Measurement Properties for a Scale Assessing Self-Regulation in Parents and Parenting Practitioners

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Abstract
Parenting self-regulation is increasingly recognised as an important facet of positive parenting, as it allows parents to manage their thoughts, behaviours, emotions and attention in order to effectively carry out parenting tasks. Evidence-based parenting programmes such as the Triple P-Positive Parenting Program aim to increase parenting self-regulation by teaching parents a range of skills and strategies to deal with everyday parenting. Despite the importance of self-regulation within the field of parenting, few measures assessing this construct are available. The current investigation aims to add to existing literature by evaluating the measurement properties of a brief and parsimonious measure of self-regulation for both parents and parenting practitioners, the Parenting Self-Regulation Scales (PSRS)—Parent and Practitioner versions. Exploratory and Confirmatory Factor Analyses gave support for a single-factor model for the parent version, and this was confirmed in the practitioner version. Both versions demonstrated excellent internal consistency and hypothesis testing supported the construct validity of both scales. The results indicate that the PSRS is a promising brief measure of parenting self-regulation for parents and practitioners which could prove useful to both clinical work and research in the parenting field.

Keywords Self-regulation · Parenting · Practitioners · Measurement properties · Triple P

Highlights
- Evaluated measurement properties of a 12-item brief measure of self-regulation for parents and practitioners delivering parenting programmes.
- Factor analyses supported a single-factor structure, and both scales displayed excellent internal consistency.
- Parent version can be used with parents to assess parental self-regulation in parenting.
- Practitioner version can be used to assess practitioners’ self-regulation in delivering parenting programmes.
- Both versions of the measure displayed convergent and concurrent validity for use with the targeted populations.

An individual’s ability to self-regulate is linked with positive life outcomes including, but not restricted to, financial and academic success, better interpersonal relationships, and overall wellbeing (Duckworth & Seligman, 2005; Moffitt et al., 2011; Sanders & Mazzucchelli, 2013). Similarly, deficits in self-regulation are associated with psychological disorders (e.g., Moffitt et al., 2011) and self-regulation has been shown to be an important mechanism of change in therapies (e.g., Hayes et al., 1999; Martell et al., 2010). As defined by Karoly (1993), self-regulation is a process that occurs both within an individual and in communication with others, which allows for people to direct their goal driven activities according to various circumstances that may arise across time. Within the field of parenting, self-regulation has been seen as fundamental to success for both parents and the practitioners who work with parents to help them overcome parenting challenges (Sanders & Mazzucchelli, 2013).

In the parenting context, Sanders and Mazzucchelli (2013) have presented a five-domain model of self-regulation which
consists of self-management, self-efficacy, personal agency, self-sufficiency and problem solving. Self-management refers to the different skillsets and tools that parents and practitioners learn to use in order to alter their practices and become more self-sufficient. This includes self-monitoring of behaviours, self-determination regarding goals and personal standards, self-selection of strategies used, self-evaluation of achievements in reference to goals and self-reward for achieving goals. Self-efficacy refers to an individual’s belief that they have the ability to perform any given task successfully (Ajzen, 1991). Personal agency refers to how a parent or practitioner internally attributes improvements or changes to their situation to their own determination and effort (Hamilton et al., 2015). Self-sufficiency refers to a person’s ability to become an independent thinker and problem solver. Problem solving refers to how people plan for and apply an inventory of essential skills required to effectively manage their tasks or challenges that may arise. It involves the formulation of a plan, execution of this plan and evaluation of its outcome. A self-regulating parent or parenting practitioner will be able to generalise their knowledge and skills in order to problem solve in the presence of new challenges. It is argued that parenting interventions which specifically target self-regulation processes, can improve the self-regulation skills of both the practitioners who deliver the programmes and the recipients of the programme (Sanders & Mazzucchelli, 2013).

Evidence-based parenting programmes have emerged in Western cultures during the last 40 or so years with the most well-known being developed and tested in the United States and Australia (Gardner et al., 2015). Most established parenting programmes were first designed to target disruptive child behaviour and have their origins in operant learning theory, social learning theory and cognitive-behavioural principles (Leijten et al., 2019). The specific techniques used in the programmes vary but typically include behaviour management techniques based on reinforcement principles and may include other techniques such as problem solving or teaching emotion-regulation strategies. A large evidence base has demonstrated that parenting programmes, have the potential to reduce the prevalence of mental disorders in, promote the resilience for, and foster the healthy development of children as well as reducing parent adjustment difficulties (Leijten et al., 2019; Scott, 2010). Moreover, parenting programmes are one of the most cost-effective ways to improve outcomes for both children and parents (Foster et al., 2008; Mihalopoulos et al., 2011). One of the most well-established and widely disseminated parenting programmes is the Triple P- Positive Parenting Program, which emphasises the use of self-regulatory processes by both practitioners and parents (Sanders et al., 2019). Self-regulation has always been a core principle embedded in the development of the Triple P program extending to all participants of Triple P, from service provider to parents (McWilliam et al., 2016). While the ultimate goal is to build children’s own self-regulation processes, it is proposed that parents using and modelling self-regulation may best achieve this goal (Sanders & Mazzucchelli, 2013). Similarly, in training practitioners to deliver parenting programmes it is argued that practitioners must model and use similar self-regulatory practices in order to optimally assist parents (Sanders & Mazzucchelli, 2013).

