Does Stepping Stones Triple P plus Acceptance and Commitment Therapy improve parent, couple, and family adjustment following paediatric acquired brain injury? A randomised controlled trial

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Does Stepping Stones Triple P plus Acceptance and Commitment Therapy improve parent, couple, and family adjustment following paediatric acquired brain injury? A randomised controlled trial

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Abbreviations:
AAABIQ, Acceptance and Action ABI Questionnaire
ABI, Acquired Brain Injury
ACT, Acceptance and Commitment Therapy
ASD, Autism Spectrum Disorder
CAU, Care as Usual
CI, Confidence Interval
DASS, Depression Anxiety and Stress Scale
EA, Experiential Avoidance
ES, Effect Size
FAD, McMaster Family Assessment Device
GCS, Glasgow Coma Scale
ITT, Intention to Treat
M, Mean
MDiff, Mean Difference
MMRM, Mixed-Model Repeated Measures
NA, Not Applicable
PPC, Parent Problem Checklist
PTC, Parenting Task Checklist
PTFQ, Parent Thoughts and Feelings Questionnaire
RCI, Reliable Change Index
RCT, Randomised Controlled Trial
RQI, Relationship Quality Index
SD, Standard Deviation
SE, Standard Error
SPSS, Statistical Package for the Social Sciences
SSTP, Stepping Stones Triple P
TBI, Traumatic Brain Injury
Triple P, Positive Parenting Program
Abstract

Objective: To evaluate the efficacy of a behavioural family intervention, Stepping Stones Triple P (SSTP), combined with an Acceptance and Commitment Therapy (ACT) workshop in improving parent, family and couple outcomes following paediatric acquired brain injury (ABI).

Participants and setting: Fifty-nine parents (90% mothers) of children (mean age 7 years; 35 males, 24 females) with ABI.

Intervention: Participants were randomly assigned to a treatment (10-week group SSTP and ACT program) or a care-as-usual (CAU) control condition (10 weeks). Those in the CAU condition received the treatment after the waitlist period.

Outcomes: Self-report measures of family functioning, parent psychological distress, parenting confidence, and couple relationship, assessed at: pre-intervention, post-intervention, and 6-months post-intervention.

Results: Post-intervention, the treatment group showed significant, small to medium improvements relative to the CAU group (at the $p<.05$ level) on parent confidence in managing behaviours, family adjustment, parent psychological distress, and number of disagreements between parents. Most improvements were maintained at 6-months.

Conclusions: Parent skills training and ACT may be efficacious in improving parent, family, and couple outcomes in families of children with an ABI.

Keywords: acquired brain injury, behavioural family intervention, acceptance and commitment therapy, randomised controlled trial, parenting
Paediatric acquired brain injury (ABI) not only has a significant impact on the child, but also affects individual family members and the family as a whole. Approximately one in two children will present with behavioural difficulties post-ABI and these can persist and worsen over time (Li & Liu, 2013). Parents and families can experience acute and long-term burden and distress, including psychological symptoms, and strained couple relationships (Anderson, Catroppa, Haritou, Morse, & Rosenfeld, 2005; Stancin, Wade, Walz, Yeates, & Taylor, 2008; Wade, Taylor, et al., 2006).

While a dose-response relationship may exist between injury severity and child cognitive and physical outcome (Anderson et al., 2005), psychosocial factors appear to contribute to child behavioural, social, and emotional outcomes, beyond characteristics of the neurological insult. Contributing post-injury family factors include parent distress, parenting strategies and family functioning (Anderson et al., 2006; Li & Liu, 2013; Yeates et al., 2004).

Reciprocally, increased child behaviour difficulties significantly disrupt family functioning and increase parent distress (Anderson et al., 2005; Taylor et al., 2001). Family adjustment is also influenced by availability of material and social resources, stressors, and coping styles (Stancin et al., 2008; Wade et al., 2001). Importantly, parental coping styles characterised by behavioural and emotional avoidance or withdrawal (which could include strategies such as avoidance of reminders of the injury, or attempts to suppress emotions) are consistently linked to poorer parent psychological functioning post-ABI (Stancin et al., 2008; Wade et al., 2001).

The relationship between high parent distress and poorer child outcome may be partly explained through the adoption of maladaptive parenting strategies. Parents
of children with ABI appear prone to either over-reactive or permissive parenting practices, and higher parent and family distress predicts poor parenting practices (Woods, Catroppa, Barnett, & Anderson, 2011). Superior child behavioural and adaptive outcomes from ABI are linked to high parental warmth and responsiveness, and low parental negativity, permissiveness, and authoritarianism (Micklewright, King, O'Toole, Henrich, & Floyd, 2012; Wade et al., 2011; Yeates, Taylor, Walz, Stancin, & Wade, 2010), while high authoritarianism appears to mediate the negative relationship between parent distress and child adaptive functioning (Micklewright et al., 2012). Qualitatively, parents report that struggling with internal experiences (such as guilt, frustration, anxiety, and flashbacks to the injury) can interfere with effective parenting (Brown, Whittingham, Boyd, & Sofronoff, 2013a).

