Assessing Self-Efficacy in Infant Care: A Comparison of Two Scales

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Purpose The Self-efficacy in Infant Care Scale (SICS) was developed with acceptable psychometric properties to assess the degree of Thai mothers’ belief in their ability to perform designated infant care tasks. The purpose of this study was to identify whether the SICS, with a 6-point rating scale, can be used as an alternative to a rating scale with 0–100 confidence continuum scale.

Methods Eligible subjects included 42 mothers with 6 or 9 years of education who took their infants to the well-baby clinic for immunizations at Samutsakorn Hospital. Each mother first completed the original scale and then the 6-point SICS rating scale. Afterwards, the mothers were asked to indicate which of the questionnaires was easier to administer.

Results Using Cronbach’s α, the reliability of both scales was .95. Correlations between the same items of both response formats of the SICS revealed that only 11 pairs of items demonstrated high magnitudes of correlation. Correlations between the same subscales and between the total scales of both response formats were high but less than .95. Slightly over half of all mothers (57%) preferred the 6-point rating scale. Interestingly, 59% of the group with 6 years of education preferred the original scale, compared with only 25% of the group with 9 years of education.

Conclusion The findings suggest that correlations between SICS and two different response formats do not reach the criteria for use as alternatives to each other. However, further research is needed, with particular emphasis on the investigation of construct validity and comparisons between the two scales. [Asian Nursing Research 2008;2(3):166–172]

Key Words infant care, instrumentation, self-efficacy

INTRODUCTION

Recent Thai research has highlighted parenting self-efficacy as a strong predictor of parental functioning, including maternal behavior in health promotion for their children (Danchai, 1997), maternal role attainment (Rujiraprasert, 1996), adaptation to motherhood (Sirikarna, 1999), maternal capability in caring for asthmatic children (Akesiritrirat, 2000), and maternal provision of a suitable home environment for premature infants (Prasopkittikun, 2001). As subjective perceptions of competency influence the objective quality of parenting behavior, the development of programs to enhance parenting self-efficacy is needed. However, research into the application of a self-efficacy construct to the domain of parenting,
although not neglected, has been relatively sparse. One factor related to the deficit of research on parenting self-efficacy is a lack of psychometrically sound parenting self-efficacy measures (Coleman & Karraker, 1997). Thus, the Self-efficacy in Infant Care Scale (SICS) (Prasopkittikun, Tilokskulchai, Sinsuksai, & Sitthimongkol, 2006) was developed for use in a Thai population to assess the degree of belief in maternal ability to perform designated infant care tasks. The SICS corresponds to Bandura’s (1997) recommendation for assessing self-efficacy, and an empirical study with 397 Thai mothers has shown that the SICS has acceptable psychometric properties.

According to Bandura (1997), in the standard methodology, individuals are required to rate their degree of confidence in performing a specific task on a 100-point scale, ranging in 10-unit intervals from 0 (cannot do), through intermediate degrees of assurance, 50 (moderately certain can do), to complete assurance, 100 (certain can do). Although there is no empirical evidence that it is more accurate, the use of the 0–100 confidence continuum scale has been encouraged (Resnick, 2004). Bandura suggests that scales using only a few steps should be avoided because they are less sensitive and less reliable. People usually avoid the extreme positions on a scale; therefore, a scale with only a few steps may shrink to 1 or 2 points. In sensitive measures, the responses are distributed over a good part of the range of alternatives.

