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RESEARCH ARTICLE OPEN ACCESS

Validation of the Norwegian Version of the Tool to Measure Parenting Self-Efficacy (TOPSE) Questionnaire in Families With Children and Adolescents With Acquired Brain Injury

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Received: 24 April 2026 | **Revised:** 29 July 2026 | **Accepted:** 28 August 2026

Keywords: acquired brain injury | parenting self-efficacy | psychometrics | Teen TOPSE | TOPSE

ABSTRACT

Objectives: This study aimed to validate the Norwegian translations of the Tool to Measure Parenting Self-Efficacy (TOPSE) and its equivalent for parents of adolescents in families with children and adolescents with paediatric acquired brain injury (pABI).

Methods: Parents of children (6–16 years) 1 year or more after acquired brain injury (ABI) who participated in the Child in Context Intervention (CICI) study were included. Parents of children younger than 10 years completed the TOPSE, whereas those with kids 10 years or older completed the Teen TOPSE. Internal consistency was assessed with Cronbach's alpha. Test–retest reliability was explored with intraclass correlation coefficients (ICCs), *t*-tests and coefficients of variation. Standard error of measurement and minimal detectable change were also assessed. Correlations were used to explore discriminant validity in relation to the Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder Scale-7 (GAD-7), Family Needs Questionnaire (FNQ-P), Health and Behavior Inventory (HBI), Behavior Rating Inventory of Executive Function-2 (BRIEF-2), an estimate of the children's abstract thinking (WISC-V), the Pediatric Quality of Life Inventory (PedsQL) and the McMaster Family Assessment Device, General Functioning Scale (FAD-GF).

Results: Overall internal consistency was excellent, with Cronbach's alphas of 0.94 for TOPSE and 0.96 for Teen TOPSE, whereas internal consistency for most subscales was good. Test–retest reliability of the TOPSE and Teen TOPSE was good (ICCs = 0.90 and 0.89). Discriminant validity showed that the strongest correlation between both versions of TOPSE and other measures was a moderate correlation with family functioning (FAD-GF). To increase statistical power and due to the negligible differences between the questionnaires, results for a merged TOPSE/Teen TOPSE are also presented.

Conclusion: Norwegian versions of the TOPSE and Teen TOPSE have good to excellent psychometric properties and are valid and reliable measures to assess parenting self-efficacy in families with a child or teen with pABI.

1 | Introduction

Parenting self-efficacy (PSE) is defined as a parent's self-perceived competence in the parenting role (Coleman and

Karraker 1998). The theoretical framework of PSE is built on Bandura's social cognitive theory (Bandura 1982). PSE has been shown to be strongly associated with a broad spectrum of parenting behaviours (Fang et al. 2021; Glatz et al. 2023). Higher

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Summary

- Contextual factors such as parenting factors are important for outcomes after paediatric acquired brain injury, but validated questionnaires are often lacking in non-English-speaking countries.
- Overall, the TOPSE and the Teen TOPSE are valid and reliable measurement instruments for assessing parenting self-efficacy in parents of children with acquired brain injury in Norway.
- Larger sample sizes are needed for a more extensive validation.

PSE is associated with more parental involvement, warm discipline and better perception of the child's vulnerability, whereas lower PSE is associated with negative parenting behaviour, e.g., hostile or coercive parenting (Fang et al. 2021). The relationship between PSE and parenting behaviour is bidirectional, meaning improvement of one could lead to improvement of the other (Glatz et al. 2023). Higher PSE has been found to be positively associated with children's emotional well-being and capacity to regulate emotion (Kendall and Bloomfield 2005; Morelli et al. 2020) and negatively associated with parental depression and stress (Fang et al. 2021; Glatz et al. 2023) and to mediate the influence of parental distress on children's emotional functioning (Morelli et al. 2020).