Despite these findings, there is a paucity of published trials of interventions for parenting skills post-pediatric ABI (Brown, Whittingham, Boyd, & Sofronoff, 2013b) or for parent distress (Cole, Paulos, Cole, & Tankard, 2009). Given the bidirectional relationship between parent and child functioning post-ABI, a potential dual-intervention approach is to combine a parent-skills training intervention targeting child behaviour, with an intervention targeting parent wellbeing.

We have recently reported on a two-arm waitlist-controlled RCT of an evidence-based parenting program, group-based Stepping Stones Triple P (SSTP) (Sanders, Mazzucchelli, & Studman, 2009), plus an Acceptance and Commitment Therapy (ACT) workshop for parents of children with ABI (Brown, Whittingham, Boyd, McKinlay, & Sofronoff, 2014). SSTP is an evidence-based intervention for parents of children with disabilities, demonstrating significant improvements in child and parent outcomes (Tellegen & Sanders, 2013). This is the first reported trial of an evidence-based behavioural parenting intervention with the pediatric ABI population.
ACT is a cognitive-behavioural therapy that aims to reduce experiential avoidance (EA; attempts to alter or control unwanted internal experiences of cognitions, memories, or emotions) and foster psychological flexibility, that is, the ability to interact flexibly with internal experiences and respond adaptively to given situations for the purpose of valued living (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). There is empirical support for the efficacy of ACT for treating psychological distress (A-Tjak et al., in press). EA is related to psychological distress and burden for parents of children with various disabilities (Weiss, Cappadocia, MacMullin, Vicili, & Lunsky, 2012; Whittingham, Wee, Sanders, & Boyd, 2012), and may mediate the relationship between child behaviour problems and parent distress (Weiss et al., 2012). In support of the delivery of an ACT intervention in conjunction with a parenting intervention, a simultaneously conducted 3-arm study trialling SSTP alone versus SSTP plus ACT versus CAU for parents of children with cerebral palsy found some additive benefits of ACT for child behavioural problems and problematic parenting strategies (Whittingham, Sanders, McKinlay, & Boyd, 2014).

Therefore in this trial we delivered the ACT-based intervention alongside SSTP with the aim to promote psychological flexibility in managing the emotional toll of ABI, and enhance parent effectiveness and confidence through reducing the impact of difficult thoughts and feelings on parenting behaviour. The ACT intervention aimed to teach parents strategies for managing difficult thoughts through ‘defusion’, accepting difficult emotions, identifying their values as a parent and other life domains, and taking action in line with those values.

We have reported significant short-term improvements in the combined intervention condition (ACT+SSTP), compared to the 10-week CAU condition, on the primary outcomes of child behavioural and emotional outcomes and parenting
styles of laxness and overreactivity (Brown et al., 2014). Most outcomes were maintained at six-months. We have also reported additional analyses of the mediational role of improvements in psychological flexibility on treatment effects on parenting style and psychological distress, supporting the rationale for ACT in this population (Brown, Whittingham, & Sofronoff, 2015).

This paper reports on the same RCT, but considers the important secondary outcomes of parent and family wellbeing. We hypothesised that parents of children with ABI who participated in the ACT+SSTP intervention would also demonstrate improved parenting confidence, decreased psychological distress, and improved family functioning relative to the CAU condition. In two-parent families we hypothesised improved relationship satisfaction and reduced conflict over parenting. Improvements on the proposed process variable of parental psychological flexibility were also hypothesised. It was expected that these effects would be maintained at a 6-month follow-up.

Method

For a detailed description of trial procedures, including ABI definitions, intervention details, outcome measures, recruitment, sample size calculation, and randomisation, see the study protocol (Brown, Whittingham, McKinlay, Boyd, & Sofronoff, 2013).

Participants

Recruitment was conducted through two paediatric rehabilitation services in Brisbane, Australia between October 2010 and May 2012. Eligible parents had a child: (a) aged 2-12 years, diagnosed with an ABI; (b) at least three months post-injury/diagnosis; and (c) currently demonstrating at least one parent-reported emotional or behavioural difficulty. Parents were excluded if: (a) they did not have
sufficient English proficiency to participate in the group sessions; (b) the child was still medically unwell or undergoing chemotherapy or radiation therapy.

**Design and Procedure**

This study was a randomised controlled, parallel-group trial comparing ACT+SSTP to CAU. Ethical approval was obtained, and the trial was registered on Australian New Zealand Clinical Trials Registry (ID: ACTRN12610001051033, www.anzctr.org.au). After providing written informed consent and completing baseline assessments, participating parents were randomly assigned to ACT+SSTP or CAU. CAU participants received the ACT+SSTP intervention after the 10-week waiting period. Data was collected at baseline, post-intervention, and 6-months post-intervention. As both groups received the intervention, maintenance of change was assessed as a within-group comparison of post-intervention and 6-month follow-up scores for both groups combined, with no control group comparison.

