

# The Effect of Behavioral Family Intervention on Knowledge of Effective Parenting Strategies

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**Abstract** There is a paucity of research considering the effect of behavioral family intervention (BFI) on parenting knowledge and the relative importance of both knowledge and parent confidence in reducing parenting dysfunction and problematic child behavior is unclear. In this study ninety-one parents (44 mothers, 47 fathers) of children aged 2–10 years completed an evidence-based BFI and were assessed at pre and post-intervention on knowledge of effective parenting strategies, parenting confidence, parent dysfunction, and reported intensity of externalised child behavior. Results showed that at pre-intervention parents higher in education ( $N = 57$ ) demonstrated greater knowledge than those lower in education ( $N = 34$ ). Relative to baseline, parents in both groups significantly improved their knowledge and confidence, reduced their dysfunction and reported less externalised child behavior. Effect sizes for the latter two variables were similar for both groups, however for parents higher in education the effect for confidence was larger than knowledge. Change in level of dysfunction explained the largest amount of unique variance in change to externalised child behavior. Results suggest that for optimal outcomes for parenting and child behavior management more knowledgeable parents may benefit from interventions that focus on practice and consolidation of already learned skills in order to increase confidence whereas for less knowledgeable parents the teaching of new skills and strategies, alongside increasing confidence, are important.

**Keywords** Parenting knowledge · Parent confidence · Parent dysfunction · Child behavior · Behavioral family intervention

## Introduction

The literature is replete with evidence that the quality of parenting a child receives is fundamental to his or her wellbeing. Children exposed to warm, responsive, consistent parenting are more likely to experience optimal child development outcomes (Guajardo et al. 2009; Stack et al. 2010) while adverse family experiences including family dysfunction, harsh, punitive discipline practices and parental psychopathology are associated with an increased risk of child and adolescent psychopathology (Chadwick et al. 2008; Koskentausta et al. 2007). In terms of the well being of children parenting is likely the most important potentially modifiable target of preventive intervention (Sanders, 2012) and there is strong empirical evidence that structured parenting programs are among the most efficacious and cost-effective interventions available to promote the mental health and well being of children (Collins et al. 2000; Mihalopoulos et al. 2011; Sanders, 2012). However, traditional clinic-based parenting programs have a poor population reach with most parents never receiving help for day to day child behavior problems (Sanders 2008). To address this a universal, public health perspective to parenting support involves targeting all families within a given population, ideally in conjunction with more targeted interventions for high-risk groups, in an effort to reduce the prevalence rates of child maltreatment, and child emotional and behavioral disorders at a societal level (Sanders 2010).

Recently, there has been substantially increased international recognition of the value of positive parenting

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programs, particularly toward young children by both professional bodies and major policy influencing groups (Sanders 2010). Examples of international policy initiatives promoting improvements to parenting knowledge, skills, and confidence as public health strategies include the Centres for Disease Control and Prevention (United States) (Mercy 2009), the Institute of Medicine's Report (United States) on Preventing Mental, Emotional and Behavioral Disorders Amongst Young People (National Research Council and Institute of Medicine 2009), the American Psychological Association (APA) Task Force on the prevention of child maltreatment (APA 2009), and the World Health Organisation (2009), all recommending the wider implementation of evidence-based parenting programs.

Improving the knowledge, skills and confidence of parents is often the focus of parenting based public health strategies and the goal of parenting programs, yet while much research attention has focused on parenting skills (Guajardo et al. 2009; Stack et al. 2010), and parenting confidence (Jones and Prinz 2005) there has been comparatively much less research into parenting knowledge. The research which does exist focuses to a large extent on knowledge of child development processes and milestones within high-risk samples. Greater parent knowledge of this type has been positively associated with child motor and cognitive functioning (Dichtelmiller et al. 1992) and quality of the home environment (Benasich and Brooks-Gunn 1996) within high-risk samples while a negative association has been found between child development knowledge and child abuse (Twentyman and Plotkin 1982) and child abuse potential in adolescent mothers (Dukewich et al. 1996; Fulton et al. 1991). Others have argued that this type of knowledge is too simplistic to adequately predict complex parent-child interactions (Azar et al. 1984) and that parents quickly forget this type of knowledge as their children move past each developmental stage (Bornstein et al. 2010).