Paediatric acquired brain injury (pABI) is a brain injury that occurred after birth due to traumatic (e.g., falls and traffic accidents) or non-traumatic events (e.g., stroke and tumour) (Lezak et al. 2012). Many children with pABI suffer from chronic cognitive, behavioural, social and emotional problems, resulting in reduced quality of life (Ylvisaker and Feeney 2007; Stavinocha et al. 2018; Serpa et al. 2021). Challenges may become more evident over time as demands increase (Babikian et al. 2015). Behavioural problems following pABI affect the well-being of families (Taylor et al. 2001; Fisher et al. 2020). In turn, family functioning and parental mental health influence pABI outcome (Babikian et al. 2015; Yeates et al. 2010; Ryan et al. 2016). These findings are in line with a biopsychosocial understanding of pABI (Wade and Halligan 2017), and caregiver-focused interventions are recommended as part of children's rehabilitation following pABI (Laatsch et al. 2020; Shen et al. 2023).

PSE has been shown to be modifiable through caregiver-focused interventions (Bloomfield and Kendall 2012), also regarding children with disabilities and complex health care needs (Whiting et al. 2019). This makes PSE a promising target for interventions after pABI. To effectively target PSE in clinical practice and research, a valid measurement instrument is needed. However, valid measures suitable for families of children with pABI are scarce, particularly in non-English-speaking countries.

The Tool to Measure Parenting Self-Efficacy (TOPSE) is a self-report measure in which PSE is measured through statements reflecting aspects of parenting behaviour and experience

(Kendall and Bloomfield 2005). It has been extensively used in research and clinical evaluations (Taylor et al. 2001; Bloomfield and Kendall 2012; Whiting et al. 2019). Its initial development was grounded in the cultural context of the United Kingdom (Bloomfield et al. 2005).

Existing international adaptations of TOPSE include studies from Bangladesh, where the Bangla TOPSE showed high internal consistency and strong convergent validity (Trishna et al. 2021), and Italy, where the Italian version demonstrated good reliability and responsiveness with minor changes to item and subscale structure (Roncaglia et al. 2023). An Iranian validation in parents of children with autism spectrum disorder confirmed high internal consistency and test-retest validity (Jamshidian et al. 2024), demonstrating the measure's relevance in clinical and general-population samples. These studies generally replicated the eight-subscale structure and indicate that the TOPSE can be a relevant tool outside of the United Kingdom, while also highlighting the importance of thorough assessment in new cultural contexts (Trishna et al. 2021; Roncaglia et al. 2023). There is also a version of TOPSE for parents of adolescents, the Teen TOPSE, which differs only slightly from the original TOPSE. To our knowledge, validation data have not previously been published.

The aim of the present study was to validate the Norwegian translation of TOPSE and the Teen TOPSE in families with children with pABI by measuring their internal consistency, test-retest reliability and discriminant validity in relation to parent, family and child functioning.

2 | Methods

The study was conducted in accordance with the COSMIN Study Design checklist for patient-reported outcome measures (Mokkink et al. 2019).

2.1 | Setting

The current study is a sub-study of the Child in Context Intervention (CICI), a pragmatic randomized controlled trial (RCT) conducted at Sunnaas Rehabilitation Hospital, Norway. TOPSE was one of the primary outcome measures (Rohrer-Baumgartner et al. 2022; Rohrer-Baumgartner et al. 2026) in the CICI study.

2.2 | TOPSE and Teen TOPSE

The TOPSE is a parental self-report measure consisting of 48 statements rated on a Likert scale from 0 (*completely disagree*) to 10 (*completely agree*). The measure is divided into eight domain-specific subscales of PSE: affection and emotion, play and enjoyment, empathy and understanding, control, discipline and boundary setting, pressures and expectations, self-acceptance, and knowledge and learning. Negatively worded items are reversed, and higher scores indicate higher levels of PSE. The TOPSE has been found to be a valid and reliable measure of PSE in a sample of parents with

children from 0 to 6 years of age in the United Kingdom (Kendall and Bloomfield 2005), and the creators included children up to 9 or 10 years in their latest studies (Bloomfield and Kendall 2012; Bloomfield and Kendall 2007).

The Teen TOPSE has several age-appropriately rephrased items, e.g., from 'I find it hard to cuddle my child' to 'I find it hard to hug my child'. At a subscale level, the only difference between TOPSE and Teen TOPSE is that the second domain, 'play and enjoyment', is renamed 'enjoying time together' in the teen version. At an item level, the significance, intent and structure of the statements largely remain the same. The first subscale of the Teen TOPSE, affection and emotion, consists of one more item than the original ('I feel confident in allowing my child to show anger'), resulting in a total of 49 items. The Teen TOPSE thus differs only marginally from TOPSE.

