

RESEARCH ARTICLE

Development and validation of the Distracting Ingenuity Promotion Scale for paediatric nurses to support the psychological outcomes of paediatric patients and their families: A survey-based cross-sectional cohort study

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Abstract

Aim: To develop and validate the Distracting Ingenuity Promotion Scale (DIPS) for paediatric nurses.

Design: Cross-sectional study using anonymized self-administered questionnaires.

Methods: From July–November 2013, paediatric nurses working in the wards or out-patient departments in 39 medical institutions in Japan were enrolled in the survey. Data were analysed using the Student's *t*-test, Mann–Whitney U test and analysis of variance test. Exploratory and confirmatory factor analyses were performed to validate the factors in the DIPS. Cronbach's α was used to calculate the reliability of the DIPS.

Results: The DIPS included five subscales comprising 21 items. The goodness-of-fit indices for confirmatory factor analysis had a Comparative Fit Index of 0.923 and a Root Mean Square Error of Approximation of 0.059 and fulfilled the standard external validity criteria. Cronbach's α was 0.707–0.826 for each subscale and 0.895 for the overall scale.

KEYWORDS

distraction, paediatric patient, preparation, psychological outcomes, scale

1 | INTRODUCTION

Every year, many children visit medical facilities and meet strangers to receive specialized care based on their medical needs. In the United States, 156 million children under 15 years of age visited out-patient clinics in 2016, and the average number of medical exchanges has increased by 1.25 times each year since 2016 (Rui & Okeyode, n.d.). During medical care, children undergoing invasive medical procedures experience psychological outcomes that increase their perception of pain, anxiety, fear and threats when they meet with

medical staff (De Mula-Fuentes et al., 2017; Jurko et al., 2016). Emotional responses related to the general experience of hospitalization, such as invasive medical procedures, can be distressing and lead to post-traumatic stress disorder (PTSD; Triantafyllou & Matziou, 2019). These emotional responses can delay crucial medical treatment, prolong the time to complete treatment and reduce patient satisfaction (Lerwick, 2016). Moreover, even without the physical, invasive or painful processes of medical procedures, children can experience anxiety related to equipment, settings and pain remembrance (von Baeyer et al., 2004; Pavlova et al., 2020). Such

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emotional experiences that also increase parental anxiety cause serious problems (Oommen & Shetty, 2020).

Currently, nursing strategies to reduce anxiety and stress in children include distraction (Bulut et al., 2020; Gates et al., 2020; Stone & Neale, 1984; Tiedge, 1975) and preparation (Getahun et al., 2020; Koller, 2007; Matsumori et al., 2006; Yoo & Cho, 2020). In particular, providing children with medical support options during invasive procedures allows for tailored support based on individual needs (Maslak et al., 2019). However, 14% of paediatric patients recruited in a survey by the National Health Service in England reported that communication with staff was unsuitable or only partially directed to include them in care decisions (Care Quality Commission, 2017). The United Nations Convention on the Rights of the Child (UNCRC) emphasizes the importance of providing health and welfare information to children; however, previous studies indicate that children are not well supported in the medical environment (Coyne et al., 2016; Eklund et al., 2020; Przybylska et al., 2019). These observations underpin the rationale for paediatric nurses to enhance the support they provide for the psychological outcomes of paediatric patients receiving medical care and their families.

2 | BACKGROUND

School age is a developmental stage with trait anxiety (Jovanovic et al., 2014), and 64.7% of the hospitalized children aged 7–10 years are afraid of injections (Şahin & Topan, 2019). Further, hospitalized children may suffer from negative psychological sequelae by the first year after discharge (Rennick & Rashotte, 2009). Since individual interventions by paediatric nurses to support school-age children were recommended (Hart & Bossert, 1994), indicating a shift in the right direction, active involvement of children has been demonstrated to be effective in reducing pain and fear (Lee et al., 2018).

A 2016 survey reported that 57% of 34,000 paediatric patients felt they were either not or minimally involved in making decisions about their care (Care Quality Commission, 2017), and fewer than 50% of the healthcare organizations in England had established a specific strategy to improve paediatric patients' experience (Improving the Patient Experience of Children and Young People 2015). Paediatric services now increasingly consider the child's perspective (Lewis et al., 2014), and paediatric ethics is gaining momentum in established research and the development of medical protocols (Nicholl et al., 2020). The participation of nurses in ethical discussions increases the involvement and understanding of paediatric patients in decision-making processes and helps to instill trust in team members (Bartholdson et al., 2021).

However, there are currently no tools available for paediatric nurses to protect the decision-making rights of children receiving medical care or enhance strategically viable "distractions" and "preparations." Therefore, such tools are needed to raise awareness of nursing practices, including ethical considerations so that paediatric nurses can provide support to paediatric patients and their

families. Particularly, planning patient distraction is essential to a child-centred care approach because it facilitates the provision of medical assistance to children during invasive procedures (Maslak et al., 2019; Quaye et al., 2019). Thus, this study aimed to validate the Distracting Ingenuity Promotion Scale (DIPS) developed by the author for paediatric nurses to support the psychological outcomes of paediatric patients and their families.

3 | THE STUDY

3.1 | Operational definitions

Based on a commentary on informed consent/assent (Hein, De Vries, et al., 2015; Hein, Troost, et al., 2015; Katz & Webb, 2016), "children" in this study were defined as individuals aged 6–14 years. School-age children were focused on because they are old enough to experience psychological outcomes, such as trait anxiety, pain and fear (Jovanovic et al., 2014; Rennick & Rashotte, 2009; Şahin & Topan, 2019), and paediatric nurses can provide them with support (Bartholdson et al., 2021; Lee et al., 2018).

