The Faces Emotional Coping Scale as a self-reporting instrument for coping with needle-related procedures: An initial validation study with children treated for type 1 diabetes

Journal of Child Health Care

2017, Vol. 21(4) 392–403

© The Author(s) 2017

Reprints and permission:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1367493517729041

journals.sagepub.com/home/chc

Stefan Nilsson¹, Lena Hanberger², Anna Lindholm Olinder³
and Maria Forsner^{4,5}

Abstract

The aim of this study was to determine the concurrent and content validity, sensitivity and inter-rater reliability of the Faces Emotional Coping Scale (FECS) to evaluate the children's anticipation of the level of emotional coping in conjunction with a venepuncture. A total of 153 children with type 1 diabetes and 86 of their parents participated in the study. The age of the children, 76 of whom were boys, ranged from 7 to 18 years. The child and his or her parent reported the child's coping ability, and the child reported the pain intensity and unpleasantness of a venepuncture. The child also wrote a short narrative about his or her experience of the needle procedure. The FECS correlated negatively with the Coloured Analogue Scale and the Facial Affective Scale and positively with the FECS by proxy. The narratives of 90 children correlated negatively with the FECS. Younger children reported significantly lower scores than older children did regarding their ability to cope with a venepuncture. The children's scores on the FECS showed good agreement with the

¹ Institute of Health and Care Sciences, University of Gothenburg, Gothenburg, Sweden

² Division of Nursing Science, Department of Medical and Health Sciences, Linköping University, Linköping, Sweden

³ Department of Clinical Science and Education, Karolinska Institute, Södersjukhuset, Sachs' Children and Youths Hospital, Stockholm, Sweden

⁴ Department of Health and Social Sciences, Caring Sciences, Dalarna University, Falun, Sweden

⁵ Department of Nursing, Umeå University, Umeå, Sweden

Corresponding author:

Stefan Nilsson, Institute of Health and Care Sciences, University of Gothenburg, Box 457, 405 30 Gothenburg, Sweden.

Email: stefan.nilsson.4@gu.se

parents' scores. In this study, the FECS was deemed valid for measuring children's ability to cope with their emotions when undergoing needle-related procedures like venepuncture.

Keywords

Child, coping, needle-related procedures, pain, pain unpleasantness

Background

Needle-related procedures are common in the life of most children (McMurtry et al., 2015), and coping with the experience is therefore essential (Karlsson et al., 2014). A venepuncture is a procedure that is often associated with pain unpleasantness and pain intensity by children (Aydin et al., 2016). The procedure is frequent for children with type 1 diabetes and particularly challenging for them (Hofman et al., 2010). The prevalence of a fear of needles among children managing type 1 diabetes has varied between 9.5% and 32.7% (Heinrich and Callahan, 2016). Managing the treatment is crucial for children with type 1 diabetes (Rzeszut, 2011) because compliance affects the treatment outcomes (Sparapani et al., 2015). Children with a more intense fear of needles have reported higher glycated haemoglobin (HbA1c) levels (Cemeroglu et al., 2015).

Children aged 7–15 years with type 1 diabetes have in earlier research reported three main coping strategies, and the first of these was gradual habituation, that is, overtime children described becoming habituated to using needles. Another strategy was rationalization, that is, other children vividly described the direct impact and efficacy of an insulin injection, providing the energy required for the morning. This was followed by a subsequent 'drop off' in energy as the injection 'wore off'. The third strategy, adaptive denial, has been exemplified by distancing from type 1 diabetes mellitus (T1DM) risks through a shift in linguistics between first person (when describing his blood glucose levels) to second or third person (when speaking of negative consequences) (Ferrari et al., 2016, p. 5). High levels of pain from needle-related procedures were significantly more common at the time of the type 1 diabetes diagnoses than six to nine months later. Younger children had higher values for fear. Approximately one in three of the younger children experienced trouble coping with needles even after six to nine months. These findings suggest that most of the children treated for diabetes found valuable coping strategies to manage needle-related procedures (Howe et al., 2011).

