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ORIGINAL PAPER

Randomised Controlled Trial of a Brief, Low Intensity Parenting Intervention to Promote Healthy Living: The Lifestyle Triple P Seminar Series

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Abstract

Parents play a key role in establishing a healthy home environment. This randomised controlled trial examined the efficacy of a low-intensity parenting intervention (three 2-hour Lifestyle Triple P-Positive Parenting Program Seminars) for parents who are concerned about or interested in learning more about healthy lifestyle behaviours for children. Parents of 160 children aged 3–10 years were randomly assigned to the intervention or control condition. Primary outcomes of parenting practices, child lifestyle-specific and general behaviour and parent self-efficacy were assessed via parent self-report. Secondary outcomes included child BMI z-score, a food diary measuring energy intake, physical activity levels measured by accelerometers and parent reported time spent on screen-based activities. Assessment occurred at pre-intervention, post-intervention, and 6- and 12-months after completion. At 12-months post-intervention, intent-to-treat analyses found a significant intervention effect on overall ineffective parenting, lifestyle-specific and general parenting confidence. Child lifestyle problem behaviours reduced, with no effects on general child behaviour. On the secondary exploratory outcomes, time spent watching television reduced with no other significant effects detected. Parents viewed the intervention as high-quality and acceptable. A brief parenting program aiming to promote healthy lifestyles for all families offers promise for improving parenting skills and child lifestyle behaviour.

Keywords Lifestyle Triple P · Lifestyle · Triple P · Parenting · Intervention · Seminars

Highlights

- First efficacy trial of 3 × 2-hour Lifestyle Triple P Seminar Series for parents.
- Intervention effects on parent-report child lifestyle-specific but not general behaviours.
- Intervention effects on parent-report parent self-efficacy and parenting style.
- Limited effects on secondary exploratory outcome measures.
- Brief large-group seminar series deemed high-quality and acceptable to parents.

Lifestyle behaviors in childhood lead to lifestyle patterns in the future (Mamun et al., 2005). The benefits of an active child with a healthy nutritional intake include enhanced health status, better academic performance, and improved social and emotional outcomes (Bauman, 2004; Rampersaud, et al., 2005). Parenting has been demonstrated to play a central role in the development of health and lifestyle behaviors in children (Davids et al., 2017). Strong associations have been found between the dietary intake and physical activity levels of children and those of their parents (van der Horst et al., 2007; Moore et al., 1991). Parenting style has been linked to children's lifestyle patterns (Gerards et al., 2011), and health behaviors have been shown to increase when parents make healthy food choices more accessible (Rasmussen et al., 2006) and support opportunities for physical activity (Sallis et al., 1992; Gustafson & Rhodes, 2006). Parents also perceive that the promotion of health

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behaviors is an important aspect of their parenting role (Kone et al., 2022).

Intervention at a young age before lifestyle habits have become established is likely to be a more effective and sustainable approach than interventions during late childspedhood or adolescence (Birch & Ventura, 2009). While historically, interventions to promote health in children have included children as the intervention targets, there has been a shift to targeting parents exclusively by addressing parenting skills (West et al., 2010). Parenting interventions place responsibility on the parents as agents of change, may be more cost-efficient and highlight the importance of providing healthy home environments conducive to sustainable health behaviors.

Parenting interventions in the healthy lifestyle literature have primarily been high-intensity, targeted treatment programs for children who are overweight or obese. A review of interventions to address general parenting to prevent or treat childhood obesity found seven studies showing small-to-moderate intervention effects on weight-related outcomes (Gerards et al., 2011). A systematic review including 20 randomized controlled trials (RCTs) of diet, physical activity and behavioral interventions delivered to parents for treating overweight or obesity in children aged 5–11 years showed that parent-only interventions had similar intervention effects on weight outcomes to parent-child interventions (Loveman et al., 2015). In a review of treatment programs for childhood obesity, parent-only behavioral treatment was classified as a well-established treatment for children (Altman & Wifley, 2015). The interventions included in these reviews have either combined existing parenting interventions with lifestyle-specific components or have developed a stand-alone intervention which combines general parenting with lifestyle-specific strategies. The Triple P-Positive Parenting Program is a system of evidence-based parenting programs with a strong evidence base and wide international reach (Sanders et al., 2014), which has been included in a number of parent-only interventions for childhood obesity. Initially, the Group Triple P program was included as one component in a comprehensive intervention (Golley et al., 2007) and following this, a specific variant of Triple P, Lifestyle Triple P, was developed to promote healthy eating and physical activity in families (West et al., 2010).

The first version of Lifestyle Triple P that was evaluated was Group Lifestyle Triple P, consisting of a 12-week intervention with nine 90-minute group sessions and three 20-minute telephone sessions for parents of children who are overweight or obese. Group Lifestyle Triple P aims to reduce the risk of chronic weight problems by increasing parents' skills and confidence in managing lifestyle-related concerns. Lifestyle Triple P focuses on three components (nutrition, physical activity, and positive parenting) based on hypothesized links to the development and maintenance of childhood obesity (Birch & Davison, 2001). In the first trial evaluating Group Lifestyle Triple P, West and colleagues (2010) randomly allocated 101 parents of overweight or obese children aged 4–11 years in Brisbane, Australia to the intervention or waitlist control group. Results showed a significant intervention effect on child BMI *z*-scores following the intervention, with additional improvements found at 12-months follow-up. A significant decrease was also observed for child weight-related problem behavior and dysfunctional parenting styles, and parental confidence increased at post-intervention and 12-months follow-up. A second evaluation trial of Group Lifestyle Triple P in the Netherlands randomly allocated 86 parents of overweight and obese children aged 4–8 years to the intervention or control condition (Gerards et al., 2015). Positive short-term intervention effects were found for children's soft-drink consumption, parental responsibility regarding physical activity, encouragement to eat, psychological control, and parental confidence and satisfaction with parenting. At 12-months post-intervention, effects were found on sedentary behavior, time spent playing outside, parental monitoring of food intake, and responsibility regarding nutrition. Contrary to the West et al. (2010) trial, no significant intervention effects were found on BMI *z*-score, which may have been due to the sample having lower baseline scores and thereby lacking power to detect a significant change. While this intervention has shown positive effects in treating childhood obesity and weight-related and parenting outcomes, it is a high-intensity program delivered across 12 weeks, consistent with other similar interventions which range from 9 weeks to 6 months in duration (Gerards et al., 2011). Additionally, these programs focus on treating children who are classified as overweight or obese, and therefore the impact of health promotion programs on the wider population remains unknown. The effects of lower intensity parenting interventions on lifestyle behaviors in the wider population of children has been less explored.

