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Research article

# Social media and gamification: Engaging vulnerable parents in an online evidence-based parenting program☆,☆☆

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ABSTRACT

The aim of this study was to examine the feasibility (accessibility, engagement and impact) of adding social media and gaming features (e.g., social sharing with anonymity, badges to incentivize skills practice, an accredited facilitator for support) and access via smartphones to an evidenced-based parenting program, *Triple P Online*. The highly vulnerable population included 155 disadvantaged, high-risk parents (e.g., 76% had a family annual income of less than $15,000; 41% had been incarcerated; 38% were in drug/alcohol treatment; and 24% had had a child removed due to maltreatment). The ethnic groups most commonly identified were African American (24%) and Hispanic (66%). Respondents were primarily mothers (86%) from five community programs in Los Angeles. The study used a single group repeated measures design (pre, post, 6-month follow-up). Data collected included standardized self-report measures, post-intervention focus groups and interviews, website usage reports, and Google Analytics. Significant multivariate ANOVA time effects were found, demonstrating reductions in child behavioral problems, reduced lax/permissive and over-reactive parenting, and decreased parental stress. No effects were found for parental confidence, attributions, or depression and anxiety (which were in the normal range at baseline). Positive effects were maintained or improved at 6-month follow-up. The participants engaged in the online community and valued its flexibility, anonymity, and shared learning. This foundational implementation trial provides support for future rigorous evaluation of social media and gaming features as a medium for increasing parental engagement in evidence-based parenting programs online—a public health approach to protect and improve the development of vulnerable children.



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☆☆ The Triple P – Positive Parenting Program is owned by The University of Queensland. The University through its technology transfer company, UniQuest Pty Ltd, has licensed TRIPLE P International Pty Ltd and its subsidiaries to publish and disseminate the program worldwide. Royalties stemming from published Triple P resources are distributed in accordance with the University's intellectual property policy and flow to the Parenting and Family Support Centre, School of Psychology, Faculty of Health and Behavioural Sciences, and contributory authors. No author has any share or ownership in Triple P International Pty Ltd. Matthew Sanders is the founder and a contributory author on various Triple P programs and a consultant to Triple P International. Karen Turner is a contributory author of various Triple P programs. Ronald Prinz is a consultant to Triple P International. All authors are members of the Triple P Research Network.

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## Introduction

### *Improving Child Development*

Abuse and neglect are painful realities that can set a child on a negative developmental trajectory toward poor emotional, social, behavioral (Cicchetti & Valentino, 2006), and health outcomes (Felitti et al., 1998). Young children and youth raised in coercive families are at increased risk of serious adult problems including antisocial disorder (Loeber & Farrington, 1998), substance abuse disorders (Mayes & Suchman, 2006), early arrests (Patterson, Reid, & Dishion, 1992), mental illnesses (Keenan, 2000), and to intergenerational cycles of poverty (Zielinski, 2009) and violence (Kaufman & Zigler, 1987; Malinosky-Rummell & Hansen, 1993). It is estimated that 10.2% (Finkelhor, Ormrod, & Turner, 2009) of the child population in the U.S. are victims of maltreatment. Furthermore, Fang, Brown, Florence, and Mercy (2012) argue that the financial burden of child maltreatment is substantial, estimating a lifetime economic burden of new cases in the U.S. in 2008 at $124 billion.

According to the Center for Disease Control (2013), safe, stable, nurturing relationships are essential to prevent child maltreatment and allow children to reach their full potential. Providing high-risk parents with effective parenting interventions is critical to modifying a child's life trajectory (Afifi et al., 2008; Rutter, 2006), including brain development (Luby et al., 2013).

### *Reaching Vulnerable Families*

Reaching vulnerable parents with effective parenting programs is a formidable challenge. Despite the demonstrated effectiveness of evidence-based parenting programs, relatively few families, and even fewer vulnerable families are likely to participate in effective parenting programs (Harachi, Catalano, & Hawkins, 1997), even though they do benefit from them (Heinrichs, Krueger, & Guse, 2006). Required in-person classes may overwhelm parents with multiple logistical difficulties, such as transportation, work schedule conflicts, and childcare (Prinz & Sanders, 2007). Families in which maltreatment occurs are traditionally less likely to participate in community parenting programs and are more likely to drop out if they do (Turner & Sanders, 2006). The stigma surrounding a child's behavioral or emotional disorders constitutes a meaningful barrier to participation due to feelings of "blame and shame" (Corrigan, Watson, & Miller, 2006). Other barriers exist at the agency level such as the high cost of in-person delivery.

### *Engaging Vulnerable Populations in Low-resourced Communities*

The most critical issue, outside of reach, is engagement—the ability to capture parents' attention and to sustain it long enough to expose them to an evidence-based program. Metzler, Sanders, Rusby, and Crowley (2012) asked 158 ethnically diverse parents to rate their preferred formats for receiving parenting information. The most preferred format was television, followed by online programs, written materials, and workshops. The least preferred choices by parents and, paradoxically, the most commonly employed, were in-person parenting groups, individual therapist meetings, and lastly, home visits. Plantin and Daneback (2009) state that the majority of today's parents look for both information and social support on the internet, and that parents want "experience-based advice as well as interacting with other parents" (p. 9). Tate and Zabinski's (Tate & Zabinski, 2004) review of computer and internet applications for psychological treatments argues for using chat rooms for online social support and feedback by both peers and therapists to enhance online education. Online programs have the potential to engage high-risk parents; maximize reach by overcoming barriers such as limited availability of trained professionals, geography, logistics, social stigma and distrust; and lower delivery costs.

### *Delivering Effective Parenting Support Online*

The evidence-based parenting intervention, *Triple P – Positive Parenting Program*, is based on over 40 years of rigorous science and has demonstrated effectiveness in improving parenting skills, parent–child relationship quality, child behavior problems, and family wellbeing as reviewed in multiple meta-analyses (de Graaf, Speetjens, Smit, de Wolff, & Tavecchio, 2008a, 2008b; Fletcher, Freeman, & Matthey, 2011; Nowak & Heinrichs, 2008; Sanders, Kirby, Tellegen, & Day, 2014; Tellegen & Sanders, 2013; Thomas & Zimmer-Gembeck, 2007; Wilson et al., 2012). Furthermore, *Triple P* has been shown to have positive impact on child-maltreatment indicators in a randomized population-level study (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009). Triple P has variants for parents of children up to 12 years of age, teenagers, and children with disabilities. Its effectiveness has been demonstrated in a range of delivery options from parenting groups and individual family meetings to TV broadcasts, and most recently, in an online delivery format.