In this study, paediatric nurses were qualified nurses, at least 21 years of age, with clinical experience with paediatric patients aged 6–14 years in paediatric wards or paediatric outpatient departments. "Distraction" involves the diversion of attention from the problem by prompting the child undergoing a medical procedure to think about other things or by engaging them in another activity (Stone & Neale, 1984). "Preparation" involves the process of reducing fear and anxiety in a child scheduled for a medical procedure and promoting their long-term coping abilities and adjustment to future healthcare challenges (Koller, 2007). These definitions are important concepts in nursing and were used to develop the DIPS and demonstrate that the scale is based on previously established fundamental evidence (Koller, 2007; Stone & Neale, 1984).

3.2 | Design

This descriptive questionnaire-based cross-sectional study was performed to develop the DIPS and establish its validity and reliability among paediatric nurses.

4 | METHODS

4.1 | Participants and setting

The questionnaires were administered to 746 paediatric nurses working in 39 medical facilities in Japan between July and November 2013. The selection of target nurses was based on a report released in 2012 by the Japanese Ministry of Health, Labour, and Welfare (Ministry of Health, Labour, and Welfare, 2012) and the Nursing

Association (Japanese Nursing Association Press, 2013). The sample size was calculated using G* Power 3 software with an effect size of 0.5 (Cohen, 1988), an alpha error probability of 0.05 and a detection rate of 0.95 (Cohen, 1992). The calculated sample size was >210 paediatric nurses. Furthermore, the number of items in the 24-item draft questionnaire was estimated. To measure the difference in credible mean values, the sample size was justified (Noordzij et al., 2010). The detection rate had to be changed to 0.8 and compared using a sample size of more than 64 participants. The inclusion criteria for participants were as follows: (a) age > 21 years, (b) work experience in a paediatric ward or paediatric clinic and (c) experience in providing nursing care for children aged 6–14 years old. The exclusion criteria were as follows: (a) non-paediatric nurses and (b) one or more unanswered questions in the questionnaire. It was necessary to avoid statistical biases in selecting the paediatric nurse participants to conduct this quantitative study.

Pseudo-random numbers were applied to the prefectures and municipalities to select survey participants from each medical facility. Furthermore, multistage and multilayer extractions were adopted as random sampling methods. For each facility, requests for research cooperation were presented over the phone to the directors of the hospitals and directors of the nursing departments. Thereafter, the required number of questionnaires was confirmed and mailed via the postal service to the facility. Explanations were provided to the paediatric nurses to elicit a response from an ethical perspective. Moreover, the environment represented an examination or treatment setting with psychological outcomes for paediatric patients and their families. Written informed consent, which was obtained from respondents participating in the survey, was submitted along with the completed questionnaire.

4.2 | Participant attributes

Eight attributes of the participants, including sex, age, final education level, years of nursing experience, years of paediatric nursing

experience, current workplace, knowledge of the UNCRC and informed assent (IA) were considered in this study.

4.3 | Study measurement: DIPS

The DIPS was created based on the “Nursing Techniques for Bringing Out the Potential of Children” (Figure 1; Matsumori et al., 2006). Nurses are best able to develop the potential of children while protecting their dignity by combining the following six nursing techniques continuously (Matsumori et al., 2006): “allowing choices,” “continuous explanations,” “suiting the child’s timing,” “distraction,” “cooperation of the mother and family” and “negotiating with the child.” Figure 1 was adapted for this study and was reproduced with the copyright holder’s approval (John Wiley and Sons: License Number 5010051380348). The original questionnaire used in this study was the template for the DIPS, and the author has obtained verbal approval and written consent for its use through a licensing agreement.

Before developing the DIPS, the validity of the preliminary content (i.e. the inclusion of children’s rights) was confirmed according to previous studies (Koller, 2007; Matsumori et al., 2006). Specifically, the DIPS is based on a care model that respects both the rights and autonomy of children and their parents. The superficial validity of the DIPS was confirmed by a pre-test evaluation conducted with five individuals representing the following target groups: nurses with experience working in a paediatric ward ($N = 3$), nurse with experience working in a paediatric outpatient department ($N = 1$) and a university professor with a good understanding of paediatric nursing ($N = 1$); based on the results, difficult or similar items were corrected. The original version of the questionnaire, which comprised 1–20 items (Figure 2), was modified in the pre-test phase, and items 21–24 were added. The DIPS draft questionnaire had 24 questions and 4 answer options (not at all, not applicable, slightly applicable and highly applicable; Table 1). The scale was designed so that a higher score corresponded to a better self-assessment of nursing practice.

