the efficacy of internet based parent behavioural training. The selected studies directly compare outcomes for an internet based parent training with a 'no intervention' control group. One study (Sourander et al., 2016) included an 'education' control condition (offering participants access to very basic support) rather than 'no intervention' and monitored access to alternative treatment across both groups - 12.2% of the intervention group and 19.3% of the education control group accessed additional treatment between randomization and follow up. These additional controls are taken into account in WoE 'B' and 'C' judgements.

All five studies collected data at baseline, immediately post intervention (approximately 3 – 4 months after randomization) and at a follow up stage (varying between 9 and 12 months after initial randomization). This is a strengths in all five studies, seeking to establish not only the immediate impact of the intervention but also to evaluate any longer term outcomes, for example whether initial effects might be sustained. In real world terms, long term impact is important, showing that an intervention has the potential to bring about meaningful and lasting change in the child's behaviour.

Characteristics of the Interventions

All of the interventions included were based on established, evidence based face to face parent management training/behavioural parent training programs. All of the interventions were delivered entirely or mainly via the internet and there were clear similarities across all of the interventions in terms of content and structure. The main difference between the five interventions was in the level and nature of additional support provided, varying from technical support only to weekly telephone coaching from a trained clinician. The three studies including an entirely self-administered intervention allow us to draw more confident conclusions about internet delivery as a method for BPT, for the others the impact could be mitigated by the role of the clinician (reflected in WoE 'C' judgements). The inclusion of clinician support also has implications for ensuring intervention fidelity and accurate representation of the intervention as the three studies evaluating clinician enhanced interventions do not provide clear details about the exact nature of this support (reflected in WoE 'A' judgements). Finally, involvement of clinician support

may be a factor that influences participation and completion of the internet based element, which in turn could impact on intervention efficacy.

Outcome Measures

In all five studies the primary outcome measure was child behaviour, as reported by the parent that had participated in the training. This data was collected using established, norm referenced measures, either the Eyberg Child Behaviour Inventory (Intensity and Problem Scales) (Eyberg & Ross, 1978) or the Child Behaviour Checklist (Externalising Scale)(Achenbach & Rescorla, 2000). However, relying on parent report as the key measure is a key weakness across the studies, given that parents were not blind to condition and were themselves involved in influencing any change in behaviour. Two of the studies also included clinic observation of parent-child interactions to assess behaviour at baseline, post and follow up – the Family Observation Schedule (Sanders et al., 2012) and Parent-Child Play Task Observation System (Baker et al., 2017). These two studies include details of the measures taken to ensure that observers were blind to condition and to monitor inter-rater reliability. All five studies included a range of secondary measures focused on parental confidence, parental stress, parenting style and behaviours.

Attrition and Invention Completion Rates

Overall attrition rates were acceptable across the five studies (less than 20% at post and less than 30% at follow up) with two key exceptions - Day & Sanders (2018) where attrition was high at post (22%) and Enebrink 2012 where attrition was very high at follow up (53.4%). Of more relevance to the

review question might be levels of participation in and completion of the intervention which were found to vary across the studies. Enebrink et al.'s (2012) reported that 65.5% of intervention group completed all sessions while in Day & Sander's (2018) study only 22.2% of the self-administration group completed the intervention. Completion rates were higher where clinician support was provided (e.g. 47% in Day & Sanders 2018) or where frequent reminders sent out (e.g. 47% in Sanders et al. 2012).

Overall Findings

Primary outcomes for the five studies (i.e. impact of internet based parent training on child behavioural difficulties) are presented below in Table 7, along with details of sample size and attrition rates. Based on the primary measure of parent reported child behaviour, all five studies in this review reported a significant intervention effect, with a range of effect sizes from small/medium through to very high. In some cases the effect was observed at post measurement and maintained through to the follow up stage. In other cases (Baker et al., 2017, Sourander et al., 2016) the effect was not seen at post measurement but was evident at the follow up stage. It is important to note that in the two studies that also used clinic observations to collect data on child behaviour, this measure showed no significant intervention effect at post or follow up. This could suggest that the parent report data showed simply a shift in parental perceptions rather than a reduction in actual problematic behaviours. However there are also issues with the observation data collection method, as baselines in both studies showed low levels of problematic behaviour in the clinic setting, a potential floor effect may have limited the possibility of seeing improvement in child behaviour.

One aspect of interest is the potential impact of clinician support alongside the internet based component of the BPT. However findings in this respect are unclear. The study that directly compared two delivery formats (Day & Sanders 2018) indicated that clinician support leads to a much stronger impact on child behaviour. However the lowest effect size seen across all of the studies was in a study which evaluated a programme including clinician support (Sourander et al., 2016) and there were medium to large effect sizes seen in Sanders et al. (2012) in spite of a self-administered intervention format. Notably, Sanders et al. (2012) achieved a relatively high completion rate using email reminders.

