



A randomized controlled trial of a telehealth parenting intervention: A mixed-disability trial



Sharon Hinton*, Jeanie Sheffield, Matthew R. Sanders, Kate Sofronoff

School of Psychology, Faculty of Health and Behavioural Sciences, The University of Queensland, Brisbane, Queensland, 4072, Australia

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ABSTRACT

Background: The quality of parenting a child receives has a major impact on development, wellbeing and future life opportunities.

Aims: This study examined the efficacy of Triple P Online – Disability (TPOL-D) a telehealth intervention for parents of children with a disability.

Methods: Ninety-eight parents and carers of children aged 2–12 years diagnosed with a range of developmental, intellectual and physical disabilities were randomly assigned to either the intervention (51) or treatment-as-usual (47) control group.

Results: At post-intervention parents receiving the TPOL-D intervention demonstrated significant improvements in parenting practices and parenting self-efficacy, however a significant change in parent-reported child behavioral and emotional problems was not detected. At 3-month follow up intervention gains were maintained and/or enhanced. A significant decrease in parent-reported child behavioral and emotional problems was also detected at this time.

Conclusions: The results indicate that TPOL-D is a promising telehealth intervention for a mixed-disability group.

1. Introduction

Problem behavior is one of the most enduring and pervasive challenges experienced by children with disability, their families, professionals, and the community at large. For families, problem behaviors such as tantrums, aggression and self-injury can be difficult to manage, emotionally distressing and disruptive to everyday routines, leading to increased stress, worry and depression (Einfeld, Tonge, & Clarke, 2013). For the children themselves, such behaviors can threaten personal health, safety and well-being as well as their inclusion in social, educational and community activities (Stuttard et al., 2014). With the prevalence of problem behaviors in children with intellectual or developmental disabilities being significantly higher than in typically developing children (Einfeld & Tonge, 1996), the unique combination of difficulties experienced can present a formidable set of challenges for parents and carers.

There is a growing consensus that the quality of parenting a child receives has a substantial impact on development, emotional functioning, language, social skills and future life opportunities (Stack, Serbin, Enns, Ruttler, & Barrieau, 2010). More specifically, positive parenting programs based on social learning and cognitive-behavioral principles have been found to be particularly effective in reducing emotional and behavioral problems in children and adolescents. Those that also incorporate ‘live’ (i.e., in-session) coaching of skills have been found to result in even greater gains in parenting skills and larger reductions in child problem behaviors

* Corresponding author at: School of Psychology, The University of Queensland, St. Lucia, Queensland, 4072, Australia.

E-mail addresses: s.hinton@uq.edu.au, redumbrella@live.com.au (S. Hinton), jeanie@psy.uq.edu.au (J. Sheffield), matts@psy.uq.edu.au (M.R. Sanders), kate@psy.uq.edu.au (K. Sofronoff).

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(Kaminski, Valle, Filene, & Boyle, 2008; Wade, Oberjohn, Conaway, Osinka, & Bangert, 2011). While reviews of parenting interventions specifically for children with developmental delay and/or disability are more limited, these have shown similar positive results (Antonini et al., 2014; Stuttard et al., 2014; Tellegen & Sanders, 2013; Whittingham, Sanders, McKinlay, & Boyd, 2014).

Given the efficacy of parenting interventions in improving child outcomes in both typically-developing children and children with a disability, it is unsurprising that programs that enhance parents' self-sufficiency in managing their children's behavior and environment have become a common route for early intervention. Despite both the availability and established effectiveness of evidence-based parenting programs, parent participation remains low (Sanders, Baker, & Turner, 2012). For parents, attendance in the traditional face-to-face modality has many well-documented challenges both logistical and personal, such as availability of alternative carers, cost, cultural barriers, perceived social stigma and so on (Breitenstein, Gross, & Christophersen, 2014; Enebrink, Högström, Forster, & Ghaderi, 2012). For service providers, common barriers to delivery include availability of funding; third party funding approval processes; availability of appropriately trained staff and geographical coverage issues (Love, Sanders, Metzler, Prinz, & Kast, 2013). With regular attendance at face-to-face parenting programs undoubtedly presenting a challenge for any parent, for parents of children with disabilities such barriers are likely to be further exacerbated by the need for specialized and/or additional resources associated with caring for their children.

With the clear need for more accessible treatment options, online parenting interventions offer the very real potential of helping to alleviate the burden of caring by providing 'anytime, anywhere' assistance to a parent or carer who has Internet access, predicated upon a basic level of Internet knowledge and expertise (Dittman, Farruggia, Palmer, Sanders, & Keown, 2014). While the empirical evidence remains limited, comparisons of online and (more broadly) telehealth parenting interventions with conventional face-to-face therapy have not only shown comparable outcomes in treatment results but have also indicated that these programs deliver parenting support in a manner that overcomes many of the traditional barriers to support, while maintaining high levels of client satisfaction (Enebrink et al., 2012; Sanders et al., 2012). Despite these encouraging findings, there remain few empirically validated parenting programs available in an online or telehealth delivery modality, and even fewer programs that specifically target, and/or include, adaptations to meet the specific needs of parents and caregivers of children with a disability (Antonini et al., 2014; Kable, Coles, Strickland, & Taddeo, 2012; Wade et al., 2014).

1.1. Research questions

The primary aim of the current study was to investigate the efficacy of a telehealth-based parenting intervention for parents of children with a disability. A 'treatment as usual' control group was chosen as the comparator to allow for evaluation of the intervention against current practice. Based on outcomes from similar in-person and telehealth-based parenting programs (Antonini et al., 2014; Brown, Whittingham, Boyd, & McKinlay, 2014; Enebrink et al., 2012; Roux, Sofronoff, & Sanders, 2013; Sanders, Dittman, Farruggia, & Keown, 2014; Sanders et al., 2012), the central hypotheses was that, compared to parents in a treatment-as-usual control condition, parents who completed TPOL-D would report a decrease in child behavior problems as well as significant improvements in parenting skills and self-efficacy. It was also hypothesized that intervention gains would be maintained at 3-month follow-up. Lastly, parent satisfaction with TPOL-D was also assessed using the Client Satisfaction Questionnaire (CSQ; Sanders, Markie-Dadds, & Turner, 2001).