Previous literature on both parents and parenting practitioners has mainly focused on the effect of self-efficacy (one component of self-regulation) in parenting and service delivery. For parents, parental self-efficacy has been strongly associated with parenting competence, child adjustment and positive functioning in children (Jones & Prinz, 2005). Furthermore, parental self-efficacy was found to be negatively related to parental stress, anxiety, and depression (Jones & Prinz, 2005). For practitioners, self-efficacy is one of the most intensely studied predictors of implementation outcomes for evidence-based public health interventions including parenting interventions (Damschroder et al., 2009; Shelton et al., 2018). In the area of parenting interventions, practitioner self-efficacy has consistently been shown to predict the frequency of programme delivery, as well as sustained delivery of the intervention with parents following training in both quantitative studies (e.g., Sanders et al., 2009; Shapiro et al., 2012) and qualitative studies (e.g., Shapiro et al., 2014). Given self-efficacy is one of the five proposed underlying constructs of self-regulation, self-regulation should be highly correlated with self-efficacy and previous findings on self-efficacy should be easily extended to self-regulation.

Given the importance of self-regulation in parenting and for practitioners delivering parenting interventions, it is important to be able to measure this construct in brief and reliable ways. Previous related instruments have mainly tapped into only one aspect of self-regulation in parents and practitioners—self-efficacy. A systematic review identified 34 measures of parenting self-efficacy of varying psychometric quality (Wittkowski et al., 2017). These measures assess global and task specific self-efficacy and have shown important changes in self-efficacy across intervention. Similarly, the self-efficacy of practitioners has been well-measured and researched in implementation science (Damschroder et al., 2009; Shelton et al., 2018). More recently, Hamilton et al. (2015) developed and validated a measure of a parent’s ability to self-regulate, the “Me as a Parent” scale (MaaP), by capturing information about parents’ self-efficacy, personal agency, self-sufficiency and self-management. However, this measure did not include the problem-solving domain within its development (which has been considered a fundamental component) and has not been adapted for use with practitioners. The factor structure
of MaaP was recently not confirmed in a validation study with 370 Portuguese mothers and was revised to have three instead of four factors (Marques et al., 2020). We sought to produce a brief measure of self-regulation which could assess self-regulation as an overall construct (rather than focusing on multiple domains), but which is drawn from the five-domain model proposed by Sanders and Mazzucchelli (2013).

The parenting self-regulation scale was first designed for parents to complete to measure their parenting self-regulation, for use in both research and clinical settings. We then adapted the scale to create an additional version to be completed by practitioners to measure the practitioners’ ability to self-regulate in relation to their delivery of parenting interventions. The practitioner version of the self-regulation scale was developed for use by practitioners delivering any parenting intervention. In the second study included in this paper we administered the practitioner version to a population of Triple P practitioners, so scale items asked specifically about delivery of Triple P. However, our intention was to develop a scale that could also be used with practitioners trained in other evidence-based parenting interventions. The parent version of the scale is intended for use in both research and clinical settings. The scale can help researchers to explore the role of self-regulation in parenting, and its relationship with other parenting variables and outcomes. Clinically, practitioners could assess a parent’s self-regulatory capacity and whether this has changed over the course of an intervention period. The practitioner version of the scale is primarily intended for use in implementation research, for example, to investigate the role of practitioner self-regulation in predicting outcomes such as sustained programme use. This paper aimed to examine the measurement properties of both versions of the Parenting Self-Regulation Scales (PSRS) by describing two studies assessing the Parent and Practitioner versions of the scale.

According to the CONsensus-based Standards for the selection of health Measurement INstruments (COSMIN; Mokkink et al., 2019) study design checklist for patient-reported outcome measurement instruments, we evaluated the structural validity (to assess underlying factor structure), internal consistency (to assess unidimensionality) and conducted hypothesis testing for construct validity for both versions of the scale (to assess expected relationships with other measures). In the first study, we evaluated the measurement properties of the PSRS-Parent version by administering the measure to a sample of parents. We examined the structural validity using exploratory and confirmatory factor analyses, the internal consistency (using Cronbach’s alpha), and conducted hypothesis testing for construct validity. To examine convergent validity, we administered a scale measuring parent anxiety, depression and stress symptoms and predicted significant negative correlations with our scale as previous research have shown these constructs to be related (Jones & Prinz, 2005). In the second study, we examined the measurement properties of the PSRS-Practitioner version by administering the scale to an international sample of parenting practitioners trained in Triple P. We examined the structural validity using confirmatory factor analysis, the internal consistency (using Cronbach’s alpha), and conducted hypothesis testing for construct validity. To examine convergent validity, we administered a scale measuring practitioner self-efficacy and predicted that it would have a large positive correlation with our measure of practitioner self-regulation as the two scales measure similar constructs. To examine concurrent validity, we predicted that practitioner self-regulation would be positively associated with sustained programme delivery and frequency of programme delivery based on previous research demonstrating relationships between these variables (Sanders et al., 2009; Shapiro et al., 2012).