**Interventions**

The intervention was delivered in groups (3 to 6 families) and consisted of the 2-session ACT program (Whittingham, Sheffield, & Sofronoff, 2010) and 9-session SSTP program (Sanders et al., 2009). This involved approximately 16 hours of group sessions, and 1.5 hours of individual telephone consults over approximately 10 weeks. Each family was provided with an SSTP workbook. Families allocated to both the ACT+SSTP and CAU conditions continued to receive usual follow-up care from their paediatric rehabilitation service, and any other outside services, throughout the treatment period for ethical reasons. Program content is described in the protocol (Brown, Whittingham, McKinlay, et al., 2013). Psychologists or postgraduate clinical psychology students who were accredited in SSTP, and received training and weekly supervision conducted programs.
Outcome Measures

The following secondary outcome questionnaires were completed via online or paper questionnaires.

**Parenting confidence.** The Parenting Tasks Checklist (PTC; Sanders & Woolley, 2005) was used to assess parent confidence in dealing with difficult behaviour (Behaviour subscale; $\alpha = .94$) and managing behaviour in different settings (Setting subscale; $\alpha = .89$). Higher scores represent greater confidence.

**Family and parent adjustment.** The Depression Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) was used to assess outcomes on the following subscales: Depression ($\alpha = .97$); Anxiety ($\alpha = .94$); and Stress ($\alpha = .95$). Higher scores represent greater symptomatology. The General Functioning Scale of the McMaster Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983) was completed as a broad measure of family functioning, with higher scores representing greater dysfunction ($\alpha = .89$).

**Parent relationship (for two-parent families).** The Parenting Problem Checklist (PPC; Dadds & Powell, 1991) was used to quantify the number of common disagreements over parenting ($\alpha = .82$). The Relationship Quality Index (RQI; Norton, 1983) was used to assess general relationship satisfaction, with higher scores representing greater satisfaction ($\alpha = .97$).

**Treatment process.** The Acceptance and Action for ABI Questionnaire (AAABIQ) is a 19-item questionnaire developed specifically for this study, and assesses psychological flexibility relating to having a child with an ABI ($\alpha = .78$). A 9-item section of the Parent Thoughts and Feelings Questionnaire (PTFQ; Metzler & Rusby, 2008) was used to assess psychological flexibility relating to parenting in general. On each measure, higher scores represent greater flexibility.
Statistical Methods

Hypothesis testing. To assess the efficacy of ACT+SSTP in comparison to CAU from pre- to post-intervention, a series of normal mixed-model repeated-measures (MMRM) linear regression analyses were conducted on the intent-to-treat (ITT) sample of all randomised participants (Hedeker & Gibbons, 2006). A restricted maximum likelihood solution was used, which allowed inclusion of participants who dropped out and had missing post-intervention outcome data. Fixed factors were time (categorical: pre- and post-intervention), and condition (categorical: ACT+SSTP and CAU). A compound symmetry covariance structure was assumed, and denominator degrees of freedom were based on the Satterthwaite approximation. Main effects are reported as type III tests of fixed effects and the estimates of fixed effects are given for the interaction terms. Additional MMRM analyses were conducted to assess maintenance of treatment gains, comparing post-intervention scores to 6-month follow-up scores, and combining data from ACT+SSTP and CAU groups. Statistical significance was defined as values of $p < .05$.

Effect sizes (ES) for pre-to-post MMRM analyses are calculated as pre-post change in the ACT+SSTP group mean minus the pre-post change in the CAU group mean, divided by the pooled pre-intervention standard deviation and applying a bias-correction component (Morris, 2008). ESs for follow up within-group contrasts in the pre-to-post MMRM analyses were calculated (Wackerley, Mendenhall, & Scheaffer, 2008). For the post-intervention to 6-month follow up tests, ESs were calculated as the difference between the means divided by the standard deviation at post-intervention. Interpretation of ESs was: small ($\geq 0.2$) medium ($\geq 0.5$) or large ($\geq 0.8$) (Cohen, 1992).

Results
Figure 1 illustrates the identification, recruitment, and retention of participants. A total of 59 families completed baseline assessment and were randomised to ACT+SSTP (n=30) or CAU (n=29). Detailed information on retention, attendance, and adherence is reported in the primary outcomes paper (Brown et al., 2014).

(Insert Figure 1)

Participants

Injury and demographic characteristics of participants are presented in Table 1. The majority of participating parents were mothers (90%). The children (M=35, F=24; mean age: 7 years; SD 3 years, 1 month), had an average time since injury of 3 years, 4 months (SD 2 years, 7 months) and predominantly TBI (58%). Table 1 shows some differences in baseline characteristics. More children in the CAU group had comorbid learning difficulties (p = .049). More parents in the ACT+SSTP group were employed in full-time work (p = .039), and there were more 2-parent families in the CAU group (p = .007).