2. Method

2.1. Study design

The study was a randomized, controlled trial following a 2 group (group: TPOL-D vs treatment-as-usual [TAU] control) × 3 time (time: pre-intervention [T1], post-intervention nine-weeks after initial login [T2], three-month follow-up [T3]) repeated measures design. Randomization was achieved using an online computer program (www.randomization.com). Pre-intervention measures (T1) were completed by both the intervention and TAU control group. The intervention group only then received the TPOL-D program. Post-completion of TPOL-D, both the intervention and TAU control completed T2 measures. Following completion of the post-treatment measures, the TAU control group also received TPOL-D. The TAU control received TPOL-D before follow-up data collection for ethical reasons. Post-intervention follow-up with the intervention group only was completed 3 months after TPOL-D completion (T3). Follow-up consisted of assessing treatment maintenance. While undertaking the study, all participants were asked not to participate in another parenting program, however, treatment-as-usual continued for both the treatment and the TAU control for ethical reasons. Fig. 1 depicts the flow of study participants in a CONSORT Diagram.

2.2. Participants

Power analysis indicated that to detect a large effect size of .8, with alpha set to .05 and power set to .80, a sample size of 26 participants per group would be required (Cohen, 1992). A large effect size was anticipated, based on a meta-analysis of Level 4 Triple P outcome research undertaken by de Graaf, Speetjens, Smit, de Wolff, and Tavecchio (2008a). Previous research has demonstrated a wide variance in relation to completion rates for online interventions (Baumeister, Reichler, Munzinger, & Lin, 2014; Bennett-Levy et al., 2010; van Ballegooijen et al., 2014) with, more specifically, a systematic review of digital delivery methods of parenting training interventions finding a completion rate of between 41.7% and 99.2% (Breitenstein et al., 2014). While a generous

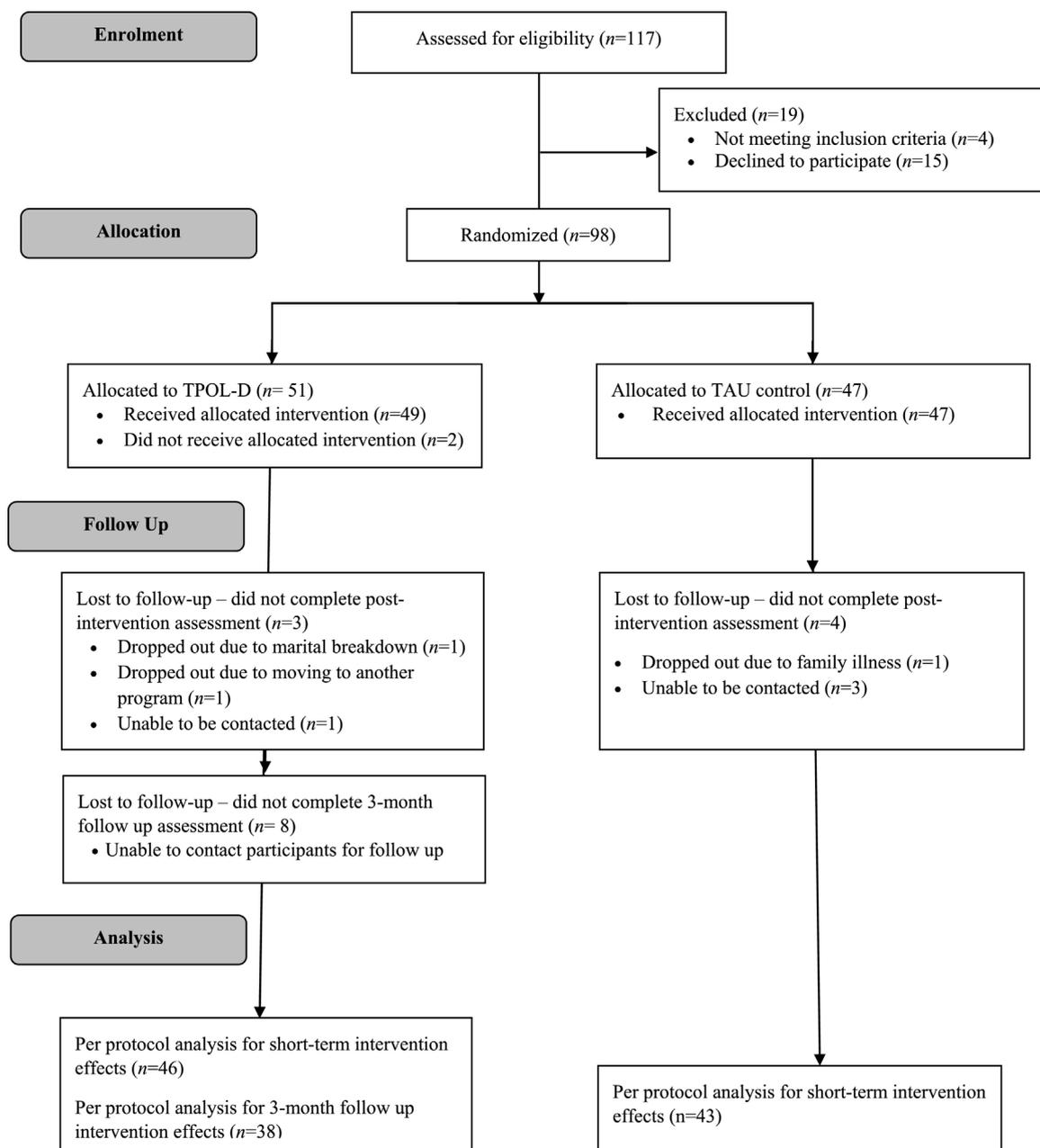


Fig. 1. Flow of participants through the study.

margin of 35 parents per group was set for minimum recruitment, 98 parents who applied and were eligible to participate at the close-off date of the final cycle were accepted – as numbers fell far short of the 64 per group required for a medium effect size (Cohen, 1992). In total, 113 eligible parents registered for participation in TPOL-D, with 15 (13%) declining to participate further post eligibility assessment. It was not possible to blind participants to knowledge of group allocation post-assignment. No limitation was placed on the nature of the child's disability; however, eligibility requirements required diagnosis from a Neurologist, Psychiatrist, Psychologist, Speech Pathologist or Occupational Therapist, as well as child age between 2 and 12 years (at point of recruitment). Only one parent per family was accepted into the research, although parents were encouraged to work through the program with a partner or friend, if desired.