**Study 1: Measurement Properties of the Parent Version**

**Method**

**Participants**

Participants were recruited via convenience sampling through social media and advertising through schools and childcare. Table 1 provides key demographic information of the sample. The survey was completed by 410 mothers and 17 fathers aged between 22 and 53 years (M = 35.30, SD = 5.81). Of these, 309 (72.36%) had completed a Bachelor degree or higher, and the majority of participants’ partners had also completed at least a Bachelor degree (50.12%). Most of the parents identified as Caucasian (88.99%) and were married (77.04%) or defacto (13.84%). Parents with two or more children were asked to complete the survey thinking about the child who required the most time and attention each day. Children (53.16% male) were aged between 1 and 12 years of age (M = 4.73, SD = 3.04).

**Procedure**

The research was conducted in accordance with the ethical review processes of the University of Queensland and the National Statement on Ethical Conduct in Human Research guidelines (UQ Ethics Clearance Number 17-PSYCH-4-107-JH). Participants provided informed consent and
completed the survey online in May-July 2017. After completion, participants were presented the opportunity to provide their email details to go into a prize draw to win one of two $50 shopping gift vouchers.

In order to design the scale, existing measures of self-regulation were reviewed and then an initial item pool of 55 items for the parent version was developed by the authors of the scale (all very experienced in parenting intervention delivery and research) based on the five-domain definition of self-regulation (Sanders & Mazzucchelli, 2013). The 55 items were then circulated to a broader range of experts experienced in questionnaire development and parenting for further feedback and refinement. In order to create a brief scale, the scale authors discussed and selected 2–3 items for each of the five domains which were deemed to be the best candidates for tapping into the construct, resulting in a final pool of 12 items.

To ensure the measure could be easily understood by parents with low education it was assessed using the Flesch-Kincaid readability test. The parent version was assessed to be easily understood by 11–12-year-old students.

**Measures**

**Family background questionnaire (FBQ)** The FBQ (Sanders & Morawska, 2010) collected demographic information such as parent and child age and gender relationship to child.

**Parenting self-regulation scales-parent version (PSRS-Parent)** This self-report measure was developed by Sanders et al. (2017), with the intention of creating a brief measure of parental self-regulation (see Appendix A). The measure contains 12 items on a 7-point Likert-type scale ranging from (1) “strongly disagree” to (7) “strongly agree”. All items in the PSRS were positively worded (e.g., “I have the skills to be an effective parent.”). For the purposes of evaluating construct validity of the PSRS in the present study, a total score was calculated by summing all 12 items, with higher scores reflecting higher levels of parent self-regulation.

**Me as a parent (MaaP)** The MaaP scale (Hamilton et al., 2015) is a measure of parental self-regulation, consisting of 16 items representing four subscales (self-efficacy, personal agency, self-sufficiency and self-management). Twelve items were worded positively, and 4 items were worded negatively. The items were measured on a 7-point Likert-type scale ranging from (1) “strongly disagree” to (7) “strongly agree”. A total score is generated, with scores ranging from 16 to 80, where higher scores indicating higher levels of parent self-efficacy. The MaaP demonstrated adequate internal consistency (α = 0.71).

**Child adjustment and parent efficacy scale (CAPES)-self-efficacy subscale** The CAPES (Morawska et al., 2014) is a self-report measure that includes two subscales. The CAPES Self-efficacy subscale (19 items) assesses parents’ efficacy in managing child problems using a 10-point scale ranging from (1) “Certain I can’t do it” to (10) “Certain I can do it”, with higher scores indicating greater levels of self-efficacy. This scale had excellent internal consistency (α = 0.95).
Parenting tasks checklist (PTC) The PTC (Sanders & Woolley, 2005) is a 28-item measure of self-efficacy in relation to different settings and child behaviours (14 items each subscale). Both scales demonstrated excellent internal consistency in the present study ($\alpha = 0.98$ and 0.93, respectively). Scores range from (0) “certain I can’t do it” to (100) “certain I can do it”, with higher scores indicating higher levels of parenting self-efficacy.

Depression anxiety stress scales—21-item version (DASS-21) The DASS-21 (Henry & Crawford, 2005) has 21 items measuring symptoms of depression, anxiety, and stress on a four-point Likert-type scale. In the present study the depression and stress subscales demonstrated good internal consistency ($\alpha = 0.88$ for both scales) and the anxiety subscale had adequate internal consistency ($\alpha = 0.76$). Overall, the DASS-21 yielded excellent internal consistency ($\alpha = 0.92$).

Analytic strategy

To evaluate structural validity, although we anticipated a single factor solution, an exploratory factor analysis (EFA) was conducted in SPSS-25 to explore the shared variance between the items in the scale and determine the optimal number of factors to retain. This was followed by a confirmatory factor analysis (CFA) in an independent sample to analyse the model’s goodness of fit and to confirm the factor structure. In order to ensure independent samples, the present sample was randomly split such that approximately half was used for the EFA ($n = 222$) and the remainder was used for the CFA ($n = 205$). These sample sizes are considered adequate for proceeding with factor analysis for a 12-item measure (Zygmont & Smith, 2014).