A child's reaction to a needle is influenced by a host of factors, including age and typical coping response (McCarthy et al., 2010). A child's pain memory can also influence his or her ability to manage a needle-related procedure (von Baeyer et al., 2004). A negative needle experience can partly be explained by the neuromatrix theory, which takes into consideration emotional and cognitive aspects of how pain signals are interpreted in the central nervous system (Melzack, 1999). Other circumstances that influence the management of injections are developmental factors and temperament (Walco, 2008). According to the United Nations (UN) Convention on the Rights of the Child, efforts should be made to reduce physical and mental stress (UN, 1989). Thus, every child has the right to individualized nursing care when facing needle-related procedures based on the child's own perspectives (Nilsson et al., 2015). Additionally, the child has the right to express her or his own feelings and thoughts (UN, 1989). For these reasons, the use of patients' self-reporting instruments is valuable to the paediatric nurse. Children aged 7–12 years reported in a study that

they appreciated when the paediatric nurses assessed their emotions (Vantaa Benjaminsson and Nilsson, 2017).

When 12-year-old girls narrated their expectations prior to a human papillomavirus vaccination, it became clear that they 'hoped to cope'. The narratives also revealed that previous experiences, knowledge and self-image influenced their expectations (Forsner et al., 2016). Furthermore, it is suggested that a child who considers himself or herself highly capable of coping anticipates favourable outcomes for future painful procedures (Jaaniste et al., 2016).

There are abundant coping strategies that may be valuable to the individual child (Duff, 2003). Seeking information about the procedure is one such successful strategy (Nilsson, 2016), as is distraction (Uman et al., 2013). Paediatric nurses should endeavour to complete the child's procedure in a way that helps the child to perceive it as a positive experience (Randall and Hallowell, 2012).

Earlier research has found it harmful to take too much notice of the child's negative thoughts (Richter et al., 2010; Thompson et al., 2016). It could therefore be beneficial to take more notice of the child's ability to cope with the situation, as that mainly focuses on positive experiences. Two examples of instruments that assess coping ability are the Pain Coping Questionnaire (Reid et al., 1998) and the Waldron/Varni Pediatric Pain Coping Inventory (Varni et al., 1996). While these instruments measure the patient's pain-coping ability in general, they are time-consuming. Accordingly, they are not suitable for clinical use for children undergoing needle-related procedures. There is therefore a need for a simple and valid assessment instrument for pain-coping abilities in this specific situation. It has been shown that pictures, including those of faces, make it easier for children to understand and communicate the meaning of emotions (Nilsson et al., 2012, 2014). However, the ability to understand a self-reporting instrument can vary between individual children, and the instrument must be tested with children of varying ages and coping abilities.

Objectives

The objectives for this study were to create and establish psychometric properties of a measure of perceived coping ability during needle procedures. To this end, the aim of the current work was to determine the concurrent and content validity, sensitivity and inter-rater reliability of the Faces Emotional Coping Scale (FECS) to evaluate whether the instrument can assess children's anticipation of the level of emotional coping in conjunction with a venepuncture. The assumption in this study was that a high number on the FECS would, in most cases, be negatively associated with pain intensity and pain unpleasantness. There was also an expected inter-rater reliability with the parents by proxy scoring.

A venepuncture is a procedure that is often associated with pain unpleasantness and pain intensity by children (Aydin et al., 2016). The procedure is frequent for children with type 1 diabetes and particularly challenging for them (Hofman et al., 2010). Accordingly, a venepuncture was chosen as a procedure in this study.

Methods

Study design

The study tested concurrent validity (Laerd Statistics, 2012), sensitivity and inter-rater reliability (Streiner et al., 2015). Furthermore, the content validity was analysed, comparing the scores with narrative data (Hsieh and Shannon, 2005; King, 1994).

Figure 1. The self-reporting instrument FECS. Children were asked to rate their ability to cope in response to the following statement: 'I can manage my feelings during the venepuncture'. FECS: Faces Emotional Coping Scale.

Participants

The inclusion criteria for the participants in the study were that they were aged 7–18 years and being treated for type 1 diabetes at one of three diabetes clinics in Sweden. The parents of some of the children also participated.