An interactive web-based program, *Triple P Online* (TPOL; Turner & Sanders, 2011) has been tested in two randomized controlled trials. One study, involving 116 parents in Australia (Sanders, Baker, & Turner, 2012), found that compared to a computer-use-as-usual control group, TPOL was highly effective, with significant improvements maintained at 6-month follow up on key variables (disruptive child behavior, dysfunctional parenting, parenting confidence, parental anger and inter-parental conflict). The magnitude of these effect sizes was similar to those for in-person group delivery. To explore program delivery modality, a second study (Sanders, Dittman, Farruggia, & Keown, 2014), assigned families of 193 children

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(294 parents) in New Zealand to *TPOL* or a self-help workbook with equivalent content. Both interventions led to clinically meaningful decreases from pre- to post-intervention in mother and father reported levels of disruptive child behavior, dysfunctional parenting, parental anger, and inter-parental conflict on both mother and father report measures. Intervention effects were largely maintained or improved at 6-month follow up, with some deterioration in mother reports of disruptive child behavior, dysfunctional parenting and inter-parental conflict from post to follow-up. Relevant to the present study was the sustained reduction in mothers' child maltreatment risk ($d = .49$). In brief, TPOL shows promise for improved child and parent outcomes (Sanders, Dittman, et al., 2014; Sanders, Kirby, et al., 2014), but engagement and efficacy with high-risk families has yet to be explored.

### *Enhancing Triple P Online with Social Media, Gaming Features and Responsive Design*

*Triple P Online Community* (*TPOC*) was designed to reach and engage highly vulnerable, young parents in a number of important ways. It: (1) delivers an evidence-based parenting program in a format that young adults prefer, with a focus on programming for smartphones, tablets, and desktops through "responsive design"; (2) encourages peer support by allowing users to share and read program work and "star" each other's postings; (3) incentivizes the practice of positive parenting strategies through a reward "badge" system; (4) decreases stigma by allowing participants to create a virtual identity which promotes peer support while maintaining anonymity; and (5) ensures safety through the presence of a Triple P accredited facilitator who responds to posts, answers questions, rewards and features parents' exceptional shared work, and monitors the site for inappropriate postings.

### *Engaging Marginalized Communities*

Community-Based Participatory Research (CBPR) is a mechanism to engage a vulnerable population for mutual benefit. Minkler, Glover-Blackwell, Thompson, and Tamir (2003) define CBPR as "a collaborative process that equitably involves all partners in the research process and recognizes the unique strengths that each brings (p. 1210)." CBPR begins with a research topic of importance to the community with the aim of combining knowledge and action for social change. Leaders in the field of CBPR at Yale University, University of Victoria, University of Washington, and McGill University have disseminated models of CBPR positioned on a spectrum from the least to the most community engaged (i.e., Community Based-Research to Participatory Action Research). CBPR intentionally involves a negotiation of the balance of power between researchers and the community with the intended goal of building community capacity and social change. Lasker and Weiss (2003) refer to "partnership synergy" as an opportunity to leverage the benefit of working with disparate groups through learning from one another.

### *Aims and Objectives*

This project explored the feasibility of implementing an existing evidence-based parenting intervention, *Triple P Online* (Turner & Sanders, 2011), in the context of an online community (*Triple P Online Community*), incorporating social media, gaming features, and responsive design. The principal objectives were to reduce risky family environments by improving parenting practices and subsequent child developmental outcomes through the delivery of an evidence-based parenting program in a format that: (a) maximizes reach by overcoming barriers such as limited availability of trained professionals, (b) logistics, social stigma and distrust; engages high-risk parents; and (c) optimizes efficiency of professional support.

The project also aimed to evaluate the efficacy of *TPOC* for highly vulnerable parents in reducing disruptive child behavior in children aged 2–12 years, improving parenting style, confidence and attributions, and improving parents' general adjustment (e.g., reducing stress). Specifically, we hypothesized that participation in *TPOC* would be associated with reduced disruptive child behavior (H1), reduced dysfunctional parenting (H2), improved confidence and attributional style (H3), and improved parental adjustment (H4). It was also hypothesized that all intervention gains would be maintained at 6-month follow-up assessment. Furthermore, the project explored parents' patterns of use and reactions to the program, and the technical and organizational factors required to successfully deliver the program in a resource-poor environment. This project addresses the significant, well-documented need for an accessible and engaging parenting education program to alter the adverse developmental trajectory of at-risk children.

## Method

### *Participants*

Participants were 155 parents ($M = 33$ years, $SD = 7.5$) with a 2- to 12-year-old child recruited from five different agency programs: 60 (39%) from Children's Bureau; and 95 (61%) from four programs at Shields for Families in Los Angeles, CA. The agency programs serve high-need, high-risk families, providing substance-abuse treatment for drug- and alcohol-addicted mothers, parenting support services for families in the child welfare system, social services to families in a low-income housing development, and rehabilitation services to ex-offenders returning to the community from incarceration. Thus,

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**Table 1**
Demographic information.