Within a nonclinical sample knowledge of effective parenting strategies has been found to have greater predictive ability than knowledge of child development processes and milestones in terms of both parent and child variables (parenting competence, parent psychopathology, and problematic child behavior) (Winter et al., under review). Effective parenting strategies are defined as strategies shown empirically through randomized controlled trials (RCTs) to be effective at reducing parenting dysfunction and child maltreatment, improving parent confidence, and providing positive outcomes for the prevention and management of problematic child behavior (Nowak and Heinrichs 2008; Prinz et al. 2009; Sanders, 2012). Parents with greater knowledge of this type tend to be less dysfunctional (Morawska et al. 2009; Winter et al., under review), report lower levels of anxiety and have

demonstrated greater behavioral competence during interactions with their children (Winter et al., under review). However, the effect of behavioral intervention on knowledge of effective parenting strategies has not yet been tested. Although improving parent knowledge is commonly listed as a goal of parenting interventions few studies have specifically examined changes in level of parents' knowledge (of any type) post intervention.

Improvements in reported externalised child behavior and knowledge of child development have been found post intervention in mothers of non-compliant, aggressive children compared with controls (Landy and Menna 2006). While Browne and Talmi (2005) found that, post intervention, mothers of preterm infants improved on their knowledge of preterm infant behavior and demonstrated a higher parent-infant relationship quality than controls. Similar results have been found in studies assessing changes in knowledge of child development relative to baseline. Home visitation programs have been shown to result in increased child development knowledge in both adolescent and non-adolescent mothers (Culp et al. 1998; Fulton et al. 1991; Hammond-Ratzlaff and Fulton 2001). While pregnant and drug dependent women showed significant improvements in knowledge of newborn care, feeding, child development, and in utero drug substance exposure after completing a parenting skills program (Velez et al. 2004).

While the effects of intervention on knowledge of effective parenting strategies has not yet been examined there is some evidence to suggest that any effect of intervention on this type of knowledge may differ depending upon the socio-economic status (SES) of parents. Parents of lower SES tend to demonstrate less parenting knowledge than those of higher SES (Parkes and Smeriglio 1986; Winter et al., under review). Further, there are differences in the way knowledge and confidence combines to influence parenting dysfunction within each group. Confidence, often referred to as self-efficacy, describes a parent's self-belief in their ability to perform the parenting role. For lower SES parents both knowledge of effective parenting strategies and parent confidence have each been shown to explain a significant amount of the variance in parenting dysfunction whereas for parents of higher SES the variance is almost exclusively accounted for by confidence (Winter et al., under review). These results suggest first that higher SES parents, who tend to already have good parenting knowledge, may require the opportunity to 'fine tune' and consolidate already learnt skills in order to increase their confidence and reduce dysfunction, with less importance on increasing knowledge. Whereas, for parents lower in SES the acquisition of new skills and knowledge, alongside improving confidence will be important for reducing dysfunction. To test these conclusions within a clinical intervention setting would provide universal parenting

intervention developers with important information regarding the diverse requirements of parents allowing for the tailoring of both the intervention and engagement strategies specific to each group's needs. Finally, to our knowledge, no study to date has examined the unique contributions of changes to parenting knowledge, confidence, and competence to improvements in problematic child behavior, often the ultimate goal of parenting programs.

The aim of this study was to extend the literature on parenting knowledge by assessing the effect of an evidence-based behavioral family intervention on knowledge of effective parenting strategies. Specifically to first examine the relative effects of intervention on knowledge and parent confidence within a group of higher and lower educated parents and second, examine the unique contributions of changes to parenting knowledge, confidence and competence (level of dysfunction) to improvements in reported problematic child behavior overall.

### Hypotheses

Consistent with previous research it was expected that at baseline, parents higher in education would demonstrate significantly greater knowledge than parents lower in education and that both higher and lower educated parents would demonstrate significant improvements in knowledge relative to baseline. The Triple P-Positive Parenting Program (Sanders 2008) was used as the behavioral family intervention in this study as it has previously been tested through numerous RCTs and found to be effective at reducing parent dysfunction, increasing confidence, and reducing externalised problematic child behavior (de Graaf et al. 2008; Nowak and Heinrichs 2008; Sanders 2008). Therefore it was expected that all parents would increase their confidence and reduce both their level of dysfunction and the reported intensity of child behavior problems relative to baseline. Finally, given the previous findings regarding knowledge and confidence within higher and lower SES parents it was expected that for parents higher in education the effect of intervention for confidence would be larger than the effect for knowledge. No specific predictions were made regarding the unique contribution of changes in parenting variables to any improvement in reported problematic child behavior.

