
TREATMENT

Keeping Parents Involved: Predicting Attrition in a Self-Directed, Online Program for Childhood Conduct Problems

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Positive parenting programs have a strong evidence base for improving parent–child relationships, strengthening families, and reducing childhood behavior disturbances. Their reach is less than optimal however, with only a minority of families in need of help participating. Father involvement is particularly low. Online, self-directed programs have the potential to improve participation rates. This article examines risk factors for dropout/attrition from a free, evidence-based, self-directed, father-inclusive parenting program, Parentworks, which was made available across Australia. Parents ($N = 2,967$) enrolled in the program and completed preintervention questionnaires. There was a steady and consistent loss of participants through the sequence of core program modules, until a final sample of 218 completed the postintervention questionnaire. A range of demographic and parent and child variables were tested as predictors of 3 subgroups: nonstarters, partial completers, and full completers. Nonstarters ($n = 1,625$) tended to have older children with fewer behavioral problems and report higher psychopathology and dysfunctional parenting than those who partially ($n = 1,124$) or fully completed. Contrary to findings from face-to-face research, single parents had the

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highest completion rates. Coparticipation of partners and interparental conflict had no impact on completion rates. Fathers participated at relatively high levels. Results show that parents with the greatest need tend to engage with online programs, and online programs may be particularly useful for fathers, single parents, and those in conflicted relationships. Directions for future program design and research are discussed.

Parenting interventions, which typically focus on improving the quality and consistency of parenting practices, are regarded as the gold standard treatment for children with behavioral problems (Comer, Chow, Chan, Cooper-Vince, & Wilson, 2013; Eyberg, Nelson, & Boggs, 2008; Kaminski & Claussen, 2017; Sanders, Kirby, Tellegen, & Day, 2014). Although the majority of parenting interventions are delivered face-to-face, there is growing interest in online delivery, which has the potential to increase program reach and overcome stigma and other barriers to participation. Research suggests that online interventions could play a significant role in enhancing enrolment and attendance in parenting interventions (Breitenstein, Gross, & Christophersen, 2014; Sourander et al., 2016), and potentially replace or be offered as an adjunct to face-to-face interventions (Jones et al., 2013). The Internet is already used by many parents to obtain information and advice about parenting (Nieuwboer, Fukkink, & Hermanns, 2013), and both mothers and fathers report that they prefer online delivery of parenting interventions to face-to-face delivery (Metzler, Sanders, Rusby, & Crowley, 2012; Tully, Piotrowska, Collins, Mairé, Black, et al., 2017).

Meta-analytic reviews support the efficacy of online parenting interventions for child and parent outcomes, with effect sizes similar to face-to-face interventions (Baumel, Pawar, Kane, & Correll, 2016; Nieuwboer et al., 2013; Sanders, Baker, & Turner, 2012; Sanders, Dittman, Farruggia, & Keown, 2014). The success of online parenting interventions, however, ultimately relies on the ability to engage parents and retain them in the program. Although the factors influencing attrition from traditional face-to-face parenting interventions are well studied (Chacko et al., 2016; Kazdin, 1996; Reyno & McGrath, 2006), less is known about attrition from online interventions. The current article aims to address this issue by investigating factors associated with attrition from an online parenting intervention.

Despite considerable research demonstrating the efficacy of parenting interventions in terms of both child and parent outcomes (Barlow et al., 2011; Eyberg et al., 2008; Kaminski & Claussen, 2017; Lundahl, Tollefson, Risser & Lovejoy, 2008; Nores & Barnett, 2010), there are nevertheless high rates of program attrition. Important to note, attrition has been shown to lead to poorer outcomes for children and families compared to those who complete intervention (Boggs et al., 2005), at least for face-to-face parenting interventions. A recent meta-analytic review ($k = 262$; Chacko et al., 2016) of targeted face-to-face parenting interventions for child behavior problems including

attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder, and conduct disorder found that at least 25% of parents dropped out prior to commencement and 26% dropped out during intervention. Although there are no reviews comparing attrition from face-to-face and online parenting interventions, individual studies that have included face-to-face and online versions of the same intervention (Bert, Farris, & Borkowski, 2008; Kable, Coles, Strickland, & Taddeo, 2012) have found comparable attrition rates regardless of delivery modality. A review of technology-assisted parenting interventions found that attrition rates ranged from 30% to 50% (Hall & Bierman, 2015), although attrition tended to be higher for self-directed online programs (i.e., those without any practitioner support).

Attrition from online parenting programs may also be underestimated, because many studies report only the average amount of program content completed rather than percentage of participants who complete the full program, and around one third of studies do not provide completion rates at all (MacDonell & Prinz, 2017). Further, there is scant research on universal online parenting interventions; that is, Internet-based programs made freely available to all parents as a preventive intervention. In one feasibility study, albeit with a sample size of only 20 participants, just 15% of parents completed the entire program (Owen & Hutchings, 2017). Evaluations of other universal, self-directed online interventions targeting anxiety and depression in adult populations suggest that although participants enrolling in these programs may number in the thousands, as few as 1% will complete them (Christensen, Griffiths, & Farrer, 2009). In summary, attrition from online parenting interventions is likely to be higher for self-directed programs, especially programs designed for universal uptake.

