

# Measuring Our Impact: Validation of a Parenting Self-Efficacy Outcome Tool for Caregivers Participating in Developmental Interventions

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**Background:** Evidence suggests that higher levels of parenting self-efficacy (PSE) result in positive caregiver–child interactions and improved developmental outcomes for children. Currently, there are few PSE tools specific to the domain of parenting a child with a developmental concern that are also applicable to a wide clinical cohort and range of multidisciplinary services.

**Aim:** This study aimed to develop and validate an outcome measurement tool to determine change in PSE for caregivers who participate in developmental interventions with their child. The development of a minimal clinically important difference (MCID) value was a secondary aim.

**Methods:** Based on existing literature, and clinician and consumer consultation, the SET and GO, a parenting Self-Efficacy Tool for Gathering Outcomes of developmental interventions, was developed. This nine-item retrospective pretest-posttest scale was validated with 204 caregivers at service discharge. Participants were predominantly mothers (91.7%) caring for children (average age of 5.7 years) presenting with a range of developmental concerns who had participated in intervention with one or more of a range of clinical disciplines.

**Results:** Exploratory factor analysis indicated that the SET and GO is a unidimensional tool with good internal consistency (Cronbach's  $\alpha = 0.94$  and  $0.93$ ), strong test–retest reliability (quadratic weighted kappa =  $0.80$  and  $0.76$ ), and adequate construct validity. Ceiling effects were noted in some individual item “now” scores. A preliminary MCID value of  $\geq 7$  was established using a distribution-based method.

**Conclusion:** The SET and GO is a valid and reliable outcome measurement tool suitable for use with a wide range of caregivers taking part in developmental interventions with their child. Future research with a larger sample will allow investigations into the validity of using the tool with specific populations, and further refinement of the MCID value.

**Keywords:** child development, neurodevelopmental conditions, outcome measurement tool, patient reported outcome measure, PROM, multidisciplinary, allied health

## Introduction

Routine evaluation of the impact of developmental interventions is important to ensure the provision of effective and efficient services and to provide accountability for resourcing.<sup>1,2</sup> Best practice in early childhood intervention underscores the need to enhance caregivers' capacity to support their child's development; therefore, evaluating the impact of interventions on caregivers is essential.<sup>3,4</sup>

## Parenting Self-Efficacy (PSE)

It is well established that higher levels of parenting self-efficacy (PSE) are related to improved outcomes for children<sup>3,5,6</sup> and research demonstrates that change in PSE is a reliable indicator of the impact of a developmental intervention.<sup>6</sup> As such, increasing PSE is central to the provision of specialist services for children with developmental concerns.<sup>3–5,7</sup>

Preliminary evidence suggests that even brief developmental interventions, such as diagnostic assessment, can improve a caregiver's level of self-efficacy.<sup>8</sup>

The concept of self-efficacy was originally defined by Bandura as an individual's belief in their capability to complete a task.<sup>9</sup> Self-efficacy is task dependent, with PSE defined as a caregiver's belief in their ability to successfully carry out the tasks needed in their parenting role.<sup>10</sup> According to Bandura<sup>9</sup> the concept of self-efficacy is influenced by four factors. These include 1) previous success at a task, 2) opportunities to watch others completing a task, 3) validation from others, and 4) an individual's emotional state. Relational and participatory help-giving practices, which are the foundation of family-centred practice, work to support the development of PSE, as do the social supports that are available to a caregiver.<sup>3-5,11,12</sup>

There are also many other factors that have been shown to be negatively associated with PSE. These include parental level of stress,<sup>13,14</sup> complexity of the child's developmental needs,<sup>15</sup> and family income.<sup>16</sup> There is inconsistent evidence that other factors such as socio-economic status, and level of education are related to PSE.<sup>16</sup>

Throughout this paper we use the term "parenting" when referring to the role and tasks of any person taking on a parenting role (not just a child's biological parent).