(Insert Table 1)

Efficacy of ACT+SSTP

The short-term intervention effects for all outcomes are presented in Table 2. Significance values for the effects of Time and Condition are provided, however the value of interest is the estimate of fixed effects for the time-by-condition interaction term.

(Insert Table 2)

Parent confidence (PTC). On the Behaviour subscale, there was a significant time-by-condition interaction, with medium effect size. The ACT+SSTP group showed a significant, large increase in confidence in managing child behaviour from
pre- to post-intervention ($M_{diff}$= 15.37, $SE$= 3.16, $t$(54.82)= 4.86, $p < .001$, 95%CI [9.04, 21.71], $d=0.95$), while the CAU group showed no significant change ($M_{diff}$= 2.97, $SE$= 3.08, $t$(52.86)= 0.96, $p = .340$, 95%CI [-3.21, 0.14], $d=0.18$). There was no significant time-by-condition interaction for the Setting subscale.

**Parent psychological distress (DASS).** The time-by-condition interaction for Depression was non-significant, indicating no difference in change between groups over time. The time-by-condition interactions were significant for both Anxiety, and Stress with medium effect sizes. Despite the significant interaction for anxiety, the 95% CI for the effect size did include 0 (-0.15 to 0.93), however this is potentially due to reduced power since effect sizes were calculated with completers only. Follow-up contrasts demonstrated a significant, small decrease in symptoms of anxiety in the ACT+SSTP group ($M_{diff}$= -2.31, $SE$= 1.01, $t$(49.74)= -2.28, $p = .027$, 95%CI [-4.34, -0.28], $d=0.45$), while the CAU group did not significantly change ($M_{diff}$= 0.67, $SE$= 0.98, $t$(48.67)= 0.69, $p = .494$, 95%CI [-1.26, 2.64], $d=0.13$). Follow-up contrasts for Stress demonstrated a similar pattern: a significant and medium decrease in the ACT+SSTP group ($M_{diff}$= -4.30, $SE$= 1.55, $t$(51.82)= -2.77, $p = .008$, 95%CI [-7.42, -1.18], $d=0.54$) and no significant change for CAU ($M_{diff}$= 0.48, $SE$= 1.51, $t$(49.91)= 0.32, $p = .754$, 95%CI [-2.56, 3.51], $d=0.06$).

**Family adjustment (FAD).** Analysis of the FAD indicated a significant time-by-condition interaction, with a medium effect size. The ACT+SSTP group showed a significant, medium increase in family functioning from pre-to post-intervention ($M_{diff}$= -0.38, $SE$= 0.10, $t$(53.28)= -3.90, $p < .001$, 95%CI [-5.79, -0.19], $d=0.76$) while the CAU group showed no movement ($M_{diff}$= 0.07, $SE$= 0.10, $t$(51.67)= 0.74, $p = .449$, 95%CI [-0.12, 0.26], $d=0.14$).
Couple adjustment (RQI and PPC). On the RQI, there was no significant time-by-condition interaction, indicating no difference in change between the groups for relationship satisfaction. On the PPC there was a significant time-by-condition interaction, and a medium effect size. The ACT+SSTP group showed a significant decrease in the number of disagreements between parents from pre-to post-intervention, with a medium effect ($M_{\text{diff}}=-2.12$, $SE=0.88$, $t(38.04)=-2.41$, $p=0.021$, 95%CI [-3.89, -0.34], $d=0.62$) while the CAU group did not significantly change ($M_{\text{diff}}=0.26$, $SE=0.70$, $t(36.99)=0.37$, $p=0.714$, 95%CI [-1.16, 1.67], $d=-0.08$).

Processes of change. There was a significant time-by-condition interaction for AAABIQ with a medium effect size, with the ACT+SSTP group showing a significant, medium increase in psychological flexibility specific to having a child with an ABI ($M_{\text{diff}}=9.90$, $SE=2.54$, $t(52.57)=3.90$, $p<0.001$, 95%CI [4.81, 14.98], $d=0.77$), while the CAU group did not significantly change ($M_{\text{diff}}=-1.90$, $SE=2.46$, $t(51.36)=-0.77$, $p=0.442$, 95%CI [-6.83, 3.03], $d=-0.15$). Likewise, the interaction and medium effect size for PTFQ, occurred because the ACT+SSTP showed a significant, medium increase in psychological flexibility relating to parenting ($M_{\text{diff}}=5.37$, $SE=1.35$, $t(53.80)=3.97$, $p<0.001$, 95%CI [2.66, 8.08], $d=0.78$) while the CAU group did not ($M_{\text{diff}}=-0.06$, $SE=1.32$, $t(51.77)=0.05$, $p=0.962$, 95%CI [-2.58, 2.70], $d=0.01$).