### Method

#### Participants and Procedure

Ninety-one parents (44 mothers, 47 fathers) of children aged 2–10 years took part in the study. Participants were recruited from clients of the Child and Family Psychology

Clinic at the University of Queensland, who were enrolled to undergo a Level 4, Group Triple P parent training program. Ethical clearance for the study was sought and received in accordance with the ethical review process of the University of Queensland and within the guidelines of the National Health and Medical Research Council. As part of standard Clinic procedures all enrolled parents were mailed a set of questionnaires prior to the commencement of the program which they completed at home and returned to the Clinic at the first group session. An information sheet regarding this study, a consent form, and the parenting knowledge measure were also included in the initial mail-out. Over a 2-year period a total of 164 parents were asked to consider participating in the study. Those willing to participate arrived at their first session of the program with signed consent forms and Time1 assessments, and received a free movie ticket in recognition of their time. Due to the restrictions of the ethical approval for the study no data was able to be collected on those parents declining to participate. Two parents who consented to participation were excluded as their children were under 2-years of age while a further four parents were excluded as they indicated they were currently receiving other professional support for their parenting or child behavior problems. Of those accepted for participation eight fathers had been referred to the program by order of the Family Court, all others attended the program on a voluntary basis. Approximately 1 week after completing the final session of the program participants were mailed Time2 questionnaires, asked to complete them at home and return them in the supplied postage paid envelope. A maximum of three attempts were made to contact participants by phone or email if Time2 assessments had not been returned within 2 weeks of posting. Sixty-one parents (64%; 28 mothers, 33 fathers) returned completed Time2 assessments.

For the purpose of statistical analyses participants were divided into two groups on the basis of their reported education level. The Lower Education group included 34 parents (16 mothers, 18 fathers) who had completed less than university level (five reported less than year 12, three reported completing year 12, and 26 reported having a trade certificate or similar). In this group parents were aged on average 35.5 years ( $SD = 5.73$ , range 29–53), while their children were on average 4.37 years ( $SD = 2.33$ , range 2–10). The majority of parents were either married or in defacto relationships (65%). Eleven mothers were employed for an average of 30.20 h per week ( $SD = 12.97$ ). Sixteen fathers were employed for an average of 37.42 h per week ( $SD = 8.27$ ).

The Higher Education group included 57 parents (28 mothers, 29 fathers) who reported having a university level of education. In this group parents were aged on average 36.7 years ( $SD = 4.74$ , range 27–48), while their children

were on average 3.55 years ( $SD = 1.76$ , range 2–10). A large proportion of parents were either married or in de-facto relationships (84.2%). Twenty-one mothers were employed for an average of 20.10 h per week ( $SD = 11.64$ ). Twenty-seven fathers were employed for an average of 39.20 h per week ( $SD = 7.97$ ).

#### *Education Level as an Indicator of SES*

To clarify that parent education level was representative of the broader SES of parents, the index of relative socioeconomic advantage and disadvantage (based on participant post codes) was obtained from the Australian Bureau of Statistics (2006). Participant scores on the index were positively correlated with education level ( $r = .31$ ,  $P = .004$ ).

#### *The Intervention*

The Triple P-Positive Parenting Program is a multi-level parenting and family support strategy which aims to prevent behavioral, emotional, and developmental problems in children by increasing the confidence and behavioral competence of parents (Sanders 2008). Group Triple P involves intensive parenting skills training on causes of children's problem behaviors, strategies for encouraging children's development, and strategies for managing and preventing misbehavior. Active skills training methods include modeling, rehearsal, feedback, and homework tasks (Sanders 1999). Triple P has a strong theoretical basis grounded in social learning theory, social information processing models, and research in child and family behavior therapy, developmental psychology, and public health research (see Sanders 2008, for a review). Through numerous RCTs Triple P has been consistently shown to be effective at providing positive outcomes for parenting competence and the prevention and management of child behavior problems (Nowak and Heinrichs 2008; Sanders 2008). Group Triple P consists of eight sessions, the first four 2-h group sessions were led by practitioners trained to criterion and allowed parents to learn through observation, discussion, practice, and feedback. Following the group sessions four 15–30 min follow-up telephone sessions (one per week for 4 weeks) were conducted by trained psychology interns providing additional support to parents as they put into practice learned strategies. All participants completed all four of the group sessions and on average approximately 68% of the four telephone sessions (fathers 47%, mothers 88%).