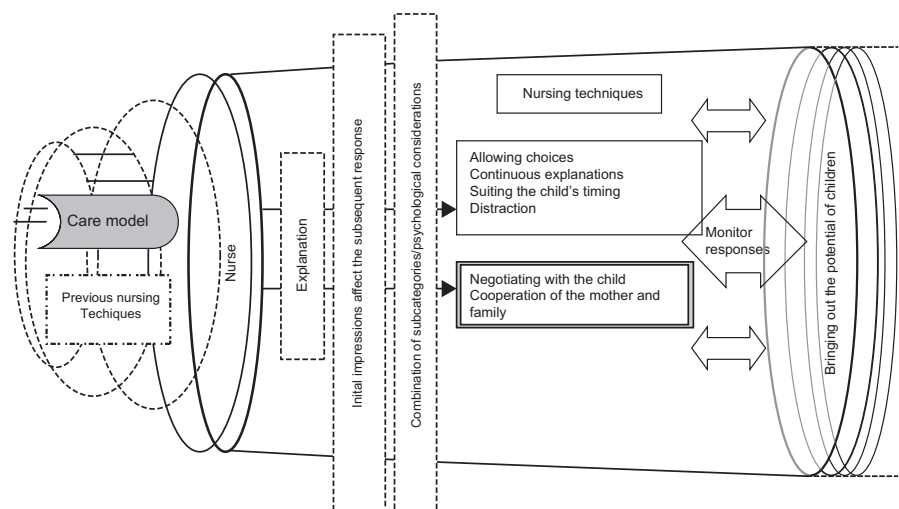


FIGURE 1 Nursing techniques for bringing out the potential of children

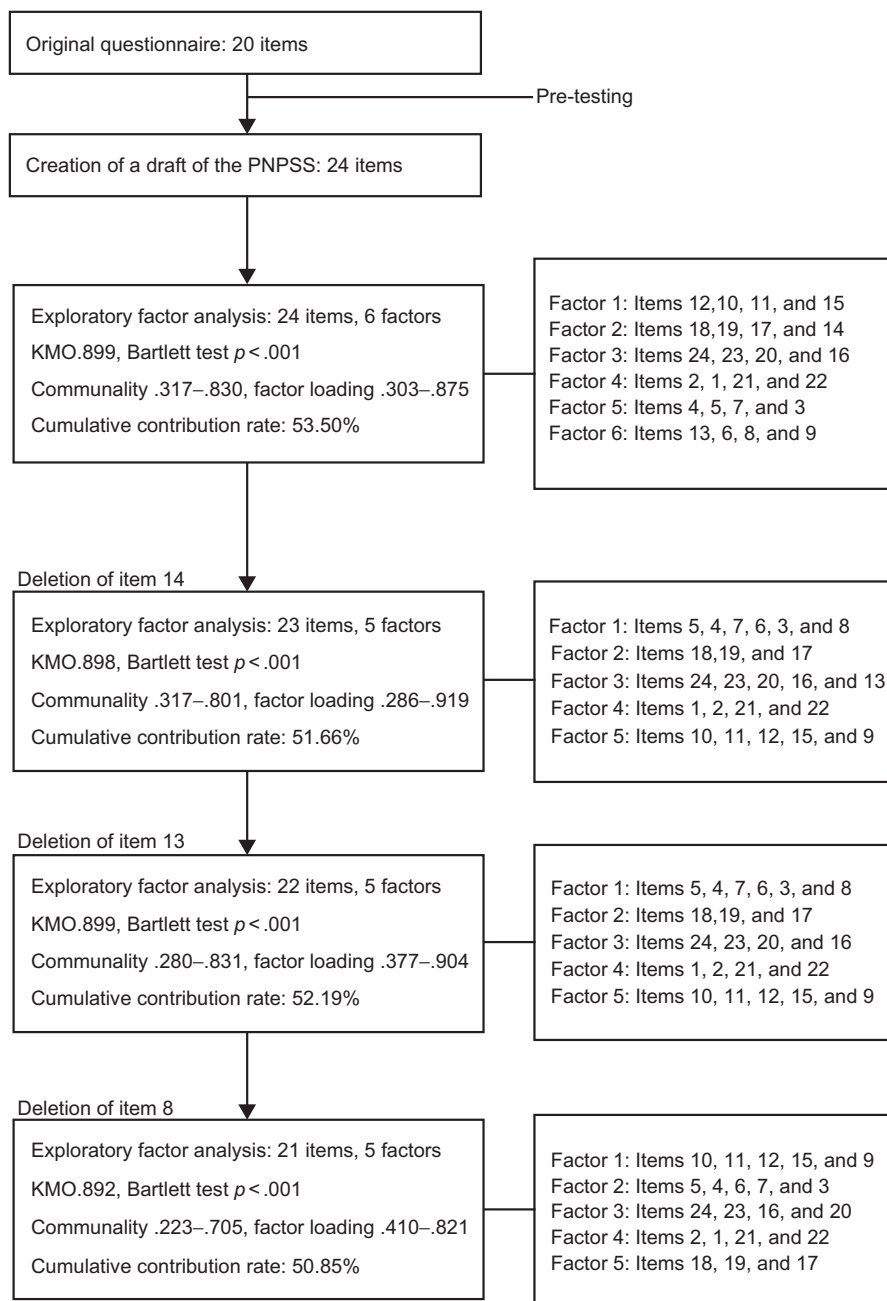


FIGURE 2 Flowchart of exploratory factor analysis. DIPS, Distracting Ingenuity Promotion Scale, KMO, Kaiser-Meyer-Olkin

4.4 | Statistical analyses

All statistical analyses were performed using SPSS version 23.0 and AMOS 26.0 (IBM). Participant data were expressed as numbers and percentages. The DIPS scores for each attribute were analysed using the Student's *t*-test, Mann-Whitney U test and analysis of variance test. An exploratory factor analysis (EFA) was performed for each diagonal rotation to validate factors included in the DIPS. Factor names were determined and tested using a confirmatory factor analysis (CFA). The discriminating power of the DIPS was confirmed by the difference between the mean of the upper and lower groups that were stratified by the total score, and the normality of the response distribution and total DIPS score were examined using the

Shapiro-Wilk test to eliminate biased items. The reliability of the DIPS was calculated using Cronbach's α coefficient for the entire scale and the subscales.

4.5 | Ethical approval

Ethical considerations, including participant anonymity, data confidentiality and voluntary participation, were explained to the study participants. The return of a completed, anonymous questionnaire was considered consent to participate in the main study. This study was conducted with the approval of the Asahikawa Medical University Research Ethics Committee (approval number 1490).