Research on predictors of attrition has largely focused on face-to-face parenting interventions using demographic and child or parent characteristics as predictors (for a review, see Reyno & McGrath, 2006). For many of these variables, frequently studied in isolation, there are inconsistent results across studies, and there appears to be no single area of risk that accounts for higher likelihood of dropout. For example, low socioeconomic status has been found to be associated with higher rates of attrition in some studies (Fernandez & Eyberg, 2009; Lavigne et al., 2010) but not others (Capage, Bennett, & McNeil, 2001; Werba, Eyberg, Boggs, & Algina, 2006). Similarly, single parenthood has typically been associated with high attrition (Dumka, Garza, Roosa, & Stoerzinger, 1997; Kazdin, Holland, & Crowley, 1997), although several studies have found no significant difference in attendance

rates based on marital status (Danoff, Kemper, & Sherry, 1994; Garvey, Julion, Fogg, Kratovil, & Gross, 2006; Orrell-Valente et al., 1999). More severe child externalizing behavior has been found to be associated with higher attrition in targeted interventions (Kazdin et al., 1997; Prinz & Miller, 1994) but lower attrition in some universal interventions (Garvey et al., 2006; Heinrichs, Bertram, Kuschel, & Hahlweg, 2005). Parental psychopathology and dysfunctional parenting have also been shown to be associated with higher attrition in some targeted interventions (Kazdin et al., 1997) but not in others (Gross, Julion, & Fogg, 2001; Prinz & Miller, 1994). Regarding online parenting interventions the evidence is limited, although lower levels of parenting conflict and younger child age have been shown to be associated with lower attrition rates (Baker, Sanders, Turner, & Morawska, 2017).

Attrition usually occurs early in interventions (Beveridge et al., 2015; Dumas, Nissley-Tsiopinis, & Moreland, 2007; Kleve et al., 2011), which means that parents may miss out on critical information needed to bring about change in parenting. However, there has been little research on factors associated with attrition at different phases of interventions, and for online parenting programs this issue remains unexamined. In studies of face-to-face interventions for parents of children with ADHD (Chacko, Wymbs, Rajwan, Wymbs, & Feisen, 2017; Schneider, Gerdes, Haack, & Lawton, 2013), various child and parent/family factors have been explored as predictors of dropout at different stages of intervention. Schneider et al. (2013) found that single parents were significantly more likely than those in two-parent families to both never commence and drop out during the intervention. Extending these findings, Chacko et al. (2017) showed that parents who never commenced intervention had lower parental self-efficacy and more maladaptive attributions regarding their child when compared to both those who dropped out during intervention and intervention completers. Given parent/family and child factors that influence dropout may vary according to which phase of intervention dropout occurs, it is imperative to investigate these differences to tailor specific strategies to improve participation at different phases of the intervention. This may be particularly important for online parenting interventions, as initial research suggests that enhanced child outcomes are predicted by a greater number of sessions completed by the family (Dittman, Farruggia, Palmer, Sanders, & Keown, 2014).

Parenting interventions generally target both mothers and fathers (the core parenting team), but father participation rates are often very low (Panter-Brick et al., 2014) and participation patterns may differ from mothers (Mauricio et al., 2017). Important to note, evidence suggests that face-to-face parenting interventions are more effective when fathers participate along with mothers (Fabiano, 2007; Lundahl, Tollefson, Risser, & Lovejoy, 2008). Surveys indicate that online interventions are particularly appealing to fathers, as they can overcome practical barriers

to participation such as lack of time and work commitments (Tully, Piotrowska, Collins, Mairat, Black, et al., 2017). However, with some notable exceptions (e.g., Dittman et al., 2014), the majority of studies of online parenting interventions have included data from only one parent, usually mothers (Breitenstein et al., 2014; Nieuwboer et al., 2013). Thus, evaluations of online interventions have generally not reported on rates of father participation or dropout. Consequently, rates of father participation and attrition from online interventions remain unexplored, as has the question of whether predictors of attrition differ between mothers and fathers. Furthermore, given that involvement of the core parenting team is associated with improved intervention outcomes for face-to-face interventions (Piotrowska et al., 2017), it would also be important to examine whether there is differential dropout for parents from two-parent families who choose to participate in an online intervention alone versus together.

To summarise, compared to face-to-face parenting interventions, there is little research and thus limited understanding of the factors associated with attrition from online parenting interventions, especially in relation to self-directed and universal programs, and dropout at different phases of the intervention, that is, prior to commencement versus during the intervention. In addition, no research has yet examined predictors of dropout from online interventions for fathers as well as mothers. The present study evaluates predictors of dropout from an open access, universal, self-directed parenting program; examines a wide range of participant characteristics that may influence dropout status; and reports data from both mothers and fathers. The primary research questions were as follows: (a) What are the demographic, child, and parent characteristics associated with dropout status? (b) Do predictors of dropout status differ significantly between fathers and mothers? (3) Does participation of a second caregiver in two-parent families significantly affect dropout status?

METHOD

Participants

Participants in this study were 2,967 parents or caregivers (herein referred to as parents, mothers, or fathers) who registered for participation in ParentWorks, an online parenting intervention, following a national media campaign promoting the availability of this free, father-friendly parenting program. To be eligible for participation in the study, participants had to meet the following criteria: parent or caregiver of a child 2–16 years of age, 18 years of age or older, living in Australia, and able to understand the program content in English. The total Australian sample estimated to meet these criteria was estimated to be 3,978,125,

55% of whom were mothers (Australian Bureau of Statistics, 2016).