| Demographic | Total ($n$ = 155) % | Complete ($n$ = 61) % | Incomplete ($n$ = 94) % |
|---|---|---|---|
| Gender | | | |
| Female | 85.81 | 91.80 | 81.91 |
| Male | 14.19 | 8.20 | 18.09 |
| Marital status | | | |
| Single, never married | 47.74 | 45.90 | 48.94 |
| Single, divorced | 6.45 | 8.20 | 5.32 |
| Single, widowed | 1.29 | 1.64 | 1.06 |
| Unmarried, living with partner | 9.03 | 6.56 | 10.64 |
| Married | 27.10 | 34.43 | 22.34 |
| Married, separated | 5.16 | 1.64 | 7.45 |
| Other | 3.23 | 1.64 | 4.26 |
| Language at home | | | |
| Spanish | 54.19 | 50.82 | 56.38 |
| English | 36.77 | 44.26 | 31.91 |
| Other | 7.10 | 3.28 | 9.57 |
| Education | | | |
| Some high school | 29.03 | 19.67 | 35.11 |
| High School Grad or GED | 37.42 | 40.98 | 35.11 |
| Some college or beyond | 30.97 | 39.34 | 25.53 |
| Income source | | | |
| Employed | 25.81 | 27.87 | 24.47 |
| Unemployed | 10.32 | 9.84 | 10.64 |
| Public assistance/welfare | 40.65 | 40.98 | 40.43 |
| Social security/disability | 5.16 | 3.28 | 6.38 |
| Child support or alimony | 1.29 | 1.64 | 1.06 |
| Other | 16.77 | 16.39 | 17.02 |
| Housing | | | |
| Emergency shelter | 1.29 | 3.28 | 0 |
| Transitional housing for homeless persons | 17.42 | 13.11 | 20.21 |
| Permanent supportive housing for formerly homeless persons | 1.94 | 1.64 | 2.13 |
| Substance abuse treatment facility | 7.74 | 13.11 | 4.26 |
| Half-way or three-quarter-way home for persons with criminal offenses | 1.29 | 1.64 | 1.06 |
| Room, apartment or house that you rent | 44.52 | 47.54 | 42.55 |
| Apartment, condo or house that you own | 10.97 | 11.48 | 10.64 |
| Friend's or family member's room, apartment or house | 9.68 | 3.28 | 13.83 |
| Hotel or motel paid for without emergency shelter voucher | 0.65 | 0 | 1.06 |
| Other | 4.52 | 4.92 | 4.26 |

*Note*: Participant demographics were compared across those participants who completed all 8 modules and those who did not utilizing both. Chi-Square analysis for frequency data and $t$-tests for continuous data; none of the comparisons were significant at a .05 level.

the sample included highly vulnerable families with a multitude of risks: 118 (76.13%) had a family annual income of less than $15,000; 63 (40.65%) had been incarcerated; 59 (38.06%) were in drug/alcohol treatment; 37 (23.87%) had had a child removed due to maltreatment; and 23 (14.84%) had a child in foster care at the time. The ethnic groups most commonly identified were Hispanic (65.81%) and African American (23.90%). Respondents were primarily mothers (85.8%); and single parents (59.35%). The mean age for parents was 32.98 years ($SD$ = 7.55; range = 18–53 years). Further demographics are provided in Table 1. Participant demographics were compared across those participants who completed the study (i.e., completed all 8 modules) and those who did not complete the study utilizing both Chi-Square analysis for frequency data and $t$-tests for continuous data; none of the comparisons were significant at a .05 level.

With regard to their computer and internet usage, the majority of parents reported using the internet every day (57.42%), although 53.55% reported spending fewer than two hours per week online. The majority of participants reported feeling "very" or "totally" confident on the internet (54.74%). The most commonly reported access point for the internet for these parents was a home computer (47.40%) or smartphone (43.51%).

Recruitment was conducted in January and February 2013. Staff members at the participating agencies were asked to refer clients who were parents (of at least one 2- to 12-year-old child) who they thought would benefit from the *TPOC* program. We attempted to exclude parents without English proficiency at a fifth grade level. No other inclusion or exclusion criteria were utilized. The goal was to assemble a sample of high-need, high-risk, poor, and minority parents who were either voluntarily seeking parenting classes or who had been investigated by child welfare and were either referred to or court-ordered to attend a parenting class. The participants were randomly assigned into two groups to begin *TPOC* within a manageable cohort for one online facilitator (see Fig. 1 for participant flow and retention rates). The cohorts ran one after the other, 12 weeks apart.

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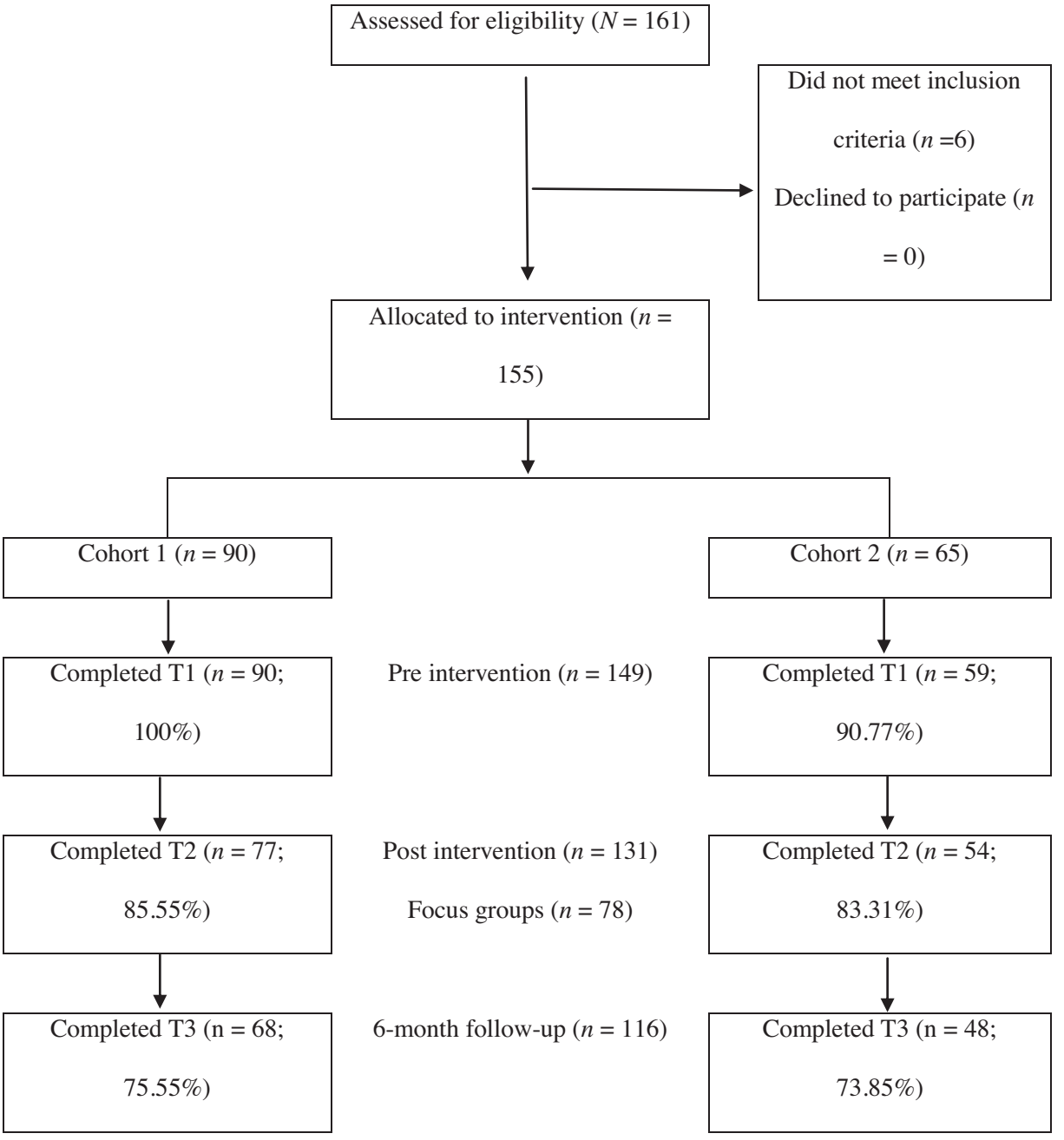