In all, 78% of participants were seeking treatment to address the behavior of a male child. Behavioral problems were based on parent identification and were not required to meet a threshold for inclusion in the study. At pre-intervention, no significant differences between the groups was detected using Chi-square analysis and ANOVA, as appropriate. The disability mix was similar between the two groups, with ASD being the most prevalent diagnosis. Participant demographics are presented in Table 1.

Table 1
Sample characteristics of participants.

Variables	Intervention (n = 51)		Control (n = 47)		Combined (n = 98)		F(df)	p	
	M	SD	M	SD	M	SD			
Child age (years)	6.33	2.43	5.66	2.15	6.01	2.31	.91(1)	.34	
		n	%	n	%	n	%	χ^2	
Gender								1.53	.21
Male		37	73	39	83	76	78		
Female		14	27	8	17	22	22		
Diagnosis ^a								1.62 ^b	.20
ABI + ASD + Epilepsy		2	4	0	0	2	2		
ABI + II/DD + Epilepsy		0	0	1	2	1	1		
Angelman syndrome		0	0	2	4	2	2		
ASD		38	74	30	65	68	70		
ASD + CP + Dispraxia		1	2	0	0	1	1		
ASD + II/DD		4	8	4	9	8	8		
ASD + OG/CD		1	2	2	4	3	3		
ASD + Blind/VI + II + OG/CD		0	0	1	2	1	1		
Cornelia de Lange syndrome		1	2	0	0	1	1		
Deaf/Hearing impaired		0	0	2	4	2	2		
Down syndrome		0	0	1	2	1	1		
Down syndrome + II/DD		0	0	1	2	1	1		
II/DD		1	2	1	2	2	2		
LD/SPD		0	0	1	2	1	1		
Prader-Willi syndrome		2	4	1	2	3	3		
Williams syndrome		1	2	0	0	1	1		
Participant Relationship to Child								4.84	.43
Mother (biological or adoptive)		43	83	43	92	86	88		
Stepmother		2	4	0	0	2	2		
Foster Mother		1	2	0	0	1	1		
Father (biological or adoptive)		4	8	2	4	6	6		
Grandmother		1	2	2	4	3	3		
Marital Status								2.09	.65
Married/Defacto		34	66	35	75	69	71		
Cohabiting		7	14	2	4	9	9		
Divorced/Separated		8	16	6	13	14	14		
Single		2	4	3	6	5	5		
Widow/er		0	0	1	2	1	1		
Family Composition								.08	.99
Original		37	72	43	92	80	82		
Step-family		5	10	1	2	6	6		
Sole Parent		7	14	3	6	10	10		
Foster Family		1	2	0	0	1	1		
Extended		1	2	0	0	1	1		
Employment – Participant Parent								7.75	.26
Full Time (35 h +)		10	20	10	21	20	20		
Part-Time/Casual		15	29	21	45	36	37		
Employed (on maternity leave)		1	2	1	2	2	2		
Full Time Student		4	8	4	9	8	8		
Unemployed		21	41	11	23	32	33		

^a ABI = Acquired Brain Injury, ASD = Autism spectrum disorder, Bind/VI = Blind/Vision impaired, CP = Cerebral Palsy, II/DD = Intellectual impairment/Developmental delay, LD = Language delay/Language disorder, SPD = Sensory processing disorder, OG/CD = Other Genetic/Chromosome disorder.

^b Comparison of ASD v non ASD diagnosis.

2.3. Procedure

Ethical approval for the project was obtained from the University of Queensland in accordance with National Health and Medical Research Council of Australia standards; ethics approval number 2012001065. Australia-wide recruitment was conducted over a 12-month period via community outreach in mass media, disability support associations, support groups and schools with a Special Education Unit (Queensland only). Post email inquiry, parents were forwarded a detailed information flyer outlining the program structure, content, timings and technology requirements – along with a link that allowed them to review the online program interface. Parents were informed that the program was being offered with staggered start dates throughout the year and that each ‘cycle’ would have two possible start dates for which they would need to be available.

One week prior to commencement of each cycle of the intervention, interested parents were invited to complete online registration and informed consent, as well as their T1 questionnaires. Post-completion, parents were emailed their TPOL-D commencement date, with the intervention group also receiving their individual log-in details, personalized timetable and supplementary disability-specific resources (via registered mail). Participants allocated to the TAU control group were also emailed information in relation to their (later) program start date and T2 questionnaire timings. To guarantee consistency in the intervention approach, the first author (Masters qualified, SSTP-accredited psychologist) was the remote facilitator for all intervention participants. T2 data was completed by both the intervention and TAU control immediately following program completion with T3 data (intervention only) being completed three months later.

2.4. Intervention

Triple P Online-Disability (TPOL-D) is a new, telehealth variant of the Triple P-Positive Parenting Program (Triple P; Sanders, 2008). Targeting parents of children (aged 2–12 years) with mixed disabilities, TPOL-D combines elements of the evidence-based Triple P Online (TPOL; Turner & Sanders, 2011) and Stepping Stones Triple P (SSTP; Sanders, Mazzucchelli, & Studman, 2003) programs, with several unique variations.

With the aim of treating and preventing severe behavioral, emotional and developmental problems in children and adolescents by enhancing the knowledge, skills and confidence of their parents, Triple P is one of a group of Behavioral Family Interventions (BFIs), derived from social learning, functional analysis and cognitive-behavioral principles (Sanders, Bor, & Morawska, 2007). Offering a multi-level system of parenting intervention (ranging from ‘light touch’ to intensive, targeted interventions), Triple P adopts a self-regulatory framework for parents. The program has been evaluated extensively in RCT trials, as well as through several meta-analyses which demonstrated strong effects on child behavior outcomes and parenting effectiveness (de Graaf et al., 2008a; de Graaf, Speetjens, Smit, de Wolff, & Tavecchio, 2008b; Nowak & Heinrichs, 2008; Sanders et al., 2014; Thomas & Zimmer-Gembeck, 2007). Level 4 Triple P is an intensive training program of 8–10 sessions for parents of children with more severe behavioral difficulties. It has several variations, including programs targeting parents of children up to 12 years of age, teenagers and children with disabilities. While founded on common theory, principles and strategies, each program variant has some unique content and targets a different population.