Domain scores range from 0 to 60 (all TOPSE domains and seven Teen TOPSE domains) and from 0 to 70 (one Teen TOPSE domain). Total scores range from 0 to 480 and from 0 to 490, respectively. Higher scores indicate a higher level of PSE. There are six negatively worded items in TOPSE and five in Teen TOPSE, which were reverse scored. TOPSE is typically used for children up to 9 years of age (Bloomfield and Kendall 2012), which was also done in the current study. Parents with children aged 10 years or older were given the Teen TOPSE.

2.3 | Translation and Cultural Adaptation

An authorized Norwegian version of TOPSE was provided by author SK, the lead researcher who developed the original TOPSE. As part of the development of CICI, Teen TOPSE was translated into Norwegian in 2019 following the recommended procedure of the ISPOR Task Force for Translation and Cultural Adaptation (Wild et al. 2005). SK acted as a consultant and approved the final authorized version.

2.4 | Participants

The participants in the current study took part in the CICI study and were recruited from Sunnaas Rehabilitation Hospital, Oslo University Hospital, the Norwegian Service of Special Needs Education (Statped) and user organizations. Inclusion criteria were (1) families with children aged 6–16 with a verified diagnosis of ABI; (2) at least 1 year having passed since the insult, i.e., in the chronic phase of ABI; (3) self- or parent-reported difficulties with cognitive, social, behavioural or emotional functioning; (4) a child with ABI attending school regularly; and (5) families speaking sufficient Norwegian or English and in other ways being able to participate actively in a goal-oriented intervention. Exclusion criteria for parents were severe psychiatric illness, drug abuse and indications of domestic violence. Child exclusion criteria were severe premorbid or comorbid neurological, neuropsychiatric or psychiatric disorders, living in institutions most of the time, and going through active treatment of cancer or having a great risk of relapse (Rohrer-Baumgartner et al. 2022).

2.5 | Measures

2.5.1 | Measures of Parent Functioning

Symptoms of depression and general anxiety in the parents were assessed using the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al. 2001) and the Generalized Anxiety Disorder Scale-7 (GAD-7) (Spitzer et al. 2006). In both, symptoms are reported on a scale from 0 to 3. Total scores of 0–4 are considered 'minimal', 5–9 'mild', 10–14 'moderate', 15–19 'moderately severe' and 20–27 'severe' symptom levels. Both instruments have excellent internal consistency, as measured by Cronbach's alpha (Kroenke et al. 2001; Spitzer et al. 2006).

2.5.2 | Measure of Family Functioning

Family functioning was assessed with the General Functioning subscale of the McMaster Family Assessment Device (FAD-GF) (Epstein et al. 1983). The 12-item scale has high internal consistency (Byles et al. 1988). A mean score of 2 or more indicates problematic family functioning. The scaled score was applied.

Families' health care needs were assessed with the paediatric version of the Family Needs Questionnaire (FNQ-P), which has shown good reliability and construct validity (Gan et al. 2020). The 40-item measure provides a total score and six subscales of family needs. Responses are given in a Likert scale format from 1 to 5, with higher scores indicating a higher degree of met needs (Gan and Wright 2019).

2.5.3 | Measures of Child Functioning

Parent-reported brain injury symptoms were assessed with the Health and Behavior Inventory (HBI) (Ayr et al. 2009), which has good to excellent internal consistency a few months after ABI (O'Brien et al. 2021). The 20 items measure cognitive and somatic symptoms (11 and 9 items, respectively) on a 4-point Likert scale ranging from 0 (*never*) to 3 (*often*) (range cognitive subscale 0–33 and somatic subscale 0–27), with higher scores indicating more brain injury symptoms.

The Behavior Rating Inventory of Executive Function-2 (BRIEF-2) (Gioia et al. 2000; Gioia et al. 2015) was used to assess executive dysfunction in daily life. The 63-item scale is widely used in various populations and has good to excellent internal consistency. Items are scored from 0 to 2: 'never', 'sometimes' and 'often', with higher scores representing worse executive functioning. The Global Executive Composite (GEC), a summary score of all nine subscales of the BRIEF-2, was used.