**Fig. 1.** Participant flow through the study.

*Measures*

*Demographics.* Family demographic data included age, relationship to the target child, marital status, race/ethnicity, family composition, educational level, employment situation, income sources, and income level. Parents also completed questions about the nature of their internet access, and their confidence and frequency of internet use.

*Child Behavior.* The *Eyberg Child Behavior Inventory* (ECBI; Eyberg & Pincus, 1999) was used to assess children's externalizing behaviors. The ECBI is a well-established, nationally normed, 36-item measure of parents' reports of disruptive behavior in their children aged 2–16 years, including frequency of disruptive behaviors (Intensity scale) and whether those behaviors are a problem for the parent (Problem scale). Parents answer on a 7-point frequency scale for the Intensity scale, and on a dichotomous Yes/No scale for the Problem scale. The scales have good test–retest reliability ($r$ = .80 and .85, respectively;

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Funderburk & Eyberg, 1989); and discriminate between children with and without disruptive behavior problems (Burns & Patterson, 2001). Higher scores reflect greater problem behavior.

The *Child Adjustment and Parent Efficacy Scale* (CAPES: Morawska, Sanders, Haslam, Filus, & Fletcher, 2014) was also used to assess child behaviors. The CAPES is a 27-item survey of parents' reports of their child's internalizing, externalizing, and positive behaviors on a 4-point scale. The scale consists of an Intensity scale with two subscales measuring children's Behavior problems and Emotional problems. The scales have good internal consistency ($\alpha$ = .74, .90 and .96 respectively) and construct validity (Morawska et al., 2014). Higher scores indicate greater levels of child emotional or behavioral problems.

*Parenting Style.* The *Parenting Scale* (PS; Arnold, O'Leary, Wolff, & Acker, 1993) was used to measure parents' dysfunctional parenting style. Parents rate the nature of their discipline practices on a 7-point semantic differential scale on 30 items, and three subscales are yielded: Laxness (permissive discipline), Over-reactivity (authoritarian discipline, anger, and irritability) and Verbosity (long reprimands or reliance on talking). The scale has good test–retest reliability ($r$ = .83 and .82 respectively) and has been found to discriminate between parents of clinic and non-clinic children and to correlate with observational measures of dysfunctional discipline. Higher scores reflect more dysfunctional practices.

*Parental Confidence.* Parents' self-efficacy in managing child emotional and behavioral problems was measured with the *CAPES* Self-efficacy scale (Morawska et al., 2014). Parents rate their confidence in being able to successfully deal with 19 different child misbehaviors, on a 10-point scale, ranging from (1) *Certain I can't do it to* (10) *Certain I can do it*. This scale shows good internal consistency ($r$ = .79). Higher scores reflect greater confidence.

*Parental Attributions.* Parents' negative attributional style for the causes of children's misbehaviors was measured with the *Parent's Attributions for Child's Behavior Measure* (PACBM; Pidgeon & Sanders, 2004). A total score and three subscales are derived: Stable; Blame and intentional; and Internal. After reading a written scenario, parents are asked to imagine their own child in the situation and to indicate, on a 5-point scale, how strongly they believe their child's actions would result from specific causes. The total scale and three subscales have adequate internal consistency and discriminate between clinically angry parents at risk of child abuse and non-clinically angry parents (Sanders et al., 2004). Higher scores reflect more negative attributions.

*Parental Adjustment.* Parents' adjustment difficulties were measured with the *Depression Anxiety Stress Scales* (*DASS-21*; Lovibond & Lovibond, 1995). The DASS-21 is a short form of the original 42-item questionnaire, assessing symptoms of depression, anxiety, and stress in adults. Parents rate, on a 4-point severity/frequency scale, the extent to which they have experienced a range of symptoms over the past week. It evidences good convergent and discriminant validity for each of the three subscales (depression, anxiety, stress; Henry & Crawford, 2005).

*Patterns of Program Use. TPOC*'s content management system allowed for the tracking and reporting of a number of variables on individual program use. This included number of logins, login duration, completion of modules, time spent on each module, interaction with the social features (number of stars, comments, questions, replies, and content of shared posts), and gaming aspects (number of badges earned). *Google Analytics* was also used to document aggregated anonymous site usage data (location and device logged in from and page views).

*Satisfaction with the Program.* At T2, parents were asked to rate their satisfaction with the level of program support, the length of the program, and the time they were given to complete it (5-point scale). They were also asked to rate their satisfaction with the different social media and gaming features (e.g., videos, avatars). They were prompted to provide information on technological barriers encountered during the program and the reason they stopped the program when they did.

*Social Contagion.* The project assessed the degree that parents in the program shared Triple P content with each other, across Cohorts and with others outside of the program. At T2, Parents in Cohort 1 were asked to report whether or not they had shared *Triple P* strategies with parents in the Cohort 2. Conversely, Cohort 2 was asked at T1 to report the degree to which they had already been exposed to *Triple P* content by a parent in the first Cohort. Furthermore, both Cohorts were asked if they shared the content with someone not in the study, and if so, what specific strategies they had shared, with whom (e.g., partners, friend, relative, childcare provider), where (e.g., at a playground, school, or home), and how (e.g., talked about it, demonstrated it).