Instruments

Perceived coping ability. The FECS self-reporting instrument can be a means by which children aged seven years and older can report their ability to cope with their pain-related emotions by marking one of five faces presented in an ordered sequence. Children were asked to rate their ability to cope in response to the following statement: 'I can manage my feelings during the venepuncture'. As shown in Figure 1, in this study, 0 indicated *not at all*, graduating to 4, indicating *excellent*. The use of a five-point visual scale with faces was inspired by the Visual CARE Measure, which showed that children were able to report their perceptions of empathy provided by their practitioners using five faces (Place et al., 2016). The FECS was developed to meet the need to assess children's own views on their emotional coping and enable comparison between the parent's and the child's assessments. The face validity of the FECS was confirmed by two researchers (SN and MF) with considerable experience in the area of children's self-reports based on faces scales.

Pain intensity. The Coloured Analogue Scale (CAS; McGrath et al., 1996) assesses a child's pain experience on a 10-point scale, with 0 signifying *no pain* and 10 representing *most pain*. The CAS has demonstrated construct, content and convergent validity in the measurement of acute pain in children aged 5–16 years (Bullock and Tenenbein, 2002), as well as strong psychometric properties in children aged 4–17 years (Tsze et al., 2013).

Pain unpleasantness. The Facial Affective Scale (FAS; McGrath et al., 1996) assesses a child's affective reaction to a pain experience and ranges from *happiest feeling possible* to *saddest feeling possible*. The scale consists of nine faces in the interval .04–.97 (the maximum level of pain unpleasantness is .97 and the minimum level is .04). The FAS has demonstrated a discrepancy between pain unpleasantness and pain intensity, and the instrument consequently catches the emotional component of pain in children aged 4–10 years (Goodenough et al., 1999) and children aged 5–15 years (Perrott et al., 2004).

Table 1. Examples of content analysis codes of the children's narratives.

Sentence	Code	Score
Have no problem with it	It is no problem	0
Most of the fear has vanished	It is ok	1
It is relatively painful to take venepuncture	It can be problematic	2
Venepuncture I hate!!	It is very problematic	3

Procedure

Data were collected between August 2015 and August 2016. Each child, and in some cases one parent as a proxy, reported the child's experience on the FECS. Each child also self-reported via the CAS and FAS on a venepuncture. The children and their parents judged the child's coping ability related to venepuncture procedures in general and not in conjunction with a specific situation.

The children were also invited to write a narrative about their needle procedure experiences. The specific instruction was to write a narrative about their experience of needles in general. Narratives that specifically mention 'coping' related to venepuncture were included in this study.

Concurrent validity. To test the concurrent validity of the FECS instrument, each child additionally completed the CAS and FAS tools.

Content validity. Content analysis aims to turn text into quantitative data; that is, words are sorted into codes that can be calculated statistically (King, 1994). This study is partly a summative approach to content analysis in which data analysis starts with searches for occurrences of words that describe a specific term. The frequency of the terms is then calculated (Hsieh and Shannon, 2005). The narratives consisted mainly of short sentences, and the children wrote these sentences in conjunction with their ratings on the FECS. Words that could be interpreted as coping, that is, *manage*, *handle* and *cope*, were selected. The level of coping of each sentence was then rated by one researcher (SN). Another researcher (MF) read and revised the ratings, and this continued until consensus was reached. The content in the narratives related to coping with venepuncture was coded as follows: 0 = *no problem*, 1 = *it is ok*, 2 = *it can be problematic* and 3 = *it is very problematic* (Table 1).

Sensitivity of the scale. Differences in responses between older and younger children were measured. The assumption in this study was that younger children report lower values on the FECS than older children do. Hodgins and Lander (1997) found that they tended to report fewer coping strategies than older children did.

Inter-rater reliability. To test the inter-rater reliability, both children and parents reported the child's perceived coping ability on the FECS instrument.

Data analysis

Statistics were calculated using IBM SPSS Statistics for Windows, version 23 (IBM Corp., New York, New York, USA). Statistical significance was considered if $p < .05$. Nonparametric tests

were used and the concurrent validity tested by Spearman's rank correlation coefficient. A correlation coefficient of 0–.19 was considered very weak; .2–.39: weak; .40–.59: moderate; .6–.79: strong and .8–1: very strong (Fang et al., 2016). Group comparisons between younger and older children were calculated using the Mann–Whitney *U* test. The content codes were tested with Spearman's rank correlation coefficient. The inter-rater reliability was tested with a two-way mixed model intra-class correlation (ICC) test. An ICC of <.40 indicated poor agreement, values between .40 and .75 indicated fair to good agreement and an ICC of >.75 indicated excellent agreement (Kamsvåg-Magnusson et al., 2014).