Sanders et al. (2012), which was rated highly for WoE 'D', showed medium to large effect sizes at post and follow up but showed no significant effect when considering only clinical observation data. Based on Weight of Evidence D judgements, the most useful and relevant study for this review is Baker et al. (2017) which shows a significant effect size at follow up for parent reported child behaviour but with a relatively modest effect size of 0.41 (ECBI Problem Scale) and 0.27 (ECBI Intensity Scale). This study shows no significant intervention effect at post and no effect when considering data from clinic observations. Also rating relatively high on WoE 'D', Sourander et. al, (2016) showed a relatively modest effect size of 0.34 and only at follow up. Together these three studies confirm that the intervention did have a small to medium impact on parent perceptions of child behaviour.

Table 7

Outcomes from the Five Selected Studies

Study	Sample size	Attrition	Outcome measure	Study findings	Cohen's d Effect size (post)	Cohen's d Effect size (follow up)	WoE D
Baker et al. 2017	200	7.5% (post) 19% (follow up)	ECBI	No short term intervention effect. Significant intervention effect at follow up	--	Intensity 0.41 Problem 0.27	2.8
			Clinic Observation	No significant intervention effect at post or follow up	--	--	
Enebrink et al. 2012	104	17% (post) 53.4% (follow up)	ECBI	Significant intervention effect post. Outcomes maintained at follow up.	Intensity 0.42 Problem 0.72	<i>Not reported</i>	1.2
Sourander et al. 2016	464	18% (post) 25% (follow up)	CBCL (externalizing scale)	Significantly greater improvement in the intervention group compared with EC group	<i>Not reported</i>	0.34	2.3

Study	Sample size	Attrition	Outcome measure	Study findings	Cohen's d Effect size (post)	Cohen's d Effect size (follow up)	WoE D
Sanders et al. 2012	116	8% (post) 14% (follow up)	ECBI	Significant intervention effect at post.	Intensity 0.89 Problem 0.71	Intensity 0.74 Problem 0.60	2.5
			Clinic Observation	No significant intervention effect shown	--	--	
Day + Sanders 2018	183	22% (post) 27% (follow up)	ECBI	Waitlist versus TPOL: intervention effect on ECBI problem scale but not intensity scale	Intensity -- Problem 0.66	Intensity -- Problem 0.52	2.2
				Waitlist versus TPOLe: significant intervention effect at post and follow up	Intensity 0.76 Problem 0.93	Intensity 0.70 Problem 1.28	

0.2 = small, 0.5 = medium, 0.8 = large (Cohen, 1988)
ECBI = Eyberg Child Behaviour Inventory
CBCL = Child Behaviour Checklist (externalising scale)

Conclusion and Recommendations

The main outcome measure across the five studies was parent reported child behaviour and based on this data, the studies consistently showed a significant intervention effect, allowing us to conclude that internet based parent training does lead to improved behaviour in young children with behavioural difficulties. This is in line with the strong evidence based for the efficacy of face-to-face behavioural parent training and suggests that this intervention can successfully be delivered in an online format.

However this positive finding should be treated with some caution. It is notable that significant intervention effects were seen in parent collected data but no significant intervention effects were seen in the clinic based observation data (collected in just two studies). This could indicate that the findings represent only a shift in parent perception and not an actual change in child behaviour. However, there are limitations to both data collection methods, while parent reported data is at risk of expectation effects, the clinic observations represent just a snapshot of the child's behaviour in a non-naturalistic setting and may equally not provide accurate data in terms of actual behavioural change.

Based solely on evidence from the selected studies, it would be appropriate for practitioners to recommend internet based parent training interventions to families with a young child with reported behavioural difficulties. This should be an established training

program and based on the issues outlined above, consideration should be given to how best to support the family to complete the full program. The studies in this review suggest that either telephone based clinician support or a schedule of prompts and reminders can be effective in achieving this.

In terms of future research, there is a clear need to explore further the relationship between efficacy and completion rates and clearer guidance is needed on the elements of an intervention that lead to higher completion rates. Given the costs associated with weekly clinician led coaching, it would be beneficial to establish whether online programs can incorporate sufficient in-built prompts and reminders to achieve a high completion rate. It would also be useful to explore further the strengths and weaknesses of a purely self-administered delivery model in terms of meeting the ongoing needs of the families. It is possible that needs and preferences in terms of format and additional support may vary from family to family.

This systematic review indicates a lack of UK based research and future research should therefore also address the need for UK based interventions to be evaluated. There is also an overall lack of research focusing on participants with lower social economic status. Further research amongst this high need target group will be important. Finally, any further research will need to consider further options for collecting data to accurately capture any change in child behaviour. Parent report should ideally be balanced with ongoing, objective measures of child behaviour.

One final area for consideration is the continued growth and development in terms of technology available and consumer usage and attitudes. With 95% of adults under 35 years owning a smartphone, it may be that mobile applications will provide the most effective delivery format for parent behavioural training in the future. Currently research into this area is very limited and further research will be key to provide understanding of the possibilities this format offers.