Participants enrolled in ParentWorks were classified into three groups based on their dropout status: (a) nonstarters ($n = 1,625$; 54.7%): participants who completed registration but subsequently did not complete any modules, (2) partial completers ($n = 1,124$; 37.8%): participants who completed at least one module but either selected to discontinue (by clicking the discontinue button) or did not complete the postintervention questionnaire, and (c) full completers ($n = 218$; 7.5%): participants who completed at least five core modules and completed the postintervention questionnaire. This grouping is consistent with previous research in this area (Chacko et al., 2017) and sidesteps the problems of constructing a continuous “dose” variable based on the assumption that the number of modules completed forms a linear scale. This is problematic given that the program totals only five core modules and that these modules may not be equally weighted in their contribution to producing parenting and child outcomes, or understanding drop-out patterns. Only nonstarters and partial completers who registered more than 84 days before the time of data download were included in the study, as ParentWorks recruitment was ongoing at the time of downloading the data and 84 days was the mean completion time for the full completer group. In other words, those who registered fewer than 84 days prior to the data download were still considered to be active participants and were consequently not included in this study.

Intervention

ParentWorks is an online parenting intervention based on *Integrated Family Intervention for Child Conduct Problems* (Dadds & Hawes, 2006). This intervention has been shown to be effective in reducing child externalising problems both face-to-face (Dadds & McHugh, 1992; Dadds, Schwartz, & Sanders, 1987; Hawes & Dadds, 2005; Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013) and in a web-based version that included videoconferencing with a practitioner (Kirkman, Hawes, & Dadds, 2016). The original intervention was developed for parents of children with conduct problems, so the intervention was modified for ParentWorks to be suitable to a broader community sample of parents who had more general concerns about parenting and child behavior.

The program consisted of video presentations of six interactive sequenced modules, five of which are specified as “core” modules in that they must be completed prior to postassessment and the completion certificate being available (see Tully, Piotrowska, Collins, Mair, Hawes, et al., 2017, for further information). Each module took approximately twenty to thirty min to complete. Participants progressed through the program at their own pace in order to maximise program flexibility, and the minimum completion time was 3

weeks if they completed only core modules. Modules 1 and 2 were available immediately, and Modules 3 to 6 were unlocked sequentially 1 week after completing the previous module. This was designed to mimic the pacing of face-to-face interventions and allowed time for participants to implement the program strategies between modules. Enrolment in the program was anonymous and, apart from a certificate of completion that could be downloaded, participants received no compensation for participating.

Measures

Demographic Information

Participants completed questions on their child’s age, child’s gender, number of children, parent’s age, parent’s gender, relationship status (single/separated/divorced vs. married/de facto), education level and whether English was the primary language spoken at home. Participants were also asked if they had ever sought help from a health practitioner for their child’s behavior and whether they were completing the program alone or with someone else. If two parents were completing together, each participant completed all questionnaires individually and independently.

Participants in ParentWorks completed a range of measures at preintervention, postintervention, and 3-month follow-up, as part of the evaluation of the program’s effectiveness (Piotrowska, Tully, Collins, Hawes, Kimonis, et al., 2018). However, for the purpose of this study, which was to examine predictors of completion and noncompletion, the following domains were assessed.

Child emotional and behavioral difficulties. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a 25-item parent-report questionnaire that measures child emotional/behavioral adjustment. Each item is rated on a scale of 0 (*not true*) to 2 (*certainly true*). The SDQ Total score was used to measure total emotional and/or behavioral problems (range = 0–40), and the SDQ Conduct Problems subscale was used to measure conduct problems (range = 0–10). The SDQ has excellent psychometric properties for use in large population studies (Goodman, 2001).

Parent psychological difficulties. The Kessler Psychological Distress Scale (K6; Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002) is a six-item self-report questionnaire that measures psychological distress. Scores range from 6 to 30, with higher scores indicating higher levels of psychological distress. The K6 shows excellent psychometric properties from previous large samples epidemiological studies in Australia (Furukawa et al., 2003).

Parent and family functioning. The Parenting and Family Adjustment Scale (Sanders, Morawska, Haslam,

Filus, & Fletcher, 2014) is a 30-item measure that assesses various aspects of family functioning, with higher scores indicating lower levels of functioning. Parents rate each item on a 4-point scale from 0 (*not true of me at all*) to 3 (*true of me very much, or most of the time*). Only the Parenting subscale (18 items) was used in this study, and scores range from 0 to 54, with higher scores indicating more dysfunctional parenting. Its psychometric reliability and validity have been confirmed in two previous Australian samples (Sanders et al., 2014)

Parenting conflict. The Parent Problem Checklist (PPC; Dadds & Powell, 1991) is a 16-item self-report questionnaire measuring conflict between parents specifically relating to childrearing practices. For each of the items, parents report whether the issue has been a problem over the last 4 weeks by answering either yes or no. Scores range from 0 to 16, with higher scores indicating a greater number of areas in which the parents are experiencing conflict. The PPC shows excellent reliability and validity when used in community and clinical samples of Australian parents (Dadds & Powell, 1991; Stallman, Morawska, & Sanders, 2009).