#### Measures

The *Knowledge of Effective Parenting Scale* (KEPS; Morawska et al. 2007) assesses knowledge of effective

parenting strategies that have been empirically shown to improve parenting competence, and provide positive outcomes for the management and prevention of problematic child behavior, through several randomized controlled trials of the Triple P-Positive Parenting Program (Nowak and Heinrichs 2008; Sanders 2008) and as such has good content validity. Suitable for parents of children aged 2–10 years the measure assesses parenting knowledge across four broad areas, promoting development (developing positive relationships, encouraging desirable behavior, and teaching new skills and behaviors), principles of effective parenting (ensuring a safe and engaging environment, creating a positive learning environment, having realistic expectations, and taking care of oneself as a parent), using assertive discipline, and causes of behavior problems. Questions are multiple-choice in format with respondents asked to indicate the correct answer to each of 28 questions from four possible responses. Each question answered correctly is scored one point, whilst incorrect and unanswered questions are scored as zero. The KEPS has demonstrated predictive validity for both parent and child variables and scores are correlated with other commonly used parenting knowledge measures providing construct validity (Winter et al., under review). Within a pilot study the KEPS has been shown to have satisfactory test–retest reliability ( $r = .70$ ) and internal consistency ( $\alpha = .73$ ). Internal consistency in this study was also satisfactory ( $\alpha = .69$ ).

The *Eyberg Child Behavior Inventory* (ECBI; Eyberg and Pincus 1999) is a 36-item questionnaire that measures parental perceptions of externalised problematic behavior in children. The questionnaire results in two specific measures of child behavior, an intensity score, rated on a 7-point Likert-type scale, which assesses parental perceptions of the frequency of occurrence of disruptive behavior problems and a problem score which indicates the number of behaviors perceived by the parent to be problematic on a yes/no scale. Parents with more than one child were asked to respond in relation to the child with the most behavioral difficulties. For the purposes of the present study only the intensity scores were utilised for which internal consistency was high ( $\alpha = .94$ ). The intensity score clinical cut-off for this measure is 131.

The *Parenting Scale* (PS; Arnold et al. 1993) is a 30-item questionnaire measuring three dysfunctional discipline styles: laxness (permissive discipline), over-reactivity (authoritarian discipline), and hostility (use of verbal or physical force). The current study used only the Total score and internal consistency was found to be good ( $\alpha = .83$ ). A high score represents greater dysfunction and the clinical cut-off is 3.1. The PS is a valid and reliable scale, with good test–retest reliability ( $r = .84$ ) and is recommended as a tool for measuring parenting skill (Locke and Prinz 2002).

The *Parenting Tasks Checklist* (PTC; Sanders and Woolley 2005) consists of 28 items designed to assess task-specific self-efficacy in parents. Parents rate how confident they are in dealing with difficult child behavior in common parenting situations. Confidence is rated on a scale from 0 (Certain I cannot do it) to 10 (Certain I can do it). Two dimensions are measured: behavioral self-efficacy (confidence in dealing with specific child behaviors) and setting self-efficacy (confidence in different settings). Ratings are averaged across the items on these two domains. The Behavioral Self-efficacy scale (14 items) and the Setting Self-efficacy scale (14 items) have both been shown to have good internal consistency ( $\alpha = .97$  and  $.91$ , respectively). In the current study ratings across both domains were averaged to give a measure of overall confidence and internal reliability across all items was found to be good ( $\alpha = .89$ ).

### Design

The study was a repeated measures  $2 \times 2$  design involving participants of two education levels (lower and higher) by two time periods (pre-intervention and post-intervention). An intent-to-treat model was used such that pre-intervention scores were carried forward and used as post-intervention scores for those participants who did not complete post-intervention measures.