The EFA was performed by implementing principal axis factoring (PAF) to allow for hypothesised measurement error (Norris & Lecavalier, 2010). Furthermore, PAF is robust to departures from normality (Fabrigar et al., 1999). As any arising factors were assumed to be to some extent correlated, Direct Oblimin oblique rotation was implemented to allow for factor correlations (Kahn, 2006). The Scree plot and Kaiser criterion were examined to identify the number of factors produced. However, scree plots require subjective decision-making regarding the number of factors to retain. Furthermore, existing literature on the Kaiser criterion suggest that this extraction method fails to account for sampling errors and that it tends to identify too many factors (Ruscio & Roche, 2012). Therefore, Parallel Analysis was used as it accounts for the sampling error and is considered to be the most accurate method for factor extraction (Henson & Roberts, 2006).

The CFA was conducted and evaluated using the Mplus software package (Muthén & Muthén, 2011). Due to evidence of non-normality, a Maximum Likelihood estimator with robust standard errors (MLR) was used to compute the goodness of fit (Yuan & Bentler, 2000). The chi-square ($\chi^2$) goodness-of-fit value, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) using a 90% confidence interval, and standardised root mean square residual (SRMR) were utilised in order to evaluate the model fit. CFI and TLI values of 0.95 and above are considered to be an acceptable fit, however values of 0.90 and above are also considered adequate (Hu & Bentler, 1999). Additionally, although it is suggested that RMSEA values should not be greater than 0.05, values up to 0.08 are considered adequate and SRMR values should be less than 0.08 (Browne & Cudeck, 1992). Modification indices were taken into consideration when re-specifying models, along with theoretical considerations (Kline, 2016).

Cronbach’s alpha was examined for internal consistency. To test hypotheses on construct validity, bivariate correlations were conducted between the PSRS and the MaaP, CAPES Self-efficacy, PTC Behaviour and Setting scales to examine convergent validity and correlations with the DASS-21 examined concurrent validity.

Results

Preliminary Analyses

As there were no missing data for the PSRS, missing data analyses were not required prior to conducting the EFA and CFA. Six items were negatively skewed, such that a larger proportion of participants provided higher scores indicating less self-efficacy. This was expected as parents who are more concerned with issues relating to parenting were likely to participate. Three items had significant kurtosis. PAF was used as it is robust to non-normal distribution (Fabrigar et al., 1999). The correlation matrix of the PSRS indicated that the majority of the inter-item correlations were above 0.30 and deemed acceptable (Field, 2009). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.90, suggesting the data was suitable for factor analysis (Field, 2009; Tabachnick & Fidell, 2013), and Bartlett’s Test of Sphericity was also significant, $\chi^2(66, N = 427) = 1633.16, p < 0.001$ suggesting adequate correlations between the variables.

Structural Validity

Exploratory factor analysis

An EFA examined the underlying factor structure of the PSRS. The Scree plot and Kaiser criterion initially suggested a two-factor model. Parallel Analysis produced a single factor model with an eigenvalue of 5.98 and criterion value of 0.58. Thus, both the two-factor solution and the single factor solution were explored for interpretability and clean
factor structure. The two-factor model accounted for 62.85% of the total variance for the PSRS and the single factor model accounted for 53.01%. Although the two-factor model accounted for more of the total variance, the single factor solution was preferred as the two-factor solution did not provide a clear pattern of loadings and was not interpretable. A factor loading of 0.40 was initially used as the criterion for retaining items (Fabrigar et al., 1999; Field, 2009). Applying this to the single-factor solution, 11 items loaded onto the extracted factor (see Table 2), and one item (item 8: “I believe that changes in my parenting cause changes in my child’s behaviour”) fell slightly below the 0.40 threshold (0.38). However, as the item had theoretical relevance and potential clinical utility, it was retained for further validation in CFA analyses with an independent sample.

**Confirmatory factor analysis**

A CFA was conducted to assess and cross-validate the single-factor model derived from the EFA in the independent sample of 205 cases. First, a single-factor structure was tested with all 12 PSRS items included in the model. The chi-square test of model fit was significant, \( \chi^2(54) = 185.54, p < 0.001 \). Furthermore, the alternative fit indices suggested that the model fit was not adequate, CFI = 0.874, TLI = 0.846, RMSEA = 0.109 [90% CI: 0.090, 0.126], SRMR = 0.055. Examination of the modification indices suggested substantial improvements to model fit could be attained by correlating residual errors for items 4 and 5 (“I feel confident that I can take actions to improve my child’s behaviour” and “I am confident I can make changes to my parenting to solve a problem relating to my child’s behaviour”). Substantive review of these items suggested that this was reasonable as both related to parenting confidence. The chi-square test of model fit for this adjusted model was significant, \( \chi^2(53) = 129.17, p < 0.001 \). Alternative fit indices indicated that the model fit was more adequate than the initial CFA, but was still lower than ideal, CFI = 0.927, TLI = 0.909, RMSEA = 0.084 [90% CI: 0.066, 0.102], SRMR = 0.050.

