Measurement in Family Nursing: Established Instruments and New Directions

Over the past 25 years, programs of practice and research in family nursing have matured and expanded to include new approaches to care, new settings, and new research questions. It is no surprise that measurement of family variables has also expanded to capture this growth. In 1994, the primary focus of measurement in family nursing was family functioning (Sawin & Harrigan, 1994). Several of the well-established measures of family functioning identified in that critique remain relevant. A recent systematic review of self-report family assessment measures confirmed several of the measures classified as “established” in the 1994 review; that is, the Family Assessment Device, the Family Adaptability and Cohesion Scales (FACES IV), and the Family Assessment Measure (FAM), have continued psychometric support and remain suitable for use in clinical practice and research use (Hamilton & Carr, 2016). However, these authors questioned whether the Family Environment Scale (FES) continues to be suitable for clinical use. Previously, the FES relationship domains (expressiveness, cohesion, and conflict subscales) have been supported.

A review by this author (Sawin, 2015) of instruments used by nurse authors in published studies from 2000 to 2015 found the McMaster Family Assessment Device; the FACES II-IV(Family Adaptability and Cohesion Scale); the Family APGAR (which examines family satisfaction with five areas of family function: adaptability, partnership, growth, affection, and resolve [APGAR]); the Feetham Family Functioning Survey (FFFS); the Family Dynamics Measure II; and Measures From the McCubbin Framework (e.g., Family Hardiness, Family Inventory of Life Events and Changes, and Family–Crisis Oriented Personal Evaluation Scales [F-COPES]) remain in use by nurse authors. Two of the family functioning instruments created by nurse authors, the FFFS and the Family Dynamics Measure II, have continued to be used by nurses in clinical practice and research. The FFFS has been translated into eight languages (Spanish, French, Japanese, Russian, Korean, Chinese, Bosnian, and American Sign Language) and continues to be used by investigators globally, especially in the United States and Japan. The Family
Dynamics Measure II has been used primarily in the United States and Nordic countries (White et al., 2010) but has been recently translated into Portuguese. In addition, the battery of instruments developed by an interdisciplinary team, which included a nurse investigator, has been used extensively by nurses and others exploring family (McCubbin, Thompson, & McCubbin, 2001). Each of these instruments continues to be relevant to family nursing today and is used by nurses in studying both family as the unit of analysis and family as a context variable.

Measurement in family nursing is a relatively new focus of the *Journal of Family Nursing (JFN)*. In a review of topics published in *JFN* from 1995 to 2007 by Cannon and colleagues (2011), two thirds of the manuscripts published were on family practice and research topics. Psychometric studies or instrument development studies were not identified as a specific category. However, in the last 12 years (2004-2016), 16 manuscripts addressing 13 new measures of interest to family scholars have been published in *JFN* (see Table 1). They reflect individual concepts or programs of research developed by groups of family scholars studying a particular culture or country. For example, Svavarsdottir and colleagues in Iceland (Gisladottir & Svavarsdottir, 2016; Sveinbjarnardottir, Svavarsdottir, & Hrafnkelsson, 2012a, 2012b) have led the development of several instruments for use with families. Family nursing in Japan has grown substantially in the last decade and translating measures has expanded this scholarship. Revisions, reevaluation, or translation of three instruments originally published in *JFN* were also published in the journal. The (a) Families’ Importance in Nursing Care–Nurses’ Attitudes, (b) Grandparent Support Scale for Teenage Mothers, and (c) Iceland–Family Perceived Support Questionnaire (see Table 1) were updated, expanded, or translated several years after the original instrument was published, a sign of maturity and potential usefulness. In addition, *JFN* has published multiple manuscripts using the Family Management Style Framework (Knafl, Deatrick, & Havill, 2012; Knafl et al., 2013) in family research. Knafl and colleagues (2011) developed the Family Management Measure (FaMM) built on this framework. The instrument captures how families manage caring for a child with a chronic condition and the extent to which these families incorporate condition management into everyday family life. Studies published in *JFN* have used this instrument in both English and Chinese. Authors publishing in *JFN* from 1995 to 2016 have used The McMaster Family Assessment Device, Family APGAR, The FACES II-IV, FFFS, Family Inventory of Life Events and Changes (FILE), F-COPES, FaMM, The Family Hardiness Index, and the Family Environment Scale (FES) Conflict Subscale.