The subtests Matrices and Similarities from the Wechsler Intelligence Scale for Children, fifth edition (WISC-V) were administered to provide an estimate of the children's abstract reasoning abilities (Wechsler 2014). Scaled scores were used.

Children's quality of life was assessed with the core module of the Pediatric Quality of Life Inventory

(PedsQL) (Varni et al. 2001a), reported by parents. The 23-item scale has good reliability and validity (Varni et al. 2001b). Items are scored on a scale from 0 (*never a problem*) to 4 (*almost always a problem*).

2.6 | Data Collection Procedures

Questionnaires were completed online through an electronic data capture system (Viedoc Technologies AB, Uppsala, Sweden). Parents first completed TOPSE at the baseline assessment of the CICI study and were then asked to complete it again 1 week later. The questionnaire was completed independently by mothers and fathers. Parents were asked to refrain from discussing their individual ratings with each other. A 1-week interval was chosen to ensure that participants did not recollect their previous answers, while minimizing the chances of significant changes in families' lives. Both completions took place before randomization in the CICI study. Data for the current study were collected between May 2021 and December 2022.

2.7 | Statistical Analyses

Analyses were performed using IBM SPSS versions 29–31. In addition to separate analyses for TOPSE and Teen TOPSE, scores from the two TOPSE versions were also analysed together due to the high similarity between the two and to increase statistical power.

Internal consistency was assessed by Cronbach's alpha. Levels from 0.7 and above are generally interpreted as acceptable, whereas levels above 0.9 may suggest redundancy (Tavakol and Dennick 2011). Test-retest reliability was evaluated using intraclass correlation coefficients (ICCs; two-way mixed effects, absolute agreement, single measures) with a target ICC of 0.75–0.90 indicating good and >0.90 indicating excellent reliability (Koo and Li 2016) and targeting a lower limit of the 95% confidence interval (CI) of >0.50 (at least moderate reliability) (Koo and Li 2016). ICCs were calculated for the total score and subscale scores. To evaluate the test-retest score differences, a paired-sample *t*-test was performed (alpha level = 0.05). Effect size was calculated using Cohen's *d*. A Bland-Altman plot (Altman 1991) was created to assess general agreement and potential systematic biases between the two measurement points.

The standard error of measurement (SEM) was calculated as $SEM = SD_{\text{difference (test-retest)}}/\sqrt{2}$ and represents the typical measurement error for a single assessment. From the SEM, the minimal detectable change (MDC) was derived using $MDC = SEM \times z \times \sqrt{2}$, where $z = 1.28$ (80% CI, two-tailed). The MDC represents the smallest change between two measurements that can be interpreted as a *real* change beyond measurement error. To allow comparison across instruments, MDC values were also expressed as a percentage of the total possible score. For the merged version, the highest possible score was set to 485 for the analysis; this is the mean of TOPSE and Teen TOPSE.

Discriminant validity was assessed using Spearman's rho, as scales were non-normally distributed. Correlation coefficients below 0.20 were considered poor, 0.21–0.40 fair, 0.41–0.60 moderate, 0.61–0.80 good and above 0.80 very good (Altman 1991).

2.8 | Ethics

All parents and adolescents who were 16 years old provided written informed consent. Younger children were given age-appropriate information and assented verbally to participate in the study. The study was completed in accordance with the Helsinki Declaration. It was approved by the Norwegian Regional Committee for Medical and Health Research Ethics (2019/1283) and by the Data Protection Officer at Sunnaas Rehabilitation Hospital.

3 | Results

Demographics and sample characteristics at T1 (first test time point) and T2 (retest time point) are shown in Table 1. Of the 112 parents who responded at T1, 42 (37.5%) completed the TOPSE and

TABLE 1 | Demographics and sample characteristics at both time points.