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6. Appendices

Appendix A – Details of the Interventions

Table 8

Details of the Interventions included in this Review

Baker et al. (2017)	<i>Triple P Online Brief</i>	<ul style="list-style-type: none"> ▪ A shorter version of Triple P Online (TPOL) – see details below. ▪ Five modules – Positive parenting, disobedience, fighting and aggression, going shopping, self-esteem ▪ Semi-structured approach with flexibility over the order of the modules ▪ No additional support from researchers or clinicians. Limited prompts to guide
Day and Sanders (2018)	<i>Triple P Online (TPOL)</i>	<ul style="list-style-type: none"> ▪ Based on the Triple P program, developed in Australia (Turner & Sanders 2011) ▪ Teaches positive parenting practices: nurturing behaviours, behaviour management, low-conflict environment, parental confidence ▪ Highly structured: activities and exercise, video modelling of skills, personalized content, parent testimonials, homework tasks, downloadable resources ▪ Eight modules - what is positive parenting, encouraging behaviour you like, teaching new skills, managing misbehaviour, dealing with disobedience, preventing problems by planning ahead, making shopping fun, raising confident capable kids ▪ Entirely self-administered, no feedback or therapeutic support
	<i>TPOLe (enhanced practioner support)</i>	<ul style="list-style-type: none"> ▪ TPOL (see above) but with a weekly telephone consultation with a clinical practitioner

Enebrink et al. (2012)	<i>iComet</i>	<ul style="list-style-type: none"> ▪ Based on the established face to face Comet program (Communication Method) (see Kling, Forster, Sundell & Melin, 2010) ▪ Delivered via written text, video modelling of skills, illustrations plus a weekly quiz to assess and reinforce the learning. Parent reflections captured in written feedback. ▪ Weekly feedback provided online by research assistants, including problem solving and reinforcement of progress, providing answers to specific questions. ▪ 7 sessions each lasting 1.5 hours (positive parenting, communication, positive reinforcement, response-cost/punishment of problem behaviour)
Sanders (2012)	<i>Triple P Online (TPOL)</i>	<ul style="list-style-type: none"> ▪ TPOL – see above for more details (Day & Sanders 2018) ▪ Entirely self-administered with no added or individualised support from clinicians or researchers ▪ In this study researchers sent regular reminders to participate
Sourander (2016)	<i>Strongest Families Smart Website</i>	<ul style="list-style-type: none"> ▪ Based on the Strongest Families telephone based program (McGrath et al. 2011) ▪ Focus on strong parent-child relationships, reinforcing positive behaviour, reduced conflict, daily transitions, planning for difficult situations, encouraging pro-social behaviour ▪ Internet formal included strategies, exercises, instructional videos, audio clips. ▪ Eleven weekly online sessions ▪ Supplemented by 45 minute weekly phone-call from a coach (reviewing progress, answer questions, provide encouragement) ▪ Booster coaching session provided at 7 and 10 months after randomization.

Appendix B: List of excluded studies

Study Title	Reason for Exclusion
Baggett, K., Davis, B., Feil, E., Sheeber, L., Landry, S., Carta, J., & Leve, C. (2010). Technologies for Expanding the Reach of Evidence-Based Interventions: Preliminary Results for Promoting Social-Emotional Development in Early Childhood. <i>Topics in Early Childhood Special Education</i> , 29(4), 226-238.	Age group
Baumel A, Pawar A, Mathur N, Kane JM, Correll CU. Technology-Assisted Parent Training Programs for Children and Adolescents With Disruptive Behaviors: A Systematic Review. <i>J Clin Psychiatry</i> . 2017 Sep/Oct;78(8):e957-e969.	Review or Meta-analysis
Baumel, A., & Faber, K. (2018). Evaluating Triple P Online: A Digital Parent Training Program for Child Behavior Problems. <i>Cognitive and Behavioral Practice</i> , 25(4), 538-543.	Review or Meta-analysis
Breitenstein, S., Fogg, L., Ocampo, E., Acosta, D., & Gross, D. (2016). Parent Use and Efficacy of a Self-Administered, Tablet-Based Parent Training Intervention: A Randomized Controlled Trial. <i>Jmir Mhealth And Uhealth</i> , 4(2), 536-549.	Not internet delivery
Calam, R., Sanders, M., Miller, C., Sadhnani, V., & Carmont, S. (2008). Can Technology and the Media Help Reduce Dysfunctional Parenting and Increase Engagement With Preventative Parenting Interventions? <i>Child Maltreatment</i> , 13(4), 347-361.	Not internet delivery
Churchill S.S., Kieckhefer G.M. (2018) One Year Follow-up of Outcomes from the Randomized Clinical Trial of the Building on Family Strengths Program. <i>Matern Child Health J</i> . 2018 Jun;22(6):913-921.	Follow up data only
Cotter, K.L., Bacallao, M., Smokowski, P.R., & Robertson, C. (2013). Parenting Interventions Implementation Science: How Delivery Format Impacts the Parenting Wisely Program. <i>Research on Social Work Practice</i> , 23(6), 639-650.	Age group
Cunningham, C., Ristkari, T., McGrath, P.J. & Hinkka-Yli-Salomaki, S. (2018). Does parental mental health moderate the effect of a telephone and internet-assisted remote parent training for disruptive 4-year-old children? <i>Scandinavian Journal of Psychology</i> ., 59(3), 273-280	Secondary Analysis