Lower intensity parenting programs focussing on general parenting skills have shown promise in improving parent and child outcomes. A number of RCTs support the efficacy of low-intensity Triple P programs. A brief, 2 h discussion group on dealing with disobedience has shown intervention effects in reducing child disruptive behavior and improving parenting practices in two RCTs (Mejia et al., 2015; Dittman et al., 2016). Discussion groups targeting other specific concerns such as shopping behavior (Joachim et al., 2010) and communicating about sexuality (Teo & Morawska, 2021) have shown positive intervention effects in RCTs. While these discussion groups are designed to be delivered in groups of around 12 parents, another delivery option with wider population reach are seminars. Triple P Seminars typically last 90–120 min, can be delivered to

hundreds of parents at a time and are typically offered to all parents universally with no specific selection criteria for attendance. In a quasi-experimental study in Australia, 240 parents of children aged 4–7 years attended Triple P Seminars with attendance at a single seminar resulting in significant reductions in child behavior problems and dysfunctional parenting styles (Sanders et al., 2009). RCTs in Greece and Indonesia found significant intervention effects on child behavior problems and dysfunctional parenting for the Triple P Seminar Series delivered in populations of parents of children aged 2–12 years (Foskolos, 2014; Sumargi et al., 2015). There have been mixed findings on the effects of Triple P seminars on parent self-efficacy with the Australian and Greek studies finding no intervention effect (Sanders et al., 2009; Foskolos, 2014). In contrast, the seminar RCT study in Indonesia found significant intervention effects on parenting confidence (Sumargi et al., 2015), similar to that found with discussion groups (Dittman et al., 2016) and consistent with the moderate effect size for parenting satisfaction and efficacy found in a meta-analysis on the low-intensity Triple P programs (Sanders et al., 2014). Low-intensity seminar interventions offer a potential opportunity to provide information and strategies to large numbers of parents on either general parenting strategies or specific parenting issues. Parenting seminars on healthy lifestyle choices could be a particularly useful avenue to promote healthy behaviors in children and families, with potential for preventing the development of overweight/obesity and other poor health outcomes.

To this end, a series of three Lifestyle Triple P seminars were developed and designed for delivery to any parent concerned about or interested in learning more about promoting healthy lifestyle behaviors in their children. The three seminars provide tips and information on the three main components linked to the promotion of health behaviors in children: general parenting strategies in the context of a healthy home environment; nutrition and healthy eating; and promoting physical activity, respectively. This paper details the first efficacy trial of the Lifestyle Triple P Seminar Series. The aim of this study was to evaluate the effects of the intervention on a range of child and parent outcomes, relative to a waitlist control condition. The primary outcomes of the evaluation were parenting practices, child behavioral and emotional adjustment, lifestyle-specific child problem behavior (i.e., problems with child behaviors relating to unhealthy practices such as too much screentime, demanding food, eating unhealthy snacks), and parenting self-efficacy and lifestyle confidence. Based on previous research showing intervention effects for parenting practices and child behavior problems following parent attendance at Triple P seminars (Foskolos, 2014; Sanders et al., 2009; Sumargi et al., 2015), it was expected that attendance at the lifestyle seminars would result in significantly greater improvements for the intervention compared to the control group. Based on previous research suggesting that low-intensity Triple P interventions can have significant effects on parenting confidence (Sumargi et al., 2015; Sanders et al., 2014), it was predicted that parent self-efficacy and lifestyle confidence would improve significantly more in the intervention compared to the control group. A range of child-based secondary outcomes were included as exploratory variables to assess possible impacts of the seminars on child lifestyle outcomes. The secondary outcomes were child BMI *z*-score, energy intake, physical activity, and screen-based behaviors. However, there were no specific predictions that the seminar series would lead to improvements in these secondary child outcomes given the intervention was low-intensity and broad selection criteria for this study. Lastly, this study reported on data from a satisfaction survey to explore the acceptability of the intervention with parents.

Method

Participants

Participants were recruited between January 2012 and May 2015 through community outreach in social media, online forums, and schools and childcare centres around Brisbane, Australia. All participants completed a telephone interview to assess eligibility and discuss study requirements. Parents were eligible if they had a child aged 3 to 10 years. Exclusion criteria included: (1) the child had a severe developmental delay, chronic illness or disability; (2) the child was currently consulting another professional for weight management or behavioral and/or emotional problems; (3) the child was taking medication that affected growth or weight control (including inhaled or oral steroids, anti-epileptics or other), or (4) the parent could foresee major disruptions in the next 12 months that may make it difficult to complete the study.

Of 224 parents who completed the telephone screening, 180 (91%) met the inclusion criteria. Forty-four parents (20%) declined participation, with the major reason being that parents wanted a program without a health-focus. Of those eligible, 160 (83%) were randomized to either the intervention or control condition ($n = 80$ in each). The flow of participants through the study is shown in Fig. 1.

Participants were 160 parents, with an average age of 39 years ($SD = 5.01$). They were predominantly mothers (92%), with 59% overweight or obese and 40% healthy weight. Eight percent of parents were fathers. The average age of children (91 females, 89 males) was 6 years ($SD = 1.91$), with 63% within the healthy weight range and 35% overweight or obese (Cole et al., 2000). Seventy-five