Procedure

Participants were parents who enrolled to participate in an intervention study that sought to evaluate the effectiveness of ParentWorks in changing child behavior and a range of parent and family outcomes (Piotrowska et al., 2018). For a full description of study procedures, see the study protocol (Tully, Piotrowska, Collins, Mairet, Hawes, et al., 2017).

An 8-week national media campaign was conducted to promote ParentWorks through online and social media channels, as well as traditional media formats, such as radio (see Tully, Piotrowska, Collins, Frick, Anderson, et al., *in press*), for full details and evaluation of the media campaign). Potential participants were also recruited through flyers distributed to child and family services. Parents were directed to the program website for further information and to enroll in the program. Although ParentWorks was specifically developed to appeal to fathers, mothers were also encouraged to participate, and two-parent families were encouraged to participate in the program together.

Parents who chose to participate in ParentWorks were required to read the participant information statement and consent to the conditions in the online consent form. They then registered for the program by completing the preintervention questionnaire. Participants completed the program at their own pace. Following completion of the final compulsory module, participants completed the postintervention questionnaire. Questionnaires were anonymous, and no identifying information was obtained.

E-mail reminders were sent to participants to increase the likelihood of completion. Participants could choose to discontinue the program by clicking a box indicating discontinuation. However, only a few participants utilised this function, and the remainder simply became inactive as they did not return to complete the program.

The study was approved by the University of Sydney Human Research Ethics Committee (Project No. 2016/452) and registered with the Australian New Zealand Clinical Trials Registry (ACTRN12616001223426).

Data Analysis

Initially all variables were examined using descriptive statistics. To compare differences between dropout groups (nonstarters, partial completers, and full completers) across all variables (demographic, child, and parent measures) for the entire sample of parents, chi-square tests were used for categorical variables and one-way between-group analysis of variance for continuous variables. The same group comparison analyses were also repeated for mothers and fathers separately. Variables that differed significantly across dropout groups were subsequently included as predictors in a multinomial logistic regression model analysing dropout status as the outcome variable. The multinomial model also included one variable that showed different patterns of results between mothers and fathers (child conduct problems), as well as gender interaction term. One variable that was significant at the first stage, couple participation status (whether participants in two-parent families completed the program alone or with their partner), was analysed in a separate multinomial logistic regression model for married and de facto parents only, as this question was relevant only to these parents. The latter model also included as predictors five significant variables from the analysis of the overall sample as well as parenting conflict (PPC).

RESULTS

Demographics and Patterns of Attendance

The sample of participants who fully registered for the program included 2,967 individual caregivers (60% female) with a mean age of 38.9 years ($SD = 7.08$). The progress of participants through the program is presented in the flow diagram (Figure 1). The majority of parents (93.5%) reported English as their main language, and almost two thirds (64.1%) had a university degree. Half of participants (49.9%) worked full time, and almost one third worked part-time (29.9%). The sample included 2,256 children (59.9% boys), age range 2–16 ($M = 6.41$, $SD = 3.57$), with 50% of the sample younger than age 6. Slightly more than 40% of families reported seeking previous help for their child's behavioral and/or emotional problems; among those, the

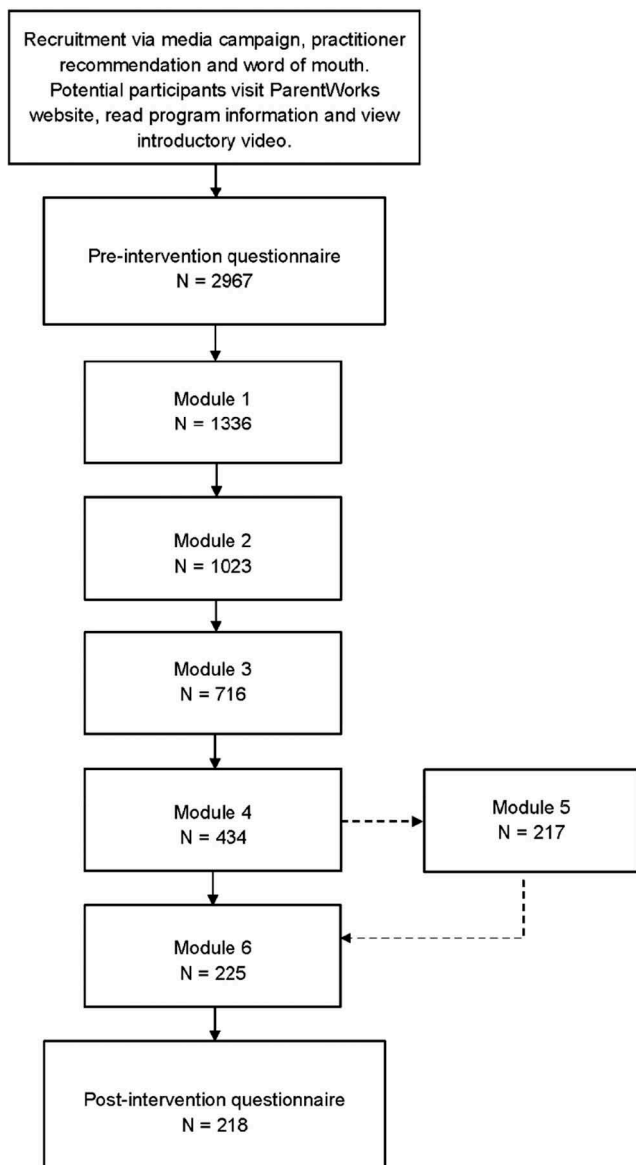


FIGURE 1 Flow diagram of participant progress through the program.

most commonly reported problems were anxiety (25.8%), ADHD (20.2%), and developmental problems (16.0%). One third of children (32.3%) had two or more diagnoses. Table 1 shows that children's mean scores on the SDQ Conduct Problems and Total Problems scales were roughly twice those of healthy community samples in Australia, for whom the normative means and standard deviations are conduct problems ($M = 1.50$, $SD = 1.60$) and total problems ($M = 8.18$, $SD = 6.06$; Mellor, 2005).