Study Title	Reason for Exclusion
Day, J., Sanders, M., & Sexton, Thomas L. (2017). Mediators of Parenting Change Within a Web-Based Parenting Program: Evidence From a Randomized Controlled Trial of Triple P Online. <i>Couple and Family Psychology: Research and Practice</i> , 6(3), 154-170.	Secondary Analysis
Dupaul, G., Kern, L., Belk, G., Custer, B., Hatfield, A., Daffner, M., & Peek, D. (2018). Promoting Parent Engagement in Behavioral Intervention for Young Children With ADHD: Iterative Treatment Development. <i>Topics in Early Childhood Special Education</i> , 38(1), 42-53.	Not RCT
Farruggia, S.P., Palmer, M.L., Sanders, M.R., & Keown, L.J. (2014). Predicting Success in an Online Parenting Intervention: The Role of Child, Parent, and Family Factors. <i>Journal of Family Psychology</i> , 28(2), 236-243	Not RCT
Feil, E. G., Gordon, D., Waldron, H., Jones, L. B., & Widdop, C. (2011). Development and Pilot Testing of an Internet-based Version of Parenting Wisely. <i>The Family psychologist : bulletin of the Division of Family Psychology</i> (43), 27(2), 22-26.	Age group
Feil, E., Sprengelmeyer, P., & Leve, C. (2018). A Randomized Study of a Mobile Behavioral Parent Training Application. <i>Telemedicine and E-Health</i> , 24(6), 457-463.	Not internet delivery
Fossum, S., Ristkari, T., Cunningham, C., McGrath, P., Suominen, A., Huttunen, J., . . . Sourander, A. (2018). Parental and child factors associated with participation in a randomised control trial of an Internet-assisted parent training programme. <i>Child and Adolescent Mental Health</i> , 23(2), 71-77.	No child outcome measures
Gelatt, V.A., Hammond, M., Seeley, J.R. (2015). A Randomized Study of Internet Parent Training Accessed From Community Technology Centers. <i>Prevention Science</i> , 16(4), 597-608.	Age group
Ghaderi, A., Enebrink, P., Kadesjö, C., & Björnsdotter, A. (2018). Randomized effectiveness Trial of the Family Check-Up versus Internet-delivered Parent Training (iComet) for Families of Children with Conduct Problems. <i>Scientific Reports</i> , 8(1), .	Age group
Gross, D., & Christophersen, R. (2014). Digital Delivery Methods of Parenting Training Interventions: A Systematic Review. <i>Worldviews on Evidence-based Nursing</i> , 11(3), 168-176.	Review or Meta-analysis

Study Title	Reason for Exclusion
Hinton, S. Sheffield, J., Sanders, M., Sofronoff, K. (2017). A randomized controlled trial of a telehealth parenting intervention: A mixed-disability trial. <i>Research in Developmental Disabilities</i> , 65, 74-85.	Not behaviour/ conduct disorder
Hoffman, S., Barnes, B., & Oats, R.. (2016). Perspectives on Engagement Barriers and Alternative Delivery Formats from Non-completers of a Community-Run Parenting Program. <i>Journal of Child and Family Studies.</i> , 25(2), 545-552.	Review or Meta-analysis
Högström, J., Enebrink, P., Melin, B., & Ghaderi, A. (2015). Eighteen-Month Follow-Up of Internet-Based Parent Management Training for Children with Conduct Problems and the Relation of Homework Compliance to Outcome. <i>Child Psychiatry & Human Development</i> , 46(4), 577-588.	Follow up data only
Högström, J., Enebrink, P., Ghaderi, A., & Kaslow, Nadine J. (2013). The Moderating Role of Child Callous-Unemotional Traits in an Internet-Based Parent-Management Training Program. <i>Journal of Family Psychology</i> , 27(2), 314-323.	Behavioural outcomes not provided
Nieuwboer, F. (2016). The Psychology of Social Networking Vol.1. BERLIN: De Gruyter Open. (Peer and Professional Online Support for Parents)	Not peer reviewed journal
Olthuis, J., McGrath, V., Cunningham, P., Boyle, J., Lingley-Pottie, C., Reid, E., . . . Sdao-Jarvie, L. (2018). Distance-Delivered Parent Training for Childhood Disruptive Behavior (Strongest Families™): A Randomized Controlled Trial and Economic Analysis. <i>Journal of Abnormal Child Psychology</i> , 46(8), 1613-1629.	Not internet delivery
Porzig-Drummond, R., Stevenson, R.J., Stevenson, C. (2015). Preliminary evaluation of a self-directed video-based 1-2-3 Magic parenting program: A randomized controlled trial. <i>Behaviour Research and Therapy</i> , 66, 32-42.	Not internet delivery
Rabbitt, S., Carrubba, M., Lecza, E., McWhinney, B., Pope, E., & Kazdin, J. (2016). Reducing Therapist Contact in Parenting Programs: Evaluation of Internet-Based Treatments for Child Conduct Problems. <i>Journal of Child and Family Studies</i> , 25(6), 2001-2020.	Not based on established program
Russell, B. S., Maksut, J. L., Lincoln, C. R., & Leland, A. J. (2016). Computer-mediated parenting education: Digital family service provision. <i>Children and Youth Services Review</i> , 62, 1-8.	Review or Meta-analysis