TABLE 1 Draft items of the Distracting Ingenuity Promotion Scale

No.	Item
1	Checked whether the child had been informed of the test/treatment by the physician, nurse, or parent(s)
2	Considered when to tell the child that the child was going to have the test/treatment
3	Asked the parent(s) to attend when the physician/nurse gave information to the child
4	Informed the child using language that is easy to understand (informed not only the parent(s) but also the child)
5	Checked if the child was ready to undergo the test/treatment
6	Listened to the child's request to determine whether the parent(s) should attend
7	Explained to the child the purpose of the test/treatment immediately before the procedure
8	Motivated the child to undergo the test/treatment by choosing the best time to have the test/treatment when the child was becoming reluctant
9	Tried alternatives to make the child to not be afraid
10	Explained to and talked to the child as the test/treatment continued
11	Appropriately responded to any utterances by the child
12	Talked to the child in a manner appropriate to the child's effort
13	Took action other than holding on or down when the child started crying and moving
14	Allowed the child to bring in a favorite object (such as a stuffed toy)
15	Distracted the child from the test/treatment by using objects such as toys
16	Medical staff members talked to each other such that the child was distracted
17	Tried not to give the impression that the procedure had ended when in fact it was ongoing
18	Verbally informed the child that the test/treatment was completed
19	Praised the child's effort
20	Explained to the child the instructions to follow after the test/treatment
21	Introduced myself as the nurse-in-charge to the child and parents
22	Told the child when the test/treatment will be performed
23	Asked the child how he/she was feeling after the test/treatment
24	Understood what the child wanted after the test/treatment

5 | RESULTS

5.1 | Demographic data of the quantitative study

In total, 254 participants were selected based on the provision of completed questionnaires. Among them, 25 respondents (10%) were excluded based on the pre-specified selection criteria. Participants in this study cohort included 229 nurses aged 21–60 years (mean \pm standard deviation [SD]: 37.29 \pm 9.36 years). The mean \pm SD duration of the nurses' experience was 13.61 \pm 8.82 years and of paediatric nurses was 6.87 \pm 6.11 years. The general demographic characteristics of the participants are shown in Table 2.

5.2 | Comparison of mean differences between total DIPS score groups by attributes

The sample size in this study was sufficient to compare the mean values. Paediatric nurses with higher education levels had higher DIPS scores than those with lower education levels had ($p < .001$; Table 2).

Paediatric nurses working in paediatric wards had higher DIPS scores than those working in other wards had ($p = .004$). Greater knowledge of and action based on the UNCRC ($p < .001$) and IA ($p < .001$) among paediatric nurses was associated with a high DIPS score.

5.3 | Validity

5.3.1 | Construct validity

Construct validity was evaluated using EFA. The results revealed that the Kaiser–Meyer–Olkin measure of sampling adequacy was 0.899, and the results of Bartlett's test of sphericity were statistically significant ($\chi^2 = 2,314.048$, $p < .001$), which indicated that the questionnaire was suitable for factor analysis. Five factors with eigenvalues greater than 1.0 were extracted using promax rotation by the principal factor method to prevent Haywood's case and pursue a simple structure. These were supported by screen plot examination.

Figure 2 shows the procedure and process flow, up to the extraction of the five factors that were repeated in sequential order.

TABLE 2 Demographic characteristics of quantitative studies and intergroup comparison of DIPS scores ($N = 229$)

Variables	N	%	DIPS total score		
			Mean	SD	<i>p</i>
Sex					
Male	6	2.6	74.3	11.8	ns
Female	223	97.4	75.1	9.4	
Age, decades					
20s	61	26.6	76.2	8.5	ns
30s	78	34.1	75.7	10.1	
≥40s	90	39.3	73.7	9.3	
Educational attainment					
Vocational school	126	55.0	73.1	8.5	<.001*
Junior college	21	9.2	80.3	9.1	
University	37	16.2	78.6	8.6	
Graduate School	9	3.9	84.9	8.0	
Other	36	15.7	72.3	10.2	
Years of nurse experience					
<1–3	35	15.3	70.7	11.3	ns
4–10	52	22.7	69.7	13.7	
>10	142	52.0	69.9	11.3	
Years of paediatric nurse experience					
<1–3	97	42.4	73.5	9.3	ns
4–10	70	30.6	76.3	9.5	
>10	62	27.1	76.1	9.2	
Workplace					
Paediatric ward	87	38.0	77.7	9.1	.004*
Mixed ward	32	14.0	72.3	9.6	
Paediatric outpatient	44	19.2	75.6	9.7	
Paediatric clinic	58	25.3	72.2	8.8	
Ward and outpatient	8	3.5	75.4	7.6	
Knowledge of the UNCRC					
I do not know	93	40.6	64.9	10.1	<.001*
I just know	22	9.6	62.4	1.3	
I know and I act	114	49.8	75.2	11.0	
Knowledge of the IA					
I do not know	84	36.7	65.1	10.9	<.001*
I just know	60	26.2	66.0	8.8	
I know and I act	85	37.1	77.1	11.1	

Abbreviation: DIPS, Distracting Ingenuity Promotion Scale; IA, informed assent; ns, not significant; *p*, *p*-value; SD, standard deviation; UNCRC: United Nations Convention on the Rights of the Child.

*Analysis of variance.

The cumulative contribution was 50.85%. As shown in Table 3, the configurational concepts of the DIPS are as follows:

- Factor 1: Distracting ingenuity
- Factor 2: Protecting decision-making

- Factor 3: Sharing emotions
- Factor 4: Explaining facts
- Factor 5: Promoting adaptation

The factor loading of most items in the five factors was greater than 0.40. However, the factor loading of items 8, 13 and 14 exceeded 0.40 for the other major factors, and the factor analysis became unstable; therefore, these three items were excluded.