*Focus Groups.* Post-intervention focus groups were conducted with all available parents at T2 assessment events. Parents were briefly walked through each of the program elements and asked what they liked and disliked about each of the program content, social media and gaming elements and asked to provide feedback on what they would change.

*Agency Exit Interviews.* Key agency administrators and staff were interviewed at T2 to explore agency-level barriers, e.g., computers, staff-burden; and perceived benefits to parents.

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*Design*

This feasibility study employed a single intervention group (divided into two cohorts) assessed across three time points: pre-assessment (on enrollment in the study), post-assessment (approximately 12 weeks later), and at 6-month follow-up.

*Procedure*

All project procedures and materials were reviewed and approved by both the California State University Northridge's Institutional Review Board and the Los Angeles Superior Court. For agencies with no internet access on site, broadband was provided along with desktop computers, Agency staff described the study to eligible parents and completed a referral form (basic contact and demographic information) for parents who were interested. An agency-embedded research assistant then met with these interested parents and consented them into the study. All referred parents were invited to attend one of five enrollment days, which occurred at the participating service agencies. At these events, those who had not yet signed a consent form were consented, complete contact information was obtained, and baseline (T1) questionnaires were administered through an online assessment tool. In-person help was provided as needed (assessment took 30–60 min to complete, depending on literacy level). See Fig. 1 for participant flow.

One hundred and sixty one parents signed-up to participate, six parents were excluded (four had limited English proficiency, and two did not have a child in the age range). Of the, 155 parents enrolled into the study, 23 parents who had a child currently in foster care were prioritized by their agencies to be in the first cohort receiving the program, and the remaining 132 were randomly assigned into two groups (of 67 and 65, for cohorts of 90 and 65 parents) to participate in *TPOC* within a cohort size manageable for one online facilitator (see Fig. 1 for participant flow and retention rates). The cohorts ran one after the other, 12 weeks apart (i.e., T1 for Cohort 1 was in March 2013, T2 for Cohort 1 and T1(b) for Cohort 2 occurred in June 2013). Following T1 assessment, parents were registered onto the *TPOC* website and provided log-in details. They were prompted to complete the program within 3 months, and advised that their access remained open for 12 weeks from registration. At T2 (12 weeks post-registration), parents were invited to complete post-assessment either individually online, or at the agencies. Those completing at the agencies were invited to participate in small focus groups. These 20- to 30-minute focus groups happened onsite as part of the assessment event and only those parents who came to the event in groups of four or more ($n = 78$). There were six focus groups in total. Six months after the T2 assessment, participants were invited to complete a follow-up assessment (T3). Subjects received $60 in grocery vouchers for each assessment time point they participated in.

*Intervention*

*Triple P Online* (*TPOL*) provided the foundation of the social media program. *TPOL* (Turner & Sanders, 2011) is an eight-module, interactive self-directed positive parenting program. It provides instruction in the use of 17 core positive parenting strategies (each with a recommended age range). The module content includes: (1) What is positive parenting?; (2) Encouraging behavior you like (e.g., quality time, descriptive praise, contingent positive attention); (3) Teaching new skills (e.g., learning through watching, incidental teaching, behavior charts); (4) Managing misbehavior (e.g., clear instructions, logical consequences, quiet time); (5) Dealing with disobedience; (6) Preventing problems by planning ahead; (7) Making shopping fun; and (8) Raising confident, capable kids. The program content is presented in a sequential format (i.e., module completion opens access to the next module), and allows users to review previously completed modules. TPOL incorporates elements designed to engage participants and improve knowledge acquisition, positive self-efficacy, and behavior activation. These elements include: video-based modeling of parenting skills; culturally diverse parent 'voxpops' describing their experiences; personalized goal setting, review and feedback; interactive exercises to prompt parental problem solving, decision making, and self-regulation; downloadable worksheets and podcasts to review session content; and automated text message and email prompts to increase the likelihood of program completion. The program also includes a personalized downloadable workbook that records program content, parents' goals, and responses to exercises. The program has a self-regulatory focus in which parents set their own goals (based on their family's current concerns) and develop parenting plans using strategies appropriate to their child's developmental level.

*Triple P Online Community* (*TPOC*), a social media variant of *TPOL* designed to be implemented at a population level for vulnerable young parents, provided: (1) responsive design programming for smartphones, tablets, and desktops; (2) discussion boards for users to share and read program work and like each other's postings; (3) 'badges' to reward parents for practicing positive parenting strategies; (4) a virtual identity (an avatar) to promote peer support while maintaining anonymity; and (5) a Triple P accredited facilitator to respond to posts, answer questions, reward and feature parents' exceptional shared work, and monitor the site.

A *Community Based Partnership* was built between the Compton and North Hollywood communities in California and our international team of researchers; it enabled us to build community capacity—shared resources, training and dialog. The research team met with the agencies' administrators prior to the intervention phase in multiple face-to-face meetings over six months; the team met periodically with the direct-line staff throughout the program. The research team enhanced the agencies' computer labs with new desktops and much needed broadband access. Furthermore, to minimize agency burden, a research assistant was made available to assist parents in accessing the program (e.g., recovering lost passwords, plugging

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**Table 2**
Child and parent outcomes at baseline, post-intervention and follow-up.