Further review of modification indices suggested that adding a residual covariance between items 2 and 3 (“I am good at making a plan to achieve changes that are needed in parenting” and “I am good at carrying out a plan to achieve changes that are needed in my parenting”) would substantially improve model fit. Evaluation of these items suggested that this modification was reasonable, as both items related to planning. The chi-square test of model fit for this model was significant, \( \chi^2(52) = 102.31, p < 0.001 \), however it should be noted that chi-square goodness of fit is highly sensitive to sample size (Powell & Schafer, 2001). Alternative fit indices suggested good fit, CFI = 0.952, TLI = 0.939, RMSEA = 0.069 [90% CI: 0.049, 0.088], SRMR = 0.047. Figure 1 displays the CFA single factor model.

**Internal Consistency**

The PSRS was found to demonstrate excellent internal consistency (\( \alpha = 0.92 \)).

**Hypotheses Testing for Construct Validity**

**Missing values analysis**

In order to retain as much of the participant-provided data as possible, sum scores were computed for participants

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**Table 2** Factor loadings onto single extracted factor for each of the 12 items of the Parenting Self-Regulation Scale-Parent Version

| Item no. | Factor loading | Corrected item-total correlations |
|---------|----------------|----------------------------------|
| 1       | 0.58           | 0.57                             |
| 2       | 0.68           | 0.66                             |
| 3       | 0.71           | 0.68                             |
| 4       | 0.81           | 0.77                             |
| 5       | 0.82           | 0.78                             |
| 6       | 0.81           | 0.77                             |
| 7       | 0.54           | 0.53                             |
| 8       | 0.38           | 0.36                             |
| 9       | 0.83           | 0.79                             |
| 10      | 0.64           | 0.61                             |
| 11      | 0.71           | 0.69                             |
| 12      | 0.77           | 0.73                             |

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**Figure 1** Single factor confirmatory factor analysis of the 12-item PSRS-Parent with standardised estimates. All loadings significant at \( p < 0.001 \). *** \( p < 0.001 \)
who had completed at least 80% of items for a subscale, with missing items replaced by the participant’s mean score for that subscale. More than 50% of scores were present for each participant and for each variable. Little’s MCAR test was significant, $\chi^2(15,359) = 16,019.66$, $p < 0.001$, meaning the null hypothesis that data were missing completely at random was rejected. Inspection of the data revealed that response numbers decreased for later measures in the survey, suggesting that participant attrition may be the cause of the systematic pattern of missing data. Pairwise correlations were thus computed using all available data.

Data screening

Data for the PSRS, MaaP, and CAPES Self-efficacy were distributed normally as the observed skew and kurtosis were non-significant. The PTC Setting and PTC Behaviour scales were negatively skewed such that participants tended to report higher scores. Scores on the DASS Depression, DASS Anxiety, DASS Stress, were positively skewed such that participants tended to report lower scores. The measures included in this investigation are clinical measurements and as such are expected to produce skewed distributions of data. Therefore, the no transformations were applied to the data. Both parametric (Pearson’s $r$) and non-parametric (Spearman’s $\rho$) were analysed. There were no significant differences to interpretations; therefore, Spearman’s correlations were used, as they are more robust to non-normal data.

Results of hypotheses testing for construct validity

The correlations between the PSRS and other measures are in Table 3. As expected, a significant positive relationship was found between the PSRS with the MaaP, the CAPES Self-efficacy scale, and the PTC Setting and Behaviour scales. These relationships demonstrated convergent validity of the scale with similar measures. Demonstrating concurrent validity of the scale, significant negative correlations were observed between the PSRS and the DASS Depression, Anxiety and Stress scales as predicted.

Study 2: Measurement Properties of the Practitioner Version

Method

Participants

A total of 1606 practitioners who were trained in Triple P between 1997 and 2020 completed the survey with 91.2% identifying as female, 7.7% as male and 0.4% as another term. The majority of practitioners were aged between 35–59 years (71.3%). Practitioners were mostly trained in the United States (39.7%), Canada (22.1%), Australia (17.3%), the United Kingdom (15.1%), or New Zealand (4.5%). Mental health workers (including psychologists, social workers and counsellors) constituted 43% of practitioners, 20.1% were teachers/educators, 4.5% were allied
health and correction services, 3.4% were medical personnel while 28.6% did not fit in one of these listed work disciplines. The majority of practitioners (72.6%) had completed a bachelor’s university degree or higher, with 24.7% of the remaining practitioners having completed some college or university study. Most practitioners (89%) were trained between 2012 and 2020.

Procedure

The research was conducted in accordance with the ethical review processes of the University of Queensland and the National Statement on Ethical Conduct in Human Research guidelines (UQ Ethics Clearance Number: 2021/HE000865). All practitioners who completed training in Triple P in an English-speaking country before 2021 were sent an invitation to complete a 10-min online survey in May 2021 (this paper forms one part of a larger study investigating predictors of the sustained implementation of Triple P). Emails were successfully delivered to 28,789 practitioners with 13,371 registered as opening the email. Practitioners were not offered any incentives or remuneration for completing the survey.