Recently, a web-based version of Level 4 Triple P – Triple P Online (TPOL; Turner & Sanders, 2011) – has been developed, with empirical trials showing promising results (Day, 2016; Love et al., 2016; Sanders et al., 2014; Sanders et al., 2012). Delivered via the internet, TPOL consists of eight, self-directed modules providing instruction in the use of 17 core positive parenting skills. Topics covered include: (1) What is positive parenting?; (2) Encouraging behavior you like; (3) Teaching new skills; (4) Managing misbehavior; (5) Dealing with disobedience; (6) Preventing problems by planning ahead; (7) Making shopping fun; and (8) Raising confident, capable kids. Completed in sequential format (i.e., module completion opens access to the next module), the interactive program includes video-based modelling of parenting skills, parent-driven branching to review or gain information, personalised goal setting and probes and exercises to assist parents in checking mastery.

Given its promising evidence base and ready online accessibility, TPOL was adapted as the foundation program for TPOL-D. While another variation of Triple P – Stepping Stones Triple P (SSTP; Sanders et al., 2003) – has been specifically developed and trialled for parents of children with a disability, the program is not available in an online format. Notably, SSTP delivers the same information and module sequencing as that found in Triple P and TPOL, but ‘extends’ learnings to incorporate unique disability-specific information and strategies. Further, the visual content and imagery in SSTP focuses on children with disabilities, rather than ‘typically developing’ children.

As SSTP has previously been evaluated with children with mixed disabilities such as Down syndrome (Roberts, Mazzucchelli, Studman, & Sanders, 2006), cerebral palsy (Whittingham et al., 2014), autism spectrum disorders (Whittingham, Sofronoff, Sheffield, & Sanders, 2009); and acquired brain injury (Brown et al., 2014), the incorporation of the unique disability-specific content covered in SSTP (but missing from TPOL) was considered essential when creating TPOL-D. To achieve this in an economically-viable manner, two companion, hard-copy resources were provided to all intervention parents (a DVD – SSTP: A survival guide for families with a child who has a disability and an handbook – SSTP: A guide to positive parenting), with the pertinent content from these resources being synchronously programed for delivery with the relevant weekly TPOL web-based module. Adding an element of flexibility, participants could choose to use one or both resources (which replicated the same content in different formats) depending on their individual learning preferences and family circumstances.

Even with the addition of the Stepping Stones hard copy resources to the Triple P Online (TPOL) modules, the current intervention could not be considered Stepping Stones Online. The visual content and examples used in SSTP aim to maximize parental engagement and uptake by using highly relatable images of children with different disabilities to illustrate strategies and skills. As an online intervention originally developed for parents and carers of typically developing children, TPOL does not include any images, examples or demonstrations using children with a disability. While parents who participated in TPOL-D were made aware that the online modules had been originally created for parents and carers of typically developing children (and that all imagery would be of typically developing children) a significant concern in developing the current intervention was that parents would be unable and/or unwilling to extrapolate the strategies demonstrated by ‘typically developing’ children to the needs of their child with a disability. The unique, but somewhat hybridized, nature of the current intervention, its content and delivery formats was recognised in the naming of the intervention as TPOL-D.

With the success of any parenting program depending on both the willingness of parents to engage, as well as the feasibility of such engagement (Love et al., 2013), the final stage in developing TPOL-D involved focus group consultation to assess consumer

preferences in regard telehealth-based parenting programs, including any desired additional supports. Utilising a web-based, questionnaire link (SurveyMonkey), disseminated via relevant support agencies on an Australia-wide basis, 101 responses from eligible parents and carers of children (aged 0–17 years) were received between March and July 2014. A \$100 gift card was offered as a small incentive to survey completion, however parents could also choose to respond anonymously. Drawing upon the consumer-preference information received, several novel variations were incorporated into TPOL-D.

The first of these variations involved the inclusion of an optional, weekly telephone or email session, with a SSTP-accredited facilitator. This contact provided an opportunity for parents to clarify module content, gain assistance in customising strategies and engage in supported problem solving in regard both family and disability-specific concerns. Sessions were scheduled to occur at the same time each week, with parents strongly encouraged to complete their weekly online module and hard-copy readings prior to facilitator contact. With the exception of two Australian parents temporarily residing overseas (Sweden and USA), consultation times were initially scheduled as a telephone call, however participants were subsequently advised in their Week 1 contact that facilitator support could be accessed via telephone or email. Parents were also offered the opportunity to email prior to their weekly appointment if they did not require facilitator contact in any week. In combination, these variations provided significant flexibility in relation to both the type and amount of facilitator support parents received – with control of these features residing with the parent.

A further, novel support incorporated into TPOL-D based on focus group feedback was a private Facebook ‘parent support group’. With the sole purpose of facilitating intra-parent contact, inclusion in the group was optional with interested parents being added by the administrator upon entering Week 1 of the intervention. No additional content in relation to TPOL-D was provided in this group, however reminders in relation to questionnaires being due were posted. The site was monitored by the facilitator (administrator), and notices posted in relation to relevant community events and activities.

A final support added to TPOL-D was that of personalized timetables, which were emailed to all participants upon intervention allocation. These simple ‘visual schedulers’, provided week-by-week guidance as to program expectations and content deliverables including module completion dates, additional disability-specific DVD/handbook learnings and scheduled appointment times. These were discussed in weekly facilitator sessions to help parents track their progress through the modules and hard-copy content.

2.5. Intervention engagement

On average, parents in the TPOL-D group completed seven modules ($SD = 2.16$; range 0–8). Two parents (4%) did not actively engage with the online intervention, defined as either not logging in at all, or logging in briefly but not completing the first module. Parents further participated in an average of six weekly telephone or email consultations with their remote facilitator, with 80% of these being completed by telephone and 20% by email. Twenty-six parents used a mixture of telephone and email consultations, with two parents using email contact only.

2.6. Outcome measures

Parents in both groups completed online questionnaires both before and after the intervention had taken place. The intervention group completed a further questionnaire three months after completion of the program.