## The Child Development Service Context

The Child Development Service (CDS) is the only government-funded community health service in the metropolitan area of Perth, Western Australia, that provides a multidisciplinary approach to the assessment and management of children aged 0 to 18 years with a range of developmental concerns. CDS is often the first specialised service accessed by families with children who have a range of clinical presentations such as speech and language delay, motor delays, emotional regulation difficulties, hearing loss and neurodevelopmental conditions such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). Comparable models can be seen across Australia, as well as internationally, in which interventions take family-centred, capacity-building approaches to optimise developmental outcomes for children. CDS sought a tool to measure the impact of interventions on PSE across the range of clinical services provided. A domain-specific measure was required to assess caregivers' confidence in supporting their child's development within everyday contexts.

## Existing PSE Tools

PSE tools can be mapped along a spectrum of specificity, from general (not linked to a specific parenting task or role) to domain specific (related to a more defined role such as parenting a child who needs developmental support) to those that are highly task-specific (with items detailing clearly delineated behaviours or skills within a narrow parenting role, for example, preventing challenging behaviours in children with Autism).<sup>16-20</sup> Research suggests that task-specific self-efficacy tools demonstrate greater sensitivity to change and better predictive validity than more generalised tools,<sup>17</sup> however, these tools are less applicable to a wider cohort of caregivers. CDS required a domain-specific tool to evaluate PSE in relation to the role of supporting a child with a developmental concern. The tool needed to be suitable for use with caregivers who had children aged 0 to 18 years and who had accessed one or several of the range of CDS clinical services.

A review of existing tools found that none met the needs of CDS. Measures were either: (a) not specific to parenting a child with a developmental concern,<sup>21-25</sup> (b) focused on health-seeking behaviours rather than supporting developmental needs,<sup>26</sup> (c) not suitable for a broad cohort in terms of child age and developmental concerns,<sup>27-30</sup> (d) included negatively worded statements that may be difficult for some caregivers to interpret and were incongruent with a strengths-based approach,<sup>31</sup> or (e) contained additional content unrelated to PSE.<sup>32</sup> These findings align with those of Imms et al<sup>3</sup> who reported a lack of tools to measure outcomes for caregivers participating in developmental interventions with their child. Collectively, this highlights a gap in the availability of a strengths-based outcome measurement tool suitable for use within a multidisciplinary child development context where services are provided to a broad clinical cohort.

The aim of the current study was to develop a tool to measure PSE and evaluate its validity, reliability, and interpretability with a diverse sample of caregivers who had participated in developmental interventions with their child. To support interpretability of the tool, the development of a minimal clinically important difference (MCID) value was a secondary aim.

## Method

### Development of the SET and GO

The SET and GO tool was developed in two phases, guided by best practices in scale development<sup>33</sup> and the COSMIN study design checklist for patient-reported outcome measurement instruments.<sup>34</sup>

### Phase One – Conceptual Framework and Item Generation

A working group consisting of senior clinicians in the areas of developmental paediatric medical services, occupational therapy, physiotherapy, speech pathology, social work and clinical psychology was formed to establish a framework for PSE development within the context of family-centred developmental interventions. This framework was then used as the basis for item generation, with items developed through both deductive (literature review and assessment of existing scales) and inductive methods (working group discussion) until it was felt that saturation had been reached. A modified Delphi technique was then used by the working group to reach consensus on which items were most relevant and allowed for a comprehensive assessment of PSE, whilst avoiding duplication. The resulting items were reviewed for comprehensiveness, relevance, clarity, and simplicity by practising clinicians and staff with expertise in research and writing for consumers. The resulting ten items were then presented to consumers through informal interviews and existing consumer committees. Based on the consolidated feedback, minor refinements were made to improve acceptability of the items and to further simplify the wording.

### Phase Two – Survey Development

Items were then used to develop an online survey within REDCap<sup>35,36</sup> which was reviewed by a diverse range of consumers through three structured focus groups. Caregivers were either currently or had previously been involved with CDS services. The wording of items was refined through an iterative process over the course of these three groups.

A retrospective pretest-posttest design, administered at the point of discharge, was selected to reduce potential response shift bias.<sup>37,38</sup> For each item, an 11-point bi-polar Likert-type response scale was used (0 – strongly disagree to 10 – strongly agree), with higher scores indicating higher levels of perceived self-efficacy. The scale requires caregivers to rate their current self-efficacy beliefs (“now” score) and reflect on how they were feeling before attending intervention (“before” score). See example item depicted in Figure 1.