| | Mean (*SD*) | | | Partial $\eta^2$ |
|---|---|---|---|---|
| | Time 1 | Time 2 | Time 3 | |
| ECBI Intensity | 102.70$^{A}$ (44.66) | 99.12 (43.57) | 93.50$^{A}$ (40.36) | 0.033* |
| ECBI Problem | 12.81 (10.83) | 10.64 (11.16) | 12.27 (11.67) | 0.017 |
| CAPES Behavior | 27.39$^{A}$ (14.39) | 25.88 (16.16) | 24.05$^{A}$ (13.74) | 0.028* |
| CAPES Emotion | 2.64 (2.39) | 3.07$^{A}$ (2.87) | 2.20$^{A}$ (2.16) | 0.046* |
| CAPES Self-Efficacy | 144.31 (49.21) | 145.76 (51.16) | 145.33 (53.18) | <0.001 |
| PS Total | 97.75$^{AB}$ (21.30) | 89.39$^{A}$ (23.32) | 86.36$^{B}$ (22.14) | 0.130* |
| PS Laxness | 14.45$^{AB}$ (6.00) | 12.91$^{A}$ (5.75) | 12.19$^{B}$ (5.62) | 0.066* |
| PS Overreactivity | 17.01$^{AB}$ (7.20) | 15.38$^{A}$ (6.02) | 15.22$^{B}$ (6.58) | 0.047* |
| PS Verbosity | 4.60 (3.01) | 4.30 (2.54) | 4.24 (2.78) | 0.007 |
| PACBM Stable | 12.24 (6.49) | 12.84 (6.64) | 11.84 (6.34) | 0.010 |
| PACBM Blame | 27.31 (12.05) | 28.61 (12.53) | 28.50 (12.21) | 0.008 |
| PACBM Internal | 13.16 (6.76) | 14.12 (7.63) | 13.49 (6.95) | 0.008 |
| DASS Depression | 6.26 (7.98) | 5.98 (8.47) | 5.37 (8.64) | 0.004 |
| DASS Anxiety | 5.95 (6.77) | 5.90 (7.88) | 5.56 (8.64) | 0.001 |
| DASS Stress | 10.47$^{AB}$ (8.57) | 8.59$^{A}$ (9.31) | 7.98$^{B}$ (9.13) | 0.031* |

*Note*: T1, pre-intervention; T2, post-intervention; T3, 6-month follow-up; Partial $\eta^2$, effect size; ECBI, Eyberg Child Behavior Inventory; CAPES, Child Adjustment and Parenting Efficacy Scale; PS, Parenting Scale; PACBM, Parents' Attributions for Child's Behavior Measure; DASS, Depression Anxiety Stress Scales-21.

* $p < .05$.

*Note*: Paired comparisons across time points for significant effects were adjusted using Bonferroni adjustment.

in disconnected broadband wires). The project also provided hot meals for all parents and staff on assessment day events, a small gesture appreciated by all. After the six month follow-up assessment, eight of the agencies' parent-educator staff were trained in *Triple P*. Exit interviews were conducted with each agency to understand the staff's experience of the collaboration.

### *Statistical Analysis*

To evaluate intervention effects, within-subjects repeated measures ANOVAs were conducted for each subscale across the three data collection points ($n = 115/116$ depending on the scale) using SPSS 22. The distributions of the outcomes at each time point were investigated for normality and while there were some indication of skewness in some variables (e.g., DASS stress, anxiety, depression) the combination of the two cohorts resulted in a sample size (i.e., 30+) that produces accurate repeated measures ANOVA probability values when the population distribution is non-normal (Tabachnick & Fidell, 2013). Furthermore, the test of the repeated measures sphericity assumption was conducted for all of the outcomes and were only violated in three instances (i.e., PACBM Internal and Stable, ECBI Problems). Analyses with sphericity violations were assessed using the Huynh–Feldt adjustment (Tabachnick & Fidell, 2013). Paired comparisons across time points for significant effects were adjusted using Bonferroni adjustment.

## Results

### *Child and Parent Outcomes*

Significant time effects were found for the following child outcome measures (see Table 2): ECBI Intensity ($F(2,228) = 3.896$, $p = .022$) and CAPES Behavior Scale ($F(2,228) = 3.313$, $p = .038$), with pairwise comparisons showing a significant reduction in problem behavior from T1 to T3. A significant time effect was also found for the CAPES Emotion Scale ($F(2,228) = 5.534$, $p = .005$) with pairwise comparison showing a significant reduction in emotional problems from T2 to T3.

Significant time effects were found for the following parent outcome measures (see Table 2): PS Total ($F(2,230) = 17.141$, $p < .001$), PS Laxness ($F(2,230) = 8.153$, $p < .001$), PS Overreactivity ($F(2,230) = 5.617$, $p = .004$), and DASS-21 Stress ($F(2,228) = 3.648$, $p = .028$). Pairwise comparisons showed that the time effect was accounted for by reductions in dysfunctional parenting and stress from T1 to T2, which were maintained at T3. No effects were found on the ECBI Problem scale, CAPES Parental Confidence, PS Verbosity, PACBM attributional measures, or DASS depression or anxiety.

### *Patterns of Program Use*

Online delivery of interventions provides an opportunity to collect data on how users interact with a program. Precise data were captured on the program fundamentals, including number and date of logins, time spent completing modules, and program completion. Data also captured social interaction and engagement, including the number of posts, replies and likes a user shared, and badges, replies and likes received. Google Analytics tracked a number of important data points including anonymous user location, device and browser information, as well as number of page views. Participants accessed the program from a number of locations/devices: agency computer lab (69.68%); home computer (54.10%); cell or smart

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**Table 3**
Consumer satisfaction items.

| | Mean |
|---|---|
| How happy were you with the level of support you got in the program?[a] | 5.42 |
| How did you find the length of the program and the time you had to complete it?[b] | |
| The length of the program (all 8 modules) | 2.95 |
| The time to complete the program (12 weeks) | 2.88 |
| In terms of the program, how many stars would you give each of the following?[c] | |
| The videos | 3.84 |
| The activities | 4.26 |
| The facilitator | 4.27 |
| The badges | 4.23 |
| The shared posts | 4.19 |
| The avatars | 4.03 |

[a] Out of a scale of 1–7 ranging from Very unhappy to Very happy (5.42 represents Somewhat happy to Happy).
[b] Out of a scale of 1–5 ranging from Far too little to Far too much (3 represents About right).
[c] Out of a scale of 1–5 with 5 as the most positive.

phone (50.82); work or school computer (32.79%); iPad or tablet (31.15%); friend's computer (20.50%); somewhere with free WiFi (e.g., restaurant, 19.67%); public library computer (15.57%). Of these, 24.59% relied exclusively on agency computers.