Study Title	Reason for Exclusion
Sanders, M., Dittman, R., Farruggia, C., & Keown, K. (2014). A Comparison of Online Versus Workbook Delivery of a Self-Help Positive Parenting Program. <i>The Journal of Primary Prevention</i> , 35(3), 125-133.	Delivery format
Sourander, Mcgrath, Ristkari, Cunningham, Huttunen, Hinkka-Yli-Salomäki, . . . Lingley-Pottie. (2018). Two-Year Follow-Up of Internet and Telephone Assisted Parent Training for Disruptive Behavior at Age 4. <i>Journal of the American Academy of Child & Adolescent Psychiatry</i> , 57(9), 658-668.e1.	Follow up data only
Taylor, L., Leary, C., Boyle, K., Bigelow, A., Henry, A., & DeRosier, E. (2015). Parent Training and Adolescent Social Functioning: A Brief Report. <i>Journal of Child and Family Studies</i> , 24(10), 3030-3037.	Age Group
Taylor, T., Webster-Stratton, C., Feil, E., Broadbent, B., Widdop, C., & Severson, H. (2008). Computer-Based Intervention with Coaching: An Example Using the Incredible Years Program. <i>Cognitive Behaviour Therapy</i> , 37(4), 233-246.	No child outcome measures provided
Ustun, B., & Guvenir, T. (2013). An analysis of two evidence-based parent training programmes and determination of the characteristics for a new programme model. <i>Journal of Psychiatric and Mental Health Nursing.</i> , 20(2), 176-185.	Not online delivery

Appendix C - Weight of Evidence Criteria

Methodological Quality (WoE A)

The WoE A criteria for group experimental designs was derived from Gersten et al. (2005). This has been adapted to allow for three ratings to be given – ‘high’ (3), ‘medium’ (2) or ‘low’ (1).

- To achieve a rating of ‘high’ the study must meet all but one of the Essential Quality Indicators and at least four of the Desirable Quality Indicators.
- To achieve a rating of ‘medium’ the study must meet all but one of the Essential Quality Indicators and at least two of the Desirable Quality Indicators.
- A rating of ‘low’ will be awarded where the study meets less than nine of the Essential Quality Indicators or less than two of the Desirable Quality Indicators.

A summary of the ratings for Methodological Quality is given below.

Table 9

Weight of Evidence A

Study	Score	Quality Rating
Baker	3	High
Day & Sanders	2	Medium
Enebrink	1	Medium
Sanders	3	High
Sourander	3	Medium

Methodological Relevance (WoE B)

Table 10

Weight of Evidence 'B' Rationale

Weighting	Type of Study Design	Rationale
3	Randomised Control Trial with "active" comparison group (e.g. attention placebo or alternative intervention)	These are the types of evidence, aside from systematic reviews, that are most suited to research questions about effectiveness (Petticrew & Roberts, 2003)
2.5	Randomised Control Trial with "no intervention" comparison group (e.g. waitlist or minimal contact).	
2	Cohort studies, quasi-experimental designs	
1	Qualitative research, surveys, case-control studies, non-experimental evaluations	

Relevance to the Review Question (WoE C)

Table 11

Weight of Evidence 'C' Scores

	Sufficient power to show medium size effect?	Specific age range of interest?	BPT delivered online/ minimal additional support?	Attempt to control for access to other behavioural support?	Total score for WoE 'C'
Baker 2017	Yes	Yes	Yes	No	3
Day & Sanders 2018	Yes	Yes	Yes/No	No	3
Enebrink 2012	No	No	No	No	0
Sanders 2012	No	Yes	Yes	No	2
Sourander 2016	Yes	Yes	No	Yes	3

Appendix D: Completed Coding Protocols

Name of Coder: ANONYMISED

Date: 5.2.18

Full Study Reference: Enebrink, P., Hogstrom, J., Forster, M., Ghaderi, A. (2012). Internet-based parent management training: A randomized controlled study. *Behaviour Research and Therapy*, 50(4), 240-249

Intervention Name (description of study): iComet (internet delivered parent management training targeting children with behavioural difficulties)

Coding Protocol Based on Gersten et al. (2005)

*Gersten, R., Fuchs, L., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality Indicators for Group Experimental and Quasi-Experimental Research in Special Education. *Exceptional Children*, 71(2), 149-164.*

Essential Quality Indicators

Describing Participants

Was sufficient information provided to determine/confirm whether the participants demonstrated the disability or difficulties presented?