Construct validity was further evaluated by the CFA, and the results of a standardized estimation model and the general fit index are shown in Figure 3. Most of the standardized factor loading coefficients (19/21) obtained were greater than 0.50. The pathway coefficients of the five factors ranged from 0.395–0.724, indicating a moderate to a high correlation between the factors. In addition, the results of the critical ratio test showed that all the coefficients were statistically significant (all $p < .001$).

5.3.2 | Discriminative validity

After GP (Good–Poor) analysis, the mean and total scores of the top 25% of the 21 DIPS items were significantly higher than those of the bottom 25% (all $p < .001$; Table 4). Thus, all the 21 items were confirmed to have discriminating power and could not be excluded.

5.4 | Reliability

5.4.1 | Internal consistency reliability

The Cronbach's α coefficient for the overall DIPS questionnaire was 0.895, and the values for the five factors including distracting ingenuity, protecting decision-making, sharing emotions, explaining facts and promoting adaptation were 0.826, 0.751, 0.758, 0.762–0.707 respectively (Table 4).

5.4.2 | Split-half-reliability

The 21 items were classified into two parts according to the parity of the item number, and the Guttman Split-half-reliability coefficient of two parts was 0.834.

5.5 | Bias of response distribution

The 21 items of the DIPS extracted by the EFA had scores that ranged from 21–84 points. The minimum, maximum and mean \pm SD total scores were 43, 84 and 66.4 ± 8.3 points respectively. The kurtosis was 0.075 and the skewness was -0.444 . The Shapiro–Wilk test confirmed normality based on a significance of 0.081. The DIPS results were the outcome of the guaranteed adoption of all the 21 items.

TABLE 3 Results of the 21 items of EFA and validity of constructs (N = 229)

Constituent concepts	Item no.	Comm.	Exploratory factor analysis				
			Factor structure				
			1	2	3	4	5
Factor 1 Distracting ingenuity	Item 10	0.625	0.753	0.101	-0.042	-0.048	0.036
	Item 11	0.535	0.722	-0.152	0.080	0.182	-0.086
	Item 12	0.597	0.718	-0.101	-0.086	0.036	0.205
	Item 15	0.499	0.627	0.009	0.109	-0.082	0.078
	Item 9	0.416	0.413	0.335	0.099	-0.203	0.028
Factor 2 Protecting decision-making	Item 5	0.664	0.061	0.811	0.070	-0.080	-0.080
	Item 4	0.587	0.095	0.721	-0.129	0.098	-0.037
	Item 6	0.295	-0.076	0.506	0.044	0.056	0.062
	Item 7	0.422	0.223	0.476	-0.078	0.062	0.049
	Item 3	0.223	-0.238	0.469	0.096	-0.017	0.184
Factor 3 Sharing emotions	Item 24	0.599	-0.155	0.022	0.821	0.012	0.034
	Item 23	0.693	0.190	0.085	0.723	-0.033	-0.128
	Item 16	0.305	0.238	-0.102	0.419	0.042	0.016
	Item 20	0.422	0.139	-0.027	0.410	0.147	0.163
Factor 4 Explaining facts	Item 2	0.633	0.095	0.140	-0.001	0.712	-0.163
	Item 1	0.523	-0.078	0.096	0.076	0.680	-0.069
	Item 21	0.394	-0.004	-0.183	0.011	0.604	0.224
	Item 22	0.555	-0.012	0.373	-0.093	0.475	0.100
Factor 5 Promoting adaptation	Item 18	0.705	0.111	0.101	-0.050	-0.067	0.772
	Item 19	0.571	0.240	-0.066	-0.036	0.010	0.632
	Item 17	0.416	-0.120	0.189	0.142	0.107	0.502
Eigenvalue			7.25	1.93	1.49	1.32	1.05
Contribution rate (%)			32.31	7.12	4.98	3.87	2.57
Cumulative contribution rate (%)			32.31	39.43	44.41	48.28	50.85

Note: Factor analysis: Promax rotation using the principal factor method. Item acceptance criteria: eigenvalue ≥ 1 , factor loading ≥ 0.40 .

Abbreviation: EFA, exploratory factor analysis.

6 | DISCUSSION

The DIPS, which was developed and validated by the author, has shown that paediatric nurses can promote distracting ingenuity in paediatric patients and enable nursing practices to support paediatric patients and their families. The results of this study support an important concept of nursing that is based on a care model that respects both the rights and autonomy of children and their parents (Koller, 2007; Matsumori et al., 2006; Stone & Neale, 1984). Moreover, the DIPS proved to be an essential tool for guiding the resolution of ethical problems for school-aged paediatric patients who experience psychological outcomes, such as trait anxiety, pain and fear (Jovanovic et al., 2014; Rennick & Rashotte, 2009; Şahin & Topan, 2019). Based on these findings, DIPS can serve as a new approach for child-centric care that facilitates the provision of medical assistance to children during invasive procedures (Maslak et al., 2019; Quaye et al., 2019). In this section the author carefully discusses the detailed rationale for the development and validation

of the DIPS to enable paediatric nurses to provide appropriate care for paediatric patients and their families.

6.1 | Human rights of children and the DIPS

The UNCRC was created in 1989, and Article 17 of the Convention states that “children have the right to access information that is important to their health and well-being.” However, children experience various fears and concerns in hospitals, including separation from parents and family, unfamiliar environments, research and treatment, and loss of self-determination. Moreover, the loss of self-determination of a child's personal needs exacerbates their fear and concerns (Brostrom & Johansson, 2014; Coyne, 2006; Joseph et al., 2015). These are the most prominent problems for paediatric patients receiving medical care and their families.