For partial completers, the median number of modules completed was 2 ($M = 2.4$, $SD = 1.2$), and for full completers (who completed either five or six modules—one module was optional), the median number of completed modules was 6 ($M = 5.58$, $SD = .76$).

Dropout Group Comparisons

Table 1 shows sociodemographic characteristics for each of the three groups, along with comparison statistics for all the variables. There were statistically significant differences in child's age, number of children, parent's education status, relationship status, couple participation status, and parent-reported psychological difficulties and dysfunctional parenting between the three groups. These variables were subsequently included in the multinomial logistic regression as predictors of dropout status.

When repeating the group analysis for mothers and fathers separately, the overall pattern of results was similar to the results for the total sample. However, for mothers but not for fathers, there were statistically significant differences in child conduct problems between groups, $F(2, 1749) = 3.99$, $p < .05$; mothers in the full completer ($M = 3.62$, $SD = 2.4$) and partial completer ($M = 3.66$, $SD = 2.2$) groups reported higher levels of child conduct problems than nonstarters ($M = 3.32$, $SD = 2.2$). Consequently, the variables child conduct problems and parent gender were included in the multinomial logistic regression as predictors together with gender interaction term.

Dropout Status Models

Eight predictor variables (child's age, number of children, parent gender, parent education status, relationship status, parent psychological difficulties, dysfunctional parenting, and child conduct problems) and one gender interaction term, just mentioned, were included in the multinomial logistic regression to predict dropout status (see Table 2). The overall model was significantly better than the null model, indicating that the predictors contributed significantly to explaining the differences between the three levels of dropout, $\chi^2(18, N = 2,913) = 113.94$, $p < .001$.

Nonstarters as the Reference Category

Child's age, parent's education status, parent psychological difficulties, dysfunctional parenting, and child conduct problems were significant predictors for partial completer status relative to nonstarter status, controlling for all other variables in the model. Specifically, relative to nonstarters, partial completers were more likely to have younger children, to have completed university education, and to have lower levels of psychological difficulties but higher levels of dysfunctional parenting and child conduct problems.

Full Completers as the Reference Category

Child's age, relationship status, parent psychological difficulties, and child conduct problems were significant predictors for nonstarter status relative to full completer status, controlling for all other variables in the model. Specifically, relative to full completers, nonstarters were more likely to have older children, be married or in a de

TABLE 1
Descriptive Statistics and Group Comparisons for All Predictor Variables

Variable	NS ^a	PC ^b	FC ^c	F or χ^2	p
Child's Age (<i>M, SD</i>)	6.6 (3.8)	5.9* (3.4)	5.6* (3.4)	16.85	< .001
Child > 12 Years (%)	10.6	5.6	5.5	32.86	< .001
Child's Gender (%)					
Male	58.1	62.6	60.6	5.74	.057
Female	41.9	37.4	39.4		
No. of Children (<i>M, SD</i>)	2.1 (1.0)	2.0* (.8)	2.0 (1.0)	4.68	.009
Parent's Age (<i>M, SD</i>)	39.2 (7.5)	38.6 (7.1)	38.9 (9.0)	2.12	.120
Parent's Gender (%)					
Male	39.0	41.0	41.7	1.32	.518
Female	61.0	59.0	58.3		
Parent's Education (%)					
< University Degree	37.9	33.1*	34.7	6.82	.033
≥ University Degree	62.1	66.9*	65.3		
Relationship Status (%)					
Single/Separated/Divorced	15.4**	14.7**	29.2	29.31	< .001
Married/De Facto	84.6**	85.3**	70.8		
Couple Participation Status (%)					
Alone	41.6**	40.1**	52.3	11.19	.004
With Another Caregiver	58.4**	59.9**	47.7		
English Primary Language (%)					
Yes	92.6	94.4	94.9	4.41	.110
No	7.4	5.6	5.1		
Previous Help Sought (%)					
Yes	40.0	42.3	41.7	1.48	.476
No	60.0	57.7	58.3		
SDQ – Total (<i>M, SD</i>)	13.9 (6.7)	14.1 (6.6)	13.9 (6.6)	.279	.757
SDQ – Conduct Problems (<i>M, SD</i>)	3.3 (2.2)	3.5 (2.2)	3.4 (2.3)	2.32	.098
K6 – Parent Psychological Difficulties (<i>M, SD</i>)	12.3 (4.8)	11.8* (4.4)	11.5* (4.4)	5.78	.003
PAFAS – Parenting Dysfunction (<i>M, SD</i>)	15.9 (6.8)	16.1** (6.6)	14.2* (6.7)	7.67	< .001
PPC – Parenting Conflict (<i>M, SD</i>)	5.9 (4.2)	5.7 (4.1)	5.1 (4.1)	2.76	.064

Note: NS = nonstarters; PC = partial completers; FC = full completers; SDQ = Strengths and Difficulties Questionnaire; K6 = Kessler Psychological Distress Scale; PAFAS = Parenting and Family Adjustment Scale; PPC = Parent Problem Checklist.