### Statistical Analyses

Independent group's *t*-tests were performed on pre-intervention measures to assess for differences between groups on the major variables.  $\chi^2$  procedures were used to assess for pre-intervention differences between the groups in the proportion of parents at or above the clinical cut-off for dysfunction and reported intensity of problematic child behavior. Paired-samples *t*-tests were used to determine if post-intervention scores for each group significantly differed from pre-intervention scores for the major variables. Significance level was set at .05. For each group within-samples effect sizes (Cohen's *d*) were calculated for each variable. Cohen's *d* was calculated using the average standard deviation from the pre and post-intervention means, and dependence between the means was corrected for by using Morris and De Shon's (2002) equation eight.

The impact of the intervention was assessed firstly in terms of the statistical significance of any changes within each group. Secondly, the clinical significance of changes was considered, that is, whether the statistically significant effects had practical meaning. To this end  $\chi^2$  analyses were conducted to determine if the proportion of parents in each group at or above the clinical cut-off for dysfunction and intensity of problematic child behavior differed between

pre and post-intervention. The impact of the intervention was also assessed via a reliable change index (Jacobson and Truax 1991), however reliable change could only be calculated for those participants who completed post-intervention measures. Hierarchical linear multiple regression analyses were used to assess the unique contributions of parenting variables to the predictions of both reported externalised child behavior at pre-intervention, and changes to the latter at post intervention, with education level entered as a covariate for both.

## Results

### Group Differences Pre-Intervention

The pre-intervention means and standard deviations for the major variables are presented in Table 1. Parents higher in education demonstrated significantly greater knowledge of effective parenting strategies than those lower in education  $t(52) = -3.25$ ,  $P = .002$ . There were no significant differences between the groups on confidence  $t(87) = 0.34$ ,  $P = .738$ , parenting dysfunction  $t(87) = 0.03$ ,  $P = .976$ , or intensity of problematic child behavior  $t(84) = -0.21$ ,  $P = .819$ .  $\chi^2$  analyses indicated that the proportion of parents who were at or above the clinical levels (see Table 2) did not differ between groups at pre-intervention for either dysfunction  $\chi^2(1,88) = 0.68$ ,  $P = .409$ , or intensity of problematic child behavior  $\chi^2(1,85) = 0.50$ ,  $P = .076$ .

### The Effect of Intervention on Lower and Higher Educated Parents

For the intent-to-treat analyses, paired-samples *t*-tests were conducted to assess intervention effects for the major variables within both groups. As can be seen from Table 1 at post-intervention both parents lower and higher in education demonstrated significantly greater knowledge, more confidence, less dysfunction, and reported a lower intensity of problematic child behavior than at pre-intervention. Pre and post-intervention means, standard deviations, *t*-values, significance values, effect sizes and their 95% confidence intervals for parents lower and higher in education are also presented in Table 1. For parents higher in education the effect for confidence was larger than the effect for knowledge whereas for parents lower in education effect sizes for knowledge and confidence were similar in magnitude. As can be seen from Table 2 the proportion of parents in both groups who were at or above the clinical cut-off for both PS and ECBI scores reduced significantly from pre to post-intervention. Reliable change data is also included in Table 2.  $\chi^2$  analyses indicated that the proportion of parents

**Table 1** Intervention effects for knowledge, parenting dysfunction, parent confidence, and intensity of child behavior problems by education level

Lower									
Measure	<i>n</i>	Pre		Post		<i>t</i> ( <i>P</i> )	Effect size ( <i>d</i> )	95% confidence intervals	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			Lower bound	Upper bound
KEPS	33	21.55	3.67	23.18	3.45	−3.19 (.003)	.56	.06	1.04
PTC	31	7.79	1.69	8.39	1.61	−3.32 (.002)	.60	.08	1.10
PS	34	3.20	0.52	2.70	0.77	5.12 (.000)	.96	.45	1.45
ECBI	30	123.05	36.27	103.44	34.81	3.82 (.001)	.70	.17	1.21
Higher									
Measure	<i>n</i>	Pre		Post		<i>t</i> ( <i>P</i> )	Effect size ( <i>d</i> )	95% confidence intervals	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			Lower bound	Upper bound
KEPS	57	23.91	2.63	24.59	2.54	−2.67 (.010)	.35	.02	.72
PTC	55	7.58	3.21	8.32	3.06	−4.79 (<.001)	.65	.26	1.03
PS	55	3.19	0.56	2.75	0.66	6.71 (<.001)	.92	.52	1.30
ECBI	55	124.80	28.73	113.42	26.75	5.53 (<.001)	.75	.36	1.13