It is important to focus on nursing ethics to increase the involvement and understanding of paediatric patients in decision-making

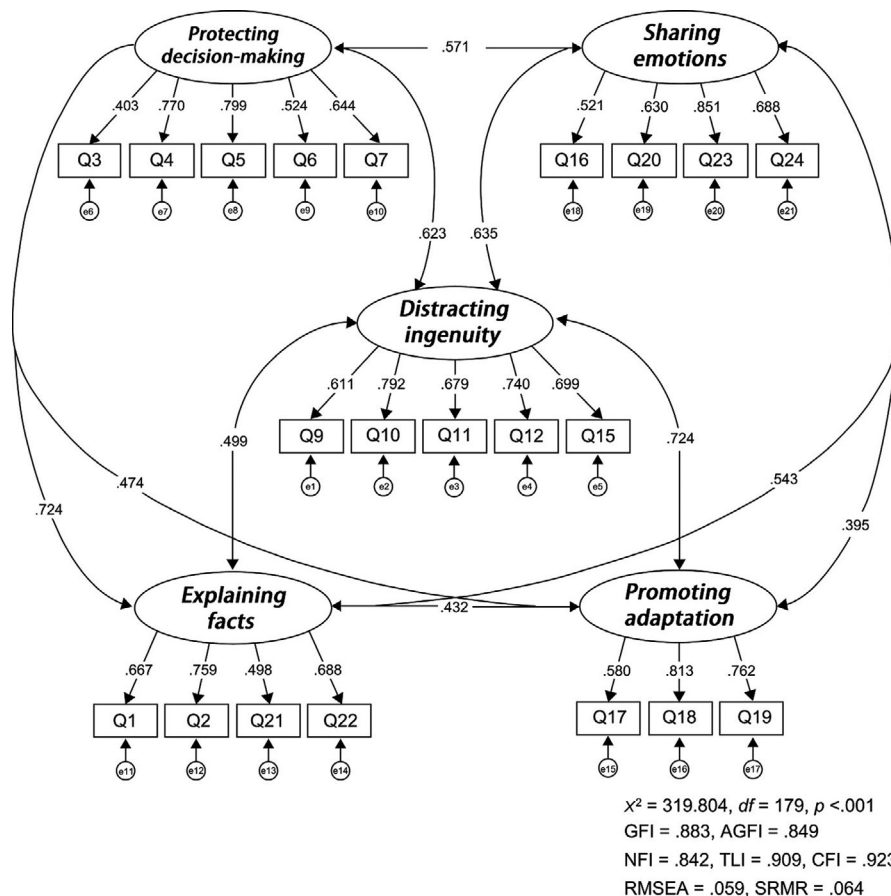


FIGURE 3 The standardized estimate of each coefficient in the confirmatory factor analysis model. AGFI, Adjusted Goodness-of-Fit Index; CFI, Comparative Fit Index; GFI, Goodness-of-Fit Index; NFI, Normed Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index

processes and instill their trust in the team members (Bartholdson et al., 2021). Hence, paediatric nurses need to resolve ethical issues, contribute to decision-making processes, and act as advocates for vulnerable populations (i.e. sick paediatric patients and their families; Bagnasco et al., 2018). Regarding these ethical issues, the DIPS provides information to enable paediatric nurses to focus on respect for the human rights of children and on the necessity of practicing nursing ethics for paediatric patients and their families.

6.2 | General condition of the questionnaire

The author created a questionnaire comprising 21 items and five factors (Appendix 1). The cumulative contribution of the five major factors (distracting ingenuity, protecting decision-making, sharing emotions, explaining facts and promoting adaptation) reached 50.85%. However, there were differences between the five factors extracted from the factor analysis and the six items shown in Figure 1 (Matsumori et al., 2006). Specifically, Factor 2 (“protecting decision-making”) included “cooperation of the mother and family” (Matsumori et al., 2006). Consistent with the results of previous studies, this result demonstrates that family cooperation facilitates the treatment of children and their decision-making autonomy (Ágata et al., 2020; Antje et al., 2020; Wijngaarde et al., 2021). According to the CFA value index, the compatibility of the DIPS was considered

good in terms of the Comparative Fit Index and Tucker-Lewis Index values (Batista-Foguet et al., 2004).

6.3 | Validity

In practice, it was necessary to logically explain the validity of the five factors of the DIPS to support the psychological outcomes of paediatric patients and their families. From the EFA results of this study, distracting ingenuity involved listening to the paediatric patient's remarks, speaking at their pace and not instilling fear in them. These behaviours could be interpreted as necessary nursing care for paediatric patients who may experience psychological outcomes (De Mula-Fuentes et al., 2017; Jurko et al., 2016). Protecting decision-making included confirming the paediatric patient's feelings and hopes regarding examination and treatment, seeking parental help, and explaining the procedure in layman's terms to the patient and their family. This implies that it is important to support paediatric patients who are eligible for IA (Katz & Webb, 2016). Sharing emotions included listening to the paediatric patient's impressions after the examination and treatment and determining if there were any improvements that could have been made. Explaining facts included checking when the examination or treatment would be undertaken for the paediatric patient, when it should be explained to them and who should do so. These two factors were closely related to Article

TABLE 4 Discriminatory validity and internal consistency of the Distracting Ingenuity Promotion Scale (N = 229)