Caregivers	T1 (N=112)	T2 (N=79)
Fathers: <i>n</i> (%)	53 (47.3)	33 (41.8)
Mothers: <i>n</i> (%)	59 (52.7)	46 (58.2)
Child's sex: <i>n</i> (%)	Boys: 28 (48.3) Girls: 30 (51.7)	Boys: 27 (55.1) Girls: 22 (44.9)
Children's age, median (range)	11.7 (6.3–16.9)	11.2 (6.3–16.9)
Children's age group: <i>n</i> (%)		
6–9 years ^a	21 (36.2)	20 (40.8)
10–16 years ^b	37 (63.8)	29 (59.2)
Injury aetiology, <i>n</i> (%)		
TBI	16 (27.6)	15 (30.6)
Tumour	15 (25.9)	12 (24.5)
Stroke	10 (17.2)	8 (16.3)
Infection	8 (13.8)	7 (14.3)
Anoxia	6 (10.3)	6 (12.2)
Other	3 (5.2)	1 (2.0)
Age at injury in years, median (range)	6.3 (0–14.5)	6.4 (0–14.5)
Time since first injury in years (range)	6.0 (1.3–16.9)	5.3 (1.3–16.9)

^aWhose parents completed TOPSE.

^bWhose parents completed Teen TOPSE.

70 (62.5%) completed the Teen TOPSE. At the retest time point, 34 parents (43.0%) completed the TOPSE and 45 (57.0%) completed the Teen TOPSE. The median timespan between the two time points was 9.0 days, range 7–21 days, interquartile range 7–13.

3.1 | Internal Consistency

The Cronbach's alphas for TOPSE and Teen TOPSE were excellent at 0.937 and 0.957, respectively. At the subscale level, Cronbach's alpha varied from 0.622 to 0.905 in TOPSE and from 0.674 to 0.908 in Teen TOPSE. In both cases, the lowest level was recorded for the affection and emotion subscale (0.622 for TOPSE and 0.674 for Teen TOPSE). Most subscales in both versions were well above 0.7. The two TOPSE subscales, self-acceptance and knowledge and learning, were the second lowest at 0.7. When TOPSE and Teen TOPSE were merged, Cronbach's alpha was excellent at 0.957. See Table 2 for full results. See also [Supporting Information](#) for the two inter-scale correlation matrices (TOPSE and Teen TOPSE).

3.2 | Test-Retest Reliability

The ICCs of the TOPSE and Teen TOPSE were both good, approaching excellent, at 0.90 (95% CI [0.801, 0.946]) and 0.89 (95% CI [0.802, 0.935]). The lower 95% CI values were well above the preset level of 0.50. This was also the case for most subscales, except the affection and emotion subscale of TOPSE and the learning and knowledge subscale of Teen TOPSE. The ICC of the merged version of the two TOPSE versions was good, approaching excellent, at 0.889 (95% CI [0.831, 0.927]). The lower 95% CI value was well above the preset level of 0.50. This was also the case for all subscales.

The SEM of the TOPSE was 15.47. The calculated MDCs for TOPSE were 28.00 (80% confidence), 36.10 (90% confidence) and 42.88 (95% confidence). The resulting MDC% values were 5.83%, 7.52% and 8.93%, respectively. The SEM of the Teen TOPSE was 17.57. The calculated MDCs for Teen TOPSE were 31.80 (80% confidence), 41.00 (90% confidence) and 48.70 (95% confidence). The resulting MDC% values were 6.49%, 8.37% and 9.94%, respectively. The SEM of the merged version of the two TOPSE versions was 16.70. The calculated MDCs were 30.22 (80% confidence), 38.96 (90% confidence) and 46.28 (95% confidence). The resulting MDC% values were 6.17%, 7.95% and 9.45%, respectively.

The paired-samples *t*-test showed no significant difference between test and retest scores for the TOPSE (mean difference = −2.62 points, 95% CI −10.25 to 5.02; $p=0.90$, Cohen's $d=-0.12$), the Teen TOPSE (mean difference = 2.56 points, 95% CI −4.91 to 10.02; $p=0.89$, Cohen's $d=0.10$) or the merged TOPSE/Teen TOPSE (mean difference = 0.33 points, 95% CI −4.96 to 5.62; $p=0.89$, Cohen's $d=0.01$).

The Bland–Altman plot (Figure 1) depicting all respondents of the two TOPSE versions demonstrated good agreement between test and retest scores. The mean difference was 0.3 points, indicating negligible systematic bias. The 95% limits of agreement ranged from −46.6 to 46.6 points. There were few outliers. No systematic pattern in the differences across the range of scores was observed.