Ethical considerations

The study was approved by the regional ethical review board (Dnr: 2014/516).

Children are often seen as vulnerable and are therefore protected from being involved in research involuntarily. However, if excluded from this study, children's views would be absent, which contradicts the spirit of the UN Convention on the Rights of the Child because, in this case, the value of their input to the study was deemed greater than the risks.

Written information about the study was provided to the children and their parents. The voluntary nature of the study was emphasized, as was the right to withdraw at any time without explanation or consequences. For children under than 15 years old, written parental consent was a requirement for participation.

All the children were given a cinema ticket in appreciation of their participation.

Results

Study participants

A total of 153 children (76 boys), aged 7–18 years (mean = 13.4; standard deviation (SD) = 3.15, Tables 2 and 3), and 86 of their parents chose to participate in this study. All the children lived in Sweden and were proficient in spoken and written Swedish. The children's values pertaining to the FECS instrument were calculated, as were their parents' judgements as proxies for their children. The children's values on the CAS and the FAS instruments were also calculated. Ninety of the 153 children (90/153 = 59%) chose to write narratives about coping of a venepuncture, and these narratives were also analysed.

Table 2. Participants in the study.

	Age	CAS	FAS	FECS	FECS by proxy
N	153	141	148	153	86
Mean	13.4	4.1	.62	2.14	1.77
Median	14	4	.59	2	2
SD	3.15	2.71	.22	1.24	1.13
Minimum	7	0	.04	0	0
Maximum	18	9.8	.97	4	4

Note: CAS = 0–10; FAS = .04–.97; FECS = 0–4. CAS: Coloured Analogue Scale; FAS: Facial Affective Scale; FECS: Faces Emotional Coping Scale; SD: standard deviation.

Table 3. Number of participants in each age.

Age	<i>n</i>	%
7	6	3.9
8	4	2.6
9	13	8.5
10	13	8.5
11	13	8.5
12	14	9.2
13	10	6.5
14	14	9.2
15	9	5.9
16	26	17
17	26	17
18	5	3.3
Sum	153	100

Concurrent validity

The FECS correlated significantly and negatively with the children’s scores on the CAS ($r = -.47$; $p < .001$) and the FAS ($r = -.65$; $p < .001$).

Content validity

Ninety children’s narratives (45 boys; see Table 4) correlated negatively and significantly ($r = -.41$; $p < .001$) with the FECS.

Table 4. The FECS and the narratives.

	Age	FECS	Narratives
<i>N</i>		90	90
Mean	13.8	2.4	1.4
Median	14	3	1
SD	2.95	1.19	.90
Minimum	7	0	0
Maximum	18	4	3

Note: FECS = 0–4. FECS: Faces Emotional Coping Scale; SD: standard deviation.

Sensitivity of the scale

The participants were divided into two groups: one composed of children between the ages of 7 and 12 years ($n = 63$) and the other of children aged between 13 and 18 years ($n = 90$), as shown in Table 5. Their FECS scores were compared, and a significant difference was observed ($p < .001$).

Inter-rater reliability

The children’s scores on the FECS had a significant agreement with the parents’ scores on the FECS (ICC = .73; 95% confidence interval .59–.82; $p < .001$).

Table 5. The FECS in younger (7–12 years) and older (13–18 years) children.

	7–12 years	13–18 years
N	63	90
Mean	1.68	2.47
Median	1	3
SD	1.26	1.13
Minimum	0	0
Maximum	4	4

Note: FECS = 0–4. FECS: Faces Emotional Coping Scale; SD: standard deviation.

Discussion

The FECS measured the children's estimations of their ability to cope with their emotions related to a needle procedure. The results were confirmed with a moderate to strong concurrent validity and good inter-rater reliability in conjunction with a venepuncture. The content validity confirmed that the children could interpret the content of the FECS.