For validation purposes a total score for both “before” intervention and “now”, as well as a change score (the difference in these scores), were calculated.

#### 1. I understand my child's developmental needs.

	<b>Strongly Disagree</b>		<b>Strongly Agree</b>										
<b>Before CDS</b>	0	1	2	3	4	5	6	7	8	9	10		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	reset
<b>Now</b>	0	1	2	3	4	5	6	7	8	9	10		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	reset

**Figure 1** Example item from the SET and GO indicating response scale.

## Validation Study

### Recruitment

Participants were recruited from three CDS sites spread across the Perth metropolitan area. Sites were selected to increase the socio-economic and cultural and linguistic diversity of the sample. Caregivers were invited to participate by their discharging clinician if they were aged 18 years or older and were the primary caregiver involved in their child's intervention. Participating clinicians were encouraged to invite every eligible caregiver to reduce sample bias. A pre-determined quota for each discipline was developed to guide the recruitment of participants. This ensured that the services received by the caregivers in the sample were broadly representative of the services provided by CDS. Recruiting clinicians were encouraged to continue recruitment until the quota for their discipline was reached. A minimum of 200 participants were required.<sup>33,34</sup>

Participation in the study was explained to caregivers by the discharging clinician, and an information sheet was provided. Caregivers were informed that participation was voluntary, that declining to participate would not impact any future care provided to their child, and that their participation and responses would be kept confidential. Participants were not compensated for taking part in this research. This research was reviewed and approved by the Human Research Ethics Committee at the Child and Adolescent Health Service (RGS0000004716) and by the Western Australian Aboriginal Health Ethics Committee (HREC1132).

### Data Collection

All data was collected via electronic questionnaires using the REDCap data management tool.<sup>35,36</sup> Prompts to respond to all questions were included in the SET and GO, comparison measures and key demographic details to ensure that there was no missing data. The discharging clinician completed several questions in relation to the service provided to the child and family, as well as specific information about the child's clinical presentation. These questions included discipline of discharge, neurodevelopmental diagnosis (if applicable), and intervention length (brief intervention included assessment with advice about supporting development, while extended intervention included assessment, therapy and review sessions). The number of clinical disciplines involved in the child's care was also recorded and used as a proxy measure of the child's developmental complexity. Categories included: (a) low complexity, single discipline; (b) moderate complexity, multiple disciplines (excluding paediatrician); (c) high complexity, multiple disciplines (including paediatrician).

Participants completed a demographic questionnaire, the SET and GO, and four other validated tools within four days of discharge. The demographic questionnaire included questions relating to both the caregiver (relationship to child, age, highest level of education obtained, number of dependent children, postal area code, identification as Aboriginal and/or Torres Strait Islander and main language spoken at home) and the child who was being discharged (child age and gender). Not all responses to the demographic questions were mandatory. Additional validated tools included the 6-item Learning and Development subscale of the Tool to measure Parenting Self Efficacy (TOPSE),<sup>21</sup> the 8-item Family-Centered Practices Scale short form (FCPS),<sup>39</sup> the 12-item Multidimensional Scale of Perceived Social Support (MSPSS),<sup>40</sup> and the 10-item Perceived Stress Scale (PSS).<sup>41</sup> These tools were used to evaluate the convergent validity of the SET and GO. Participants were then invited to complete the SET and GO for a second time two-weeks following discharge for test-retest reliability purposes.

Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) scores were calculated for each participant based on their postal area code and the Australia Bureau of Statistics data cubes.<sup>42</sup> This index considers the economic (income and employment) and social (education, occupation, housing, rate of disability, family structure) environments of households within the area.

### Statistical Analysis

The COSMIN study design checklist for patient-reported outcome measurement instruments<sup>34</sup> and the COSMIN taxonomy,<sup>43</sup> as well as work by Terwee et al<sup>44</sup> and Carpenter,<sup>45</sup> were used to guide the analysis and reporting of psychometric properties. All data were analysed using Stata 16.1.<sup>46</sup> Statistical significance was considered  $p < 0.05$ .