^a*n* = 1,625.

^b*n* = 1,124.

^c*n* = 218.

*Significantly different from nonstarter group at *p* = .05. **Significantly different from completer group at *p* = .05.

facto relationship, have higher levels of psychological difficulties, and have lower levels of child conduct problems. Relationship status and dysfunctional parenting were significant predictors of partial completer status relative to full completer status, controlling for all other variables in the model. Relative to full completers, partial completers were more likely to be married or in a de facto relationship and have higher levels of dysfunctional parenting.

Parent gender did not significantly predict dropout status, and none of the interaction terms between parent gender and child conduct problems were significant (all *ps* > .05), showing that the associations between conduct problems and dropout status did not significantly differ between mothers and fathers.

Married/De Facto Parents Only

In the second model, seven predictor variables (child's age, number of children, parent education status, parent

psychological difficulties, dysfunctional parenting, parenting conflict [PPC] and couple participation status) were included as predictors of dropout status for married/de facto participants only (see Table 3). The overall model was statistically significant, indicating that the predictors distinguished between the three dropout groups, $\chi^2(14, N = 2,466) = 58.55, p < .001$.

Nonstarters as the Reference Category

Child's age, parent psychological difficulties, and dysfunctional parenting were significant predictors for partial completer status relative to nonstarter status, controlling for all other variables in the model. Relative to nonstarters, partial completers were more likely to have younger children and have lower levels of psychological difficulties but have higher levels of dysfunctional parenting.

TABLE 2
Results of Multinomial Logistic Regression Predicting Dropout Status

Variable	PC vs. NS (ref. category)		NS vs. FC (ref. category)		PC vs. FC (ref. category)	
	OR [95% CI]	p	OR [95% CI]	p	OR [95% CI]	p
Child's Age	.95 [.93, .97]	<.001	1.08 [1.03, 1.13]	.001	1.03 [0.98, 1.08]	.264
No. of Children	.92 [.84, 1.01]	.080	.99 [.84, 1.17]	.933	.91 [.77, 1.09]	.303
Parent's Gender ^a	1.32 [.99, 1.77]	.060	.59 [.35, 1.00]	.051	.78 [.46, 1.35]	.374
Parent's Education ^b	.84 [.71, .99]	.036	1.28 [.93, 1.75]	.129	1.07 [.77, 1.48]	.694
Relationship Status ^c	1.10 [.88, 1.38]	.408	.34 [.24, .48]	< .001	.38 [.26, .54]	< .001
K6 – Parent Psychological Difficulties	.97 [.95, .99]	.001	1.05 [1.01, 1.08]	.017	1.01 [.98, 1.05]	.542
PAFAS – Parenting Dysfunction	1.02 [1.00, 1.03]	.010	1.03 [1.0, 1.05]	.057	1.04 [1.02, 1.07]	.002
SDQ – Conduct Problems	1.07 [1.02, 1.13]	.004	.90 [.82, .98]	.015	.96 [.88, 1.05]	.404
SDQ-CP × Parent's Gender ^a	.94 [.88, 1.01]	.094	1.11 [.97, 1.26]	.139	1.04 [.91, 1.19]	.572

Note: PC = partial completers; NS = nonstarters; ref. = reference; FC = Full completers; OR = odds ratio; CI = confidence interval; K6 = Kessler Psychological Distress Scale; PAFAS = Parenting and Family Adjustment Scale; SDQ = Strengths and Difficulties Questionnaire; CP = conduct problems.

^a Male versus female (ref. category).

^b < university degree vs. ≥ university degree (ref. category).

^c Single/separated/divorced versus married/de facto (ref. category)

Full Completers as the Reference Category

Child's age was the only significant predictor for nonstarter status relative to full completer status, controlling for all other variables in the model. Specifically, relative to full completers, nonstarters were more likely to have older children. Number of children was the only significant predictor for partial completers relative to full completers, controlling for all other variables in the model. Relative to full completers, partial completers were more likely to have fewer children.

DISCUSSION

Numerous studies have described predictors of engagement versus dropout in face-to-face parenting programs, and the results have facilitated methods for improving intervention effects via reducing dropout rates (e.g., Reyno & McGrath, 2006). Online parenting programs are emerging as capable of producing similar outcomes to face-to-face interventions; however, less is known about dropout, especially for self-directed universally available programs, which typically have very high dropout rates. There is also little research to date on differential predictors of attrition for mothers versus fathers. We sought to collect data on predictors of dropout from a universal, self-directed parenting program made freely available to mothers and fathers in the Australian population. In what follows we discuss key findings and their implications.

In terms of child age, parents of older children were more likely to be in the nonstarter group (vs. both partial and full completer groups), but there were no differences between partial and full completers. The percentage of children older than 12 years in the nonstarters was nearly double those in the partial and full completer groups. Age of the child has rarely emerged as a reliable predictor of dropout rates; however, this could be due

to most studies involving more restricted age ranges than included in the current study (e.g., Lavigne et al., 2010, included 3- to 6-year-olds). It is not surprising that parents with older children were less likely to commence the program. Although the program was open to parents of 2- to 16-year-olds, many of the management strategies are more applicable to younger children, and many of the visuals on the website were skewed toward younger children. It is possible that parents of older children may not view the program as relevant to them and may therefore be less likely to commence participation. This finding suggests that the design of programs should be mindful of how age of target children is presented in the web design graphics and information to best match parents to the intervention.