The children also associated a venepuncture with moderate pain intensity, moderate pain unpleasantness and poor ability to cope. The parents' ability to rate their child's ability to cope with a venepuncture was also good. Another study reported that parents were more likely to report their child's pain when it was of greater severity (Kamper et al., 2016), and this study seems to show a similar result. Parents were able to accurately rate their child's coping ability when it was poor. However, proxy estimations are not equivalent to the child's self-reports (Zhou et al., 2008).

This study suggests that the FECS shows that older children report higher perceived ability to cope with venepunctures than younger children do. This is in agreement with the 12-year-old girls' narratives bearing witness to a growing ability to cope with minor unpleasantness such as needle-related procedures (Forsner et al., 2016). Younger children with type 1 diabetes often report high levels of fear related to injections compared with reports of older children (Howe et al., 2011). In this study, we tested whether the FECS was able to detect this difference, and there was a difference between younger and older children in conjunction with a venepuncture.

It is of course important to mitigate pain intensity and unpleasantness caused by needle-related procedures. Current research suggests that there is a correlation between childhood pain and fear associated with medical procedures and adult pain sensitivity, fear and avoidance of healthcare (Kennedy et al., 2008). Needle-related fear in children with type 1 diabetes is also associated with higher HbA1c levels and less frequent blood sugar monitoring (Cemeroglu et al., 2015). According to this, it is incumbent on paediatric nurses to reach those children who need extra support to cope with the distress of needle-related procedures when interacting with a skilled nurse (Rindstedt, 2013). Consequently, assessment tools and guidelines adapted for children are important contributors to individualized pain management (Ljusegren et al., 2012). The findings in this study showed that FECS has the potential to become an effective tool to assess an individual child's perceived ability to cope with venepuncture as well as other needle-related procedures.

If paediatric nurses use a validated assessment scale to identify children who need extra support with coping strategies, the risk of nurses using their own preunderstanding of the child's coping ability with a needle-related procedure will be reduced (Nilsson et al., 2015). Children's self-reports, when available, can be considered a primary source of evidence (Twycross et al., 2015). At present, there is no clear consensus regarding the age threshold at which children can

reliably use self-reporting scales. However, children aged seven and older are deemed able to use a self-reporting tool with faces (Stanford et al., 2006). It is also an advantage in clinical practice when an instrument is easy to use, and this study showed that the FECS instrument has the potential to meet these requirements.

Limitations

A limitation of this study is that not all the parents participated. The study has not evaluated all the dimensions of validity and reliability of the FECS instrument. Another limitation is that the children reported on non-present pain states. It is a challenge for younger children to report on non-present pain states (Jaaniste et al., 2016). However, children with type 1 diabetes have experiences of venepunctures in the past and will undergo venepunctures in the future. Additionally, the children in this study were aged above five years, and at that age, most children can provide accurate recall of past pain states (Jaaniste et al., 2016).

Only 90 of the children's narratives included a story about coping of a venepuncture. The specific instruction was to write a narrative about their experience of needles in general, which was a limitation. An instruction that limited the children to only write narratives that describe coping of venepunctures could have given more narratives to the analysis.

The study ought to be repeated with one that further evaluates the reliability and validity of the FECS. On the other hand, the study design was strengthened by the fact that the sample size was quite large, composed of participants who assessed their values in conjunction with a needle-related procedure.

Conclusion

The FECS has the potential to identify children who are in need of extra support to cope with needle-related procedures by assessing their ability to cope. The FECS showed a moderate to strong concurrent validity, acceptable content validity and sensitivity as well as good inter-rater reliability in conjunction with a venepuncture.

Acknowledgements

The authors would like to thank the participants of the study who generously gave of their time and shared their experiences. They would also like to thank the nurses who helped them with the data collection.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by grants from the Diabetes stiftelsen, Novo Nordisk, Ypsomed and finally Infocare.