Through Google Analytics data on browser usage, the research team was able to realize quickly that the agencies' computer labs were using outdated internet browsers, allowing for a technological update that included updating browsers, strengthening broadband and monitoring labs for continuous connectivity to optimize site experience for the users. To ensure that the parents continued to access the program as intended, a research assistant was assigned a few hours per week to provide on-site and telephone support.

*Satisfaction with the Program*

Consumer satisfaction with the program, including social media and gaming elements were high (see Table 3 for a summary). Adjustments were made between Cohort 1 and 2 to increase consumer satisfaction, including increasing the amount of time participants had to finish the program from 12 to 16 weeks, and adding a dedicated research assistant to trouble shoot technical problems with participants. Subsequently, Cohort 2 participants were less likely to mention technical problems as the reason they stopped the program, 21% versus 14%.

*Social Contagion.* Although the intervention was online, the in-person relationships within the ethnic communities generated a buzz and credibility amongst peers. Cohort 1 parents actively shared *Triple P* content and parenting strategies with Cohort 2 parents at a rate of 50%. Parents in both cohorts told us on their post-surveys and in the post-intervention focus groups that they shared *Triple P* concepts, strategies and attitudes with each other, family members, friends, teachers and daycare providers. Furthermore, the program's integrated reward system, including badges, proved to be an important motivator for research participant sharing. The participants created 1,188 top level posts which included sharing their Module Check-in's a total of 731 times. Breaking the 90-9-1 rule (van Mierlo, 2014) typical of social media sites, 50% of the participants lurked, 32% shared occasionally and 17% shared more than three times (see Fig. 2 for graphic of the 90-9-1 rule).

*Barriers to Program Completion.* Running out of time was the most common barrier. Cohort 1 was strictly limited to 12 weeks, while Cohort 2 participants who had made it at least half way through the program at 12 weeks were given an additional 4 weeks to complete the program. As a consequence, 27.4% of Cohort 1, as opposed to 16% of Cohort 2, reported running out of time as their reason for stopping the program. The second self-reported reason for stopping the program early was technical problems. This included problems with requiring working email addresses during registration, lack of sufficient broadband, reliance on outdated browsers, and graphic user interface issues. Needing an email address proved to be a barrier for many

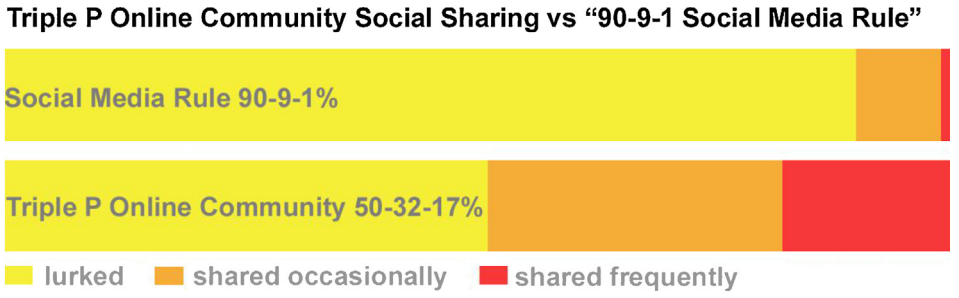


**Fig. 2.** The 90-9-1 Social Media Rule.

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participants. During enrollment, 21% of the sample had to have an email address created to register for the program; and 42.5% of the sample self-reported checking their email never, rarely or sometimes. A positive discovery during outreach to research participants, was that while many were unreachable by phone and email, they were quickly responsive to text message (SMS). Connectivity and older browsers at agency computer labs also resulted in participants not being able to see program videos properly: around a third of participants experienced difficulties watching the videos. Slow connection problems meant that 1- to 2-minute video clips took time to download or stopped and started. Another technical problem, encountered by 23% of participants, was getting stuck on a page. Many were not accustomed to the linear layout of the program often utilized in e-learning, but did not seek help, leading to an unnecessary number of participants abandoning the program early. Few parents sought help through the email form on the Help page or sending a message to the facilitator, and a small number sought help by sharing their technical problem in the online community.

The completion rate for the entire eight-module program increased from 36% (Cohort 1) to 51% (Cohort 2), possibly due to the following factors: (1) twice as many parents in the second cohort completed the program on a smartphone, rather than an agency-provided or other desktop; (2) the "buzz" and support generated from *TPOC* Cohort 1 peers; and/or (3) more in-person availability of a research assistant to resolve access issues (e.g., lost passwords, unplugged broadband wires).

*Focus Groups.* Parents' overall experience of *TPOC* was very positive (i.e., convenient, supportive, engaging, private, and self-paced). Key themes were as follows:

*Program content was helpful.* The most positive feedback was about the Triple P content (video clips, text, exercises): "*I liked the modules. They showed good parenting tips I tried with my child*"; and "*At the beginning, it was boring, but it became very interesting and I didn't want the modules to end; Everything I did worked for me, so I wouldn't change anything. I liked it because it helped me*." Only 8% of comments were negative: "*I wanted more videos*"; and "*more videos with older children*."

*Social network aspects made the program engaging.* Forty eight parents explicitly remarked on the sense of moving through the program as a community, such as: "*I read the opinions of others. They were a great source of support*"; and "*I was encouraged when someone moved on to another module, and it made me want to try what they were doing*." Another social media element was the ability to 'like' posts by assigning a star, and receive a gold star from the facilitator: "*Reassured I was doing something right*"; and "*Got gold stars, that encouraged me to stay in the program*."

*Gaming aspects also enhanced motivation.* Achieving badges (for practicing positive parenting skills in vivo and sharing this with the community) was another valued feature: "*Badges helped because it shows you're doing something right. Once I found out, I wanted to post to earn badges*"; and "*I had all the badges and showed my certificate to my social worker*."

*Suggestions for change.* Some parents requested longer access for future reference: "*I want lifetime access*". Most parents wanted *TPOC* to be more available: "*If everybody did it, there'd be no judgment*"; "*Allow both parents to have access to do it together*"; and "*I would bring in children's friends, neighbors*." Another suggestion was to include more in-person coaching or guidance: "*I would have liked to have a staff person on site*"; and "*Sometimes I feel like speaking with someone*." There were some elements that many participants did not discover, such as direct messaging to the facilitator, the downloadable workbook. One final suggestion was that the content could be more age-specific and sortable by the child's age.