Not all of the self-efficacy measures follow Bandura’s recommendation. Likert-type scales measuring self-efficacy that consist of choices from 1 to 4, 1 to 5, or 1 to 6 have been used by some researchers (Bernal, Wooley, & Schensul, 1997; Bijl, Poelgeest-Eeltink, & Shortridge-Baggett, 1999; Froman & Owen, 1989; Gross & Rocissano, 1988; Hurley, 1990). The benefit of using Likert-type scales to assess the strength of self-efficacy includes ease of administration in individuals with lower literacy skills or in certain telephone surveys that do not support a 100-point response continuum (Maibach & Murphy, 1995). Despite its benefit, there are some limitations when a Likert-type scale is used. Flackerud (1988) reported that Hispanic and Vietnamese subjects had difficulty understanding the request to select one of four or five possible responses and preferred a dichotomous response. Lee, Jones, Mineyama, & Zhang (2002) also reported a cultural bias in the Likert format of a 13-question Sense of Coherence scale. In their study, Chinese and Japanese were less likely to use the “often” response category compared to Americans ($p < .001$) and more likely to use the middle response category ($p < .05$) on items reflecting the presence of positive feeling. However, due to the ease of administration, Likert-type scales remain popular.

The primary author’s experience as a researcher and professor supervising Thai masters and doctoral students in conducting research is that Likert-type scales are widely used in Thai nursing research, and Thai researchers are much more familiar with this type of measurement than others. After the SICS, a 40-item questionnaire with 0–100 confidence continuum ranging in 10-unit intervals, was developed and published elsewhere (Prasopkittikun et al., 2006), a question from colleagues and the scale users has arisen, “Can a SICS response scale be changed into a Likert-type scale?” With regard to the convenience of use by researchers and the appropriateness of use with a group of mothers who have poor literacy skills, it is a challenge to examine the possibility of using a SICS Likert-type scale. Thus, the purpose of this study was to identify whether the SICS with a Likert-type scale can be used as an alternative to that of the traditional, or 0–100 confidence continuum, scale for assessing Thai mothers’ perceived self-efficacy in infant care.

**METHODS**

**Sample**
The subjects included Thai mothers who took their infants to the well-baby clinic for immunizations at Samutsakorn Hospital in Samutsakorn Province, which is located 30 km from Bangkok, Thailand. Their infants had to be healthy without any form of physical disability. As the study aimed to examine the use of the Likert-type scale in a low literacy group,
eligible mothers had to be educated in schools for no more than 9 years, which is the minimum education Thai people must receive according to the National Education Act B.E. 2542 (1999).

Since prior estimates of effect size were not available, the conventional values of large effect in a bivariate correlation \( r = .50 \) were used (Polit & Beck, 2004). The authors believed that the correlations between the two instruments would be high because these two instruments asked the same items. This was the reason why a large effect size of \( r = .50 \) was assumed to calculate a sample size. According to Cohen (1988), approximately 28 participants were needed to achieve 80% power for testing a hypothesis at the .5 significance level. However, 43 eligible mothers were recruited by convenience sampling within a 1-month period of data collection. During the analysis, a visual scan of all the survey responses showed that the data from one mother was not reliable, so it was excluded (eight items which the mother scored as zero on the Likert-type scale were rated as 100% on the traditional scale). In summary, 42 mothers were included in the study.

The sample consisted of mothers aged 19–40 years (mean age, 25.7 ± 5.7 years), and 45% of them were first-time mothers. Twenty mothers (48%) had completed ninth grade while the remainder (52%) had completed sixth grade (mean education, 7.4 ± 1.75 years). It was not surprising to find that the highest education level was at either sixth or ninth grade because the former National Education Act required the compulsory education of Thai people to sixth grade and the latest one to ninth grade. Over half of the mothers (55%) were unemployed while the remainder were labor workers (21%) or were employed in companies, banks, and government offices (24%). The average age of the infants was 231 days \( (SD = 57) \), or nearly 8 months old.

**Instruments**

SICS (Prasopkittikun et al., 2006) is a self-administered measure assessing maternal judgment of their ability to care for infants. It contains 40 items with four dimensions of self-efficacy in infant care: developmental promotion (14 items), general health care (13 items), safety (5 items), and diet (8 items). In each statement (item), mothers were asked to indicate the degree of belief in their ability to perform designated infant care tasks on a range in 10-unit intervals from 0 = not confident at all, to 50 = moderately confident I can do it, and 100 = definitely confident I can do it. The scale was scored by summing the numerical ratings for each item and dividing by the total number of items. The reliability of the entire scale was .95, ranging from .83 to .93 for its four subscales. Its construct validity was determined through factor analysis with 397 Thai mothers.