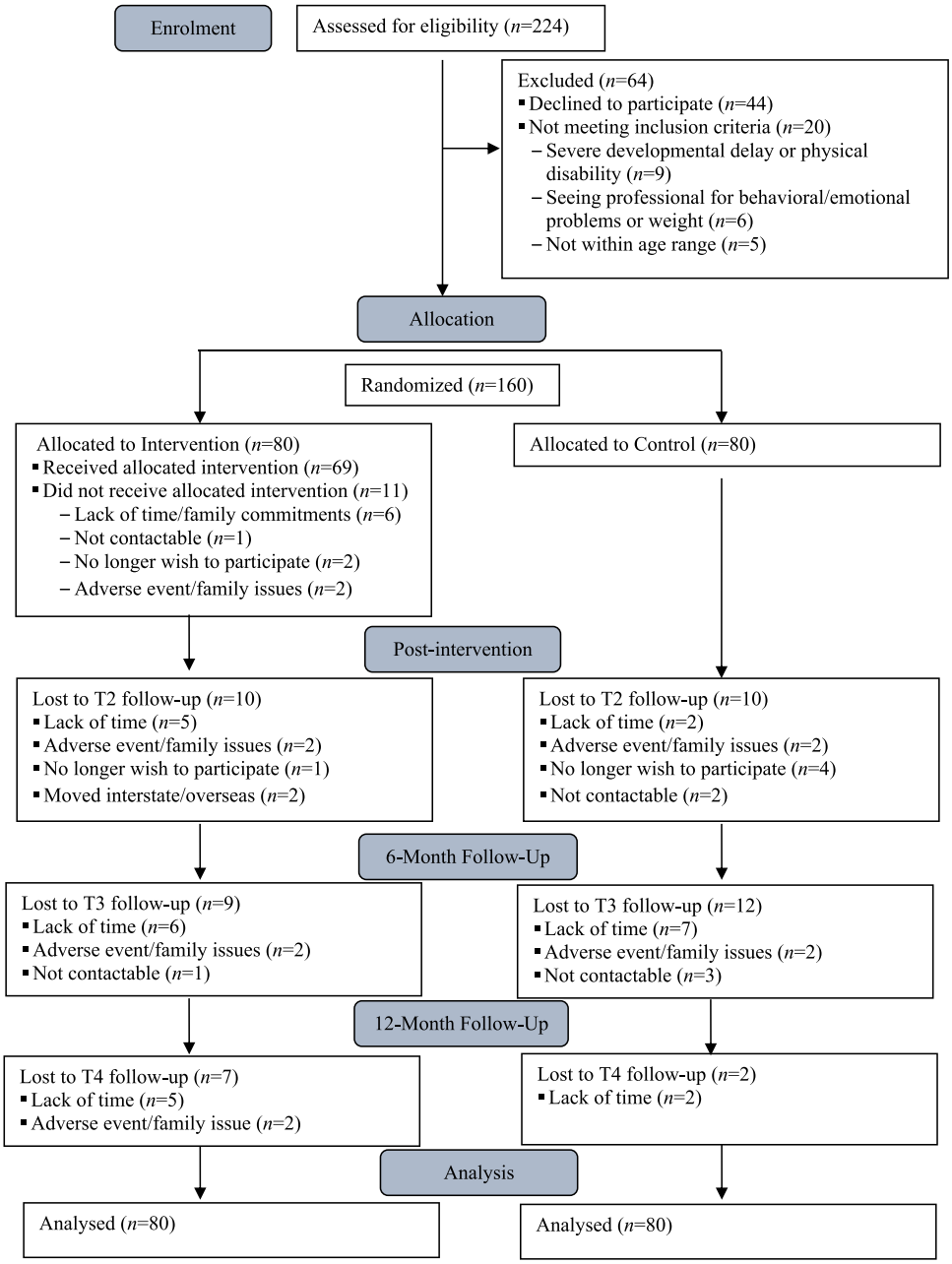

Fig. 1 CONSORT diagram of flow of participants

percent of the parents were married, with an average of 2.17 ($SD = 0.86$) children in each family. Most of the parents (76%) were born in Australia or New Zealand. The majority of primary parents had completed a university degree with undergraduate (34%) or postgraduate qualifications (35%). Seventy-three percent of the parents were employed, working an average of 27.90 h a week ($SD = 13.32$). Most parents were able to meet household expenses (82%). The majority of parents (89%) had not participated in any lifestyle intervention or parenting program previously. Sample demographic characteristics are shown in Table 1. Chi-squared tests of independence for the categorical variables and independent samples *t*-tests for the continuous variables were conducted in order to compare the intervention and control conditions across demographic and outcome variables. No significant differences between conditions were found (see Table 1).

Procedure

Ethical approval was granted by The University of Queensland Behavioral and Social Sciences Ethical Review Committee (#2012000219) and the trial was pre-registered on the Australian New Zealand Clinical Trials Registry (ACTRN12612000865819). Interested parents were screened for eligibility and informed about study requirements via

Table 1 Demographic characteristics of the intervention and control group

Variable	Intervention ($n = 80$)		Control ($n = 80$)			
Continuous	*M*	*SD*	*M*	*SD*	*t*	*p*
Child age (years)	5.96	1.86	6.00	1.97	0.15	0.882
Parent age (years)	39.50	4.96	38.40	5.04	−1.39	0.166
Number of children	2.18	0.86	2.16	0.87	−0.11	0.914
DASS Depression	2.70	3.46	2.70	3.20	−0.25	0.801
DASS Anxiety	1.63	2.49	1.50	1.77	−0.38	0.703
DASS Stress	5.12	3.60	5.74	4.22	0.98	0.327
Categorical	*n*	%	*n*	%	χ^2	*p*
Child sex						
Male	38	48	31	39	3.05	0.081
Female	42	52	49	61		
Parent sex						
Male	7	9	5	6	0.36	0.548
Female	73	91	75	94		
Child weight status						
Underweight	2	3	1	1	1.78	0.619
Healthy weight	53	66	48	60		
Overweight	12	15	18	23		
Obese	13	16	13	16		
Parent weight status						
Underweight	1	1	1	1	1.08	0.782
Healthy weight	32	40	32	40		
Overweight	29	36	24	30		
Obese	18	23	23	29		
Household[a]						
Original biological parents	65	83	63	80	0.39	0.825
An original and step-parent	2	3	2	2		
Sole parent	11	14	14	18		
Martial status[a]						
Married	56	72	60	76	0.35	0.553
Single/Divorced/Separated	22	28	19	24		
Parent country of birth[b]						
Australia/New Zealand	52	68	65	82	8.56	0.200
South East Asia	3	4	3	4		
United Kingdom	7	9	7	9		
Middle East	2	3	0	0		
Asia	2	3	0	0		
South Africa	5	6	3	4		
Western Europe	5	6	1	1		
Child Ethnicity[a]						
Not Aboriginal/Torres Strait	76	97	78	99	0.35	0.552
Aboriginal/Torres Strait	2	3	1	1		
Parent's education[a]						
Senior high school	12	15	9	12	0.60	0.896
University degree	26	33	27	34		
Postgraduate degree	27	35	28	35		
Tafe/College/Diploma	13	17	15	19		
Parent employed[a]						
No	26	33	17	22	2.76	0.097
Yes	52	67	62	78		
Annual income (AUD)[a]						
< $20,799	2	3	2	3	7.94	0.338
$20,800–$31,199	0	0	6	8		
$31,200–$41,599	3	4	1	1		
$41,600–$51,999	2	3	2	3		
$52,000–$67,599	9	11	7	9		
$67,600–$83,199	8	10	6	8		
$83,200–$103,999	11	14	14	18		
> $104,000	43	55	41	50		
Able to meet household expenses[a]						
Yes	12	15	16	20	1.69	0.430
No	66	85	62	79		
Don't know	0	0	1	1		
After expenses can afford[a]						
Nothing	15	19	12	15	1.91	0.385
Some things	30	38	39	50		
Most things	33	42	28	35		

[a]Data missing for 2 intervention cases and 1 control case

[b]Data missing for 4 intervention cases and 1 control case

DASS Depression, Anxiety and Stress Scale, *AUD* Australian dollars, *M* Mean, *SD* Standard deviation

telephone. Baseline assessments were then completed and included: (1) parent-report questionnaires (available online or printed format); (2) a 3-day food diary of child food intake; (3) the child wearing an accelerometer for 7 days; and (4) attendance at two assessment visits to assess anthropometric measurements and distribute assessment materials. The first assessment visit was approximately 30 min; the second visit was around 20 min. The first visit involved viewing a 15 min training video detailing instructions for accurately positioning the accelerometer and completing the food diary. Child and parent anthropometric measurements were also taken. The second visit occurred approximately 8 days later and involved returning materials.

Once 10 eligible families had completed baseline assessment, parents were randomly allocated to intervention or control conditions. Intervention participants were offered access to the next available parenting group, and repeated the assessment process at 2-, 6- and 12-months. Parents assigned to the control condition repeated assessments at 2-, 6- and 12-months post-enrolment. The control condition parents were on a waitlist and offered the program following completion of all assessment and received no materials or intervention prior. All participants provided informed consent to participate in the study.

Design

The study was a randomized controlled trial with a 2 (condition: intervention versus control) by 4 (time: pre-intervention [Time 1], post-intervention [Time 2], 6-months [Time 3], and 12-months [Time 4] follow-up) design. This study was conducted at The University of Queensland,

Brisbane, Australia from 2012 to 2016. Interventions were conducted at two university sites (Ipswich and St Lucia, Brisbane).

Randomisation

Randomisation was via computer-generated random number sequence by a contact independent of allocation consignment with no clinical involvement in the trial, using a random block design (block size of 10). The project coordinator was informed of allocation, and participants were sent a notification letter.

Intervention

The Lifestyle Triple P Seminar Series (Bartlett & Sanders, 2021) is a 3-session parenting intervention designed to help parents raise healthy children by providing information and practical strategies for positive parenting, healthy eating, and physical activity. The intervention consisted of three 2-hour group (in person) sessions conducted weekly. Partners (if applicable) were invited to attend. Children did not attend sessions; however free childcare was available to increase parental attendance. The control group participated in the intervention following participation in the trial.