KEPS knowledge of effective parenting scale, PTC parenting tasks checklist, PS the parenting scale, ECBI eyberg child behavior inventory

**Table 2** Clinical and reliable change by education level

Measures	Lower				Higher			
	% Clinical range (n/n)		$\chi^2$ ( <i>P</i> )	% Reliable change (n/n)	% Clinical range (n/n)		$\chi^2$ ( <i>P</i> )	% Reliable change (n/n)
	Pre	Post			Pre	Post		
KEPS	–	–	–	13.04 (3/23)	–	–	–	5.41 (2/37)
PTC	–	–	–	21.05 (4/19)	–	–	–	27.27 (9/33)
PS	50.00 (17/34)	35.29 (12/34)	11.16 (.001)	59.09 (13/22)	61.82 (34/55)	32.14 (18/56)	16.53 (<.001)	65.71 (23/35)
ECBI	29.41 (10/34)	12.90 (4/31)	9.23 (.002)	28.57 (6/21)	41.07 (23/56)	23.64 (13/55)	23.69 (<.001)	30.56 (11/36)

KEPS knowledge of effective parenting scale, PTC parenting tasks checklist, PS the parenting scale, ECBI eyberg child behavior inventory

who achieved reliable change did not differ between groups for dysfunction  $\chi^2(1,57) = 0.88$ ,  $P = .645$ , intensity of externalised child behavior  $\chi^2(1,63) = 1.10$ ,  $P = .576$ , parenting knowledge  $\chi^2(1,61) = 1.22$ ,  $P = .269$ , or confidence  $\chi^2(1,51) = 0.25$ ,  $P = .618$ .

#### Predicting Change in Externalised Child Behavior

Given that parents in both groups showed improvements in knowledge, confidence, and dysfunction we were interested to know the extent to which change in each of these variables was associated with improvements in reported intensity of problematic child behavior over all participants. A hierarchical linear multiple regression analysis was conducted controlling for education level at step 1.

After step 1, with education level in the equation,  $R^2 = .06$  and  $R$  for regression was significantly different from zero,  $F(1,77) = 4.54$ ,  $P = .036$ . At step 2, the

addition of change scores for knowledge, confidence, and dysfunction as predictors resulted in a significant increment in  $R^2$ ,  $R^2$  change = .22,  $F(3,74) = 7.41$ ,  $P < .001$ . As a set the predictors accounted for approximately 27% of the variance in change scores for reported intensity of externalised child behavior (adjusted  $R^2 = .23$ ). Standardised co-efficients, confidence intervals,  $t$ -values, zero-order correlation coefficients, and squared semi-partial correlations are contained in Table 3. As can be seen from Table 3 changes in parent dysfunction explained the largest amount of unique variance in changes to reported intensity of externalised child behavior.

#### Post Hoc Analyses

Given the similar participation rates we were interested to know if intervention effects would show a consistent pattern for both mothers and fathers. Independent groups

**Table 3** Summary of hierarchical linear regression analyses

Variable	$\beta$	95% confidence intervals		<i>t</i>	<i>P</i>	<i>r</i>	<i>sr</i> <sup>2</sup>
		Lower bound	Upper bound				
Step 1							
Education level	−0.24	−0.02	−0.45	−2.13	.036	−.24	.03
Step 2							
Change in knowledge	−0.17	−0.38	0.03	−1.66	.101	−.31	.03
Change in confidence	−0.08	−0.32	0.16	−0.66	.509	−.30	<.01
Change in dysfunction	0.34	0.10	0.58	2.79	.007	.44	.08

*t* tests were conducted to assess for differences on the major variables pre-intervention with means and standard deviations presented in Table 4. Mothers demonstrated significantly higher knowledge of effective parenting strategies than fathers  $t(88) = 3.68, P < .001$ . There were no significant differences between mothers and fathers on confidence  $t(84) = 0.29, P = .775$ , parenting dysfunction  $t(87) = 0.88, P = .384$ , or reported intensity of problematic child behavior  $t(84) = 1.38, P = .171$ .  $\chi^2$  analyses indicated that the proportion of mothers and fathers who were at or above clinical levels (see Table 5) did not differ pre-intervention for either dysfunction  $\chi^2(1,88) = 0.02, P = .900$ , or intensity of problematic child behavior  $\chi^2(1,85) = 1.64, P = .201$ .