2.6.1. Developmental Behaviour Checklist – Primary Carer version (DBC-P; Einfeld & Tonge, 2002)

Completed by a parent or carer, the DBC-P assesses behavioral and emotional problems in children and adolescents (aged 4–18) with an intellectual disability. The 96 items are answered by the primary carer on a 3-point scale (0 = not true as far as you know, 1 = somewhat true, 2 = very true or often true). A score of 46 or more is indicative of clinically significant levels of behavioral and emotional problems. Individual sub-scale scores, and scores on individual items, are useful for assessing the severity of individual problems. The DBC-P has five sub-scales as well as a Total Behaviour Problem Score (TBPS), created from the sum of the individual scores. In this study, internal consistency at pre-intervention for the TBPS was excellent ($\alpha = .96$), with individual subscales: Disruptive/Antisocial ($\alpha = .92$), Self-Absorbed ($\alpha = .92$), Communication Disturbance ($\alpha = .74$), Social-Relating ($\alpha = .73$) and Anxiety ($\alpha = .72$). A parallel version of the DBC-P, the DBC-P-U4, was employed with caregivers of children under 4 ($n = 5$), however the results for this measure were omitted from analysis due to insufficient sample size. All other outcome data from these parents was included in analysis.

2.6.2. Child Adjustment and Parent Efficacy Scale – Developmental Disability (CAPES-DD; Emser, Mazzucchelli, Christiansen, & Sanders, 2016)

Completed by any caregiver of the child, the CAPES-DD consists of 24 items and assesses behavioral and emotional problems, as well as prosocial behavior and skills in children aged 2–16 years with a range of disabilities. All 24 items are rated by caregivers based on how true the statement is of their child over the past 4 weeks (0 = not at all, 1 = a little, 2 = quite a lot, 3 = very much). The Total Problems scale score is obtained by summing the ‘how true’ ratings of the 10 item Behavioural Problems subscale plus 3 item Emotional Problems subscale plus 3 individual items included on the basis of their clinical relevance – hurts themselves, upset when separated, fusses or refuses to eat. The Prosocial Behaviour scale score is obtained by summing the ‘how true’ rating of 8 items describing prosocial behaviors. The Self-Efficacy scale score is obtained by summing caregivers’ confidence ratings for the behavioral or emotional problems (1 = Certain I can’t manage it, to 10 = Certain I can manage it). There are no parent confidence ratings for the Prosocial Behavior scale. As the Prosocial Behavior scale does not report on a key outcome of the current research it was omitted from analysis. Internal consistencies indicated moderate to good values for the Total Problems scale score ($\alpha = .80$) and Self-Efficacy

scale ($\alpha = .89$). At a subscale level, Behavioural Problems also reported good internal consistency ($\alpha = .88$), while internal consistency for the Emotional Problems subscale was poor ($\alpha = .60$) (likely a reflection that this subscale has only three items).

2.6.3. The Parenting and Family Adjustment Scales (PAFAS; Sanders & Morawska, 2010)

The PAFAS is a 30-item inventory, consisting of two scales assessing parenting practices – (Parenting scale) and family adjustment (Family Adjustment scale). The 18-item Parenting Scale has four subscales: Parental Consistency, Coercive Parenting, Positive Encouragement, and Parent-Child Relationship. The 12-item Family Adjustment scale has three subscales: Parental Adjustment, Family Relationships, and Parental Teamwork. Each item is rated by the caregiver on a 4-point Likert-type scale and answers are summed for each individual subscale with higher scores indicating higher dysfunction. As the Family Adjustment scale does not report on a key outcome of the current research it was omitted from analysis. In this study, internal consistencies for the Parenting Scale ($\alpha = .83$) was good, with individual subscales recording: Consistency ($\alpha = .67$), Coercive ($\alpha = .73$), Positive Encouragement ($\alpha = .78$) and Parent-Child Relationship ($\alpha = .84$).

2.6.4. The Client Satisfaction Questionnaire (CSQ; Sanders et al., 2001)

Client satisfaction was assessed using the Client Satisfaction Questionnaire at post-intervention for the intervention group only. The 13-item measure evaluated satisfaction on a range of indicators such as the quality of the service, the extent to which the program met the needs of the family, and whether parents feel the program has equipped them to deal more effectively with problems that arise. Items are rated on a scale of 1–7, and a total score ranging between 13 and 91 is obtained by summing the items, with higher scores indicating greater satisfaction. The scale has high internal consistency ($\alpha = .96$) (Sanders, Markie-Dadds, Tully, & Bor, 2000).

3. Results

3.1. Preliminary analyses

To check for adequate randomization, preliminary analyses using chi square (categorical variables) and analysis of variance (continuous variables) was conducted to confirm the equivalence of the intervention and TAU control at pre-test on all demographic variables. No significant pre-treatment differences were detected. ANOVA was also undertaken on all outcome variables (means are presented in Table 2). No significant differences were detected between conditions on any variable, indicating that randomization resulted in comparable groups on both sociodemographic measures and the intensity of presenting problems. Similarly, no significant differences in retention rates between conditions from T1 to T2 $p = 1.00$ (2-sided Fisher's Exact Test) were observed. Given the very small percentage of missing data (0.12%) across all time points (0.05% at T1; 0.16% at T2; and 0.23% at T3), mean substitution of the sample mean was used where data was missing. While the PAFAS and CAPES-DD do not have clinical cut-offs available, the DBC-P

Table 2

Short-term intervention effects: intervention and TAU control conditions at pre- and post-intervention.

Measure ^a	TPOL-D				TAU Control				ANOVA	p	η^2
	Preintervention		Postintervention		Preintervention		Postintervention				
	M	SD	M	SD	M	SD	M	SD			
DBC-P > 4 Total ^b	63.79	32.91	56.21	34.32	60.46	28.04	60.03	25.30	3.69(1,76)	.058	.05
-Disruptive/Antisocial	21.60	11.96	19.33	12.66	19.16	9.79	18.79	9.37	1.35(1,76)	.25	.02
-Self-Absorbed	18.85	13.52	17.09	12.69	18.89	9.77	19.76	9.89	5.11(1,76)	.027	.06
-Comm. Disturbance	8.99	4.69	7.61	4.99	9.08	5.17	8.54	4.46	1.08(1,76)	.30	.01
-Anxiety	6.95	3.49	6.19	3.75	7.00	4.14	6.62	3.63	0.39(1,76)	.53	.001
-Social Relating	5.95	3.01	5.22	3.21	5.49	3.21	5.24	2.55	1.03(1,76)	.31	.01
CAPES-DD Total	20.02	8.24	18.46	7.51	19.81	6.53	18.39	6.36	.02(1,87)	.90	.00
-Emotional	2.13	1.61	1.87	1.73	1.53	1.78	1.65	1.67	1.66(1,87)	.20	.02
-Behavioural	13.11	7.53	11.67	6.54	13.42	5.88	12.06	5.54	.01(1,87)	.93	.00
CAPES-DD Self-Efficacy	81.24	21.93	97.30	20.08	79.42	18.86	79.88	20.72	13.33(1,87)	.000	.13
PAFAS Parenting Scale											
-Consistency	4.91	2.69	3.72	2.36	4.91	2.71	5.09	2.53	8.36(1,87)	.005	.09
-Coercive	4.69	2.34	3.35	2.06	4.53	2.68	4.63	2.89	12.39(1,87)	.001	.13
-Positive Encouragement	2.87	1.77	1.89	1.34	1.93	1.62	2.26	1.94	15.33(1,87)	.000	.15
-Parent-Child R'ship	2.37	2.43	1.61	2.19	2.28	2.50	2.39	2.74	5.62(1,87)	.020	.06