The first seminar focused on positive parenting strategies for a healthy home environment. This seminar introduced parents to the five core principles of positive parenting in the context of promoting a healthy lifestyle: having a safe, interesting and healthy environment for children; having a positive learning environment; using assertive discipline; having realistic expectations; and taking care of yourself as a parent. The second seminar introduced parents to nutrition strategies, such as establishing healthy eating routines, dealing with fussy eating, trying new foods, and reading food labels to select healthy foods. The third seminar outlined ways for parents to promote physical activity through reducing sedentary activity and screen-based behavior, increasing incidental activities, promoting participation in organized physical activities, and establishing healthy sleep habits. Families received Tip Sheets for each session to reinforce session content. If necessary, families were offered make-up sessions for missed seminars. Group sizes ranged from three to fifteen families ($M = 6.00$, $SD = 3.56$).

Protocol Adherence

Triple P has an internationally coordinated system of training and accreditation designed to support treatment fidelity. All sessions were delivered by a practitioner trained and accredited in Lifestyle Triple P, who was a provisionally registered psychologist completing postgraduate training in Clinical Psychology. Structured session checklists were completed following each session, and an independent observer assessed video-recordings of 60% of sessions to assess content covered.

Measures

Demographic characteristics

The *Family Background Questionnaire* (FBQ; West & Sanders, 2010) was used to collect participant demographic information.

Primary outcome measures

Parenting The *Parenting Scale* (PS; Arnold et al., 1993) measured overall parenting practices (PS Total) using 30 items, with higher scores indicating more dysfunctional parenting. The internal consistency was high for the PS Total, ($\alpha = 0.84$).

Parent self-efficacy The *Child Adjustment and Parent Efficacy Scale* (CAPES; Morawska et al., 2014) is a 30-item measure, which assesses child behavioral and emotional adjustment and parent efficacy. The CAPES Efficacy subscale was used to assess parental self-efficacy in dealing with child general child behavior, with higher scores indicating higher levels of efficacy. Internal consistency was excellent ($\alpha = 0.95$).

The *Lifestyle Behavior Checklist* (LBC; West & Sanders, 2009) is a 25-item measure assessing child lifestyle-specific problem behavior and confidence. The Confidence subscale of the LBC was used to assess parental confidence in dealing with lifestyle-specific child behavior problems. Higher scores represent greater levels of confidence. Internal consistency was excellent ($\alpha = 0.96$).

Child behavior The CAPES (Morawska et al., 2014) is a 30-item measure used to assess general child behavior problems. Parents rate the extent to which each behavior applies to their child, with higher scores indicate higher levels of problem behavior. The Intensity, Behavioral and Emotional Adjustment scales demonstrated acceptable to high internal consistency ($\alpha = 0.90$, 0.91, 0.71, respectively).

The LBC (West & Sanders, 2009) child lifestyle-specific problem behavior scale has 25 items (e.g., eating unhealthy snacks, too much screen time, or demanding food). Parents rate the extent to which they are experiencing each behavior, with higher scores indicating greater problems. The LBC Problem scale demonstrated high internal consistency ($\alpha = 0.88$).

Secondary outcome measures

BMI z-scores All assessors were trained to conduct measurements according to standard procedures detailed by

Davies and colleagues (2001). Electronic scales (Seca, Model 803, Hamburg, Germany) were used to measure weight to the nearest 0.1 kg. A portable stadiometer assessed height to the nearest 0.1 cm (Seca, Model 213, Hamburg, Germany). Child BMI *z*-scores were then calculated. The international standard definitions were used to classify BMI into underweight, healthy weight, overweight and obese (Cole et al., 2000; World Health Organisation, 2000). Child age- and sex-specific BMI *z*-scores were derived from the L (lambda), M (mu), S (sigma) parameters published by the Centre for Disease Control (CDC; Kuczmarski et al., 2000).

Energy intake Parents recorded all food and drink their child consumed over a 3-day period (including two weekdays and one weekend day). Total energy intake (kilojoules) was analysed using Foodworks 8 Professional nutrition software (Xyris Software, Australia).

Physical activity The target child wore an accelerometer for 7 days to assess physical activity levels (GT3X and GT3X plus models, Actigraph, Pensacola, Florida). Accelerometry is considered the gold standard objective measure of child activity levels (Trost et al., 2005). Devices were worn over the right hip via a waist belt, as placement here is more valid and less obtrusive (Sirard et al., 2005). Parents were instructed to ensure their child wore the accelerometer at all times (excluding during water-based activities). Analysis was performed using ActiLife6 software (Pensacola, Florida), with a 15-second sampling interval to detect the spontaneous activity of children. At least 4 days of valid data was needed, and to meet criteria for a valid day the accelerometer must have been worn for a minimum of 8 h per day. Cut-points were used to distinguish different intensities of physical activity (Evenson et al., 2008). Average total minutes of moderate-to-vigorous intensity physical activity (MVPA) daily was assessed. To promote wear compliance, information sheets were given to caregivers and teachers. Parents also kept an activity log during the wear period to provide information regarding when the device was taken off.

Screen-based behavior Total weekly time (in minutes) viewing television, playing electronic games, and computer use was assessed via parent report.

Baseline measures

Parent BMI As described above, height and weight measurements were taken for parents at baseline to calculate BMI.

Parent adjustment The *Depression Anxiety and Stress Scale-21* (DASS-21; Lovibond & Lovibond, 1995) has 21 items and assessed baseline symptoms of parental psychological distress, including depression, anxiety and stress (higher scores indicating more symptoms). The Depression, Anxiety and Stress subscales demonstrated acceptable to excellent internal consistencies ($\alpha = 0.90$, $\alpha = 0.73$, and $\alpha = 0.87$, respectively). DASS-21 scores were only collected at baseline to assess parent adjustment in the sample.

Client satisfaction

The *Consumer Satisfaction Questionnaire* (CSQ; West & Sanders, 2010) asked parents to rate the quality of the service provided, how well the intervention met parental needs, child progress, and general comments about the intervention.

Sample Size

G*Power software was used to calculate statistical power analyses. Using the LBC as a primary outcome to guide power analyses, to detect a medium effect size ($d = 0.50$), a minimum of 153 parents were needed to give at least 80% power.

Statistical Analyses

Data was analysed using SPSS 23.0 (SPSS Inc, Chicago, IL). The efficacy of the intervention was tested using a series of mixed-model repeated measures (MMRM) regression models for each outcome on the intent-to-treat sample (Hedeker & Gibbons, 2006). A restricted maximum likelihood solution was used to fit the models in order to include all randomized participants in data analysis.

Time (categorical: Time 1 [coded as 0], Time 2 [coded as 1], Time 3 [coded as 2], Time 4 [coded as 3], condition (categorical: intervention and control), and the time-by-condition interaction were entered as fixed effects. Random intercepts were included in each model to account for variation between participant's baseline scores. Random slopes for time were included for each model to account for variation between participants in rates of change over time. For models with both random slopes and random intercepts an unstructured covariance matrix was used. Residual within-person errors were estimated using an identity covariance matrix. Model fit was evaluated using *F* tests. For MMRMs with significant time-by-condition interaction effects, individual models for each condition were also run to identify the source of the significant effect. Follow-up *t*-tests were then conducted to determine whether the slope of each condition was significantly different from zero.

Effect sizes were calculated as mean change from pre-intervention to Time 4 in the intervention condition minus mean change from pre-intervention to Time 4 in the control

condition, divided by pooled pre-intervention standard deviation and applying a bias-correction for small sample sizes (Morris, 2008). Effect sizes were interpreted as: small (≥0.2), medium (≥0.5) and large (≥0.8; Cohen, 1992).