*Agency Exit Interviews.* Overall, responses from administrators and parent-educators were consistent with what parents expressed in the focus groups. One staff person typified the others when she said: "*The problems were all technical/internet [access] related. . . [TPOC] was very beneficial and the parents really liked the parenting program and have said that they felt like it was a safe and confidential space that they could be honest in*." Secondly, the staff expressed a desire for increased access to information: "*We would have liked access. . . it might be more beneficial if staff saw what the parents see*." Feedback was largely positive, for example: "*Triple P became a part of our repertoire. We love what you guys brought. We are using the development of interest in Triple P to build a Fatherhood Initiative*."

## Discussion

This *Triple P Online Community* study is the first to explore the accessibility, engagement, and impact of implementing an evidence-based parenting program with social media and gaming features with highly vulnerable parents. *Accessibility* in neighborhoods of poverty is a formidable challenge; parents need access to up-to-date computers and browsers, adequate broadband, and internet literacy education. Although broadband was provided for the purpose of this research, connections were often unplugged, overloaded, or weak given the dated building construction. Additionally, some of the agencies restricted parents' access to computers by unlocking the computer lab for only one hour per week. As the majority of participants accessed the program on agency computers (although not necessarily exclusively), this does indicate a need for agency infrastructure support, at least in the short term. Furthermore, on registration day, more than one out of five parents did not have a working email account. Regardless of the "digital divide" in the poorest neighborhoods of Los Angeles, parents increasingly, over the year of the intervention phase, accessed *TPOC* on their smartphones which mitigated broadband barriers and increased participation.

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With regard to *engagement*, nearly half of the parents in the second cohort completed the entire eight-module program, a rate comparable to the Australian middle class sample (broadband and personal computers in the home) that pilot tested *Triple P Online* (Sanders et al., 2012). This is a laudable achievement for the high-risk sample in this project. With increased engagement, and therefore treatment dosage, outcome results for the entire sample are likely to have been even better.

Moreover, there was significant *impact* on parenting practices, stress and child behavior during the intervention phase. Positive effects were maintained or improved at 6-month follow-up. The parents' satisfaction with the *Triple P Online Community* was further exemplified by the majority of parents sharing what they learned with friends, family, day care providers and neighborhood parents. The parents' and administrators' excitement was summarized well in an email (November 4, 2014):

> *I am so thrilled that the RWJF/Triple P Project was a true success. I was so honored to be part of the process from beginning to end. It was such a reward to see the clients/families benefit from the on-line Parenting instruction and have fun doing it. They truly wanted to participate and learn as they moved from module to module.*
>
> Charlene K. Smith, MA/VP, Family and Community Services, Shields for Families

Given the historical distrust of outsiders experienced by some racialized communities, our use of a community-engaged model of research allowed for more robust community involvement compared to traditional models of applied research. In order to shift to a Participatory Action Research model in the future, infrastructure considerations need to be integrated into budget development, given the time and resource commitment in developing research for social action.

Securing, training, and supporting a professional workforce to provide in-person parenting services to reduce child maltreatment at an estimated 10.2% of the child population in the U.S. (Finkelhor et al., 2009) would be a Herculean task. In Los Angeles County alone, one would need to reach the parents of nearly a quarter of a million children. Alternatively, a format that engages high-risk parents and maximizes reach by overcoming professional availability, logistical, geographic, stigma and trust barriers at minimal costs is a scalable solution. The findings of this study add to an understanding of the feasibility of implementing an effective parenting program at a population level, and the potential value of and barriers to online modalities.

### *Limitations*

The present findings must be interpreted in light of the study's limitations. First, the study was not a randomized controlled trial and thus cause cannot be firmly established. However, the findings of this study are consistent with extensive research into the *Triple P* system of interventions. Second, a key aspect of *TPOC* is video demonstration of parenting skills. Given the problems with getting sufficient and consistent broadband into the agencies, about a quarter of participants were not exposed to the treatment as intended. Nevertheless, the social media features, facilitator postings and discussion boards, supported parents in absorbing key knowledge. As more parents have access to smartphones, the problems of broadband access will diminish. User interface design becomes an important research question as assumptions about user behavior must be tested against reality. For example, are users exploring available resources accessible from the site's menu? If not, how can program resources be made more prominent ensuring that users find important intervention components? Fortunately, with Google Analytics up-to-day data can be pulled to test assumptions. Third, social media is new as a healthcare delivery system, and thus, the research evidence to draw upon is limited. It is difficult to know what features are most engaging and what features are either unnecessary or possibly distracting from the intervention. For example, parents in this trial took longer to complete the program, than those in the Australian *TPOL* trial (approximately 20 min longer per module). Possible explanations are low literacy, English as a second language, in addition to reading posts in the discussion forums, which was more time consuming than the online program with none of the social media features. Finally, we do not know if it was the program's social media features, or the "buzz" and excitement in the neighborhood that motivated and engaged the parents. Although, this study could not tease out these influences, it does suggest that peer-to-peer enthusiasm, whether online or in-person, especially in disadvantaged communities in the US, has a powerful influence. Future research is warranted to explore key social media features and their independent contribution to outcomes, and how communities engage with and adopt such programs, particularly disadvantaged communities with significant barriers to accessing traditional services.

### *Conclusion*

Practice wisdom, in the child maltreatment field, suggests that parenting programs must be delivered in-person to have sufficient treatment impact to modify high-risk parenting. Our outcome data goes some way in challenging these assumptions. The online delivery provided reach. The social media features engaged the parents long enough to be exposed to the evidence-based program. It all happened in a context of local on-the-ground support and enthusiasm by peers and community agency staff. Utilizing social media, our parents realized significant change over time on standardized measures for parenting style, parental stress, and child behavior—improvements that not only were sustained but improved at the 6-month follow-up assessment.

The most important activity for the success of the overall project was developing relationships with key community stakeholders—community based partnerships. Even though the intervention was provided online, in-person relationships within the communities generated interest in and acceptability of the program amongst peers. If *TPOC* is disseminated in

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the context of CBPR, parents would have the advantage of both online (anonymous) and in-person (as requested) support; shared language, attitudes and parenting strategies across staff and parent-peers; and, immediate help (including computer assistance) by trusted members of the parents' community.

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