Nurses with programs of practice and research in family nursing need to be sophisticated consumers of new family instruments. Two new instruments
Table 1. New or Revised Instruments Published in the *Journal of Family Nursing* 2004-2016.

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<tr>
<th>Authors and year</th>
<th>Article/instrument</th>
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<tr>
<td>2. Kiriaka and Moriyama (2016)</td>
<td>Development and Testing of the Partnership Scale for Primary Family Caregivers Caring for Patients With Dementia</td>
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<td>4. Sveinbjarnardottir, Svavarsdottir, and Hrafnkelsson (2012b)</td>
<td>Psychometric development of the Iceland–Family Perceived Support Questionnaire (ICE-FPSQ)</td>
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<tr>
<td>6. Saveman, Benzein, Engström, and Årestedt (2011)</td>
<td>Refinement and psychometric reevaluation of the instrument: Families’ Importance in Nursing Care–Nurses’ Attitudes</td>
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<td>7. Simpson and Tarrant (2006)</td>
<td>Development of the Family Nursing Practice Scale</td>
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and one instrument translated and implemented in a new country are published in this issue of *JFN*. Taken together they can be used to identify best practices in instrument development. First, a conceptual framework helps
guide the approach to measures. Authors need to have a clear definition of their concept and specify their conceptual framework. Gisladottir and Svavarsdottir (2016) are particularly clear about the Illness Beliefs Model (Wright & Bell, 2009) as the conceptual background for their scale development. Developers also need to determine the meaning of the concept in the population of interest. Investigators address this by reviewing the literature, conducting qualitative research, employing content validity assessments, and using cognitive interviewing. Qualitative research and reviews of the literature are most often used by investigators to generate items. Qualitative research can be especially helpful to determine individual’s perception of a specific topic and can be helpful in developing items that represent the unfiltered voices of individuals with a certain perspective or condition. Kiriake and Moriyama (2016) used qualitative interviews with five primary caregivers to generate the first draft of the items in their instrument.

Content validity assessment, usually using a Content Validity Index (CVI), is used to obtain expert’s opinion on the relevance of the proposed items (Lynn, 1986). Experts can be professionals working in the area of the measure or individuals whom the instrument addresses. This process is well executed by Bruce et al. (2016). Typically, once instrument items are generated, the instrument can be field tested in a small sample and revised if needed before collecting data from a sufficiently large sample for psychometric analysis. Cognitive interviewing has become a useful strategy during field testing as it allows the investigators to obtain typical participants’ perception of the items, their meaning, and their importance (Irwin, Varni, Yeatts, & Dewalt, 2009).

Validity and reliability are assessed in a psychometric study of new, expanded, or translated instruments. Authors in each of the instrument development manuscripts in this special focus issue addressed construct validity by either exploratory factor analysis or confirmatory factor analysis. Analyses for instruments early in their development are more likely to use exploratory factor analysis as conducted by Gisladottir and Svavarsdottir (2016). In contrast, instruments that have an established factor structure, even if it is in another culture, might more appropriately confirm the factor structure (Bruce et al., 2016). In some cases, authors split their sample and conduct both but sample size needs to be large enough to justify this strategy. Many authors will also evaluate construct validity for new instruments by examining concurrent relationship of the new measure with similar or divergent scales, as Kiriake and Moriyama (2016) did finding positive moderate relationships with social support and negative relationships with care burden.