For the primary outcomes, reliable and clinically significant change were calculated for variables where a significant intervention effect was found. Reliable change was calculated using the standard deviation of pre-intervention scores and published test-retest reliabilities (Jacobson & Truax, 1991), to examine the extent to which change from Time 1 to Time 4 was reliable or unlikely due to chance. Clinically significant change was explored using chi-square analyses of the proportion of participants moving from the clinically elevated to non-clinical range at Time 4, based on available published cut-offs (Kendall et al., 1999).

Results

Study Attrition

Overall, 18.96% of total score values were missing from Time 1 to Time 4. A missing values analysis indicated that data was missing completely at random (MCAR), with Little's test not reaching significance, χ^2 (1649) = 267.29, $p = 1.000$. The proportion of participants who were lost to follow-up over the course of the study did not differ significantly between intervention (26/80) and control conditions (24/80), χ^2 (1, $n = 160$) = 0.03, $p = 0.854$. Intention-to-treat analyses were used to ensure all participants were included in the analyses, and the MMRM approach ensured appropriate handling of missing data in the modelling.

Protocol Adherence

Of the 69 treatment completers: 60 completed all sessions, 6 completed 2 sessions, and 3 completed 1 session. Four make-up sessions were conducted face-to-face. The majority of missed sessions were due to work commitments or parent/child illness. Protocol adherence checklists completed by the practitioner indicated that 98% of content was covered. The inter-rater reliability, measure as the agreement between the practitioner and independent rater, was 100%.

Primary Outcome Intervention Effects

MMRM linear regression was used to compare the rate of change for individuals in the intervention and control condition across the range of outcome variables from Time 1 to Time 4. Intervention effects for the primary outcomes along with means, standards deviations and effect sizes are reported in Table 2.

Parenting practices

MMRM analysis revealed a significant time-by-condition interaction on general parenting practice suggesting that the rate of change was moderated by condition. Follow-up contrasts revealed that the rate of decrease in general parenting from Time 1 to Time 4 was significantly greater for parents in the intervention condition ($\beta_{INT} = -0.17$, $p < 0.001$), compared to the control condition ($\beta_{CON} = -0.04$, $p = 0.017$), $t(156) = 4.28$, $p < 0.001$.

Parent self-efficacy

Parent self-efficacy showed a significant time-by-condition interaction suggesting that the rate of change was moderated by condition. Follow-up contrasts revealed that the rate of increase in efficacy scores from Time 1 to Time 4 was significantly greater for parents in the intervention condition ($\beta_{CON} = 9.72$, $p < 0.001$), compared to the control condition ($\beta_{INT} = 4.48$, $p = 0.001$), $t(156) = -2.63$, $p = 0.009$.

Lifestyle-specific parenting confidence showed a significant time-by-condition interaction. Follow-up contrasts showed that the rate of increase from Time 1 to Time 4 in lifestyle-specific confidence scores was significantly greater in the intervention condition ($\beta_{INT} = 9.22$, $p < 0.001$), compared to the control condition ($\beta_{CON} = 4.11$, $p = 0.009$), $t(156) = -2.11$, $p = 0.037$.

Child behavior

MMRM analysis of child lifestyle behavior problems showed a significant time-by-condition interaction suggesting that the rate of change was moderated by condition. Follow-up contrasts showed that the rate of decrease in lifestyle problem scores from Time 1 to Time 4 was significantly greater for parents in the intervention condition ($\beta_{INT} = -3.13$, $p < 0.001$), compared to the control, who showed no significant change from Time 1 to Time 4 ($\beta_{INT} = -1.13$, $p = 0.053$), $t(156) = 2.29$, $p = 0.023$. The time-by-condition interactions for general child behavior, intensity and emotional adjustment were not significant.

Secondary Outcomes Intervention Effects

BMI z-score

Time was a significant predictor of change in child BMI z-scores ($\beta = -0.05$, $F(1, 118) = -2.86$, $p = 0.005$). However, no significant time-by-condition interaction was found for BMI z-scores suggesting that change was not moderated by condition with both groups experiencing reductions in BMI z-scores.

Table 2 Intervention effects for primary and secondary outcomes by condition

	Intervention ($n = 80$)				Control ($n = 80$)				Estimate of fixed effects: time x condition interaction term[c]				Effect size
	T1	T2	T3	T4	T1	T2	T3	T4					T1-T4
Measure	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M(SD)*	*M (SD)*	*M (SD)*	*M (SD)*	β	*F*	*df*	*p*	*d* [95% CI]
Primary Outcomes													
Parenting													
PS Total	3.21 (0.63)	2.89 (0.68)	2.68 (0.68)	2.66 (0.66)	3.24 (0.59)	3.19 (0.58)	3.10 (0.61)	3.09 (0.62)	−0.13	18.45	245.36	0.000	0.65 [0.34–0.97]
Child behavior													
CAPES Intensity	25.92 (10.81)	22.74 (9.87)	22.20 (11.14)	20.86 (10.12)	29.43 (12.16)	29.13 (11.05)	27.20 (10.70)	25.63 (11.62)	−0.34	0.36	228.28	0.549	ns
CAPES Behavior	23.96 (10.35)	20.91 (9.53)	20.46 (10.84)	19.06 (9.99)	27.00 (11.41)	26.66 (10.37)	24.89 (9.96)	23.24 (10.80)	−0.42	0.63	233.04	0.429	ns
CAPES Emotional	1.96 (1.62)	1.83 (1.59)	1.75 (1.57)	1.85 (1.72)	2.43 (2.01)	2.47 (2.16)	2.31 (1.90)	2.36 (1.99)	0.06	0.35	220.42	0.556	ns
Child lifestyle behavior	62.60 (19.88)	56.76 (18.23)	52.29 (17.18)	54.87 (17.22)	64.60 (20.88)	64.51 (20.56)	64.28 (22.98)	61.73 (22.12)	−2.04	5.47	384.50	0.020	0.24 [−0.07–0.55]
Parent Self-efficacy													
CAPES Self-efficacy	131.13 (35.84)	156.41 (32.40)	166.54 (25.87)	162.04 (29.80)	125.04 (33.71)	130.21 (32.61)	131.97 (36.69)	141.02 (33.01)	4.73	5.67	216.59	0.018	0.43 [0.12–0.74]
Lifestyle confidence	176.92 (47.02)	196.46 (49.36)	213.36 (31.08)	208.91 (33.75)	169.76 (38.65)	177.03 (41.69)	174.52 (44.13)	183.52 (43.21)	6.05	7.14	217.88	0.008	0.42 [0.11–0.73]
Secondary Outcomes													
BMI z-score	0.50 (1.13)	0.56 (1.16)	0.51 (1.36)	0.30 (1.15)	0.67 (1.05)	0.71 (1.07)	0.39 (1.25)	0.49 (1.17)	−0.01	0.00	118.36	0.958	ns
Energy intake (kilojoules)	8991.73 (4526.50)	8215.29 (3960.69)	10923.01 (12515.62)	13807.27 (19479.20)	9674.43 (5426.11)	9414.58 (4403.18)	11124.65 (10426.61)	12942.88 (15738.92)	52.94	0.00	347.68	0.947	ns
Physical activity	56.09 (20.09)	53.23 (22.43)	54.87 (22.83)	57.56 (21.20)	57.68 (23.38)	56.99 (22.80)	51.49 (18.71)	59.17 (23.11)	0.47	0.20	169.08	0.653	ns
Screen-based behaviors													
Watching TV (mins/week)	522.63 (320.09)	428.00 (247.35)	441.67 (271.06)	431.97 (236.84)	525.54 (348.71)	561.08 (371.00)	643.65 (333.45)	635.66 (499.54)	−70.95	6.60	233.22	0.011	0.59 [0.03–0.16]
Electronic games (mins/week)	186.99 (259.16)	138.45 (200.17)	160.81 (182.72)	182.88 (207.35)	169.66 (186.12)	177.25 (201.57)	206.88 (218.19)	235.46 (231.23)	−24.98	1.72	239.99	0.191	*ns*
Computer use (mins/week)	53.60 (97.18)	42.18 (148.91)	46.59 (108.11)	58.64 (146.22)	43.00 (105.91)	42.25 (99.57)	58.02 (145.24)	56.76 (123.85)	−6.04	0.41	175.34	0.524	*ns*