Measures

Parenting self-regulation scales-practitioner version The 12-item parent version of the PSRS was adapted so that items referred to practitioners in relation to working with parents, instead of parents in relation to parenting their child/ren (PSRS-Practitioner; Sanders et al., 2017) (see Appendix A). The measure can be used with practitioners trained in any parenting programmes, however in the present study, the measure was adapted to include the programme name of Triple P. The Flesch-Kincaid readability test assessed the practitioner version to be easily understood by 12–13-year-old students with the intention of creating a brief measure of parental self-regulation. As in the parent version, the 12 items were rated on a 7-point Likert-type scale ranging from (1) “strongly disagree” to (7) “strongly agree”, and all items were positively worded. A total score was calculated by summing all 12 items, with higher scores reflecting higher levels of practitioner self-regulation.

Practitioner self-efficacy Practitioner self-efficacy was also measured using the practitioner confidence subscale of the practitioner consultation skills checklist (PCSC; Turner & Sanders, 1996), which has two items each rated on a scale from 1 to 7. The items were “How confident are you in conducting parent consultations about child behaviour?” and “Do you feel adequately trained to conduct parent consultations about child behaviour?” These two items have been used most commonly to evaluate training in previous research and have been shown to be a predictor of programme use by practitioners. In this study the two items are combined into a scale which has excellent internal consistency ($\alpha = 0.93$) and the average of the scores is used.

Frequency of programme use The frequency of current programme use by practitioners was measured with a single item asking practitioners to make an estimation of how many sessions of Triple P they delivered in the last six months (note that a session could be an individual session, group session, seminar/discussion group etc.). The response scale had 8 levels of increasing numbers of sessions ($1 = 0$ sessions, $2 = 1$ to 2 sessions, $3 = 3$ to 5 sessions, $4 = 6$ to 9 sessions, $5 = 10–19$ sessions, $6 = 20–29$, $7 = 30$ to 39 session, $8 = more than 40$ sessions).

Continued delivery of Triple P Continued delivery of Triple P by practitioners was assessed by asking practitioners if they have initiated or stopped using Triple P with families with three possible options of $0 = never used$, $1 = used but stopped$, $2 = currently using$.

Analytic strategy

To evaluate structural validity, a CFA was conducted to confirm the single factor structure established in Study 1 for the parent version. The same procedure and parameters were used as described in Study 1. Cronbach’s alpha was examined for internal consistency. Bivariate correlations were conducted between the PSRS-Practitioner version and the self-efficacy scale to test hypotheses for convergent validity. A bivariate correlation between the PSRS-Practitioner version and the frequency of programme use was conducted to test for concurrent validity. Additionally, for concurrent validity, the association between self-regulation and continued delivery of Triple P was examined using a one-way analysis of variance (ANOVA) to test the hypothesis that self-regulation of practitioners would be associated with whether practitioners were continuing to deliver Triple P or not.

Results

Preliminary Analyses

This study is part of a larger project focusing on predicting programme implementation. For the large dataset, an investigation of missing data showed that about 65% of participants had no data missing, less than 3% had more than 10% data missing, and less than 1% had more than 20% data missing. The 12 participants with more than 20% missing data were deleted from the sample as they were not
adequately sampled and had a different pattern of responses to those with low levels of missing data. No variable had more than 20% of data missing, and overall, 1.6% of values were missing. Little’s MCAR test, $\chi^2(16,903, N = 1606) = 17,815.75, p < 0.001$, suggested that the data was not missing completely at random. Separate variance $t$-tests suggested that the missingness of some variables was influenced by other variables within the study, which inferred that the data was missing at random (Tabachnick & Fidell, 2013). We therefore used expectation-maximisation algorithm to substitute all missing values for continuous variables (Bennett, 2001).

All items of the practitioner version of the PSRS had significant negative skew indicating practitioners tended to score high on the items. This is not surprising given the sample of trained and educated practitioners. All of the items also had significant kurtosis. The self-efficacy scale items had significant negative skew and significant kurtosis.

**Structural Validity**

**Confirmatory factor analysis**

The single-factor structure was tested using CFA in Mplus with MLR estimator to account for non-normality. The chi-square test of model fit was significant, $\chi^2(54) = 1008.77, p < 0.001$, however it should be noted that chi-square goodness of fit is highly sensitive to sample size and likely to be significant due to the large sample size in this study (Powell & Schafer, 2001). Furthermore, the alternative fit indices suggested that the model fit was not adequate, CFI = 0.869, TLI = 0.840, RMSEA = 0.105 [90% CI: 0.099, 0.111], SRMR = 0.043. Similar to the CFA on the parent version, examination of the modification indices suggested that adding a residual covariance between items 2 and 3 (“I am good at making a plan to achieve changes that are needed in my delivery of Triple P” and “I am good at carrying out a plan to achieve changes that are needed in my delivery of Triple P”) would substantially improve model fit. This modification improved model fit in the CFA of the parent version and was deemed reasonable as both items related to planning and were correlated in Study 1 to improve fit in the parent version. In the practitioner version, the chi-square test of model fit for this model remained significant, $\chi^2(53) = 580.16, p < 0.001$, however alternative fit indices suggested good fit: CFI = 0.928, TLI = 0.910, RMSEA = 0.079 [90% CI: 0.073, 0.085], SRMR = 0.037. Figure 2 displays the CFA single factor model.