3.3 | Discriminant Validity

Regarding the TOPSE, there were significant, moderate negative Spearman's correlations with family functioning, indicating that low family functioning was associated with low PSE ($r=-0.44$, $p<0.001$). Higher levels of executive problems in daily life in the children (BRIEF-2) were also moderately associated with low PSE ($r=-0.40$, $p<0.001$). All other explored associations (PHQ-9, GAD-7, FNQ-P, HBI, WISC-V similarities and matrices, and PedsQL) were weak and non-significant. Regarding the Teen TOPSE, there was a significant, moderate negative Spearman's correlation with family functioning (FAD-GF) ($r=-0.48$, $p<0.001$), similar to the one with TOPSE. There was also a significant, low negative correlation with parental depression (PHQ-9) ($r=-0.30$, $p=0.011$) and a low negative, significant correlation with parental anxiety (GAD-7) ($r=-0.28$, $p=0.020$). All other explored associations (FNQ-P, HBI, BRIEF-2, WISC-V similarities and matrices, and PedsQL) were weak and non-significant. Regarding the merged version of TOPSE and Teen TOPSE, there was a significant, moderate negative Spearman's correlation with family functioning (FAD-GF) ($r=-0.477$, $p<0.001$). There was also a significant, low negative correlation with parental depression (PHQ-9) ($r=-0.215$, $p=0.023$) and a low negative, borderline significant correlation with parental anxiety (GAD-7) ($r=-0.168$, $p=0.050$). All other explored associations (FNQ-P, HBI, BRIEF-2, WISC-V similarities and matrices, and PedsQL) were weak and non-significant.

4 | Discussion

This study assessed the psychometric properties of the TOPSE and Teen TOPSE in a sample of families with children with pABI. The results showed excellent internal consistency for the total scale and mainly stable results over the test–retest period, except for the affection and play subscale in the TOPSE, which showed poor stability, and the learning and knowledge subscale in the Teen TOPSE, which showed moderate stability. Overall, discriminant validity analyses indicate that the TOPSE and Teen TOPSE measure a distinct construct, as there were no strong correlations with other measures. Overall, the results suggest that the TOPSE and Teen TOPSE are well suited as a measure of PSE in samples with pABI and as an outcome measure in clinical trials.

4.1 | Internal Consistency

Cronbach's alpha coefficients showed excellent internal validity for both versions of the TOPSE. The high alpha levels may be expected due to the length of the TOPSE questionnaires and do not necessarily suggest redundancy (Tavakol and Dennick 2011).

At the subscale level, Cronbach's alpha coefficients showed poor internal consistency for one subscale: affection and emotion. Both versions of TOPSE struggle with poor internal consistency on that subscale. The two subscales, self-acceptance and knowledge and learning, in the child version of TOPSE were at 0.7 and thus the only subscales with borderline acceptable internal consistency. The same pattern was observed in the Italian validation study, although with lower internal

TABLE 2 | Internal consistency and test–retest reliability.

	TOPSE merged,		Teen TOPSE,		TOPSE merged,		Teen TOPSE,																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Abbreviations: CI: confidence interval; ICC: intraclass correlation coefficient (two-way mixed effects, absolute agreement, single measures); SD: standard deviation; T1: Time Point 1; T2: Time Point 2; TOPSE merged: version where TOPSE for children (Tool to Measure Parenting Self-efficacy, version for parents with children 6–9 years old) and Teen TOPSE (for parents with children 10 years and older) were merged.