Paired-samples *t*-tests were conducted to assess intervention effects for the major variables. At post-intervention both mothers and fathers demonstrated significantly greater knowledge, more confidence, less dysfunction, and reported a lower intensity of problematic child behavior than at pre-intervention. Pre and post-intervention means, standard deviations, *t*-values, significance values, effect sizes and their 95% confidence intervals are also presented in Table 4. As can be seen in Table 4 the effect size for knowledge within mothers was greater than that for fathers. As can be seen from Table 5 the proportion of both mothers and fathers who were at or above the clinical cut-off for both PS and ECBI scores reduced significantly from pre to post-intervention.  $\chi^2$  analyses indicated that the proportion of parents who achieved reliable change did not differ between groups for dysfunction  $\chi^2(1,57) = 3.52, P = .172$ , intensity of externalised child behavior  $\chi^2(1,63) = 0.89, P = .681$ , parenting knowledge  $\chi^2(1,61) = 1.00, P = .752$ , or confidence  $\chi^2(1,51) = 2.11, P = .157$ .

## Discussion

We aimed first to examine the relative effects of intervention on knowledge and parent confidence within a group of higher and lower educated parents. It was

expected that at baseline parents higher in education would demonstrate significantly greater knowledge than parents lower in education and the results supported both the hypothesis and previous findings (Morawska et al. 2009). It is possible that parents with higher levels of education more actively seek out parenting information than those lower in education. Engagement strategies specifically targeting less knowledgeable parents may be important for increasing parenting knowledge within this group.

Both higher and lower educated parents significantly increased their knowledge of effective parenting strategies post-intervention, relative to baseline, supporting the hypothesis. This result is consistent with past research findings that behavioral intervention can improve knowledge of child development (Culp et al. 1998; Landy and Menna 2006). As expected, consistent with previously conducted RCTs of Group Triple P (de Graaf et al. 2008; Nowak and Heinrichs 2008; Sanders 2008), parents in both groups significantly increased their parenting confidence, reduced their dysfunction, and reported a reduction in intensity of externalised child behavior.

In terms of minimal sufficiency, that is, the level or intensity of the intervention necessary for positive outcomes, effect sizes for dysfunction and externalised child behavior were similar for both groups indicating that both ‘faired’ equally well from the intervention, yet as expected, for parents higher in education the effect for confidence was larger than the effect for knowledge. For parents lower in education the effects for confidence and knowledge were similar. These results are consistent with previous findings that for parents lower in SES the variance in dysfunction can be explained by unique contributions from both knowledge and confidence whereas for parents higher in SES confidence explains a significantly larger proportion than knowledge (Winter et al., under review). Clinically, the results suggest that parents both lower and higher in education can be expected to do equally well from participating in an evidence-based intervention consistent with previous findings (McTaggart and Sanders 2007). However, for parents lower in education more importance

**Table 4** Intervention effects for mothers and fathers for knowledge, parenting dysfunction, parent confidence, and intensity of externalised child behavior

Mothers									
Measure	<i>n</i>	Pre		Post		<i>t</i> ( <i>P</i> )	Effect size ( <i>d</i> )	95% Confidence intervals	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			Lower bound	Upper bound
KEPS	44	24.25	2.53	25.30	2.02	−3.82 (<.001)	.60	.17	1.02
PTC	43	7.74	3.56	8.49	3.39	−4.49 (<.001)	.69	.25	1.12
PS	44	3.25	0.61	2.75	0.73	5.92 (<.001)	.91	.46	1.34
ECBI	42	128.84	28.16	113.54	31.18	5.27 (<.001)	.82	.37	1.26
Fathers									
Measure	<i>n</i>	Pre		Post		<i>t</i> ( <i>P</i> )	Effect size ( <i>d</i> )	95% Confidence intervals	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			Lower bound	Upper bound
KEPS	46	21.89	3.45	22.91	3.27	−2.43 (.019)	.36	−.06	.77
PTC	43	7.57	1.62	8.18	1.53	−3.74 (.001)	.57	.13	1.00
PS	45	3.14	0.47	2.71	0.68	6.01 (<.001)	.97	.53	1.40
ECBI	43	119.63	33.97	106.33	28.77	3.79 (<.001)	.59	.15	1.02