Retention of Effects

The majority of outcome measures did not statistically change from post-treatment to the 6-month follow-up when combining the scores from the treatment group with the scores of the CAU group members who went on the complete the intervention. This indicates maintenance of treatment effects in general (see Table 3). There were significant declines seen from post-intervention to follow-up on the
AAABIQ \( (p = .034, d = -0.29) \) and PPC \( (p = .042, d = -0.45) \), however the corresponding effect sizes were small. When comparing follow-up scores to baseline (MMRM analysis, collapsed across groups) for AAABIQ, \((t(34.29) = -1.84, p = .074, d = 0.14)\), and PPC, \((t(23.72) = 1.24, p = .229, d = 0.03)\) there were no significant differences, suggesting a return to baseline.

(Insert Table 3)

**Discussion**

Findings of this RCT indicate that participation in a combined intervention of an ACT-based stress management program plus group SSTP resulted in significant improvements compared to CAU for parents of children with ABI on parenting confidence, psychological distress, family functioning, and couple disagreements. Effect sizes were generally small to medium. Comparison to a CAU-control indicates that these effects were not attributable to spontaneous recovery. In each outcome measured, the CAU group did not change significantly during the wait-list period, whilst the ACT+STTP demonstrated significant improvement. Parent psychological flexibility, as a process of change specifically targeted by ACT, showed greater change in the ACT+SSTP than the CAU group. As hypothesised, the majority of short-term improvements were maintained at a 6-month follow-up.

The current findings assist in addressing the shortage of intervention studies considering parent and family functioning post-pediatric ABI. Additionally, they demonstrate the efficacy of a group-format approach, which may be cost-effective, and confer the advantage of social support for parents (Wade et al., 2004). Results are largely consistent with research demonstrating the utility of SSTP in improving parent adjustment and confidence and couple disagreements in populations of parents of children with disabilities generally (Tellegen & Sanders, 2013). To date this is the
first trial of SSTP demonstrating improvements in family functioning (Tellegen & Sanders, 2013). The reduction of stress and anxiety, and increases in psychological flexibility are consistent with Blackledge and Hayes’ (2006) findings following an ACT workshop in the ASD population. The results are also comparable to studies investigating an ABI-specific family-problem solving intervention, which addressed parent coping style and cognitions (Wade, Carey, & Wolfe, 2006).

Contrary to hypotheses however, significant intervention effects were not seen for parent-reported depressive symptomatology, parent confidence in managing child behaviour in different settings, and relationship satisfaction in two-parent families. In the case of parent confidence, the mean for the treatment group moved to the non-clinical range (<85) while the mean for the control group remained in the clinical range. It is possible that with a larger sample and greater statistical power, an intervention effect may be observed. Alternatively, additional strategies may be needed to enhance parent self-efficacy in this population.

The treatment group demonstrated an improvement in relationship satisfaction and depression, however this was not found to be significantly different to the change seen in the control group. It should be noted that the group mean fell within the non-clinical range pre-intervention, perhaps indicating a floor-effect. With larger sample sizes, analyses may be conducted separately for parents specifically demonstrating clinical levels of depression and relationship discord, to more adequately determine the utility of the intervention when these problems exist at baseline. Additionally, there was a relatively small sample for these couple outcomes due to several one-parent families. The reason and course of relationship breakdown was not a focus of this study, but qualitatively, several of these families experienced parental separation
post-ABI. Future research should consider couple functioning immediately post-injury, and trial effective brief early interventions to prevent development of discord.

Some outcomes (parent psychological flexibility relating to ABI, and number of disagreements between parents) returned to baseline levels at 6-month follow-up. It may be that further follow-up and support is required to maintain long-term progress in these domains. Since parent functioning may deteriorate over time (Wade, Taylor, et al., 2006) it is also possible that this post-treatment decline may have been greater and exceeded baseline levels without intervention. Due to the study design, this theory cannot be further investigated. Further research could consider this by withholding treatment from the CAU group until after the 6-month follow-up to allow methodologically stronger analyses of longer-term effects.

This study was not able to clarify the individual contribution of the ACT or SSTP programs to improvements in outcomes. Despite improvements in psychological flexibility suggesting that the ACT workshop had effected change as intended, it is possible that psychological flexibility may change through SSTP alone. For example, changing parenting practices through SSTP may increase psychological flexibility processes without direct training. Clearly, this is a question for future empirical study, ideally using a multi-group design with comparison between ACT, ACT+SSTP, SSTP, and a CAU control. It is important to determine whether ACT leads to improvements over and above SSTP alone, to justify inclusion in treatment packages.