T1 Time 1 (pre-intervention), *T2* Time 2 (post-intervention), *T3* Time 3 (6-month follow-up), *T4* Time 4 (12-month follow-up), *BMI* Body mass index, *PS* Parenting Scale, *LBC* Lifestyle Behavior Checklist, *CAPES* Child and Adjustment and Parent Efficacy Scale, *M* Mean, Physical activity measured by time spent in moderate-to-vigorous physical activity (MVPA) in minutes daily, *SD* Standard deviation, [c]β Estimated regression coefficient using mixed-model repeated measures regression. Figures indicate the estimated change in the intervention condition from Time 1 to Time 4 relative to the control condition. [d]Effect size represents the mean change from pre-intervention to Time 4 in the intervention condition minus the mean change from pre-intervention to Time 4 in the control condition, divided by the pooled baseline standard deviation for the measure

Table 3 Reliable and clinically significant change on primary outcomes for Time 1 to Time 4

Measure	Condition	Reliably improved			Reliably and clinically improved			Reliably worsened			No change
		% (*n*/*n*)	χ^2 [a]	*p*	% (*n*/*n*)	χ^2 [a]	*p*	% (*n*/*n*)	χ^2 [a]	*p*	% (*n*/*n*)
Parenting											
PS Total	Intervention	37 (19/52)	13.30	<0.001	23 (12/68)	7.02	0.004	2 (1/52)	0.00	1.000	62 (32/52)
	Control	6 (3/53)			3 (2/72)			2 (1/53)			75 (40/53)
Child behavior											
Lifestyle-specific	Intervention	25 (13/53)	1.89	0.139	8 (6/71)	0.54	0.323	5 (3/53)	0.00	0.673	70 (37/53)
behavior	Control	13 (7/56)			4 (3/73)			3 (2/56)			86 (48/56)
Parent self-efficacy											
CAPES Self-efficacy	Intervention	39 (19/49)	4.54	0.026	-			4 (2/49)	0.00	0.614	57 (28/49)
	Control	18 (9/51)						2 (1/51)			80 (41/51)
Lifestyle	Intervention	19 (10/53)	0.87	0.284	7 (4/61)	0.00	1.000	2 (1/53)	0.00	1.000	79 (42/53)
confidence	Control	11 (6/56)			6 (4/63)			4 (2/56)			86 (48/56)

T1 Time 1 (baseline), *T4* Time 4 (12-month follow-up), *CAPES* Child and Adjustment and Parent Efficacy Scale, *PS* Parenting Scale; [a]Pearson's chi-square test for independence using Yates' Continuity Correction with 1 degree of freedom, 2-tailed *p* value for Fishers' Exact Test reported where expected frequency for any cell is <10. CAPES Self-efficacy has no recommended clinical cut-off, therefore clinical improvement was unable to be calculated

Energy intake

No significant time-by-condition interaction was found for total energy intake scores.

Physical activity

No significant time-by-condition interactions were observed for time spent in moderate-to-vigorous physical activity (MVPA) in minutes daily.

Screen-based behavior

MMRM analyses revealed that time was a significant predictor of change in total time spent watching television per week ($\beta = 46.13$, $F(1, 230) = 5.89$, $p = 0.016$). A significant time-by-condition interaction was also found suggesting that the rate of change was moderated by condition. Follow-up contrasts showed that the rate of increase in television viewing from Time 1 to Time 4 was significantly greater for parents in the control condition ($\beta_{CON} = 46.80$, $p = 0.027$), compared to the intervention, ($\beta_{INT} = -17.09$, $p = 0.276$), $t(156) = 2.46$, $p = 0.015$), who showed no significant change. No significant time-by-condition interactions were found for time spent playing electronic games or computer use.

Reliable and Clinically Significant Change

Table 3 shows the proportion of reliable change, and the proportion of participants who reliably and clinically improved from Time 1 to Time 4. Chi-squared tests for independence indicated that a significantly greater proportion of intervention participants, compared to those in the control condition, showed reliable improvements from Time 1 to Time 4 for parenting practices. Of those scoring in the clinical range for parenting practices at Time 1, 23% of intervention participants moved into the non-clinical range by Time 4, compared to 3% of those in the control condition. Although more intervention participants reliably improved in terms of child lifestyle-specific behaviors from Time 1 to Time 4 (25 vs 13%), this difference was not significant. Significantly more intervention participants reliably improved in the intervention group than the control group (39 vs 18%) on parent self-efficacy with no significant difference on lifestyle confidence (19 vs 11%). There was no association between allocated condition and reliable worsening on any measures, with very small numbers of participants experiencing reliable worsening.

Intervention Acceptability

Overall, parents reported the program was a high-quality intervention ($M = 6.16$, $SD = 0.80$). Most parents received the type of help they wanted (94%), and gained the information needed to implement parenting strategies (97%). The majority of parents were satisfied with the overall program (90%). All parents intended to implement the strategies learnt. Parents reported that the program helped with both lifestyle-specific behavior (90%), and general child behavior (94%).

Discussion

This first evaluation of the Lifestyle Triple P Seminar Series demonstrated beneficial improvements on primary outcomes

relating to parent-reported measures of child and parent outcomes. At 12-months post-intervention, significant intervention effects were found on parenting practices, child lifestyle behaviors and general and lifestyle-specific parent self-efficacy. Significantly more intervention parents reliably and clinically improved on parenting practices and self-efficacy than in the control group. On secondary child outcomes included as exploratory variables, there was only a significant intervention effect on time watching TV with no intervention effects found for time spent on other screen-based activities, BMI *z*-score, energy intake or physical activity. The large majority of parents were satisfied with the quality and information received in the seminars.

The significant impact of the seminars on parenting practices was expected and is consistent with previous research on Triple P seminars which has found intervention effects on parenting even after delivery of only one seminar with content largely overlapping with that in the first seminar in the lifestyle series (Sanders et al., 2009). The prediction that there would be significant intervention effects on child behaviors was only partially supported with an intervention effect only found for lifestyle-specific behaviors. The lack of significant effect on the three subscales measuring general child behavioral and emotional problems may be due to the current intervention having a greater focus on lifestyle-specific behaviors and less specific information on general parenting strategies compared to that provided in the other low-intensity Triple P interventions evaluated (e.g., Dittman et al., 2016). The significant impacts found on both general and lifestyle-specific self-efficacy were in line with expectations. Significant intervention effects on parent self-efficacy have not been consistently found in past evaluations of Triple P seminars (Sanders et al., 2009; Foskolos, 2014), but are commonly seen across the suite of Triple P interventions, including lower-intensity programs (Sanders et al., 2014). That parents felt more confident in managing lifestyle-specific behaviors and concerns in their children, reported improvements in their parenting practices and reported improvements in lifestyle-specific behaviors in their children 12 months after intervention, provides promising initial support for the efficacy of the lifestyle seminar series.