Variables and item No.	Mean \pm SD			Items	Cronbach α
	Whole group (N = 229)	High group (N = 57)	Low group (N = 57)		
DIPS	66.39 \pm 8.26	75.87 \pm 4.02	57.42 \pm 4.02	21	0.895
Factor 1					
Distracting ingenuity	16.75 \pm 2.15	18.76 \pm 2.15	14.95 \pm 1.86	5	0.826
Item 9	3.15 \pm 0.55	3.55 \pm 0.55	2.84 \pm 0.55		
Item 10	3.62 \pm 0.53	3.84 \pm 0.53	3.04 \pm 0.53		
Item 11	3.39 \pm 0.56	3.59 \pm 0.56	2.87 \pm 0.56		
Item 12	3.20 \pm 0.52	3.96 \pm 0.52	3.21 \pm 0.52		
Item 15	3.40 \pm 0.62	3.83 \pm 0.62	2.99 \pm 0.62		
Factor 2					
Protecting decision-making	15.19 \pm 2.54	17.71 \pm 2.54	12.99 \pm 2.54	5	0.751
Item 3	2.72 \pm 0.70	3.60 \pm 0.70	2.89 \pm 0.70		
Item 4	2.98 \pm 0.64	3.61 \pm 0.64	2.60 \pm 0.64		
Item 5	3.12 \pm 0.66	3.52 \pm 0.66	2.52 \pm 0.66		
Item 6	3.18 \pm 0.87	3.31 \pm 0.87	2.21 \pm 0.87		
Item 7	3.20 \pm 0.64	3.67 \pm 0.64	2.76 \pm 0.64		
Factor 3					
Sharing emotions	11.47 \pm 2.27	13.44 \pm 2.27	9.854 \pm 2.2	4	0.758
Item 16	3.35 \pm 0.80	3.36 \pm 0.80	2.50 \pm 0.80		
Item 20	2.86 \pm 0.62	3.81 \pm 0.62	2.97 \pm 0.62		
Item 23	2.70 \pm 0.79	3.29 \pm 0.79	2.17 \pm 0.79		
Item 24	2.55 \pm 0.76	2.97 \pm 0.76	2.20 \pm 0.76		
Factor 4					
Explaining facts	12.22 \pm 2.51	14.21 \pm 2.51	10.08 \pm 2.51	4	0.762
Item 1	2.94 \pm 0.77	3.49 \pm 0.77	2.44 \pm 0.77		
Item 2	2.97 \pm 0.85	3.48 \pm 0.85	2.48 \pm 0.85		
Item 21	3.11 \pm 0.97	3.57 \pm 0.97	2.47 \pm 0.97		
Item 22	3.20 \pm 0.67	3.67 \pm 0.67	2.70 \pm 0.67		
Factor 5					
Promoting adaptation	10.76 \pm 1.39	11.75 \pm 1.39	9.565 \pm 1.3	3	0.707
Item 17	3.32 \pm 0.76	3.76 \pm 0.76	2.76 \pm 0.76		
Item 18	3.67 \pm 0.51	3.99 \pm 0.51	3.32 \pm 0.51		
Item 19	3.78 \pm 0.43	4.00 \pm 0.43	3.48 \pm 0.43		

Note: All *p*-values are $<.001$.

Abbreviations: DIPS, Distracting Ingenuity Promotion Scale; SD, standard deviation.

12 of the UNCRC: the right of the child to be heard. It was reaffirmed that paediatric nurses should focus on the ethical issues of the paediatric patient and their family because the paediatric patient's opinions expressed during the examination and treatment process influenced the results (Bagnasco et al., 2018; UNCRC, 2009). Promoting adaptation included instructing the paediatric patient to be honest and asserting that they had done their best. These reflect the roles of paediatric nurses in promoting coping abilities in paediatric patients and helping them adapt to future healthcare challenges (Koller, 2007).

In summary, these statistical dependencies and structural relationships can be reasonably explained by logical relationships

(Williams et al., 1999). Therefore, it can be considered that the questionnaire structure conforms to the expected content framework and has good structural validity.

6.4 | Reliability

A Cronbach's α coefficient of 0.50–0.70 is generally considered reliable and of 0.70–0.90 very reliable (Heo et al., 2015). In this study, Cronbach's α coefficient was 0.895. The Cronbach's α coefficient ranged from 0.751–0.826 for distracting ingenuity, protecting decision-making, sharing emotions and explaining facts.

However, it was 0.707 for promoting adaptation, which was lower than the coefficient for the other four factors. This may be due to the lack of items related to this factor, suggesting that further studies are needed. Overall, Cronbach's α coefficient showed that the homogeneity or intrinsic correlation between the questionnaire's factors was consistent and that the items focused on the same point. In this study, the coefficient of the Guttman Split-half was 0.834, which provided evidence that the questionnaire had good reliability.

6.5 | Characteristics

Marsac et al. (2016) provided a framework for training personnel in paediatric medical networks in the practice of trauma-based care, and King et al. (2019) suggested developing a strategy to realize that culture. Interventions designed to reduce stress in hospitalized children can reduce stress at the time and affect how future experiences are evaluated and managed (Coyne, 2006). The most significant finding in the report on PTSD evaluation tools was the lack of topic-related research (Triantafyllou & Matziou, 2019). At present, children's trauma and PTSD research mainly involve confirming the knowledge of medical staff and postoccurrence intervention for children's troubles. However, there is no practical nursing framework focused on promoting adaptation to the psychological outcomes of paediatric patients and their families or for paediatric nurses to devise distracting ingenuity. This novel DIPS questionnaire was designed based on previous studies, including that of the UNCRC, and was validated for reliability and validity. The resulting five-factor scale structure closely agreed with aspects of the child and family care model and programme (Koller, 2007; Matsumori et al., 2006; Yoo & Cho, 2020).