While the participant sample included parents from a range of education and income levels, and used broad inclusion criteria (e.g. including mild TBI and other forms of ABI), parents were largely Caucasian-Australian, and spoke English. Future research should specifically recruit parents of children with ABI from ethnically
diverse backgrounds to enhance generalisability of results. Additionally, effectiveness studies conducted within a rehabilitation setting will be important to determine the utility of the treatments in real-world settings with differing resources and demands. Given that a large proportion of eligible families declined participation because group sessions were too far away, or not possible to fit in their busy schedules, it will be worthwhile for researchers and clinicians in the field to consider online delivery of evidence-based parenting programs either in group conferencing or self-directed formats, to enhance access and feasibility. Methodologically, structured clinical interviews with blind assessors and observations of couple-interactions could improve objectivity and clarity of outcomes.

This study reports on important secondary outcomes from the only published RCT of an evidence-based behavioural parenting intervention in the paediatric ABI population to date (Brown, Whittingham, et al., 2013b). Findings indicate that this dual-approach intervention combining SSTP and ACT may result in significant improvements in parent, family, and couple outcomes following paediatric ABI. Previously reported primary outcomes also indicate significant intervention benefits in child outcomes (Brown et al., 2014). Given the bidirectional relationship between child and parent functioning following ABI (Taylor et al., 2001), improvement of parent adjustment is likely to have a significant effect on child outcomes. The addition of ACT is a novel approach in this population, and hopefully encourages additional studies considering its application.
References


**Conflicts of Interest:** The Triple P—Positive Parenting Program—is owned by the University of Queensland. The University through its main technology transfer company, UniQuest Pty Ltd, has licensed Triple P International Pty Ltd to publish and disseminate the program worldwide. Royalties stemming from published Triple P resources are distributed in accordance with the University’s intellectual property policy and flow to the Parenting and Family Support Centre, School of Psychology, Faculty of Health and Behavioural Sciences, and contributory authors. No author has any share or ownership in Triple P International Pty Ltd. F.B. was a PhD candidate at the University of Queensland at the time of this study, K.W. is a postdoctoral fellow at the University of Queensland, and K.S. is an academic on staff in the School of Psychology at the University of Queensland.

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### Table 1

**Demographic and Clinical Characteristics of the Participants**

<table>
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<td>Encephalitis/Meningitis</td>
<td>3</td>
<td>10</td>
<td>6</td>
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<tr>
<td>Hypoxia</td>
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<td>0</td>
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<td>Brain tumor</td>
<td>3</td>
<td>10</td>
<td>7</td>
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<tr>
<td>Cardiovascular accident</td>
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<tr>
<td>Other diagnoses/ conditions</td>
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<tr>
<td>Intellectual Impairment</td>
<td>2</td>
<td>7</td>
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<tr>
<td>Learning difficulties</td>
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<td>Autism spectrum disorders</td>
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<tr>
<td>Attention Deficit Hyperactivity Disorder</td>
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<td>Developmental Delay</td>
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<tr>
<td>Cerebral Palsy</td>
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<tr>
<td>Family characteristics</td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Family characteristics</td>
<td>n</td>
<td>%</td>
<td>n</td>
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<tr>
<td>------------------------</td>
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<tr>
<td>Participating parent age, years</td>
<td>38.87</td>
<td>6.36</td>
<td>39.42</td>
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<tr>
<td>Number children at home</td>
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<td>0.97</td>
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<tr>
<td>Parent relationship to child</td>
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<tr>
<td>Mother</td>
<td>27</td>
<td>90</td>
<td>26</td>
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<td>Father</td>
<td>3</td>
<td>10</td>
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<td>Relationship status</td>
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<td>Married/defacto</td>
<td>18</td>
<td>60</td>
<td>27</td>
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<tr>
<td>Separated/divorced/Widowed</td>
<td>12</td>
<td>40</td>
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<tr>
<td>Participating parent's education</td>
<td>1.90</td>
<td>.387</td>
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<tr>
<td>Year 12 or less</td>
<td>10</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>Trade/College</td>
<td>11</td>
<td>37</td>
<td>6</td>
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<tr>
<td>University</td>
<td>9</td>
<td>30</td>
<td>10</td>
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<tr>
<td>Participating parent's employment</td>
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<td>.039</td>
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<tr>
<td>Full-time</td>
<td>13</td>
<td>43</td>
<td>4</td>
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<tr>
<td>Part-time</td>
<td>5</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Home-duties/Unemployed</td>
<td>12</td>
<td>40</td>
<td>16</td>
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<tr>
<td>Family annual income (AUD)</td>
<td>1.47</td>
<td>.479</td>
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</tr>
<tr>
<td>&lt; $50 000</td>
<td>11</td>
<td>37</td>
<td>7</td>
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<tr>
<td>$50 000 to $75 000</td>
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<td>9</td>
</tr>
<tr>
<td>&gt; $75 000</td>
<td>13</td>
<td>43</td>
<td>13</td>
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<td>Parent receiving assistance</td>
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<td>Psychologist</td>
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<td>Psychiatrist</td>
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<tr>
<td>Counsellor</td>
<td>6</td>
<td>20</td>
<td>3</td>
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<tr>
<td>Social worker</td>
<td>9</td>
<td>30</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note. TBI, Traumatic Brain Injury; ABI, Acquired Brain Injury; AUD, Australian Dollars.*