- Yes – using ECBI, more than one SD away from the mean
- No
- N/A
- Unknown/Unable to Code

Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

- Yes – randomized allocation to each group
- No
- N/A
- Unknown/Unable to Code

Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

- Yes – both groups exposed to same experience at initial meeting
- No
- N/A
- Unknown/Unable to Code

Implementation of the Intervention and Description of Comparison Conditions

Was the intervention clearly described and specified?

- Yes
- No – nature of additional therapist support is unclear
- N/A
- Unknown/Unable to Code

Was the fidelity of implementation described and assessed?

- Yes
- No – 5 hours (average) therapist support increases variability
- N/A
- Unknown/Unable to Code

Was the nature of services provided in comparison conditions described?

- Yes – waitlist control
- No
- N/A
- Unknown/Unable to Code

Outcome Measures

Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalised performance?

- Yes
- No – multiple measures but all parent report
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured at the appropriate times?

- Yes – immediately post intervention (+ after 6 months for intervention group)
- No
- N/A
- Unknown/Unable to Code

Data Analysis

Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include not only inferential statistics but also effect size calculations?

- Yes
- No
- N/A
- Unknown/Unable to Code

Desirable Quality Indicators

Was data available on attrition rates among intervention samples? Was severe overall attrition documented? If so, is attrition comparable across samples? Is overall attrition less than 30%?

- Yes
- No – attrition very high at follow up.
- N/A
- Unknown/Unable to Code

Did the study provide not only internal consistency reliability but also test-retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?

- Yes
- No – parental report so not blind to condition
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured beyond an immediate posttest?

- Yes – at +6 months, but no control group at that stage
- No
- N/A
- Unknown/Unable to Code

Was evidence of the criterion-related validity and construct validity of the measures provided?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research team assess not only surface features of fidelity implementation (e.g. number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?

- Yes – researchers able to know if following the programme
- No
- N/A

Unknown/Unable to Code

Was any documentation of the nature of instruction or series provided in comparison conditions?

Yes

No – implication that the comparison condition had no intervention

N/A

Unknown/Unable to Code

Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?

Yes

No

N/A

Unknown/Unable to Code

Were results presented in a clear, coherent fashion?

Yes

No

N/A

Unknown/Unable to Code

Overall Rating of Evidence: 3 2 1 0

Name of Coder: ANONYMISED

Date: 5.2.18

Full Study Reference: Baker, Sanders, Turner, & Morawska. (2017). A randomized controlled trial evaluating a low-intensity interactive online parenting intervention, Triple P Online Brief, with parents of children with early onset conduct problems. *Behaviour Research and Therapy*, 91, 78-90

Intervention Name (description of study): Triple P Online Brief (Online Behavioural Parent Training Program)

Coding Protocol Based on Gersten et al. (2005)

Gersten, R., Fuchs, L., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality Indicators for Group Experimental and Quasi-Experimental Research in Special Education. Exceptional Children, 71(2), 149-164.

Essential Quality Indicators

Describing Participants

Was sufficient information provided to determine/confirm whether the participants demonstrated the disability or difficulties presented?

- Yes – SDQ
- No
- N/A
- Unknown/Unable to Code

Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

- Yes – computer based randomized allocation
- No
- N/A
- Unknown/Unable to Code

Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

- Yes – relevant to data collection via PCPTOS
- No
- N/A
- Unknown/Unable to Code

Implementation of the Intervention and Description of Comparison Conditions

Was the intervention clearly described and specified?

- Yes
- No
- N/A
- Unknown/Unable to Code

Was the fidelity of implementation described and assessed?

- Yes
- No
- N/A
- Unknown/Unable to Code

Was the nature of services provided in comparison conditions described?

- Yes – waitlist control
- No
- N/A
- Unknown/Unable to Code

Outcome Measures

Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalised performance?

- Yes – including both parent report and clinic observation
- No
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured at the appropriate times?

- Yes – immediately post and after +9 months
- No
- N/A
- Unknown/Unable to Code

Data Analysis

Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include not only inferential statistics but also effect size calculations?

- Yes
- No
- N/A
- Unknown/Unable to Code

Desirable Quality Indicators

Was data available on attrition rates among intervention samples? Was severe overall attrition documented? If so, is attrition comparable across samples? Is overall attrition less than 30%?

- Yes – low attrition across both groups
- No
- N/A
- Unknown/Unable to Code

Did the study provide not only internal consistency reliability but also test-retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?

- Yes
- No – parents not blind to condition
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured beyond an immediate post-test?

- Yes – measured 6 months after completing the intervention
- No
- N/A
- Unknown/Unable to Code

Was evidence of the criterion-related validity and construct validity of the measures provided?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research team assess not only surface features of fidelity implementation (e.g. number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?