In terms of severity of child behavior problems, the logistic regression indicated that nonstarters also had children with the least problems, and again the partial and full completers did not differ. For example, Table 2 odds ratios show that each unit rise in child SDQ scores is associated with a 2%–18% increase in the likelihood of being in the full completer compared to the nonstarter group. Although higher levels of child behavior problems have been found to be associated with higher attrition in targeted interventions (Kazdin et al., 1997; Prinz & Miller, 1994), our results are consistent with previous findings that more severe child problems are associated with lower attrition in universal interventions (Garvey et al., 2006; Heinrichs et al., 2005). This finding is encouraging in that it suggests that parents of children with more difficult behaviors are most likely to proceed with the program, and therefore benefit from intervention.

A positive and unusual finding was that there were only small differences in participation rates and no differences in completion or dropout rates for mothers and fathers. Previous research has shown that fathers are significantly less likely to participate in such programs (Panter-Brick et al., 2014).

TABLE 3
Results of Multinomial Logistic Regression Predicting Dropout Status for Married/De Facto Participants

Variable	PC vs. NS (ref. category)		NS vs. FC (ref. category)		PC vs. FC (ref. category)	
	OR [95% CI]	p	OR [95% CI]	p	OR [95% CI]	p
Child's Age	.95 [.93, .98]	< .001	1.10 [1.04, 1.16]	.001	1.05 [.99, 1.11]	.116
No. of Children	.91 [.82, 1.01]	.086	.89 [.73, 1.07]	.221	.81 [.67, .99]	.038
Parent's Education ^a	.84 [.70, 1.01]	.057	1.17 [.80, 1.71]	.416	.98 [.67, 1.44]	.917
K6 – Parent Psychological Difficulties	.97 [.95, .99]	.010	1.05 [1.00, 1.10]	.058	1.02 [.97, 1.07]	.484
PAFAS – Parenting Dysfunction	1.03 [1.01, 1.04]	< .001	1.00 [.97, 1.04]	.840	1.03 [1.00, 1.07]	.055
PPC – Parenting Conflict	.99 [.97, 1.02]	.601	1.03 [.98, 1.08]	.308	1.02 [.97, 1.07]	.450
Couple Participation Status ^b	.98 [.82, 1.18]	.843	.84 [.58, 1.20]	.327	.82 [.57, 1.19]	.290

Note: PC = partial completers; NS = nonstarters; ref. = reference; FC = full completers; OR = odds ratio; CI = confidence interval; K6 = Kessler Psychological Distress Scale; PAFAS = Parenting and Family Adjustment Scale; PPC = Parent Problem Checklist.

^a< university degree vs. ≥ university degree (ref. category).

^bAlone vs. with another caregiver (reference category).

ParentWorks and the national media campaign promoting its availability were designed to be “father-friendly.” Although the sample still had a majority of mothers (60%), this is not vastly different from the percentage of mothers versus fathers in the target population sample (55 mothers vs. 45% fathers), and the data from the current study thus show that the typical low participation rates for fathers can be overcome when they are specifically mentioned and encouraged to participate via media outreach and within the online materials themselves. More information on these father-friendly strategies are available in Tully, Piotrowska, Collins, Mairet, Hawes, et al. (2017); Piotrowska et al. (2017); and Tully, Piotrowska, Collins, Mairet, Black, et al. (2017).

In contrast to the preceding findings for higher child needs predicting program uptake, parents with higher levels of psychological difficulties were more likely to be in the nonstarter group compared to both partial and full completer groups (there were no differences between partial and full completers). In other words, having more psychological difficulties was associated with both not commencing and not completing the program. This is consistent with a wealth of research on face-to-face programs, where extra attention needs to be paid to successfully engaging and preventing dropout in parents with high levels of psychological distress (e.g., Kazdin, 1996; Reyno & McGrath, 2006). This is especially important but challenging for self-directed programs. We know that there are likely benefits for parental mental health for those who do participate (Piotrowska et al., 2018); however, methods for improving engagement rates among those with high levels of psychological distress when no therapist is present are, to our knowledge, largely unexplored.

In contrast to parental psychological distress, the partial completer group had significantly higher parenting

dysfunction than nonstarters and completers. This is likely to indicate that parents with higher levels of self-reported parenting dysfunction are more motivated to participate initially but are also at higher risk of dropping out prior to completion. These parents may have trouble completing the program, especially without the assistance of a practitioner to guide them. Alternatively, it is possible that these parents may receive benefits after completing the first few modules and do not perceive the need to complete additional modules. Further research should be conducted to understand the reasons why parents with more dysfunctional parenting discontinue online programs, in an effort to improve engagement strategies for these parents.