*Severity of TBI was classified as follows: (i) mild: Glasgow Coma Scale (GCS) 13-15, no neurosurgical intervention required; (ii) moderate: GCS 9-12, or 13-15 with neurosurgical intervention required; severe: GCS <8.*
b Missing data for 1 participant.

c 1 participant in treatment group was custodial grandmother.

d According to the Melbourne Institute of Applied Economic and Social Research, the poverty line in the December Quarter of 2012 for an Australian couple with the head in the workforce, and with two children is approximately $47,000 after tax.

e Self-reported, within the last 6 months.
Table 3

Short-Term Intervention Effects for the Secondary and Process Outcomes by Treatment Condition

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Time</th>
<th>Condition</th>
<th>Time-by-condition interaction term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTC Behavior</td>
<td>ACT+SSTP (n=30)</td>
<td>71.95</td>
<td>20.47</td>
<td>86.27</td>
<td>14.58</td>
<td>70.38</td>
<td>17.20</td>
</tr>
<tr>
<td></td>
<td>CAU (n=29)</td>
<td>81.62</td>
<td>15.60</td>
<td>89.91</td>
<td>14.39</td>
<td>80.31</td>
<td>15.33</td>
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<tr>
<td>Parental and family adjustment</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DASS Depression</td>
<td>ACT+SSTP (n=30)</td>
<td>8.53</td>
<td>9.63</td>
<td>5.60</td>
<td>6.27</td>
<td>8.72</td>
<td>10.50</td>
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<tr>
<td></td>
<td>CAU (n=29)</td>
<td>5.67</td>
<td>6.59</td>
<td>2.08</td>
<td>2.69</td>
<td>5.69</td>
<td>8.69</td>
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<tr>
<td>DASS Anxiety</td>
<td>ACT+SSTP (n=30)</td>
<td>12.33</td>
<td>8.68</td>
<td>7.76</td>
<td>6.77</td>
<td>12.41</td>
<td>9.41</td>
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<td></td>
<td>CAU (n=29)</td>
<td>2.11</td>
<td>0.73</td>
<td>1.71</td>
<td>0.70</td>
<td>2.04</td>
<td>0.36</td>
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<td>Relationship adjustment</td>
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<td></td>
</tr>
<tr>
<td>RQF</td>
<td>ACT+SSTP (n=30)</td>
<td>32.39</td>
<td>11.84</td>
<td>34.80</td>
<td>9.80</td>
<td>34.27</td>
<td>7.52</td>
</tr>
<tr>
<td>PPC Problems</td>
<td>ACT+SSTP (n=30)</td>
<td>5.83</td>
<td>3.79</td>
<td>4.00</td>
<td>3.80</td>
<td>6.38</td>
<td>4.02</td>
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<tr>
<td>Treatment process outcome: Parental psychological flexibility</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AAABIQ</td>
<td>ACT+SSTP (n=30)</td>
<td>93.50</td>
<td>16.38</td>
<td>103.0</td>
<td>21.19</td>
<td>90.38</td>
<td>15.56</td>
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<tr>
<td>PTFQ Flexibility</td>
<td>ACT+SSTP (n=30)</td>
<td>43.20</td>
<td>8.66</td>
<td>48.36</td>
<td>6.32</td>
<td>42.69</td>
<td>6.38</td>
</tr>
</tbody>
</table>
**Note.** CI, confidence interval; PTC = Parenting Tasks Checklist; DASS, Depression Anxiety Stress Scales; FAD, Family Assessment Device; RQI, Relationship Quality Index; PPC, Parent Problem Checklist; PS, Parenting Scale; AAABIQ, Acceptance and Action for Acquired Brain Injury Questionnaire; PTFQ; Parent Thoughts and Feelings Questionnaire.

*a* Post-intervention, *n* = 25.

*b* Post-intervention, *n* = 27.

*c* $\beta$ = estimated regression coefficient using mixed-model repeated measures regression, i.e. the estimated change in the treatment group from pre- to post-intervention relative to the control group, in scale units (adjusted such that a positive value represents improvement for treatment).

*d* Effect size represents the pre-post change in treatment group minus the pre-post change in the control group, divided by pooled standard deviation, and corrected for bias.