According to the purpose of this study, the item content of the SICS was retained but the response format was changed from a 0–100 confidence continuum to a Likert-type scale. As the issues concerning the use of a Likert-type scale are the number of responses and the types of anchors used in the response scale (Vojir, Jones, Fink, & Hutt, 2006), a pilot survey was performed with employees in a school of nursing (six nurse instructors, four clerks, and two office cleaners) and 10 mothers in the hospital. Each of them was individually approached and given three different patterns of the Likert-type response. The differences included the number of responses from 0 to 4, 1 to 5, and 0 to 5, and the anchor phrases used in the response scale. A discussion took place to determine which pattern was most appropriate. Finally, a 6-point fully semantically-anchored scale ranging from 0 = not at all confident, 1 = little confidence I can do it, 2 = somewhat confident I can do it, 3 = moderately confident I can do it, 4 = very confident I can do it, and 5 = definitely confident I can do it, was selected.

**Data collection procedure**

Upon approval from the Institutional Review Board of Samutsakorn Hospital, data collection was performed at the well-baby clinic. When informed consent was obtained, the SICS with 0–100 confidence continuum scale was given to each eligible mother. After completing the first questionnaire, the mother was given the SICS with the 6-point rating scale to complete. Afterwards, mothers were asked to indicate
which of the questionnaires was easier to administer and to give reasons for their answers.

Mothers who were willing to complete both questionnaires again in the next 2 weeks were visited at home. Fifteen mothers were recruited but only 10 could re-administer the questionnaire within the time frame determined.

**Data analysis**

Although the values of each item in the Likert-type format are technically ordinal level data, the summed score is treated as interval level data in order to allow more sophisticated statistical analyses (Burns & Grove, 2005). Thus, for the present study, the Komogorov-Smirnov test was performed and the required normal distribution of the data classed as interval (Jamieson, 2004; Knapp, 1990) was found.

The internal consistency and test–retest reliabilities of either response type of the SICS were examined by calculating Cronbach’s $\alpha$ and Pearson’s product moment correlation.

The association between the 0–100 confidence continuum scale and the Likert-type scale of the SICS was determined by calculating Pearson’s product moment correlation. According to Munro (2001), the correlations between two forms of the same test must be very high (approximately .95) because alternate forms of a test should be measuring the same thing. A conventional significance level of $p < .05$ was chosen.

**RESULTS**

As shown in Table 1, the internal consistency reliabilities of both entire scales were equal (both $\alpha = .95$), ranging from .83 to .92 among the subscales of the 0–100 confidence continuum scale and .81 to .91 among the subscales of the Likert-type scale. The test–retest reliabilities were also very high for both scales.

Correlations between the same items from the two different response formats of the SICS were calculated. An interpretation of the correlation magnitude was based on Munro (2001). The results showed that only 11 pairs of items (27.5%) were highly correlated (Table 2).

As illustrated in Table 3, correlations between the same subscales of the two different response formats of the SICS and between the total scales were high, ranging from .77 to .87.

When the subjects were divided into groups who received either 6 or 9 years of education, the study revealed that there was a significant difference in ease

| Table 1

Ranges, Means, Standard Deviations, and Reliabilities of the 0–100 Confidence Continuum and 6-point Rating Scales of the Self-efficacy in Infant Care Scale (SICS) |
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<td><strong>SICS</strong></td>
<td>0–100 confidence continuum scale</td>
<td>6-point rating scale</td>
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<td><strong>Descriptives and reliability</strong></td>
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<td>Possible range</td>
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<tr>
<td>Mean ± SD</td>
<td>71.44 ± 15.36</td>
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<td>Cronbach’s $\alpha$</td>
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<td>Development promotion</td>
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<td>General health care</td>
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<td>Safety</td>
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<td>Diet</td>
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<td>Test–retest reliability ($n = 10$)</td>
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*p < .001.
of administration between the two groups ($\chi^2 = 4.97, p < .05$; Table 4). It appeared that the group with 6 years of education (59%) was more likely to prefer the 0–100 continuum scale and the group with 9 years of education (75%) was more likely to prefer the 6-point rating scale. Those preferring the traditional scale reported that the response scale was straightforward. For example, for the 0–100 confidence continuum scale, the mothers said, “I just mark the percent of confidence I feel.” While for the 6-point rating scale, they said, “When my confidence is not high, sometimes it is very hard to say whether I am somewhat confident or moderately confident.” Those preferring the 6-point rating scale reported that the response scale was easy to check because they were not forced to give the number of percent confidence they felt.