In terms of the exploratory secondary outcomes of child BMI *z*-score, energy intake, physical activity and screen-based behaviors, a significant intervention effect was only found on minutes of TV watching per week. Interestingly, a greater mean reduction in child BMI *z*-scores was found in the intervention condition, however this was not statistically significant. Nevertheless, improvements in weight, such as those seen in the initial evaluation of Group Lifestyle Triple P cannot be expected given the low-intensity nature of the seminars and the current sample including 63% of children in the intervention group falling in the healthy weight range. Future research could potentially explore whether these seminars could have some impact as a light-touch treatment approach by evaluating the effects in families with overweight or obese children or with specific concerns relating to lifestyle-specific behaviors. Further research may also consider using alternative measures of health in children (beyond BMI z-scores) to be consistent with recent practices.

A strength of this study was the inclusion of anthropometric measurements of children and parents to ensure the groups were equivalent at baseline and child BMI z-score being tracked over the intervention. Additionally, the secondary outcome of physical activity was objectively assessed using an accelerometer tracking moderate-to-vigorous activity. However, all primary outcomes and other secondary outcomes were parent-report questionnaires which may be subject to bias. Further research including other sources of assessment such as observational assessments and teacher-report measures, are warranted. This study was also limited in its use of a waitlist control group as a comparison condition. Future research would benefit from a more stringent design comparing this intervention to an active control condition. This generalisability of the findings of this study are limited given that the sample was mainly Australian mothers with high levels of education and who were able to meet household expenses. Research with diverse populations as well as research assessing the effectiveness of delivery of this program in community settings is desirable. While a strength of this study was a 12-month assessment period, large-scale longitudinal studies spanning many years could provide more insight into the preventative capacity of the intervention.

The findings of this study support the principle of minimal sufficiency in the delivery of parenting interventions (Sanders & Mazzucchelli, 2018), where not all parents require an intensive level of intervention to achieve long-term intervention benefits. This is further supported by comparable effect sizes found in other evaluations of brief Triple P interventions (e.g., Sumargi et al., 2015; Foskolos, 2014), and in parents' satisfaction with the quality of the intervention, and with the type of help they wanted and the level of information they received. The potential benefits of this program are substantial in promoting positive parenting and healthy family behaviors. There is potential for this program to produce additional effects for other public health problems by improving general parenting which, research shows, can influence a child's health behavior (Davids et al., 2017). A brief program which can be delivered to many parents at one time and with potential for online delivery has potential for wide-spread dissemination and to reach many families. This type of seminar program may be particularly suitable for implementation in countries lacking resources (Sumargi et al., 2015). The brief nature of the

program and capacity for universal application make it a potentially useful intervention which could form part of a multilevel population-based system of parenting support interventions for achieving population level changes in children's health and wellbeing (e.g., Doyle et al., 2018, Sanders & Mazzucchelli, 2018). The impact of such large-scale rollouts on long-term weight and health-related outcomes requires investigation. The potential for such programs to serve as part of preventative measures serving to reduce the health burden of obesity, diabetes and other chronic lifestyle-related diseases is worthy of further investigation.

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Compliance with ethical standards

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 Behavioral Sciences at UQ and contributory authors of published Triple P resources. Triple P International (TPI) Pty Ltd is a private company licensed by Uniquest 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. Dr. Sanders and Dr. Bartlett 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. Dr. Sanders, Dr. Bartlett and Dr. Tellegen are employees at UQ.

Ethical approval Ethical approval was granted by The University of Queensland Behavioral and Social Sciences Ethical Review Committee (#2012000219) and registered on the Australian New Zealand Clinical Trials Registry (ACTRN12612000865819). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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References

Altman, M., & Wilfley, D. E. (2015). Evidence Update on the Treatment of Overweight and Obesity in Children and Adolescents. *Journal of Clinical Child & Adolescent Psychology*, *44*(4), 521–537. https://doi.org/10.1080/15374416.2014.963854.

Arnold, D. S., O'Leary, S. G., Wolff, L. S., & Acker, M. M. (1993). The Parenting Scale: A measure of dysfunctional parenting in discipline situations. *Psychological Assessment*, *5*, 137–144. https://doi.org/10.1037/1040-3590.5.2.137.

Bartlett, J. A., & Sanders, M. R. (2021). *Facilitator's Manual for Selected Lifestyle Triple P*. Brisbane, Australia: Triple P International Pty Ltd.

Bauman, A. E. (2004). Updating the evidence that physical activity is good for health: An epidemiological review 2000-2003. *Journal of Science and Medicine in Sport*, *7*, 6–19. https://doi.org/10.1016/S1440-2440(04)80273-1.

Birch, L. L., & Davison, K. K. (2001). Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. *Pediatric Clinics of North America*, *48*(4), 893907.

Birch, L. L., & Ventura, A. K. (2009). Preventing childhood obesity: What works. *International Journal of Obesity*, *33*, s74–81. https://doi.org/10.1038/ijo.2009.22.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 115–159.

Cole, T. J., Bellizzi, M. C., Flegal, K. M., & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: International survey. *British Medical Journal*, *320*, 1240–1243.

Davids, E. L., Roman, N. V., & Leach, L. (2017). The link between parenting approaches and health behavior: A systematic review. *Journal of Human Behavior in the Social Environment*, *27*, 589–608. https://doi.org/10.1080/10911359.2017.1311816.

Davies, P. S. W., Roodvelt, R., & Marks, G. (2001). *Standard methods for the collection and collation of anthropometric data in children*. Canberra, ACT: Commonwealth of Australia.

Dittman, C. K., Farruggia, S. P., Keown, L. J., & Sanders, M. R. (2016). Dealing with disobedience: An evaluation of a brief parenting intervention for young children showing noncompliant behavior problems. *Child Psychiatry & Human Development*, *47*, 102–112. https://doi.org/10.1007/s10578-015-0548-9.

Doyle, O., Hegarty, M., & Owens, C. (2018). Population-Based System of Parenting Support to Reduce the Prevalence of Child Social, Emotional, and Behavioral Problems: Difference-In-Differences Study. *Prevention Science*, *19*, 772–781.

Evenson, K. R., Catellier, D. J., Gill, K., Ondrak, K. S., & McMurray, R. G. (2008). Calibration of two objective measures of physical activity for children. *Journal of Sports Science*, *26*, 1557–1565. https://doi.org/10.1080/02640410802334196.

Foskolos, K. (2014). *The acceptability and efficacy of a brief universal preventive parenting intervention for child behavioral and emotional disorders*. Oxford, UK: University of Oxford.

Gerards, S. M. P., Sleddens, E. F. C., Dagnelie, P. C., De Vries, N. K., & Kremers, S. P. J. (2011). Interventions addressing general parenting to prevent or treat childhood obesity. *International Journal of Pediatric Obesity*, *6*, e28–e45. https://doi.org/10.3109/17477166.2011.575147.

Gerards, S. M. P. L., Dagnelie, P. C., Gubbels, J. S., van Buuren, S., Hamers, F. J. M., Jansen, M. W. J., van der Goot, O. H. M., de Vries, N. K., Sanders, M. R., & Kremers, S. P. J. (2015). The effectiveness of lifestyle Triple-P in The Netherlands: A randomized controlled trial. *PLOS ONE*, 10(4). https://doi.org/10.1371/journal.pone.0122240.