*e* RQI and PPC: ACT+SSTP- pre-intervention *n* = 18, post-intervention *n* = 15; CAU- pre-intervention *n* = 26, post-intervention *n* = 24 (1 family separation)
Table 3

Long-Term Maintenance of Effects, Collapsed Across Treatment Conditions

<table>
<thead>
<tr>
<th>Measure</th>
<th>Post-intervention (n= 41)</th>
<th>6-month follow-up (n= 31)</th>
<th>Estimate of fixed-effect for time</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTC Behaviour</td>
<td>85.90 (13.02)</td>
<td>84.01 (14.21)</td>
<td>1.22 (31.04) .233</td>
<td>-0.14 [-0.47, 0.46]</td>
</tr>
<tr>
<td>PTC Setting</td>
<td>90.13 (12.27)</td>
<td>88.19 (15.20)</td>
<td>1.28 (31.15) .210</td>
<td>-0.16 [-0.31, 0.62]</td>
</tr>
<tr>
<td>Parental and family adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DASS Depression</td>
<td>5.46 (7.32)</td>
<td>5.52 (8.02)</td>
<td>0.24 (34.53) .809</td>
<td>-0.01 [-0.47, 0.46]</td>
</tr>
<tr>
<td>DASS Anxiety</td>
<td>2.59 (4.65)</td>
<td>3.71 (6.24)</td>
<td>-1.39 (33.64) .173</td>
<td>-0.24 [-0.71, 0.23]</td>
</tr>
<tr>
<td>DASS Stress</td>
<td>8.15 (6.57)</td>
<td>10.42 (7.83)</td>
<td>-1.54 (33.48) .133</td>
<td>-0.34 [-0.81, 0.13]</td>
</tr>
<tr>
<td>FAD</td>
<td>1.77 (0.63)</td>
<td>1.90 (0.56)</td>
<td>0.87 (32.35) .389</td>
<td>-0.20 [-0.67, 0.27]</td>
</tr>
<tr>
<td>Relationship adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQFc</td>
<td>35.34 (9.39)</td>
<td>32.73 (9.79)</td>
<td>2.03 (21.46) .055</td>
<td>-0.27 [-0.28, 0.83]</td>
</tr>
<tr>
<td>PPC Problemsc</td>
<td>4.45 (3.60)</td>
<td>6.09 (4.12)</td>
<td>-2.16 (22.59) .042</td>
<td>-0.45 [-1.01, 0.11]</td>
</tr>
<tr>
<td>Treatment process outcome: Parental psychological flexibility</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAABIQ</td>
<td>99.63 (20.37)</td>
<td>93.74 (20.16)</td>
<td>2.22 (30.71) .034</td>
<td>-0.29 [-0.18, 0.75]</td>
</tr>
<tr>
<td>PTFQ Flexibility</td>
<td>48.44 (6.22)</td>
<td>48.10 (5.97)</td>
<td>0.24 (30.92) .811</td>
<td>-0.05 [-0.41, 0.52]</td>
</tr>
</tbody>
</table>
Note. CI, confidence interval; PTC, Parenting Tasks Checklist; DASS, Depression Anxiety Stress Scales; FAD, Family Assessment Device; RQI, Relationship Quality Index; PPC, Parent Problem Checklist; PS, Parenting Scale; AAABIQ, Acceptance and Action for Acquired Brain Injury Questionnaire; PTFQ; Parent Thoughts and Feelings Questionnaire.

*Effect of time using mixed-models repeated measures regression.

^Effect size represents difference between means from post-intervention to follow-up, divided by standard deviation at post-intervention.

^ RQI and PPC: post-intervention n= 29, follow-up n= 22.
Potentially eligible parents identified and attempt made to contact (n=385)

Declined participation
- Too far to travel (n=34)
- Too busy (n=33)
- Not interested in program (n=6)
- Taking part in other treatments (n=6)
- Can’t attend times/locations (n=26)
- Consent form not returned (n=20)
- Baseline not returned (n=3)
- No reason given (n=11)

Contacted and conducted screening call (n=337)

Eligible (n=210)

Enrollment & Baseline Assessment: (n=59)

Randomisation

Allocated to Intervention (n=30)
- ACT and SSTP

Discontinued intervention:
- Illness in family (n=2)
- Parental separation (n=2)
- Too far to travel (n=1)

Post-intervention Assessment: (n=25)
- Analysed (n=25)
- Excluded (n=0)

Lost to follow up: Reason unknown (n=6)

Allocated to Waitlist (n=29)
- Care as Usual for 10 weeks

Lost to follow up: Too busy (n=2)

Post-waitlist Assessment: (n=27)
- Analysed (n=27)
- Excluded (n=0)

ACT and SSTP

Did not receive intervention:
- Times unsuitable (n=3)
- Tumor recurrence (n=1)
- Moved away (n=1)

Discontinued intervention:
- Too busy (n=4)
- Reason unknown (n=1)

Lost to follow up: Reason unknown (n=1)

Post-intervention Assessment: (n=16)

6 month follow-up Assessment: (n=19)
- Analysed (n=19)
- Excluded (n=0)

Analysed (n=12)
- Excluded (n=0)

6 month follow-up Assessment: (n=12)
Highlights

- We trial a parenting intervention for parents of children with acquired brain injury
- The intervention led to improvements on parent, family, and couple outcomes.
- Most improvements were maintained for at least 6-months post-intervention.