## Validity

### Structural Validity

Exploratory factor analysis (EFA) was performed to test the dimensionality of the SET and GO and to inform item reduction.<sup>45</sup> The “before” item scores were used for EFA as it was anticipated that due to the impact of intervention, ceiling effects may be evident in the “now” scores. Principal axis factoring was used for extraction with a Pearson correlation matrix. Data suitability was evaluated using Kaiser–Meyer–Olkin (KMO) measure (preferred value >0.6) and Bartlett’s test ( $p < 0.05$  indicating significant correlations and factor analysis is appropriate). Eigen values and loadings were reviewed for all factors identified. As the pilot SET and GO were a 10-item tool the maximum number of factors was determined to be 3 (minimum of 3 items per factor). The final number of factors was determined by the scree test, parallel analysis, eigenvalue >1, and examining proportion of variance explained per factor. For scale item selection, we required communalities >0.4 (uniqueness ≤ 0.6), significant loadings (>0.4) and Velicer’s MAP criteria, as well as interpretability. Inter-item correlations were analysed and any items with a correlation of higher than 0.75 were considered for exclusion to reduce item redundancy.

### Construct Validity – Convergent, Known Groups and Correlation

Hypothesis testing was performed for construct validity. Convergent validity (comparison with other outcome measures) was performed using the TOPSE, FCPS, MSPSS and PSS tools. Relationships between the “now” total score of the SET and GO and these measures were examined using scatter plots, followed by the Spearman’s correlation coefficient. The “now” score was used in this instance as it represented the caregiver’s current perceived self-efficacy and was completed at the same time as the comparison measures. The results were interpreted as follows: negligible 0.0 to 0.10, weak 0.10 to 0.39, moderate 0.40 to 0.69, strong 0.7 to 0.89, very strong 0.9 to 1.0.<sup>47</sup>

To further establish the construct validity of the tool, relationships between “before” total scores on the SET and GO and the categorical measures of child’s developmental complexity, intervention length (brief intervention versus extended intervention), and caregiver level of education were examined using a Mann Whitney U or Kruskal Wallance test. Associations between “before” total scores on the SET and GO and the continuous measures IRSAD,<sup>42</sup> number of dependent children, and caregiver age were then examined using Spearman’s correlation.

## Reliability

### Internal Consistency

Internal consistency was examined using Cronbach’s alpha, with a desirable cut-off of at least 0.7.<sup>33</sup>

### Test-Retest Reliability

Test–retest reliability was determined using a quadratic weighted kappa due to the ordinal and skewed nature of the data. Interpretations are as follows: 0.0 to <0.2 slight, 0.2 to <0.4 fair, 0.40 to <0.6 moderate, 0.6 to <0.8 substantial, 0.8 to 1.0 almost perfect agreement.<sup>48</sup>

## Interpretability

### Floor and Ceiling Effects

Floor and ceiling effects were determined by analysing the spread of scores on an item-by-item basis. A ceiling or floor effect was deemed evident if ≥15% of responses for an individual item were at either extreme of the response scale.<sup>44</sup> Ceiling effects were anticipated for “now” scale scores due to the impact of intervention.

### Reported Change

Perceived change was analysed by comparing SET and GO total scores “before” and “now”, using the Wilcoxon signed rank test.

### Minimal Clinically Important Difference (MCID) Value

To determine meaningful change, an anchor-based method was used as primary evidence for the MCID value followed by distribution-based methods.<sup>49,50</sup> Anchor-based methods used a within-patient total score change. Respondents were

asked whether the difference between the “before” and “now” ratings was meaningful to them using the anchor question “since coming to CDS my capacity to support my child’s development has improved/stayed the same/got worse”. This served as the anchor, with the mean change score calculated for respondents who said that their capacity to support their child had “improved”. A distribution-based approach was used as secondary evidence for the MCID value using a change value of >1 standard error of measurement (SEM).

## Results

### Participant Characteristics

A total of 243 eligible families were invited to participate in this study throughout the recruitment period. A sample of 204 caregivers (84% of those invited) consented to participate and completed all questionnaires in the validation study. A total of 136 of these participants also completed the SET and GO at time point 2 for test–retest reliability purposes. The only group difference noted in caregivers who completed the tool at both time points was level of education, with caregivers who had a higher level of education more likely to complete the survey at time point 2.