References

- Aydin D, Sahiner NC and Ciftci EK (2016) Comparison of the effectiveness of three different methods in decreasing pain during venipuncture in children: ball squeezing, balloon inflating and distraction cards. *Journal of Clinical Nursing* 25: 2328–2335.
- Bulloch B and Tenenbein M (2002) Validation of 2 pain scales for use in the pediatric emergency department. *Pediatrics* 110: e33.
- Cemeroglu AP, Can A, Davis AT, et al. (2015) Fear of needles in children with type 1 diabetes mellitus on multiple daily injections and continuous subcutaneous insulin infusion. *Endocrine Practice* 21: 46–53.
- Duff AJ (2003) Incorporating psychological approaches into routine paediatric venepuncture. *Archives of Disease in Childhood* 88: 931–937.
- Fang H, Farooq U, Wang D, et al. (2016) Reliability and validity of the EQ-5D-3 L for Kashin-Beck disease in China. *Springerplus* 5: 1924.
- Ferrari M, McIlwain DJ and Ambler G (2016) A qualitative comparison of needles and insulin pump use in children with type 1 diabetes. *Journal of Health Psychology*. Epub ahead of print 22 June.
- Forsner M, Nilsson S, Finnstrom B, et al. (2016) Expectation prior to human papilloma virus vaccination: 11 to 12-Year-old girls' written narratives. *Journal of Child Health Care* 20: 365–373.
- Goodenough B, van Dongen K, Brouwer N, et al. (1999) A comparison of the Faces Pain Scale and the Facial Affective Scale for children's estimates of the intensity and unpleasantness of needle pain during blood sampling. *European Journal of Pain* 3: 301–315.
- Heinrich KH and Callahan CP (2016) Prevalence and outcomes of fear of needles and associated psychological conditions among patients managing diabetes. *Value in Health* 19: A199–A200.
- Hodgins MJ and Lander J (1997) Children's coping with venipuncture. *Journal of Pain and Symptom Management* 13: 274–285.
- Hofman PL, Derraik JG, Pinto TE, et al. (2010) Defining the ideal injection techniques when using 5-mm needles in children and adults. *Diabetes Care* 33: 1940–1944.
- Howe CJ, Ratcliffe SJ, Tuttle A, et al. (2011) Needle anxiety in children with type 1 diabetes and their mothers. *MCN: The American Journal of Maternal Child Nursing* 36: 25–31.
- Hsieh HF and Shannon SE (2005) Three approaches to qualitative content analysis. *Qualitative Health Research* 15: 1277–1288.
- Jaaniste T, Noel M and von Baeyer CL (2016) Young children's ability to report on past, future, and hypothetical pain states: a cognitive-developmental perspective. *Pain* 157: 2399–2409.
- Kamper SJ, Dissing KB and Hestbaek L (2016) Whose pain is it anyway? Comparability of pain reports from children and their parents. *Chiropractic & Manual Therapies* 24: 24.
- Kamsvåg-Magnusson T, Thorsell-Cederberg J, Svanberg A, et al. (2014) Parents and children's perceptions of distress related to oral mucositis during haematopoietic stem cell transplantation. *Acta Paediatrica* 103: 630–636.
- Karlsson K, Rydstrom I, Enskär K, et al. (2014) Nurses' perspectives on supporting children during needle-related medical procedures. *International Journal of Qualitative Studies on Health and Well-Being* 9: 23063.
- Kennedy RM, Luhmann J and Zempsky WT (2008) Clinical implications of unmanaged needle-insertion pain and distress in children. *Pediatrics* 122(Suppl 3): S130–S133.
- King N (1994) The qualitative research interview. In: Cassell C and Symon G (eds) *Qualitative Methods in Organizational Research: A Practical Guide*. Thousand Oaks: Sage Publications Inc., pp. 14–36.
- Laerd Statistics (2012) Concurrent and predictive validity. Available at: <http://dissertation.laerd.com/criterion-validity-concurrent-and-predictive-validity.php>