Note: F = ANOVA Time x Group effect; DBC-P = Developmental Behaviour Checklist – Primary Carer version; CAPES-DD = Child Adjustment and Parent Efficacy Scale – Developmental Disability; PAFAS = The Parenting and Family Adjustment Scales. Comm. Disturbance = Communication Disturbance. Parent-Child R'ship = Parent-Child Relationship.

^a Higher scores on all variables represent decreased functioning except for CAPES-DD Self-Efficacy scale where higher scores represent more positive behavior.

^b DBC-P intervention group $n = 41$ and TAU $n = 37$ due to exclusion DBC < 4 parents ($n = 5$ Intervention, $n = 6$ control).

reports that a score of 46 or more is indicative of clinically significant levels of behavioral and emotional problems. Both the intervention and TAU control groups reported levels of child behavioral and emotional problems in the clinically significant range at T1. Based on Cohen's (1969) benchmarks, partial eta squared (η_p^2) was used to demonstrate the effect size, with .0099, .0588 and .1379 representing a small, medium and large effect, respectively (Richardson, 2011).

3.2. Statistical analysis approach

A series of ANOVAs was conducted using SPSS (Version 24) to examine differences between the intervention and TAU control groups from T1 to T2. ANOVAs were conducted on the total scores and subscales. A Scheffe adjustment was used to account for the number of analyses conducted. A further series of ANOVAs explored treatment maintenance for the intervention group only. Analyses compared pre-intervention scores (T1) to follow up scores (T3), 3-months post-completion of intervention (i.e. approx. 5 months post commencement of program).

3.3. Pre- to post-intervention treatment effects

Table 2 contains descriptive statistics for both conditions at pre- and post-intervention as well as Time x Group *F* values and effect sizes.

3.3.1. Parent-reported child behavior

Due to the 'mixed disabilities' nature of the recruitment, two measures of child behavior, with slightly different focus populations (DBC-P: intellectual disability and CAPES-DD: range of disabilities), were used to test the hypothesis that there would be a significant decrease in parent-reported child behavior problems in the intervention group post-completion of TPOL-D when compared with the TAU group. The ANOVA examining differences in overall parent-reported child behavior showed no significant Time x Group interaction, $F(2,75) = 2.69$, $p = ns$, and no significant main effect for Time, $F(2,75) = 2.63$, $p = ns$, or Group, $F(2,75) = .270$, $p = ns$ was detected. The results do not provide support for a parent-reported decrease in problematic child behavior post completion of TPOL-D.

3.3.2. Parental self-efficacy

The ANOVA for parental self-efficacy showed a significant Time x Group interaction, $F(1,87) = 13.33$, $p < .001$, $\eta_p^2 = .13$, as well as a significant main effect for Time, $F(1,87) = 14.96$, $p < .001$, $\eta_p^2 = .015$, and Group, $F(1,87) = 6.49$, $p < .05$, $\eta_p^2 = .07$. Results indicate that, in comparison with the TAU group, parents who completed TPOL-D reported significantly increased confidence in managing their child's emotional and behavioral problems.

3.3.3. Parenting style

The ANOVA exploring dysfunctional parenting style revealed a Time x Group interaction $F(4,84) = 5.93$, $p < .001$, $\eta_p^2 = .22$, and a significant main effect for Time, $F(4,84) = 3.14$, $p < .05$, $\eta_p^2 = .13$, but no significant main effect for Group, $F(4,84) = 1.40$, $p = ns$. The interaction revealed that parents who completed TPOL-D reported significant improvements in their parenting practices (such as greater use of descriptive praise, logical consequences and similar strategies) when compared with the TAU group. At a subscale level, the PAFAS Consistency subscale detected a Time x Group interaction, $F(1,87) = 8.36$, $p < .005$, $\eta_p^2 = .09$, as well as a main effect for Time, $F(1,87) = 4.46$, $p < .05$, $\eta_p^2 = .05$, but not for Group, $F(1,87) = 1.95$, $p = ns$. The Coercive subscale showed a Time x Group interaction, $F(1,87) = 12.39$, $p < .001$, $\eta_p^2 = .13$, as well as a main effect for Time, $F(1,87) = 9.39$, $p < .005$, $\eta_p^2 = .09$, but not for Group $F(1,87) = 1.31$, $p = ns$. The Positive Encouragement subscale showed a Time x Group interaction, $F(1,87) = 15.33$, $p < .001$, $\eta_p^2 = .15$, but did not show a main effect for Time, $F(1,87) = 9.39$, $p = ns$, or Group, $F(1,87) = .833$, $p = ns$. Similarly, the Parent-Child Relationship subscale showed a Time x Group interaction, $F(1,87) = 5.62$, $p < .05$, $\eta_p^2 = .06$, but did not show a main effect for Time, $F(1,87) = 3.03$, $p = ns$, or Group, $F(1,87) = .51$, $p = ns$. Results indicate that when compared to the TAU control, parents who completed TPOL-D showed a significant improvement in parenting practices including greater consistency, decreased use of coercive behaviors, increased use of positive encouragers and an improved parent-child relationship.