**Internal Consistency**

The PSRS-Practitioner was found to demonstrate excellent internal consistency ($\alpha = 0.96$).

**Hypotheses Testing for Construct Validity**

The bivariate correlations between the PSRS-Practitioner, the self-efficacy scale and the frequency of programme use are in Table 4. As expected, a large significant positive relationship was found between the PSRS-Practitioner with the self-efficacy scale, demonstrating convergent validity. Associations with frequency of programme use and continued delivery were investigated to test for concurrent validity. As expected, a medium significant positive correlation was observed between the PSRS-Practitioner and the frequency of programme use. Furthermore, a one-way ANOVA showed a significant relationship between self-regulation and continued delivery of Triple P, $F(2, 1603) = 45.689, p < 0.001, \eta^2 = 0.05$. Follow-up pair-wise
comparisons showed that practitioners who were still delivering Triple P had significantly higher levels of self-regulation ($M = 69.93$, $SD = 0.32$) than both practitioners who started using and then stopped ($M = 63.78$, $SD = 0.72$), $t(1603) = -7.78$, $p < 0.001$, and practitioners who never used ($M = 64.26$, $SD = 0.79$), $t(1603) = -6.66$, $p < 0.001$. In line with these findings, there was no significant difference in self-regulation levels between practitioners who never used Triple P and those who started and then stopped using, $t(1603) = -0.45$, $p = 0.654$.

**Discussion**

This paper evaluated the measurement properties of a brief measure of self-regulation to be used with both parent and practitioner populations within a parenting intervention context. First, the parent version of the PSRS was examined for structural validity and in an EFA the single factor model was chosen over a potential two-factor model as it produced a clearer and more interpretable pattern of results, and all items were retained. In a CFA the single factor model had the best fit when allowing two modifications. Second, the practitioner version of the PSRS was examined for structural validity using CFA and the single factor model provided the best fit when allowing one modification similar to that made in the parent version. The single-factor structure was therefore selected as the best relative fit for both versions of the scale. The internal consistency of both versions of the scale were excellent. Hypotheses testing for convergent validity found significant positive relationships with scales measuring similar constructs of self-regulation and self-efficacy, as predicted. Concurrent validity was demonstrated as lower levels of parent self-regulation were associated with higher symptoms of depression, anxiety and stress, as expected. Also as expected, practitioner self-regulation was associated with frequency of programme use and continued delivery of Triple P. The two versions of the scale both show promise as brief and parsimonious measures of self-regulation.

The present study found an inverse relationship between the PSRS and the DASS-21 scales. Our findings suggest that parents with a greater ability to self-regulate in their parenting role are less likely to experience symptoms of depression, anxiety or stress. Given the overlap in theory between self-regulation and emotional regulation, these findings build on past research which suggests that when difficulties with parents’ emotion regulation are combined with challenging child behaviours, this can lead to parent adjustment difficulties (Schechter & Willheim, 2009). Given the bi-directional relationship between self-regulation and parent adjustment, this association can also be interpreted such that parents suffering from depression, anxiety or stress symptoms are less likely to be able to regulate their emotions and behaviours in response to the child’s behaviours. As such these parents are more likely to resort to undesirable parenting practices such as coercion (Barros et al., 2015).

In addition, higher levels of self-regulation in delivering Triple P were related to more sessions being delivered in the past six months, while practitioners who reported that they were still delivering Triple P to parents displayed higher levels of self-regulation than practitioners who were trained but never delivered or stopped delivering the programme. This is consistent with findings from previous studies on Triple P implementation: practitioners with higher post-training self-efficacy are more likely to begin delivering the programme after being trained (e.g., Sanders et al., 2009; Shapiro et al., 2012; Turner et al., 2011). Moreover, the relationship between self-regulation and programme usage is likely to be bi-directional. Practitioners with higher self-regulatory capacity are more willing to deliver the programme, and more programme delivery will promote practitioners’ self-regulation. With adequate organisational support, practitioners’ self-efficacy will increase through programme use, regardless of whether their initial attitudes toward Triple P were favourable or sceptical (Côté & Gagné, 2020a). Research has shown that with high-quality implementation processes, practitioner self-efficacy in delivering Triple P increased over a two-year period following their training (Cote & Gagne, 2020b).

This paper examined measurement properties of the two versions of the scale within three domains of the COSMIN study design checklist (Mokkink et al., 2019). While support was found for the scales in terms of the structural validity, internal consistency and construct validity, evaluations of the other measurement properties of the scales are warranted. Future evaluations should consider assessing: content validity by conducting qualitative research with parents and parenting practitioners; cross-cultural validity/measurement invariance to assess whether the measure behaves similarly in different populations, reliability, measurement error, criterion validity, and responsiveness. Evaluations of responsiveness would be particularly useful to test hypotheses around changes in self-regulation for parents before and after participating in a parenting intervention, and changes in self-regulation for practitioners before and after training or programme delivery. Importantly, the practitioner version of the scale was only tested with Triple P practitioners in this study. Evaluating the measure with populations of practitioners trained in other parenting programmes is needed followed by evaluations of measurement invariance to determine if the scale performs similarly in different practitioner groups.