Golley, R. K., Magarey, A. M., Baur, L. A., Steinbeck, K. S., & Daniels, L. A. (2007). Twelve-month effectiveness of a parent-led, family-focused weight-management program for prepubertal children: A randomized, control trial. *Pediatrics*, *119*, 517–525. https://doi.org/10.1542/peds.2006-1746.

Gustafson, S. L., & Rhodes, R. E. (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine*, *36*, 79–97.

Hedeker, D., & Gibbons, R. (2006). *Longitudinal data analysis*. Hoboken, NJ: Wiley.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*, 12–19.

Joachim, S., Sanders, M. R., & Turner, K. M. T. (2010). Reducing preschoolers' disruptive behavior in public with a brief parent discussion group. *Child Psychiatry and Human Development*, *41*(1), 47–60. https://doi.org/10.1007/s10578-009-0151-z.

Kendall, P. C., Marrs-Garcia, A., Nath, S. R., & Sheldrick, R. C. (1999). Normative comparisons for the evaluation of clinical significance. *Journal of Consulting and Clinical Significance*, *67*, 285–299.

Kone, J., Bartels, I. M., Valkenburg-van Roon, A. A., & Visscher, T. L. S. (2022). Parents' perception of health promotion: What do parents think of a healthy lifestyle in parenting and the impact of the school environment? A qualitative research in the Netherlands. *Journal of Pediatric Nursing*, *62*, e148–e155. https://doi.org/10.1016/j.pedn.2021.09.005.

Kuczmarski, R. J., Ogden, C. L., Grummer-Strawn, L. M., Flegal, K. M., Guo, S. S., & Johnson, C. L. (2000). *CDC growth charts: United States*. Hyattsville, MD: National Center for Health Statistics.

Loveman, E., Al-Khudairy, L., Johnson, R. E., Robertson, W., Colquitt, J. L., Mead, E. L., Ells, I. J., Metzendorf, M. I., & Rees, K. (2015). Parent-only interventions for childhood overweight or obesity in children aged 5 to 11 years. *Cochrane Database of Systematic Reviews*, *12*, CD012008. https://doi.org/10.1002/14651858.CD012008.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. 2nd ed. Sydney, Australia: Psychology Foundation of Australia.

Mamun, A. A., Lawlor, D. A., O'Callaghan, M. J., Williams, G. M., & Najman, J. M. (2005). Family and early life factors associated with changes in overweight status between ages 5 and 14 years: Findings from the Mater University Study of Pregnancy and its outcomes. *International Journal of Obesity*, *29*, 475–482. https://doi.org/10.1038/sj.ijo.0802922.

Mejia, A., Calam, R., & Sanders, M. R. (2015). A pilot randomized controlled trial of a brief parenting intervention in low-resource settings in Panama. *Prevention Science*, *16*(5), 707–717. https://doi.org/10.1007/s11121-015-0551-1.

Moore, L. L., Lombardi, D. A., White, M. J., Campbell, J. L., Oliveria, S. A., & Ellison, R. C. (1991). Influence of parents' physical activity levels on activity levels of young children. *Journal of Pediatrics*, *118*, 215–219. https://doi.org/10.1016/S0022-3476(05)80485-8.

Morawska, A., Sanders, M. R., Haslam, D. M., Filus, A., & Fletcher, R. (2014). Child Adjustment and Parent Efficacy Scale (CAPES): Development and initial validation of a parent report measure. *Australian Psychologist*, *49*, 241–252. https://doi.org/10.1111/ap.12057.

Morris, S. B. (2008). Estimating effect sizes from pretest-posttest-control group designs. *Research Methods*, *11*, 364–386.

Rampersaud, G. C., Pereira, M. A., Girard, B. L., Adams, J., & Metzi, J. D. (2005). Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association*, *105*, 743–760. https://doi.org/10.1016/j.jada.2005.02.007.

Rasmussen, M., Krolner, R., Klepp, K.-I., Lytle, L., Brug, J., Bere, E., & Due, P. (2006). Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. *Part I: quantitative studies. International Journal of Behavioral Nutrition and Physical Activity*, *3*, 22–41. https://doi.org/10.1186/1479-5868-3-22.

Sallis, J. F., Alcaraz, J. E., McKenzie, T. L., Hovell, M. F., Kolody, B., & Nader, P. R. (1992). Parental behavior in relation to physical activity and fitness in 9-year-old children. *American Journal of Diseases of Children*, *146*, 1383–1388. https://doi.org/10.1001/archpedi.1992.02160230141035.

Sanders, M. R., & Mazzucchelli, T. G. (2018). *The Power of Positive Parenting: Transforming the Lives of Children, Parents and Communities*. New York, NY: Oxford University Press.

Sanders, M. R., Prior, J., & Ralph, A. (2009). An evaluation of a brief universal seminar series on positive parenting: A feasibility study. *Journal of Children's Services*, *4*(1), 4–20. https://doi.org/10.1108/17466660200900002.

Sanders, M. R., Kirby, J. N., Tellegen, C. L., & Day, J. J. (2014). The Triple P-Positive Parenting Program: a systematic review and meta-analysis of a multi-level system of parenting support. *Clinical Psychology Review*, *34*, 337–57. https://doi.org/10.1016/j.cpr.2014.04.003.

Sirard, J. R., Trost, S. G., Pfeiffer, K. A., Dowda, M., & Pate, R. R. (2005). Calibration and evaluation of an objective measure of physical activity in preschool children. *Journal of Physical Activity and Health*, *2*, 345–357.

Sumargi, A., Sofronoff, K., & Morawska, A. (2015). A randomized-controlled trial of the Triple P – Positive Parenting Program Seminar Series with Indonesian parents. *Child Psychiatry and Human Development*, *46*, 749–761. https://doi.org/10.1007/s10578-014-0517-8.

Teo, S., & Morawska, A. (2021). Communicating with Children about Sexuality: A Randomized Controlled Trial of a Brief Parenting Discussion Group. *Journal of Child and Family Studies*, *30*(6), 1487–1500. https://doi.org/10.1007/s10826-021-01948-w.

Trost, S. G., Mciver, K. L., & Pate, R. R. (2005). Conducting accelerometer-based activity assessments in field-based research. *Medicine and Science in Sports and Exercise*, *37*, s531–s543. https://doi.org/10.1249/01.mss.0000185657.86065.98.

van der Horst, K., Oenema, A., Ferreira, I., Wendel-Vos, Q., Giskes, K., van Lenthe, F., & Brug, J. (2007). A systematic review of environmental correlates of obesity-related dietary behaviors in youth. *Health Education Research*, *22*, 203–226. https://doi.org/10.1093/her/cyl069.

West, F., & Sanders, M. R. (2009). The Lifestyle Behavior Checklist: A measure of weight-related problem behavior in obese children. *Journal of Pediatric Obesity*, *4*, 266–273. https://doi.org/10.3109/17477160902811199.

West, F., & Sanders, M. R. (2010). *Facilitator's manual for Group Lifestyle Triple P*. Brisbane, Australia: Triple P International.

West, F., Sanders, M. R., Cleghorn, G. J., & Davies, P. S. (2010). Randomized clinical trial of a family-based lifestyle intervention for childhood obesity involving parents as the exclusive agents of change. *Behavior Research and Therapy*, *48*, 1170–1179. https://doi.org/10.1016/j.brat.2010.08.008.

World Health Organisation [WHO] (2000). Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *World Health Organization technical report series, 894*, i–253.