The sample included caregivers, aged from 23 to 64 years (mean age 37 years), who had accessed intervention for a range of concerns about their child’s development. Clinical presentations included delays in fine and gross motor skills, communication and social-emotional difficulties and neurodevelopmental conditions – ADHD (n=32), developmental language disorder (n=16) and ASD (n=15). The characteristics of the study sample are summarised in [Table 1](#).

The sample was compared to CDS population data on routinely collected caregiver and child characteristics ([Table 1](#)). The sample was similar to the CDS population on the variables of caregiver’s relationship to child, child age, child sex at

**Table 1** Demographic and Intervention Characteristics of the Validation Sample with Comparison to CDS Population

Characteristic	Mean (SD)	Range	CDS Population, Mean (SD)
Caregiver age (years)	37.0 (7.2)	23.0–64.0	NA
Number of dependent children	2.3 (1.1)	1.0–9.0	NA
Child age (years)	5.7 (3.1)	0.2–18.0	5.4 (3.1)
	No. (total responses)	Sample, %	CDS population, %
Relationship to child	(204)		
Mother	187	91.7	89.6
Father	13	6.4	6.8
Grandmother	3	1.5	NA
Foster carer	1	0.5	NA
Highest level of education	(200)		
High school	42	21.0	NA
Trade/certificate	83	41.5	NA
University degree	75	37.5	NA
IRSAD	(197)		
1 (most disadvantaged)	38	19.3	14.3
2	60	30.5	11.0
3	58	29.4	23.2
4	24	12.2	22.2
5 (most advantaged)	17	8.6	29.3
Sole caregiver	(203)		
Yes	60	29.6	NA
No	143	70.4	NA
Aboriginal or Torres Strait Islander	(204)		
Yes	5	2.5	6.3
No	197	96.5	93.7

(Continued)

**Table 1** (Continued).

Characteristic	Mean (SD)	Range	CDS Population, Mean (SD)
Prefer not to say	2	1.0	NA
Language other than English spoken at home	(204)		
Yes	52	25.5	NA
No	152	74.5	NA
Child sex at birth	(204)		
Male	131	64.2	67.0
Female	72	35.3	33.1
Prefer not to say	1	0.5	NA
Child developmental complexity <sup>a</sup>	(204)		
1 – low	93	45.6	35.5
2 – moderate	44	21.6	28.6
3 – high	67	32.8	35.9
Discharging discipline	(204)		
Audiology	25	12.3	11.3
Clinical psychology	16	7.8	6.9
Occupational therapy	34	16.7	15.8
Paediatric medical services	12	5.9	8.7
Physiotherapy	37	18.1	20.1
Social work	16	7.8	6.0
Speech pathology	64	31.4	30.7
Intervention length	(204)		
Brief intervention	44	21.6	NA
Extended intervention	160	78.4	NA

**Note:** <sup>a</sup>Children identified in categories 2 and 3 were included as “complex” for the purposes of statistical analysis.

**Abbreviation:** NA, not available.

birth, and the discharging discipline. The study sample included more families with greater socio-economic disadvantage, fewer Aboriginal caregivers, and lower child developmental complexity.

## Validity

### Structural Validity - Excluded Items

Inter-item correlations of above 0.75 were reviewed for all items by both a biostatistician and the clinical working group. This resulted in the removal of the item “I can support my child’s development” as it was determined that there was redundancy with the item “I have the skills to support my child’s development”. Further statistical analysis was then based on the remaining nine items.

### Structural Validity - Assessing the Factor Structure of the SET and GO

Suitability of the data for EFA was confirmed with a KMO of 0.934 and Bartlett’s test of  $p < 0.001$ . The EFA for the nine-item scale indicated a single factor with an eigenvalue of 5.8 accounting for 66% of the total variance. The scree plot supported a single-factor solution. The factor loading on all items was examined and ranged from 0.71 to 0.88. All items demonstrated a uniqueness of  $< 0.5$  indicating good fit with a single-factor solution.

### Construct Validity

Convergent validity was assessed by comparing the results on the SET and GO across four validated measures (Table 2). A moderate positive relationship was shown with the SET and GO and the TOPSE, and the SET and GO and MSPSS. Weak correlations were found between scores on the SET and GO and FCPS and PSS.