- Ljusegren G, Johansson I, Gimbler Berglund I, et al. (2012) Nurses experiences of caring for children in pain. *Child: Care, Health and Development* 38: 464–470.
- McCarthy AM, Kleiber C, Hanrahan K, et al. (2010) Factors explaining children's responses to intravenous needle insertions. *Nursing Research* 59: 407–416.
- McGrath PA, Seifert CE, Speechley KN, et al. (1996) A new analogue scale for assessing children's pain: an initial validation study. *Pain* 64: 435–443.
- McMurtry CM, Pillai Riddell R, Taddio A, et al. (2015) Far from “just a poke”: common painful needle procedures and the development of needle fear. *The Clinical Journal of Pain* 31: S3–S11.
- Melzack R (1999) From the gate to the neuromatrix. *Pain* (Suppl 6): S121–S126.
- Nilsson S (2016) How young people can learn about newly diagnosed type 1 diabetes. *Nursing Children and Young People* 28: 22–26.
- Nilsson S, Bjorkman B, Almqvist AL, et al. (2015) Children's voices – differentiating a child perspective from a child's perspective. *Developmental Neurorehabilitation* 18: 162–168.
- Nilsson S, Buchholz M and Thunberg G (2012) Assessing children's anxiety using the modified short state-trait anxiety inventory and talking mats: a pilot study. *Nursing Research and Practice* 2012: 932570.
- Nilsson S, Finnstrom B, Mörelius E, et al. (2014) The facial affective scale as a predictor for pain unpleasantness when children undergo immunizations. *Nursing Research and Practice* 2014: 628198.
- Perrott DA, Goodenough B and Champion GD (2004) Children's ratings of the intensity and unpleasantness of post-operative pain using facial expression scales. *European Journal of Pain* 8: 119–127.
- Place MA, Murphy J, Duncan EA, et al. (2016) A preliminary evaluation of the Visual CARE Measure for use by allied health professionals with children and their parents. *Journal of Child Health Care* 20: 55–67.
- Randall D and Hallowell L (2012) ‘Making the bad things seem better’: coping in children receiving health-care. *Journal of Child Health Care* 16: 305–313.
- Reid GJ, Gilbert CA and McGrath PJ (1998) The Pain Coping Questionnaire: preliminary validation. *Pain* 76: 83–96.
- Richter M, Eck J, Straube T, et al. (2010) Do words hurt? Brain activation during the processing of pain-related words. *Pain* 148: 198–205.
- Rindstedt C (2013) Pain and nurses' emotion work in a paediatric clinic: treatment procedures and nurse–child alignments. *Communication & Medicine* 10: 51–61.
- Rzeszut JR (2011) Children with diabetes: the impact of fear of needles. *Journal of Pediatric Nursing* 26: 589–592.
- Sparapani C, Jacob E and Nascimento LC (2015) What is it like to be a child with type 1 diabetes mellitus? *Pediatric Nursing* 41: 17–22.
- Stanford EA, Chambers CT and Craig KD (2006) The role of developmental factors in predicting young children's use of a self-report scale for pain. *Pain* 120: 16–23.
- Streiner D, Norman G and Cairney J (2015) *Health Measurement Scales*. New York: Oxford University Press.
- Thompson S, Ayers S, Pervilhac C, et al. (2016) The association of children's distress during venepuncture with parent and staff behaviours. *Journal of Child Health Care* 20: 267–276.
- Tsze DS, von Baeyer CL, Bulloch B, et al. (2013) Validation of self-report pain scales in children. *Pediatrics* 132: e971–e979.
- Twycross A, Voepel-Lewis T, Vincent C, et al. (2015) A debate on the proposition that self-report is the gold standard in assessment of pediatric pain intensity. *The Clinical Journal of Pain* 31: 707–712.
- Uman LS, Birnie KA, Noel M, et al. (2013) Psychological interventions for needle-related procedural pain and distress in children and adolescents. *The Cochrane Database of Systematic Reviews* 10: CD005179.
- UN (1989) Convention on the rights of the child document A/RES/44/25. Available at: <http://www.un.org/documents/ga/res/44/a44r025.htm>

- Vantaa Benjaminsson M and Nilsson S (2017) Experiences of communication in the caring process by children aged 7–13 where there is a requirement for nitrous oxide for needle related procedures. *Clinical Nursing Studies* 5: 13–21.
- Varni JW, Waldron SA, Gragg RA, et al. (1996) Development of the Waldron/Varni pediatric pain coping inventory. *Pain* 67: 141–150.
- von Baeyer CL, Marche TA, Rocha EM, et al. (2004) Children's memory for pain: overview and implications for practice. *Journal of Pain* 5: 241–249.
- Walco GA (2008) Needle pain in children: contextual factors. *Pediatrics* 122(Suppl 3): S125–S129.
- Zhou H, Roberts P and Horgan L (2008) Association between self-report pain ratings of child and parent, child and nurse and parent and nurse dyads: meta-analysis. *Journal of Advanced Nursing* 63: 334–342.