- Yes
- No
- N/A
- Unknown/Unable to Code

Was any documentation of the nature of instruction or series provided in comparison conditions?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?

- Yes
- No
- N/A
- Unknown/Unable to Code

Were results presented in a clear, coherent fashion?

- Yes
- No
- N/A
- Unknown/Unable to Code

Overall Rating of Evidence: 3 2 1 0

Name of Coder: ANONYMISED

Date: 5.2.18

Full Study Reference: Day, & Sanders. (2018). Do Parents Benefit From Help When Completing a Self-Guided Parenting Program Online? A Randomized Controlled Trial Comparing Triple P Online With and Without Telephone Support. *Behavior Therapy*, 49(6), 1020-1038.

Intervention Name (description of study): Triple P Online with and without telephone support (internet delivered parent management training targeting children with behavioural difficulties)

Coding Protocol Based on Gersten et al. (2005)

Gersten, R., Fuchs, L., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality Indicators for Group Experimental and Quasi-Experimental Research in Special Education. *Exceptional Children*, 71(2), 149-164.

Essential Quality Indicators

Describing Participants

Was sufficient information provided to determine/confirm whether the participants demonstrated the disability or difficulties presented?

- Yes
- No - not fully defined (using DSM-IV criteria and parent risk factors)
- N/A
- Unknown/Unable to Code

Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

- Yes – computer based randomized allocation
- No
- N/A
- Unknown/Unable to Code

Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

- Yes – only relevant to one condition (TPOLe)
- No
- N/A

- Unknown/Unable to Code

Implementation of the Intervention and Description of Comparison Conditions

Was the intervention clearly described and specified?

- Yes
 No
 N/A
 Unknown/Unable to Code

Was the fidelity of implementation described and assessed?

- Yes – although not fully for clinical telephone consultations
 No
 N/A
 Unknown/Unable to Code

Was the nature of services provided in comparison conditions described?

- Yes
 No
 N/A
 Unknown/Unable to Code

Outcome Measures

Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalised performance?

- Yes
 No – multiple measures but parental report only
 N/A
 Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured at the appropriate times?

- Yes – immediately post and after +5 months
 No
 N/A
 Unknown/Unable to Code

Data Analysis

Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?

- Yes
 No
 N/A

Unknown/Unable to Code

Did the research report include not only inferential statistics but also effect size calculations?

Yes

No

N/A

Unknown/Unable to Code

Desirable Quality Indicators

Was data available on attrition rates among intervention samples?

Was severe overall attrition documented? If so, is attrition

comparable across samples? Is overall attrition less than 30%?

Yes

No – overall attrition in both intervention groups was high

N/A

Unknown/Unable to Code

Did the study provide not only internal consistency reliability but also test-retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?

Yes

No – parents not blind to condition

N/A

Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured beyond an immediate post-test?

Yes – measured 5 months after completing the intervention

No

N/A

Unknown/Unable to Code

Was evidence of the criterion-related validity and construct validity of the measures provided?

Yes

No

N/A

Unknown/Unable to Code

Did the research team assess not only surface features of fidelity implementation (e.g. number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?

Yes

No

- N/A
- Unknown/Unable to Code

Was any documentation of the nature of instruction or series provided in comparison conditions?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?

- Yes
- No
- N/A
- Unknown/Unable to Code

Were results presented in a clear, coherent fashion?

- Yes
- No
- N/A
- Unknown/Unable to Code

Overall Rating of Evidence: 3 2 1 0

Name of Coder: ANONYMISED

Date: 5.2.18

Full Study Reference: Sanders, Baker, & Turner. (2012). A randomized controlled trial evaluating the efficacy of Triple P Online with parents of children with early-onset conduct problems. *Behaviour Research and Therapy*, 50(11), 675-684.

Intervention Name (description of study): Triple P Online (internet delivered parent management training targeting children with behavioural difficulties)

Coding Protocol Based on Gersten et al. (2005)

Gersten, R., Fuchs, L., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality Indicators for Group Experimental and Quasi-Experimental Research in Special Education. Exceptional Children, 71(2), 149-164.

Essential Quality Indicators

Describing Participants

Was sufficient information provided to determine/confirm whether the participants demonstrated the disability or difficulties presented?

- Yes
- No – ECBI ‘elevated levels’ (but not fully defined)
- N/A
- Unknown/Unable to Code

Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

- Yes – randomized allocation
- No
- N/A
- Unknown/Unable to Code

Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

- Yes
- No
- N/A
- Unknown/Unable to Code

Implementation of the Intervention and Description of Comparison Conditions

Was the intervention clearly described and specified?

- Yes
- No
- N/A
- Unknown/Unable to Code

Was the fidelity of implementation described and assessed?

- Yes
- No
- N/A
- Unknown/Unable to Code

Was the nature of services provided in comparison conditions described?