The first study examining the parent version was limited in that it used a convenience sample in Australia where 95%
were mothers, 89% were Caucasian, and the majority were well educated, married, and had children under the age of five years. Thus, the results are limited in terms of the generalisability. Other parents including fathers and parents with lower levels of education may respond differently to the scale. Further research would benefit from exploring a more diverse sample, including across cultures and in different parent populations such as parents of children with disabilities and parents of teenagers. The second study examining the practitioner version had a large sample from a range of countries and disciplines. The study was limited in that the practitioners were predominantly females, and we only collected limited information on other practitioner variables, such as ethnicity. The use of this scale across more diverse practitioner cultures and groups needs further investigation.

The PSRS, provides us with a new way to measure self-regulation of both parents and parenting practitioners in a brief, single factor scale which is easy to administer, score and interpret. Each version consists of 12 items that should take no more than two to three minutes to complete. In a clinical setting the PSRS could be useful in measuring changes in parenting and practitioner self-regulation. Additionally, the parent version uses a broad range of clinically useful items that individually could provide useful information to clinicians. Investigations of the clinical utility of the parent version are required in order to establish norms and clinical cut-off points for the scale in the parent version. In terms of research applications, the scales gives us more scope to assess the importance of self-regulation and its relationship with other variables related to parent and practitioner functioning. This research could build upon the bodies of research previously looking at the model of self-regulation, and we predict that a more thorough and precise measure of the broad construct of self-regulation should have even stronger relationships with other variables. The practitioner version will also help to progress research in the field of implementation and investigating predictors of practitioner delivery and sustained programme use.

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**Compliance with Ethical Standards**

**Conflict of Interest** The Parenting and Family Support Centre is partly funded by royalties stemming from published resources of the Triple P—Positive Parenting Program, which is developed and owned by The University of Queensland (UQ). Royalties are also distributed to the Faculty of Health and Behavioural Sciences at UQ and contributory authors of published Triple P resources. Triple P International (TPI) Pty Ltd is a private company licensed by Uniquest Pty Ltd on behalf of UQ, to publish and disseminate Triple P worldwide. The authors of this report have no share or ownership of TPI. M.R.S. and T.G.M. receive royalties and/or consultancy fees from TPI. TPI had no involvement in the study design, or analysis or interpretation of data, or writing of this report. C.L.T., J.J.D. and J.H. are or were employees at UQ. T.M. and B.P. are or were students at UQ.

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### Appendix A

Parenting Self-Regulation Scale - Parent Version

| Item                                                                 | Strongly disagree | Neither agree nor disagree | Strongly agree |
|----------------------------------------------------------------------|-------------------|---------------------------|---------------|
| 1. I know what behaviours and skills I want to encourage in my child. | 6 7               |                           |               |
| 2. I am good at making a plan to achieve changes that are needed in parenting. | 6 7               |                           |               |
| 3. I am good at carrying out a plan to achieve changes that are needed in my parenting. | 6 7               |                           |               |
| 4. I feel confident that I can take actions to improve my child’s behaviour. | 6 7               |                           |               |
| 5. I am confident I can make changes to my parenting to solve a problem relating to my child’s behaviour. | 6 7               |                           |               |
| 6. I have the skills to be an effective parent. | 6 7               |                           |               |
| 7. I have a major influence over my child’s behaviour. | 6 7               |                           |               |
| 8. I believe that changes in my parenting cause changes in my child’s behaviour. | 6 7               |                           |               |
| 9. I have the skills to manage problems my child has with behaviour or emotions. | 6 7               |                           |               |
| 10. I know how to work out most parenting problems without needing the help of others. | 6 7               |                           |               |
| 11. I can apply what I learn about parenting solutions to different situations. | 6 7               |                           |               |
| 12. I have the skills to tackle future problems with my child’s behaviour. | 6 7               |                           |               |

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## Appendix B

### Parenting Self-Regulation Scale - Practitioner Version

| Strongly disagree | Neither agree nor disagree | Strongly agree |
|-------------------|---------------------------|---------------|
| 1. I know what behaviours and skills I want to encourage in parents. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 2. I am good at making a plan to achieve changes that are needed in my delivery of [insert programme name]. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 3. I am good at carrying out a plan to achieve changes that are needed in my delivery of [insert programme name]. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 4. I feel confident that I can take actions to help parents improve their parenting behaviour. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 5. I am confident I can make changes to my delivery of [insert programme name] to solve a problem relating to a parent’s parenting behaviour. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 6. I have the skills to be an effective [insert programme name] provider. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 7. I have a major influence over the parenting behaviours of the parents I work with. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 8. I believe that my delivery of the [insert programme name] programme causes changes in the parenting behaviours of the parents I work with. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 9. I have the skills to manage problems that parents have with their parenting behaviour or emotions. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 10. I know how to work out most problems with [insert programme name] delivery without needing the help of others. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 11. I can apply what I learn about parenting interventions to different situations. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 12. I have the skills to tackle future problems with the parenting behaviours of the parents I work with. | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |

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