Internal reliability is considered minimal criteria for all instruments created using the classical measurement theory. Internal reliability is the internal consistency between items and the scale score, is sample specific, and needs
to be assessed with each use of the measure. Each of the three instrument development studies in this special focus issue included these data on their instrument. Test–retest reliability or stability is a characteristic often omitted by investigators; yet, it is an important consideration especially if the instrument is going to be used in intervention research (U.S. Department of Health and Human Services FDA Center for Drug Evaluation and Research, U.S. Department of Health and Human Services FDA Center for Biologics Evaluation and Research, & U.S. Department of Health and Human Services FDA Center for Devices and Radiological Health, 2006). If an instrument is not stable over an appropriate time period, investigators cannot be sure that any change in the instrument is due to the intervention tested. Establishing test–retest reliability is an important responsibility of the developers of any new instrument. Bruce and colleagues (2016) delineate this well, reporting strong intra-class correlations with 95% confidence intervals for their subscales. None of the measures in this special focus issue of *JFN* were observational or measures rated by health professionals. However, for these types of instruments, inter-rater reliability needs to be established and maintained. Furthermore, although not assessed by any of the articles in this special focus issue, sensitivity to change is emerging as a critical characteristic of an instrument (U.S. Department of Health and Human Services FDA Center for Drug Evaluation and Research, U.S. Department of Health and Human Services FDA Center for Biologics Evaluation and Research, & U.S. Department of Health and Human Services FDA Center for Devices and Radiological Health, 2006). Documenting that the instrument can “capture” change that we know happened in specific situations increases the investigators confidence that the instrument can function in an intervention study.

Today, there are new emerging approaches to measurement that may generate new instruments. The most promising of these is Patient Reported Outcomes Measurement Information System (PROMIS®), which is built on item response theory (http://www.nihpromis.org/#2). This theory differs from classical measurement theory in that the goal is not to generate very similar items that measure a construct but items that have different weights and can be calibrated to be sample independent. The PROMIS® initiative, funded by the National Institutes of Health in the United States, has generated a set of relatively short, reliable, and valid measures of person-reported physical, mental, and social well-being. These measures have the advantage of being created with large diverse samples and tested extensively. They are flexible (can be administered in multiple formats or with differencing technologies) and are accessible to those with low literacy, individuals with disabilities, and across ages. Although most of the measures to date have addressed physical and mental well-being, a new measure of “Family
Relationships” with adult, pediatric, and proxy (mostly parent) versions is being released late in summer 2016 and may be an excellent resource for those in clinical practice with families or studying families.

One of the initiatives the PROMIS® project has stimulated is comparison between measures of the same concept. For example, the raw scores on the PROMIS® pediatric measure of depressive symptoms have been mapped to three other common measures of depressive symptoms (Beck Depression Inventory–II, Center for Epidemiologic Studies Depression Scale, and the nine-item Patient Health Questionnaire). This schema allows clinicians and researchers to “track” scores across instruments and, thus, facilitates the comparison of findings across clinical assessment or studies of the same construct (Choi, Schalet, Cook, & Cella, 2014). Similarly, using a sample of diverse participants with a variety of health conditions and disabilities, investigators linked the PROMIS® pediatric and adult emotional distress measures (depressive symptoms, anxiety, and anger). Using a new linking method, calibrated projection, authors were able to transform specific scores from either pediatric to adult or from adult to pediatric (Reeve et al., 2016). This capability, now for emotional distress variables and hopefully in the future for family relationship variables to be transformed into a common score, holds the potential to enhance the study of family and family members across the developmental trajectory.

Interest in “common data elements” or variables that are measured in the same way and implemented across multiple clinical and research initiatives is rapidly spreading in academic and funding agencies. These “common data elements” have the potential to accelerate knowledge generation and family science. As the PROMIS® measures are available in multiple languages and were created to function across diverse groups, the development of the first “family measures” in the social well-being category is encouraging. It or other measures may become “common data elements” across programs of practice and research in family nursing (Cohen, Thompson, Yates, Zimmerman, & Pullen, 2015; Redeker et al., 2015). If identified, common family data elements could facilitate comparison of practice and research data across countries and conditions. A global identification of these “common data elements in family nursing” could be an initiative of the International Family Nursing Association (http://www.internationalfamilynursing.org) and offer scholars across the world the ability to have a small number of “common measures” across their studies. Identifying these elements, however, is not an easy task and would take persistence and commitment. The translation of instruments generated by scholars in family nursing also expands the possibility of using common measures.
There are now advanced statistical techniques for managing multiple family members reports of family data (Knafl et al., 2009) and a growing acknowledgment that children can report their perceptions of family and quality of life data (Sawin & Bellin, 2010; Sherifali & Pinelli, 2007). Multiple assessments of proxy (usually parent report of child or adolescent data, or one person report of family data) found moderate to strong relationships between proxy and individual reports, but a growing appreciation that both perspectives (proxy and individual) are valuable (Sawin et al., 2006; Sherifali & Pinelli, 2007). In addition, there is data that children as young as seven or eight can report their own perspectives if questions are worded at their level of understanding (Sherifali & Pinelli, 2007). Thus it is clear that in future studies family science and clinical practice can be enhanced by the measurement of family variables from multiple family perspectives.