KEPS knowledge of effective parenting scale, PTC parenting tasks checklist, PS the parenting scale, ECBI eyberg child behavior inventory

**Table 5** Clinical and reliable change for mothers and fathers

Measures	Mothers				Fathers			
	% Clinical range (n/n)		$\chi^2$ ( <i>P</i> )	% Reliable change (n/n)	% Clinical range (n/n)		$\chi^2$ ( <i>P</i> )	% Reliable change (n/n)
	Pre	Post			Pre	Post		
KEPS	–	–	–	6.90 (2/29)	–	–	–	9.09 (3/33)
PTC	–	–	–	34.78 (8/23)	–	–	–	17.24 (5/29)
PS	59.09 (26/44)	34.09 (15/44)	11.04 (.001)	74.07 (20/27)	57.78 (26/45)	32.61 (15/46)	16.44 (<.001)	53.33 (16/30)
ECBI	45.24 (19/42)	26.19 (11/42)	18.04 (<.001)	29.63 (8/27)	31.82 (14/44)	13.64 (6/44)	14.44 (<.001)	30.00 (9/30)

KEPS knowledge of effective parenting scale, PTC parenting tasks checklist, PS the parenting scale, ECBI eyberg child behavior inventory

should be placed on the teaching of new skills and strategies to increase knowledge together with confidence, whereas more highly educated parents, who are likely to already have good parenting knowledge, may need the opportunity to practice and receive feedback in order to consolidate already learnt skills, increase their confidence and ultimately reduce dysfunction and problematic child behavior. These findings highlight the diversity among parents that should be taken into account when designing engagement strategies. Successful engagement strategies must recognise that different parents will have differing needs and target these accordingly. More knowledgeable parents seeking assistance for child behavior problems, for example, may not immediately see the benefit of a program which appears only to teach behavior management strategies which they are already familiar with. A successful engagement strategy should highlight the opportunity for practice and consolidation of skills, while receiving

constructive feedback as well as offering instruction, practice and feedback around new skills for less knowledgeable parents.

Our second aim was to examine the unique contribution of changes to parenting knowledge, confidence and level of dysfunction to improvements in reported problematic child behavior overall. The reduction in externalised child behavior reported by parents at post-intervention was accounted for to the greatest extent by reductions in dysfunction. This result is perhaps not surprising given that improvements to knowledge and confidence likely lead to the reduction in dysfunction which in turn leads to the improvements in externalised problematic child behavior. In other words it is possible that, in terms of change scores, level of parent dysfunction mediates the relationship between both knowledge and confidence and externalised child behavior. Future research could explicitly test this hypothesis.



Interestingly, mothers both knew more about effective parenting strategies at pre-intervention and then improved on that knowledge to a greater extent than fathers. To explain the first finding it is possible that mothers as the usual primary caregivers may take more of an active role in seeking out parenting information. Overall, mothers completed more of the telephone consult section of the program than did fathers which may explain why mothers' knowledge improved to a greater extent. Both mothers and fathers showed similar significant improvements in dysfunction, however the change was reliable for a greater proportion of mothers. Fathers also reported lower (but still significant) improvements in externalized child behavior. The difference in knowledge levels may explain why many parents report marital conflict over parenting. It would be difficult for even the most knowledgeable mothers to parent effectively if their parenting strategies are not supported by less knowledgeable fathers. Clinically it may be important to address this through specific strategies aimed at minimizing the attrition of fathers from interventions. In terms of minimal sufficiency it appears that the program was successful in providing positive outcomes to both mothers and fathers despite their differences in knowledge and knowledge acquisition.

A main strength of the study is its use of both a higher and lower risk group, and parents of a wide age-range of children allowing for increased generalisability of the results. That said, an examination of knowledge of effective parenting strategies and how it might combine with parent confidence to influence both parenting and child behavior outcomes has not yet been conducted within other high-risk groups, such as adolescent mothers, parents with mental illness, or abusive parents and is a recommendation for future research. The study has provided evidence of change sensitivity for the KEPS and as the sample included a mix of both clinically elevated parents and those within the nonclinical range, (in terms of both dysfunction and reported problematic child behavior) the KEPS has also demonstrated suitability for use within universal, public health approach parenting interventions targeting both clinical and nonclinical populations.

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