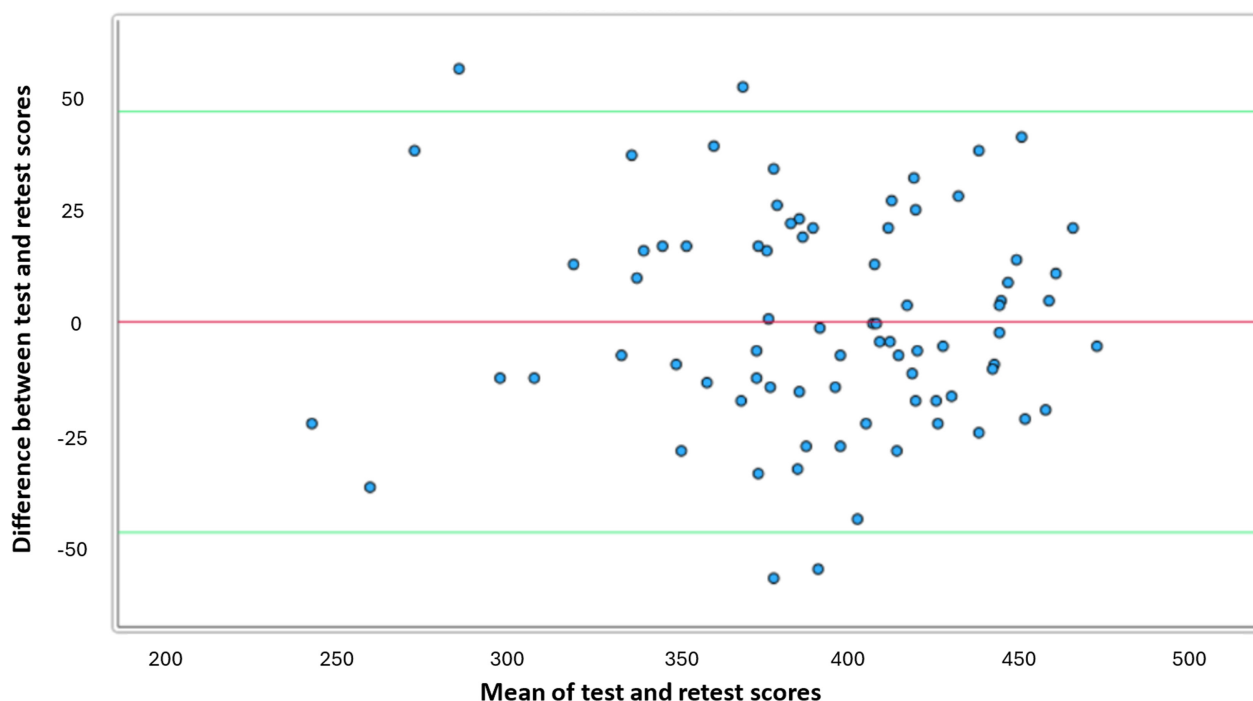


FIGURE 1 | Bland–Altman plot of agreement between test and retest scores for all TOPSE and Teen TOPSE. Bland–Altman showing agreement between parents' questionnaire scores from T1 to T2. Each point represents an individual participant, plotted as the mean of their two scores (x-axis) against the difference between the two scores (y-axis). The central red line, at 0.3, represents the mean difference (systematic bias). The upper and lower green lines represent the 95% limits of agreement. The lower is at -46.6 , and the upper is at 46.6 .

consistency for all three subscales (Roncaglia et al. 2023). In the English, Persian and Bengali versions, internal consistency was good or excellent for all subscales (Kendall and Bloomfield 2005; Trishna et al. 2021; Jamshidian et al. 2024). These differing results may suggest a linguistic or cultural aspect to the three above-mentioned subscales that does not perfectly translate to an Italian or Norwegian context. By excluding one item at the time from their analyses, the Italian study identified three specific items that accounted for the lower internal consistency, one in each of the three subscales (Roncaglia et al. 2023). Similarly, the affection and emotion domain could be revised for higher internal consistency. However, the analyses for TOPSE had the lowest sample size, which may make the results less precise. Also, TOPSE performed well across most domains in this limited sample.

4.2 | Test–Retest Reliability and Time Between Measurements

Test–retest reliability was good for the total scores of the TOPSE and Teen TOPSE, which is in line with the findings in other TOPSE validation studies (Kendall and Bloomfield 2005; Trishna et al. 2021; Jamshidian et al. 2024). We cannot rule out that the poor stability of the first TOPSE subscale and the moderate stability of the last Teen TOPSE subscale were negatively affected by this, as sample sizes for the test–retest reliability using the ICC were below the recommended number for separate analyses of the TOPSE and Teen TOPSE (Mokkink et al. 2019) and as the ICCs of the subscales of the merged version were higher. All MDCs that were expressed as a percentage

of the highest total possible score were below 10%, reflecting excellent measurement precision and indicating strong test–retest reliability and a low level of measurement error (Haley and Frigala-Pinkham 2006; Terwee et al. 2007).