The relationship between the SET and GO and other caregiver and child factors was explored for known groups validity. Group differences based on child developmental complexity were found for the SET and GO total “before” score, with caregivers of children with increased developmental complexity reporting lower PSE (SET and GO “before”

**Table 2** Spearman's Correlation Coefficients Between SET and GO Total "Now" Score and Validated Measures of Caregiver Self-Efficacy, Family Centred Practices, Social Support, and Stress

Tool	Spearman's Correlation (95% CI)		Interpretation
TOPSE	0.68*	(0.60,0.75)	Moderate positive correlation
FCPS	0.39*	(0.26,0.50)	Weak positive correlation
MSPSS	0.41*	(0.29,0.52)	Moderate positive correlation
PSS	-0.36*	(-.47, -0.23)	Weak negative correlation

**Note:** \* $p < 0.05$ .

**Abbreviations:** TOPSE, Tool to measure Parenting Self Efficacy; FCPS, Family-Centered Practices Scale short form; MSPSS, Multidimensional Scale of Perceived Social Support; PSS, Perceived Stress Scale.

median (IQR) score: not complex 63 (52, 75) vs complex 56 (40, 69),  $p=0.007$ ). Group differences were also found based on length of intervention, with caregivers who participated in an extended intervention with their child more likely to report lower pre-service levels of PSE (SET and GO "before" median (IQR) score: brief intervention 71.5 (61.5, 83) vs extended intervention 58 (46, 69.5),  $p<0.001$ ).

Negligible correlations were found between the SET and GO and IRSAD, number of dependent children, and caregiver age. No statistically significant group differences in SET and GO scores were found for level of caregiver education ( $p=0.910$ ).

## Reliability

### Internal Consistency

The SET and GO demonstrated excellent internal consistency with a Cronbach's alpha of 0.94 for the "before" score and 0.93 for the "now" scale score.

### Test-Retest Reliability

Test-retest reliability results for each item ranged from moderate to substantial. The weighted kappa for the total "before" score was 0.80 (95% CI 0.74 to 0.87) and for the "now" score was 0.76 (95% CI 0.68 to 0.85). These results indicate stability of the SET and GO across a short period of time and provide evidence for adequate test-retest reliability.

## Interpretability

### Floor and Ceiling Effects

Floor effects were not evident for either "before" or "now" item or total scale scores. Ceiling effects were evident across some individual items in the "before" scale scores, however, were not present for the total scale score with only 8.3% of participants providing the highest rating for the entire scale before attending CDS. As anticipated, ceiling effects were evident for the "now" scale score with 45% of participants providing the maximum scale score at point of discharge from the service.

### Reported Change

As the SET and GO ratings were collected using a retrospective pretest-posttest design at discharge, reported differences represent caregivers' perceived change in PSE over the course of intervention, rather than prospectively observed change. Results indicated that there was a significant difference between caregivers' "before" and "now" ratings for both the brief and extended intervention groups. The median perceived change score for the brief intervention group was 14.5 (median (IQR) scores: "before" 71.5 (61.5, 83.0) vs "now" 86.0 (77.5, 90.0),  $p<0.001$ ). The median perceived change score for the extended intervention group was 26.0 (median (IQR) scores: "before" 58.0 (46.0, 69.5) vs "now" 84.0 (78.0, 88.5),  $p<0.001$ ).

### Minimal Clinically Important Difference (MCID)

It was not possible to use an anchor-based method to determine the MCID value as insufficient participants indicated that their capacity to support their child's development had "got worse" or "stayed the same" ( $n=16/204$ ). The distribution

method was therefore used to calculate a preliminary MCID value. Using internal consistency as a measure of the scale's reliability, the calculated MCID value was 6.9, indicating that a change score of  $\geq 7$  was required to suggest a change in self-efficacy that was beyond the measurement error. Based on this MCID value, 164/204 (80.4%) participants reported a clinically meaningful difference in PSE. As this estimate is derived solely from a distribution-based method, it should be interpreted cautiously and requires confirmation in future studies using an anchor-based approach.