In addition to self-report instruments, family nurses might consider observational measures, such as the Iowa Family Interaction Rating Scale (Melby et al., 1998), which is used by at least one program of family research headed by nurse. Developing standardized scoring criteria for existing interview approaches used by family nurses in practice (Wright & Leahey, 2013) might also be useful in determining patterns of family functioning.

Finally, family nursing scholars need to aggressively pursue capturing clinical data in a systematic way. Practices where family nurses conduct systematic assessments and use an organized approach to interviewing have potential to generate important knowledge (Wright & Leahey, 2013). Using an electronic health system that reflects nursing assessments and interventions would add richness to our understanding of clinical practice with families. Many community nursing centers in the United States have used the Omaha System to meet those needs (Baisch, 2012; Hildebrandt, Baisch, Lundeen, Bell-Calvin, & Kelber, 2003). Those of us in acute care settings need to advocate for inclusion of family variables in the electronic health record and systems for extracting clinical data in relational databases. With these resources, nurses can “measure” and analyze family variables in ways that have been largely untapped.

Regardless of whether we as nurses create or use family nursing measures, we need to identify new constructs to be measured, develop skill in assessing instrument quality, begin to identify “common data elements” that could be shared in programs of practice or research, explore new approaches to understanding families, and imbed family variables in our documentation systems. If the trajectory of measurement advances in family nursing over the next 12 years matches the trajectory of the last 12 years, we will have new data on existing instruments evaluated in new settings,
cultures, or interventions, and a substantial number of new instruments to advance family science.

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**Kathleen J. Sawin**, PhD, CPNP-PC, FAAN, is a nurse scientist, Children’s Hospital of Wisconsin, and Professor Emerita, College of Nursing, University of Wisconsin–Milwaukee (USA). She is a researcher and clinician with more than 35 years’ experience studying families that have a child with a chronic health condition, especially as it relates to outcomes such as self-management, mental health, and quality of life. She has also explored predictors of self-management behaviors in adolescents and their families. Furthermore, she is the co-author of *The Individual and Family Self-management Theory: Background and Perspectives on Context, Process, and Outcomes* (with P. Ryan), and has led the development of an instrument to measure self-management behaviors. Currently, she is the principal investigator (Improving Care of Wisconsin Residents Living With Spina Bifida: The National Spina Bifida Patient Registry) in a collaborative project with with 13 other centers funded by the Centers for Disease Prevention and Control in the United States. She was the lead author for the first data-based article from this initiative: “The National Spina Bifida Patient Registry: Profile of a Large Cohort of Participants From the First 10 Clinics” in *Journal of Pediatrics* (2015, with T. Liu, E. Ward, J. Thibedau, M.S. Schechter, M. M. Soe, W. Walker on behalf of the NSBPR Coordinating Committee). Other recent publications include: “Transitioning Adolescents and Young Adults With Spina Bifida to Adult Healthcare: Initial Findings From a Model Program” in *Rehabilitation Nursing* (2015, with K. Rauen et al.), “Quality of Life in Individuals With Spina Bifida: A Research Update” in *Developmental Disabilities Research Reviews* (2010, with M. H. Bellin) and Communication during Palliative Care and End of Life: Perceptions of Experienced Pediatric Oncology Nurses. *Cancer Nursing, An International Journal for Cancer Care* (2016, with K. Montgomery and V. Hendricks-Ferguson).