3.4. Maintenance of treatment effects

A series of ANOVAs were used to assess whether the TPOL-D group maintained the gains made, at follow-up (i.e. 3-months later), by comparing T1–T3 scores. Of the 51 participants in the intervention group, 38 parents completed the T3 follow-up questionnaires. Intention to Treat (ITT) analyses were also conducted on the data by using the highly conservative method of carrying forward the scores of the missing eight parents from their pre-intervention questionnaires into their follow-up data ($n = 46$). The ITT analyses did not show any significant differences to that of the 'completer parents' analyses and there were no changes to the substantive interpretations. As such, and for ease of interpretation, the full data set for completer parents ($n = 38$) was reported (refer Table 3). The means and standard deviations are summarised in Table 3.

3.4.1. Child behavior

Although non-significant at T2, as one of the key outcome measures it was considered appropriate to re-examine child behavior in

Table 3Means and standard deviations (in parentheses) of the intervention group ($n = 38$) for all outcomes across time.

Measure ^a	Pre-intervention	Post-intervention	Follow-Up	Significance T1–T3
DBC-P > 4 Total	63.79 (32.91)	56.21 (34.32)	44.74(26.82) ^b	$p < .001$
-Disruptive/Antisocial	21.61 (11.99)	19.33 (12.66)	15.69(11.03)	$p < .001$
-Self-Absorbed	18.85 (13.52)	17.09(12.69)	12.91(9.31)	$p < .001$
-Communication Disturbance	8.99 (4.69)	7.61 (4.99)	5.86(3.39)	$p < .001$
-Anxiety	6.95 (3.49)	6.19 (3.75)	5.00(3.26)	$p < .005$
-Social Relating	5.95 (3.01)	5.22 (3.21)	4.23(2.35)	$p < .005$
CAPES-DD Total	20.02 (8.20)	18.46 (7.51)	15.58(6.37)	$p < .001$
-Emotional	2.13 (1.61)	1.87(1.73)	1.21(1.28)	$p < .005$
-Behavioural	13.11(7.53)	11.67(6.54)	9.21(5.68)	$p < .001$
CAPES-DD Self-Efficacy PAFAS Parenting	81.24(21.93)	97.30(20.08)	104.92(22.38)	$p < .001$
-Consistency	4.91(2.69)	3.72(2.35)	3.05(2.28)	$p < .001$
-Coercive	4.69(2.34)	3.35(2.06)	3.26(1.88)	$p < .001$
-Positive encouragement	2.87(1.77)	1.89(1.34)	1.50(1.52)	$p < .001$
-Parent-Child relationship	2.37(2.43)	1.61(2.19)	1.53(1.96)	$p < .005$

^a Higher scores on all variables represent decreased functioning except for CAPES-DD Self-Efficacy scale where higher scores represent more positive behavior.

^b DBC-P T3 data $n = 35$ due to exclusion DBC < 4 parents ($n = 3$).

the within-subjects analysis, particularly as the mean for the DBC-P total score at T3 was observed to be below the clinical cut-off for child behavioral and emotional problems. The ANOVA examining global parent-reported child behavior showed a significant effect for Time, $F(2,33) = 14.41$, $p < .001$, $\eta_p^2 = .47$. Examination at an individual scale level showed a significant effect for both the DBC Total Behaviour Problem scale, $F(1, 34) = 29.47$, $p < .001$, $\eta_p^2 = .46$, and the CAPES-DD Total Problems scale, $F(1,37) = 16.95$, $p < .001$, $\eta_p^2 = .31$. Further examination at a subscale level for both measures showed all subscales also to be significant for Time – DBC-P; Disruptive/Antisocial $F(1,34) = 31.24$, $p < .001$, $\eta_p^2 = .48$, Self-Absorbed $F(1,34) = 17.68$, $p < .001$, $\eta_p^2 = .34$, Communication Disturbance $F(1,34) = 26.91$, $p < .001$, $\eta_p^2 = .44$, Anxiety $F(1,34) = 9.68$, $p < .005$, $\eta_p^2 = .22$, Social Relating $F(1,34) = 9.19$, $p < .005$, $\eta_p^2 = .21$, CAPES-DD; Emotional $F(1,37) = 9.16$, $p < .005$, $\eta_p^2 = .21$, Behavioural $F(1,37) = 19.12$, $p < .001$, $\eta_p^2 = .34$. The results indicate that parent-reported child behavioral and emotional problems significantly decreased from T1 to T3, perhaps indicating the presence of a ‘sleepier effect’ in regard to this outcome.

3.4.2. Parental self-efficacy

The ANOVA for parent self-efficacy showed a significant effect for Time, $F(1,37) = 36.60$, $p < .001$, $\eta_p^2 = .49$, indicating that parents experienced a significant improvement in confidence in relation to managing the problem behaviors of their child from T1 to T3.

3.4.3. Parenting style

The ANOVA for parenting style showed a significant effect for Time, $F(4,34) = 8.94$, $p < .001$, $\eta_p^2 = .5$. Examination at an individual level revealed significant outcomes on all subscales; Consistency, $F(1,37) = 21.55$, $p < .001$, $\eta_p^2 = .37$, Positive Encouragement, $F(1,37) = 22.35$, $p < .001$, $\eta_p^2 = .39$, Parent-Child Relationship $F(1,37) = 9.46$, $p < .005$, $\eta_p^2 = .20$, Coercive $F(1,37) = 22.43$, $p < .001$, $\eta_p^2 = .38$. The results indicate that parents experienced a significant decrease in dysfunctional parenting practices from T1 to T3.

3.5. Parent satisfaction with TPOL-D

As measured by the CSQ, Parents in the intervention group reported high levels of satisfaction with TPOL-D. Ninety-six percent of participants rated the quality of service they received as ‘good’ with 98% of parents stating that they were at least ‘satisfied’ with the program. Similarly, 96% of parents also felt that the TPOL-D program helped them deal more effectively with their child’s problem behaviors.

4. Discussion

Online technologies offer the very real potential for parents of children with a disability to overcome many of the common barriers to training and support (Nieuwboer, Fukkink, & Hermanns, 2013). Unfortunately, empirically-validated, telehealth-based parent training programs for parents of children with a disability are scarce – with programs catering to disability diverse syndromes being even rarer (if available at all). To the authors’ knowledge, TPOL-D is the first completely telehealth-facilitated parenting program to be trialled with parents and carers of children with a diverse range of intellectual, developmental and physical disabilities. The aim of the current research was to assess the efficacy of a telehealth-based parenting intervention for parents of children with mixed disabilities using parent-reported child behavioral and emotional problems, parenting skills and parental self-efficacy as key outcome measures.