## Discussion

### Clinical and Service Implications

The SET and GO is a valid and reliable 9-item tool that provides services delivering developmental interventions with an efficient method for assessing perceived change in PSE as part of routine outcome measurement. This brief outcome tool is uniquely placed as it is suitable for a wide range of caregivers participating in developmental interventions with their child and has applicability within multidisciplinary child development services both nationally and internationally. Use of the tool will support research into the effectiveness of clinical interventions and inform service improvement activities. Specifically, measuring changes in perceived PSE will enable services to better understand how intervention characteristics, such as length and format of intervention (individual versus group, facilitated versus self-directed), influence caregiver self-efficacy.

### Psychometric Properties of the SET and GO

EFA demonstrated that the SET and GO is a unidimensional tool, and hypothesis testing for construct validity (convergent and known-groups) further indicated that it is a domain-specific measure of PSE associated with supporting a child with a developmental concern. Significant differences in perceived PSE were noted for both the brief and extended intervention groups, demonstrating the applicability of the scale for use with caregivers accessing a range of intervention services.

Consistent with previous research, the SET and GO was positively correlated with perceived level of social support<sup>15</sup> and the family-centred help-giving practices of the clinician providing intervention.<sup>11</sup> Additionally, a negative correlation between stress and PSE was found, which reflects findings from previous studies.<sup>13,14</sup> Whilst these relationships were significant, the strength of these relationships may have been impacted by the ceiling effect noted on the “now” score of the SET and GO, limiting the range and variability of the available data.

### Factors Associated With PSE

While PSE has been the subject of significant research over the past thirty years, there is still conflicting evidence in relation to the association between PSE and socio-economic status, parental education and number of children in a family.<sup>15,16</sup> Research into the relationship between PSE and child developmental complexity is largely unidirectional with most studies focussing on the impact of PSE on a child's development<sup>6</sup> or measuring parental stress rather than self-efficacy.<sup>51,52</sup> The current study found caregivers of children with more complex developmental needs reported significantly lower levels of self-efficacy prior to receiving services. This finding was in line with research by Greenlee et al,<sup>51</sup> who found that child symptom severity was related to distress in parents of children with autism. Similar findings were reported by Bonifacci et al<sup>52</sup> with parents of children with specific learning disorders being more likely to have higher levels of distress than parents of typically developing children.

Results indicated that caregivers reported statistically and clinically meaningful increases in self-efficacy following intervention, irrespective of intervention duration. This finding suggests that even a brief intervention, typically including a developmental assessment and strategies to support future development, provides the caregiver with meaningful support to address their child's unique developmental needs. This finding is in line with evidence from Bates,<sup>8</sup> who reported that a diagnostic assessment can result in positive changes to PSE.

Results from the current study indicated no association between IRSAD and PSE. This contrasts with findings by Glatz et al,<sup>53</sup> who reported that socioeconomic status predicted PSE among parents of school-aged children and adolescents. However, Fang et al<sup>16</sup> identified evidence for a relationship between family income and PSE, while noting

inconsistent findings regarding the broader association between socioeconomic status and PSE. These discrepancies may reflect variation in how socioeconomic status is defined and measured across studies.

The current study found no significant group differences in PSE based on caregiver level of education or number of dependent children. These results add to the body of evidence presented by Fang et al<sup>16</sup> which found inconsistent evidence for the relationship between PSE and these factors.

## Limitations

Recruitment to the study relied on clinicians inviting all eligible families to participate. Perception that the study may cause significant burden to some caregivers, or a reluctance to invite families who expressed a negative experience with the service, may have resulted in recruitment bias. However, based on comparison to the CDS population, participants were similar across a number of variables including the caregiver's relationship to child, child age, child sex at birth, and the discharging discipline. In addition, the sample displayed greater variability in socioeconomic disadvantage than the broader CDS population. This increased variation enabled examination of potential associations between PSE and socioeconomic status, particularly in light of the inconsistent findings reported in the literature.<sup>16,53</sup>

An additional limitation was the limited representation of Aboriginal and Torres Strait Islander caregivers within the sample. While approximately 6% of children currently receiving services from CDS are Aboriginal, only 2% of the caregivers in the study identified as Aboriginal or Torres Strait Islander. This limits the generalisability of the results to Aboriginal caregivers and is an area for further investigation.

A further limitation was participant attrition, with only 136 of the 204 participants completing the SET and GO at time point two for test–retest reliability purposes. As there was a group difference in terms of educational attainment for the caregivers who completed the measure at time point 2, this may have introduced selection bias, potentially influencing the test–retest reliability estimates.