- Yes – ‘internet as usual’ control
- No
- N/A
- Unknown/Unable to Code

Outcome Measures

Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalised performance?

- Yes – smaller sample also were observed by researchers
- No
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention’s effect measured at the appropriate times?

- Yes – immediately post and after +6 months
- No
- N/A
- Unknown/Unable to Code

Data Analysis

Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include not only inferential statistics but also effect size calculations?

- Yes – Cohen's d for follow up data (i.e. longer term impact)
- No
- N/A
- Unknown/Unable to Code

Desirable Quality Indicators

Was data available on attrition rates among intervention samples? Was severe overall attrition documented? If so, is attrition comparable across samples? Is overall attrition less than 30%?

- Yes – low attrition across both groups 14% at 6months follow up
- No
- N/A
- Unknown/Unable to Code

Did the study provide not only internal consistency reliability but also test-retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?

- Yes – yes internal consistency and interrater reliability
- No – parents not blind to condition
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured beyond an immediate post-test?

- Yes – measured 6 months after completing the intervention
- No
- N/A
- Unknown/Unable to Code

Was evidence of the criterion-related validity and construct validity of the measures provided?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research team assess not only surface features of fidelity implementation (e.g. number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?

- Yes
- No

- N/A
- Unknown/Unable to Code

Was any documentation of the nature of instruction or series provided in comparison conditions?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?

- Yes
- No
- N/A
- Unknown/Unable to Code

Were results presented in a clear, coherent fashion?

- Yes
- No
- N/A
- Unknown/Unable to Code

Overall Rating of Evidence: 3 2 1 0

Name of Coder: ANONYMISED

Date: 5.2.18

Full Study Reference: Sourander, A., Mcgrath, P., Ristkari, T., Cunningham, C., Huttunen, J., Lingley-Pottie, P., . . . Unruh, A. (2016). Internet-Assisted Parent Training Intervention for Disruptive Behavior in 4-Year-Old Children: A Randomized Clinical Trial. *JAMA Psychiatry*, 73(4), 378-387.

Intervention Name (description of study): Strongest Families Smart Website (internet delivered parent management training targeting children with behavioural difficulties)

Coding Protocol Based on Gersten et al. (2005)

Gersten, R., Fuchs, L., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality Indicators for Group Experimental and Quasi-Experimental Research in Special Education. Exceptional Children, 71(2), 149-164.

Essential Quality Indicators

Describing Participants

Was sufficient information provided to determine/confirm whether the participants demonstrated the disability or difficulties presented?

- Yes – using SDQ conduct problem subscale, falling above 80th percentile
- No
- N/A
- Unknown/Unable to Code

Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

- Yes – randomized allocation to each group stratified by gender
- No
- N/A
- Unknown/Unable to Code

Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

- Yes – mentions intensive training/licensed health care professionals

- No
- N/A
- Unknown/Unable to Code

Implementation of the Intervention and Description of Comparison Conditions

Was the intervention clearly described and specified?

- Yes
- No – not clear what support offered by clinicians
- N/A
- Unknown/Unable to Code

Was the fidelity of implementation described and assessed?

- Yes
- No – not clear how clinician support varied
- N/A
- Unknown/Unable to Code

Was the nature of services provided in comparison conditions described?

- Yes – education control
- No
- N/A
- Unknown/Unable to Code

Outcome Measures

Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalised performance?

- Yes
- No
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured at the appropriate times?

- Yes – immediately + after 6 months and + 12 months
- No
- N/A
- Unknown/Unable to Code

Data Analysis

Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?

- Yes

- No
- N/A
- Unknown/Unable to Code

Did the research report include not only inferential statistics but also effect size calculations?

- Yes – Cohen's d
- No
- N/A
- Unknown/Unable to Code

Desirable Quality Indicators

Was data available on attrition rates among intervention samples? Was severe overall attrition documented? If so, is attrition comparable across samples? Is overall attrition less than 30%?

- Yes – both groups less than 30% even at +12 months
- No
- N/A
- Unknown/Unable to Code

Did the study provide not only internal consistency reliability but also test-retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?

- Yes
- No – parental report only so not blind to condition
- N/A
- Unknown/Unable to Code

Were outcomes for capturing the intervention's effect measured beyond an immediate post-test?

- Yes – at +6 months and + 12 months
- No
- N/A
- Unknown/Unable to Code

Was evidence of the criterion-related validity and construct validity of the measures provided?

- Yes – for Child Behaviour Checklist
- No
- N/A
- Unknown/Unable to Code

Did the research team assess not only surface features of fidelity implementation (e.g. number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?

- Yes

- No
- N/A
- Unknown/Unable to Code

Was any documentation of the nature of instruction or series provided in comparison conditions?

- Yes
- No
- N/A
- Unknown/Unable to Code

Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?

- Yes
- No
- N/A
- Unknown/Unable to Code

Were results presented in a clear, coherent fashion?

- Yes
- No
- N/A
- Unknown/Unable to Code

Overall Rating of Evidence: 3 2 1 0