4.1. Intervention effects

Consistent with the primary hypothesis and previous research in the area (Roux et al., 2013; Sanders et al., 2012), immediately post TPOL-D completion parents in the intervention group reported significant improvements in their parenting style and feelings of self-efficacy when compared with the TAU group. TPOL-D parents indicated that they had greater confidence in managing their child's problem behaviors, were more consistent in their parenting practices, used fewer coercive behaviors, more positive encouragers and enjoyed an improved parent-child relationship. Examination of treatment gains at 3-month follow-up (i.e. 5-months post commencement of TPOL-D) revealed that these improvements were either maintained or enhanced across time – lending support to the potential durability of these changes.

While parents in both the intervention and TAU control group reported clinically-significant levels of child behavior and emotional problems at T1, in contrast to previous research findings (Day, 2016; Sanders et al., 2014; Sanders et al., 2012; Whittingham et al., 2009), the hypothesis that parents in the TPOL-D would report a significant decrease in child problem behaviors from pre- to post-intervention in comparison with the TAU group was not supported. Parents in the TPOL-D group did however report decreased problem behaviors across time, falling below clinical cut-off at T3. While within-subjects analysis also detected a significant decrease in parent-report child behavior from T1 to T3, the lack of a significant result in the controlled analysis (T1–T2) requires caution to be exercised in interpreting the result. Notably, parents in the TPOL-D group did not report undertaking any other parenting program or parent training in the 3-month follow up period, so an intuitive explanation may be that, post-completion of TPOL-D, parents experienced a degree of uncertainty in relation to maintaining the gains they had made without the assistance of their weekly therapist support. On this basis, these parents took somewhat longer to establish, employ and gain mastery of the behavior management skills learned during the program. An alternative hypothesis (based on comments made to the facilitator in support sessions) is that parents may have entered the program with a specific desire to improve their own parenting practices and skills and enhance the relationship with their child, rather than to change their child's behaviors. The learning of such parenting skills may have, therefore, been the initial focus of their observations. While this approach would undoubtedly indicate a considerable amount of insight on the part of the parents, it remains an area that would benefit from exploration in future research. Regardless, further research is necessary to determine whether the result is the product of a true sleeper effect.

4.2. Consumer engagement and satisfaction

On average parents in the intervention completed seven online modules and participated in an average of six weekly telephone or email consultations, with 52% of parents adopting a mixture of telephone and email consultations – achieving a high level of 'treatment dosage'. It is likely that the flexibility in access to content, resources and facilitator support contributed to the generally successful outcomes achieved in this mixed disability group, with parents effectively being able to decide: a) when and where they accessed the TPOL modules; b) when and if they used the additional SSTP hardcopy resources; c) the amount of facilitator support they required; and d) the medium in which the facilitator support was provided. This approach allowed each parent to tailor TPOL-D to their particular individual circumstances on a week-by-week basis, effectively resulting in a 'minimal sufficiency' approach to intervention. It would be of benefit to further explore the impact of this flexibility of contact and to include different cultural settings.

4.3. Clinical implications

The study showed good results with the targeted population of parents and carers of children with mixed disabilities, demonstrating that it is possible to bring about significant change in parent-reported child behavior, parenting practices and parental self-efficacy for this demographic using a telehealth-based parenting intervention. Further, improvements achieved were either maintained or enhanced at 3-month follow-up, suggesting some durability of change. Parents in the TPOL-D were afforded flexibility in relation to both the amount and mode of facilitator contact they experienced throughout the program. It is suggested that this flexibility encouraged parents to engage with their support in a manner that was minimally sufficient to meet their individual needs, although further research specifically concentrating on this question is required in order to fully support this statement. In accordance with previous research (Sanders et al., 2012), participant satisfaction with the program was high, with all but two parents indicating that the program helped them deal more effectively with their child's problem behaviors. As TPOL-D can be facilitated by any practitioner who has been trained in Level 4 Stepping Stones Triple P (e.g., social workers, psychologists, doctors, counsellors, teachers, teacher aides and so on) the program is highly accessible at both an organisational and individual practitioner level.

5. Limitations and future directions

A limitation of the current study was that the TAU group was provided with the intervention immediately post-completion of the T2 questionnaires. By their very nature online interventions imply an immediacy of treatment to registering parents. While the approach employed is ethically responsible (reducing a delay to treatment from 5 months to 2 months), it is acknowledged that the lack of a comparator group at T3 restricts the interpretation and conclusions that can be driven from follow-up outcomes. A further limitation of the study can be found in the range of disabilities represented which, while diverse, was clearly dominated by parents of children with ASD, with (13%) or without (69%) significant other co-morbid disabilities. While it was anticipated that this cohort would likely form the majority, a promotional 'push' by a peak ASD agency greatly increased representation of this group in the final

(and largest) recruitment cycle. In future, it would be beneficial to evaluate TPOL-D with a greater range of disabilities – perhaps on a more ‘targeted by disability’ basis. It must also be acknowledged that the study data were provided through parent report and parents may have had expectations of improvement following their participation or, have experienced a desire to please their remote facilitator and reported changes in outcome accordingly. While entry into the research study required diagnosis by a limited range of professionals, study constraints did not allow for confirmation of the primary diagnosis nor was the clinical severity of behavior problems objectively measured. The use of independent observers and measures with normative data and clinical cut-offs would be of benefit to future research. Finally, replicating across different cultural contexts and without therapist support would also be highly beneficial to support the effectiveness of the telehealth modality at a population health level. The results from this trial do however suggest that TPOL-D is a promising option for intervention for this population.

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Conflict of interest

The Parenting and Family Support Centre is partly funded by royalties stemming from published resources of the Triple P – Positive Parenting Program, which is developed and owned by The University of Queensland (UQ). Royalties are also distributed to the Faculty of Health and Behavioural Sciences at UQ and contributory authors of published Triple P resources. Triple P International (TPI) Pty Ltd is a private company licensed by Uniquet Pty Ltd on behalf of UQ, to publish and disseminate Triple P worldwide. The authors of this report have no share or ownership of TPI. Sharon Hinton and Drs Sofronoff, Sheffield and Sanders receive/may in future receive royalties and/or consultancy fees from TPI. TPI had no involvement in the study design, collection, analysis or interpretation of data, or writing of this report. Drs Sofronoff, Sheffield and Sanders are employees at UQ. Sharon Hinton is a student at UQ.

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