The preceding findings with regard to levels of child behavior problems and parental psychological distress should be interpreted with consideration to the fact that parents were given broad feedback about their scores on these variables. That is, at pre- and postintervention for those who persisted, assessment results of these measures were fed back to parents in a general but supportive way. For example, if a parent had scored high on psychological distress (the K6), the “My Family Feedback” facility would present them with the following statement: “At least one caregiver has indicated that they have been feeling symptoms of psychological distress over the last month. If you feel like you need assistance with your mental health, please refer to the Resources + Help page for a list of additional services.” The effect of such feedback on engagement and dropout is unknown, and it may be that varying the way these messages are presented could exert a positive influence. Further targeted research is needed to evaluate this possibility.

One of our key aims was to examine the effects of marital status, participation of one versus two caregivers, and levels of couple conflict on dropout rates. Given our

focus on achieving high rates of participation from fathers, we were particularly mindful of the complexities of single person versus parental team participation and designed the program to collect data on this. First, we found that single parents were actually more likely to complete the program. This contradicts findings from face-to-face interventions (e.g., Chacko et al., 2017; Schneider et al., 2013) showing that single parents have higher attrition. This finding could support the idea that online interventions are suited to single parents by overcoming practical barriers (e.g., time, costs, lack of childcare) that make it difficult for single parents to complete programs. Second, for those in two-parent families, completing the program alone versus together had no impact on dropout, and levels of interparental conflict had no impact on dropout status either for those participating together or alone.

Although we cannot be sure why these interparental factors were not associated with engagement versus dropout, we can offer some putative explanations for further consideration. First, online programs may be especially helpful for single parents who are time-poor and can work on parenting alone in their own time. Second, the overall emphasis on father engagement in the media campaign and the program itself may have gone some way toward reducing interparental disagreements that stemmed from disagreements about seeking help. Second, recall that ParentWorks included a partner support module, known to reduce interparental conflict and enhance treatment effects (Dadds et al., 1987). Those with high levels of interparental conflict at preintervention were given explicit feedback and encouraged to complete this module: “At least one caregiver has identified that there are some disagreements between the two of you about parenting. Completing Module 5 on Working as a Team may help you develop skills to work well together as a parenting team. We strongly recommend you complete this module, but the choice is yours.” Although this was an optional module, we found that most participants elected to complete this module, indicating that content regarding teamwork in parenting may be important to include in future parenting interventions.

Some more miscellaneous findings should be noted. Of interest, education level did not have much impact on dropout (although partial completers were more likely to have higher education than nonstarters). However, it is important to note that our sample was skewed toward parents with higher education, so there may not have been enough variation in our sample. We are unclear as to why the sample showed such skew (the sample had roughly double the national rate of university degrees), but it may indicate that such an online program is likely to attract those who are generally resourceful, computer literate, and able to read and complete a rather lengthy research consent process. It also raises questions about the generalisability of findings to samples with a different distribution of education. Notwithstanding this, the

failure of education level to predict dropout is counter to some but not all research with face-to-face programs (Capage et al., 2001; Fernandez & Eyberg, 2009; Lavigne et al., 2010; Werba et al., 2006) and thus encouraging in terms of the broad reach potential of online programs.

Strengths of this study include the presentation of data from a large initial sample coming from a nationwide rollout of an evidence-based parenting program. As noted, we believe this to be the first time such data have been collected on a universally available, self-directed parenting program. Along with data from mothers, we also included data from fathers, a group that is usually overlooked in parenting research. Limitations of the study come from the lack of depth we were able to employ in the measures of parents' experiences with the program. Anonymity was a feature of enrollment of the program, and we aimed to keep the program as light-touch and user-friendly as possible, which largely precluded the use of intensive measurement. Thus, it is a challenge to interpret the exact reasons for some of the objective data, and we will be reliant on future studies to unpack some of the reasons for our predictors. Finally, it should be noted that some of the effect sizes, expressed as odds ratios for the individual predictors, were small (e.g., about 5% for child age effects), which means that they may only be clinically significant in larger population interventions. However, others were large (e.g., about 70% for the effects of relationship status in comparing completers to the other groups) and therefore meaningful in even small samples.

In conclusion, the current study has discovered some positives and some potential challenging indications for the use of universally available, self-directed parenting programs to improve parenting and reduce child mental health problems. First, consistent with previous studies, dropout from initial engagement is very high for universally available self-directed online programs. Although this is disappointing, it is partially mitigated by the demonstrated effectiveness and low costs of this program for those parents who do persist and complete the program (Piotrowska et al., 2018). Second, we have seen that mothers and fathers can be reached and engaged at equal rates when program and media outreach design is explicitly father-friendly. Third, parents may be sensitive to the applicability of the program, and its presentation in terms of graphics and information, so the age of their child(ren) and targeting specific age groups might be important. Fourth, it was reassuring to see that those children with the most need for intervention had parents that were most likely to complete the program. On the contrary, parents with the most personal distress were the least likely to complete the program, and those with the most dysfunctional parenting were the most likely to just complete part of the program. Finally, this online self-directed program was very effective at engaging single parents and, with its optional focus on interparental teamwork, was not affected by dropout associated with inter-parental conflict.

Overall, the results indicate that universally available, self-directed programs will engage only a small percentage of those who register for involvement. Notwithstanding this, and consistent with previous research (Breitenstein et al., 2014; Jones et al., 2013; Sourander et al., 2016), online programs have the potential to engage an important sample of parents in need of help with managing child behavioral problems and other mental health problems in their children, and future research should explore strategies to help keep parents engaged in online interventions.

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