**DISCUSSION**

This study tested the similarity of two formats for measuring self-efficacy using Cronbach’s $\alpha$ coefficient.
and correlation analysis. The results indicated that the 6-point rating scale and the 0–100 confidence continuum measure of the SICS had similar and high reliabilities using Cronbach’s α coefficient. However, correlations between the same subscales of the two response formats were not sufficiently high for the subscales to be an alternative to each other, that is, the correlations were less than .95 (Munro, 2001). Furthermore, only 11 out of 40 pairs of items demonstrated high correlations. Considering the present empirical results, the SICS with the 6-point rating scale does not seem to offer an acceptable alternative method of measuring self-efficacy in infant care among Thai mothers. The present findings are not consistent with the study by Maurer and Pierce (1998), who reported that a 5-point rating format can be used as an alternative to the traditional format for measuring self-efficacy in academic performance. In their study, psychometric properties of the two types of scales using reliability, confirmatory factor analysis, and predictive validity were compared. However, correlations between the items and subscales of both scales were not investigated. We suggest that another type of psychometric property, especially construct validity, be investigated and compared with the traditional one to determine if the SICS with Likert-type scale can be used successfully. In addition to the very high magnitude of correlation, evidence of comparable reliability and construct validity of the two scales is also needed to conclude that the Likert-type scale is an alternative to measure maternal self-efficacy.

The study showed that 59% of mothers with poor literacy skills (6 years of education) found the SICS with the 0–100 confidence continuum to be an easier scale to use. Such an interesting finding causes us to reconsider if it is really helpful to use the SICS Likert-type format with a low literacy group of mothers. Our familiarity with using a Likert-type scale may lead us to be over-concerned about the use of a different type of scale. In addition, a scale with 0–100 confidence continuum is more sensitive and more reliable than a scale with only a few steps (Bandura, 1997). The authors would encourage the use of the SICS with the 0–100 confidence continuum in Thai mothers even in a low literacy group.

Providing sufficient instruction in how to administer the scale will reduce any difficulty in using the scale.

There are some limitations to this study that need to be discussed. First, the present study was conducted in one setting, resulting in a limited generalizability. Next, the scales were not counterbalanced in the sample. The participants rated the 0–100 confidence continuum scale first, then the 6-point rating scale. Thus, it is not known if the way mothers rated the anchors in the first scale influenced them when estimating their degree of belief in the second scale. Finally, only basic psychometric properties, including reliability, were conducted in the present study. The robust psychometric properties of the construct validity of the Likert-type scale were not investigated due to the small sample size.

**CONCLUSION**

The SICS with the 0–100 confidence continuum scale is not difficult to use among mothers with low literacy skills. Instruction about how to administer a scale that provides sufficient information to the subjects is the most important aid to rigorous measurement of self-efficacy. The present empirical findings do not support the use of SICS with a 6-point rating scale as an alternative method of measuring maternal self-efficacy. However, further research is needed, in particular to investigate the construct validity of the Likert-type scale and compare the two scales. Future research should address the limitations of the present study. Moreover, comparison of various methods of measuring self-efficacy in infant care is also recommended to determine a sound measurement tool for use in studies that would contribute to the understanding of Thai mothers’ judgment of their own ability at infant care, which, in turn, will influence their actual behavior in caring for their infants.

**REFERENCES**

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