Ceiling effects were observed, with a substantial proportion of respondents achieving the maximum total score at the “now” time point. These effects were anticipated, as reduced sensitivity at higher score ranges is commonly reported in domain-specific PSE measures.<sup>17</sup> Nonetheless, this result may indicate limited sensitivity of the measure to detect differences among caregivers reporting higher levels of PSE, potentially restricting discrimination at the upper end of the scale and inflating reliability estimates. In addition, these ceiling effects may have attenuated correlations with related measures, thereby influencing the magnitude of observed convergent validity.

Finally, while a preliminary MCID value of  $\geq 7$  has been determined using distribution-based methods, this needs to be interpreted with caution. Research with a larger sample that enables calculation of an MCID value using an anchor-based method will support the development of a more clinically robust value.<sup>49,50</sup>

## Future Directions

Future research will involve pilot implementation of the SET and GO within CDS, enabling collection of data on a larger sample. This will allow for investigation of the validity of the tool with a more diverse sample, including Aboriginal caregivers, fathers and grandparents. A larger sample will also allow analysis of caregiver responses on a discipline-specific basis and enable the refinement of an MCID value using an anchor-based method.

While the SET and GO was purposefully developed for use as a retrospective pretest–posttest scale, future research could examine its responsiveness to change using prospective longitudinal designs. Administering the measure before and after a discrete intervention (such as an 8-week group program) and across longer follow-up periods would enable evaluation of the scale's sensitivity when used in a prospective manner. Such research would provide further evidence regarding the utility of the SET and GO as an outcome measurement tool.

There are few studies available on the relationship between child developmental complexity and PSE, with studies specific to developmental diagnosis measuring adjacent constructs such as parental stress or parenting conflict<sup>52</sup> or looking at PSE as a mediating factor to parental wellbeing.<sup>54</sup> While the results presented in this study indicate an inverse relationship between PSE and child developmental complexity (ie. PSE is lower for caregivers of children who are more developmentally complex), a larger sample could provide further details on this relationship, such as whether this relationship is related to particular diagnoses or developmental concerns.

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## Conclusion

The current study provides evidence that the SET and GO is a valid and reliable nine-item domain-specific PSE tool, suitable for use with caregivers who have a child (aged 0 to 18 years) accessing intervention for any of a range of developmental concerns. Results also add to the existing body of knowledge about the relationship between PSE and service, socio-economic, parent and child factors. The proposed minimal clinically important difference (MCID) value should be considered preliminary, and the presence of ceiling effects, along with the limited representation of Aboriginal caregivers in the sample, may constrain the generalisability of the findings. Future piloting of the SET and GO will allow investigation of the validity of the tool for Aboriginal caregivers, refinement of the MCID estimate, and further exploration into the relationship between PSE and child developmental complexity. Overall, the findings from this study support the potential utility of the SET and GO in child development settings to measure caregiver outcomes, inform intervention planning, and guide service delivery decisions.

## Availability of the SET and GO

Access to the SET and GO: A parenting Self-Efficacy Tool for Gathering Outcomes of developmental interventions is free and available from <https://redcap.link/CDS-SET-and-GO>.

## Data Sharing Statement

The data that supports the findings of this study is available from the authors upon reasonable request and with the permission of Child and Adolescent Health Service. Only aggregated data will be provided in order to protect the privacy of all participants.

## Ethics Approval and Consent to Participate

This research was conducted in accordance with the principles of the Declaration of Helsinki. The protocol was reviewed and approved by the Human Research Ethics Committee at the Child and Adolescent Health Service (RGS0000004716) and by the Western Australian Aboriginal Health Ethics Committee (HREC1132) and informed consent was obtained from all participants.

## Acknowledgments

We would like to acknowledge the significant contribution of both staff and families of the Child Development Service, Child and Adolescent Health Service in the development and validation of the SET and GO.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Funding

This research project was fully funded by the Government of Western Australia – Child and Adolescent Health Service.

## Disclosure

Ms Natasha Bear reports personal fees from Natasha Bear Statistics, during the conduct of the study. The authors have no other conflicts of interest to declare that are relevant to the content of this article.

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