This framework can promote the best interests of paediatric patients and their families through awareness and a common understanding among paediatric nurses, which is supported by the study results obtained for "Factor 2: Protecting decision-making" and "Factor 4: Explaining facts." For example, if each paediatric nurse administers the DIPS before and after a paediatric patient is examined or treated, they can collaborate with other medical staff according to the principles established in the DIPS on how to approach the paediatric patient and their family. Additionally, the use of the DIPS by transfer and newly graduated nurses and nursing students may improve the quality of care provided by the team and provide common standards for care through specific educational interventions (Bagnasco et al., 2018). This is because the results of this study are associated with higher DIPS scores for paediatric nurses with higher education levels, paediatric nurses working in paediatric wards, and paediatric nurses who know and act on UNCRC/IA. With these considerations, the DIPS is a potential paediatric nursing practice method to address ethical issues wherein the psychological outcomes of paediatric patients and their families can be predicted (Care Quality Commission, 2017; Eklund et al., 2020; Lewis et al., 2014; Przybylska et al., 2019).

6.6 | Strengths and limitations

6.6.1 | Strengths

Worldwide, paediatric nursing research on interventions for the psychological outcomes of paediatric patients and their families remains challenging. In this study, scales were developed specifically for paediatric nurses by carefully considering the distracting ingenuity by paediatric nurses and the support they provided for the psychological outcomes of paediatric patients and their families.

6.6.2 | Limitations

This study had two major shortcomings. First, only paediatric nurses employed in Japan were surveyed to ensure the comprehension and support of the survey participants, and old data were used. Second, the DIPS development validation considered only the EFA and CFA components and discriminants rather than the DIPS criterion-referenced validity and individual sampling. Further validation of this finding will require sufficient sample size, stability checks and future studies with new data that include participants from different cultural backgrounds and ethnic groups.

6.7 | Conclusion

The application of the DIPS could aid paediatric nurses in supporting paediatric patients and their families in the medical environment while protecting patients' rights. This unique tool adds distracting ingenuity, which will be promoted by all paediatric nurses, and new implementable ways to provide support for the psychological outcomes of paediatric patients and their families. The DIPS questionnaire is a reliable, effective, simple and convenient tool that guides paediatric nurses in appropriating nursing care plans and practices in paediatric and family nursing. However, the reliability and validity of the questionnaire should be further verified in other prospective and controlled studies.

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CONFLICT OF INTEREST

The author declares that there is no potential or existing conflict of interest relevant to this article.

ETHICS STATEMENT

This study complies with the principles enunciated in the Declaration of Helsinki, which is the ethical principles for medical research involving human participants.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, HO, upon reasonable request.

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APPENDIX 1

DISTRACTING INGENUITY PROMOTION SCALE (DIPS)

Promoting distracting ingenuity for paediatric nurses to support the psychological outcomes of paediatric patients and their families

Paediatric nurses need to increase the awareness of nursing practices, including ethical considerations, so that they can support paediatric patients and their families. Answer by assuming the status of the examination or treatment that will lead to the psychological outcome of the paediatric patient and his/her family. It takes less than 10 min to complete this survey.

1. Sex: () Male () Female
2. Age: _____
3. Educational attainment: _____
4. Years of experience as a nurse: _____
5. Years of experience as a pediatric nurse: _____
6. Workplace: _____
7. Knowledge of the United Nations Convention on the Rights of the Child (UNCRC):
() I do not know; () I know; () I know and act based on it.
8. Knowledge of informed assent (IA):
() I do not know; () I know; () I know and act based on it.

Distracting Ingenuity Promotion Scale

A Column	B Column			
	Highly applicable	Slightly applicable	Not applicable	Not at all
Factor 1: Distracting ingenuity				
1. Tried alternatives to make the child not afraid.	4	3	2	1
2. Explained to and talked to the child as the examination /treatment continued.	4	3	2	1
3. Appropriately responded to any utterances by the child.	4	3	2	1
4. Talked to the child in a manner appropriate to the child's effort.	4	3	2	1
5. Distracted the child from the examination /treatment by using objects such as toys.	4	3	2	1
Factor 2: Protecting decision-making				
6. Asked the parent(s) to attend when the physician/nurse gave information to the child.	4	3	2	1
7. Informed the child in a language that is easy to understand (informed not only the parent(s) but also the child).	4	3	2	1
8. Checked if the child was ready to undergo the examination/ treatment.	4	3	2	1
9. Listened to the child's request to determine whether the parent(s) should attend.	4	3	2	1
10. Explained to the child the purpose of the examination/treatment immediately before the procedure.	4	3	2	1
Factor 3: Sharing emotions				
11. Medical staff members talked to each other so that the child was distracted.	4	3	2	1
12. Explained to the child the instructions to be followed after the examination/treatment.	4	3	2	1
13. Asked the child how he/she was feeling after the examination/ treatment.	4	3	2	1
14. Understood what the child wanted after the examination/ treatment.	4	3	2	1

A Column	B Column			
	Highly applicable	Slightly applicable	Not applicable	Not at all
Factor 4: Explaining facts				
15. Checked whether the child had been informed of the examination/treatment by the physician, nurse, or parent(s).	4	3	2	1
16. Considered when to tell the child that he/she would have the examination/treatment.	4	3	2	1
17. Introduced myself as the nurse-in-charge to the child and the parents.	4	3	2	1
18. Told the child when the examination/treatment would be performed.	4	3	2	1
Factor 5: Promoting adaptation				
19. Tried not to give the impression that the procedure had ended when, in fact, it was ongoing.	4	3	2	1
20. Verbally informed the child that the examination/treatment was completed.	4	3	2	1
21. Praised the child's effort.	4	3	2	1