The median number of days between measurements was 9 (IQR 7, 13), ranging from 7 (32 responses) to 21 (2 responses), which is in line with COSMIN (Mokkink et al. 2019), although there is no universal standard. Some recommend a range from 2 to 14 days (Marx et al. 2003), and others recommend up to 21 days (Wyse 2021). Variations between participants are acceptable (Marx et al. 2003). Thus, the amount of time between measurements in the current study seems acceptable.

4.3 | Discriminant Validity

Overall, the results may indicate that PSE is more closely related to overall family functioning than individual family members' symptom burden and children's functioning. This is reassuring as PSE and family functioning are related constructs from a theoretical perspective. There were no strong associations with other measures, indicating that the TOPSE and Teen TOPSE measure a separate construct. This is in line with findings in a systematic review, where PSE was predicted by parent–child communication quality and quality of co-parenting and negatively associated with family dysfunction (Glatz et al. 2023). The Teen TOPSE was also weakly related to parental emotional status, whereas the TOPSE showed a moderate association with executive functioning of children in daily life, which the Teen TOPSE did not. These findings are interesting and may suggest

age-related variability in PSE and its correlates. However, the limited statistical power and the heterogeneous sample call for interpretative caution.

4.4 | Strengths and Limitations

The present study contributes to filling a gap in research by validating the TOPSE in a pABI population. As rehabilitation for children and young people with pABI increasingly adopts a much-needed family-centred focus, it is important to have well-validated tools to measure family-related outcomes.

Another strength of the current study is that it is the first to our knowledge that includes Teen TOPSE in validation. The findings indicate very similar psychometric properties in the teen version of TOPSE, which broadens the age span in assessment. As fewer parents completed the TOPSE than the Teen TOPSE, the two versions were also merged for most analyses to limit this risk of Type II error and to improve statistical power. The results were highly similar across the three analysis modes.

The study sample included children with different injury aetiologies and a wide age range. This heterogeneity is an important consideration when interpreting the findings, especially considering the limited sample size. However, given the diversity of patients we meet in clinical settings, the heterogeneity may also be considered to increase the results' ecological validity.

Due to the limited sample size, factorial validity was not evaluated. Future studies with larger samples should use confirmatory factor analysis to examine whether the original factor structure of the Norwegian TOPSE can be confirmed. Future larger studies should also examine measurement invariance across cultural groups and the role of key sociodemographic characteristics such as sex, age and educational level.

5 | Conclusions

Overall, this study indicates that the Norwegian TOPSE and Teen TOPSE have good psychometric properties and that they are valid and reliable measurement instruments for assessing PSE in parents of children with pABI in Norway. Together with validation studies in other countries, this study contributes to the documentation of robust measures targeting contextual factors in the lives of children with pABI.

Author Contributions

Nina Rohrer-Baumgartner: conceptualization, methodology, data curation, formal analysis, funding acquisition, visualization, supervision, writing – original draft, writing – review and editing, investigation, validation. **Reidun Giffen Brandt:** data curation, formal analysis, visualization, writing – original draft, writing – review and editing, validation. **Ingvil Laberg Holthe:** conceptualization, methodology, data curation, funding acquisition, writing – review and editing, investigation. **Cathrine Brunborg:** supervision, writing – review and editing, methodology. **Sally Kendall:** resources, supervision, writing – review and editing, methodology. **Edel J. Svendsen:** conceptualization, methodology, data curation, writing – review and editing, investigation.

Marianne Løvstad: conceptualization, methodology, data curation, funding acquisition, project administration, writing – review and editing.

Acknowledgements

The authors would like to thank all the participants for their time and effort.

Funding

This study was supported by the Norwegian Research Council (Norges Forskningsråd) under Grant 288172.

Ethics Statement

All parents and adolescents aged 16 years or older provided written informed consent. Younger children were given age-appropriate information and assented verbally to participate in the study. The study was completed in accordance with the Helsinki Declaration. It was approved by the Norwegian Regional Committee for Medical and Health Research Ethics (2019/1283) and by the Data Protection Officer at Sunnaas Rehabilitation Hospital.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data are available from authors upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supporting Information.