Translation and Validation of the Implementation Leadership Scale in Chinese Nursing Context

Presented by: Jiale Hu PhD(c), MScN, RN
Background

• No valid and reliable tool for measuring implementation leadership in China

• The Implementation Leadership Scale (ILS)
  – well developed
  – having good validity and reliability
  – used widely in different settings

Purpose

• To translate and the ILS into Chinese
• To validate the translated ILS into Chinese nursing context
Background

• No valid and reliable tool for measuring implementation leadership in China

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Purpose

• To **translate** and the ILS into Chinese
• To **validate** the translated ILS into Chinese nursing context
Methodology

• Translation
  – Forward Translation (English to Chinese)
  – Comparison of the Two Forward Translation (Chinese) Versions
  – Blind Backward Translation (Chinese to English)
  – Comparison of the Two Backward Translation (English) Versions
• Linguistic validation
• Content validation
• Psychometric testing

Translation

- 2 rounds of forward translation and backward translation
- 24 translation issues were identified (1\textsuperscript{st} R 19, 2\textsuperscript{nd} R 5)
  - Semantic equivalence issue: 16
  - Operational equivalence issue: 1
  - Conceptual equivalence issue: 5
  - Item equivalence issue: 2
Main Solutions

• Using “sense-to-sense translation” rather than “word-to-word translation”
  e.g. Implementation Leadership=Leadership for implementing evidence-based practice specifically

• Using Oxford English Dictionary
  e.g. appreciate = recognize … in a good way

• Definition and examples
  e.g. evidence-based practice=Sackett’s definition along with four examples of evidence-based practice
Linguistic Validation

- Using **cognitive interview** to evaluate how Chinese nursing staff and leaders understood and responded to the translated ILS (Chinese)
  - Comprehension: encoding process
  - Recall: retrieval process
  - Inference: judgment process
  - Mapping: response process
  - Editing: process used to edit answers

(Mear & Giroudet, 2012; Nichols & Childs, 2009; Willis, 2005)
Sample of Linguistic Validation

- A convenience sample
- Shanghai Ninth People’s Hospital, which is an academic health institution affiliated with Shanghai Jiaotong University
- Nursing staff and leaders who had worked more than three years in their current positions
Results of Linguistic Validation

- 2 rounds of cognitive interviews (n=10, each round)
- 33 translation issues were identified (1st R 25, 2nd R 8)
  - Comprehension Issue: 21
  - Recall Issue: 5
  - Inference Issue: 3
  - Mapping Issue: 3
  - Editing Issue: 1
The seven adaptations in the Chinese ILS

<table>
<thead>
<tr>
<th>Proactive</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Your supervisor [Name of Supervisor] has developed a plan to facilitate implementation of evidence-based practice</td>
<td></td>
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<tr>
<td>2. Your supervisor [Name of Supervisor] has worked to minimize/remove obstacles to the implementation of evidence-based practice</td>
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<tr>
<td>3. Your supervisor [Name of Supervisor] has established clear department standards for the implementation of evidence-based practice</td>
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<td></td>
</tr>
<tr>
<td>Knowledgeable</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Your supervisor [Name of Supervisor] is knowledgeable about evidence-based practice</td>
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<tr>
<td>5. Your supervisor [Name of Supervisor] is able to answer staff’s questions about evidence-based practice</td>
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<tr>
<td>6. Your supervisor [Name of Supervisor] knows what I am talking about when it comes to evidence-based practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Your supervisor [Name of Supervisor] recognizes and appreciates employee efforts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Your supervisor [Name of Supervisor] supports employee efforts to learn more about evidence-based practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Your supervisor [Name of Supervisor] supports employee efforts to use evidence-based practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perseverant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Your supervisor [Name of Supervisor] perseveres through the ups and downs of implementing evidence-based practice</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11. Your supervisor [Name of Supervisor] carries on through the challenges of implementing evidence-based practice</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12. Your supervisor addresses critical issue(s) regarding the implementation of evidence-based practice</td>
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</tr>
</tbody>
</table>

*Investigator Guide:*

The term “department” in Item 3 could be modified and pre-determined by investigators based on the specific context. For example, “Your supervisor has established clear department standards for the implementation of evidence-based practice” will be modified to “Your supervisor has established clear unit standards for the implementation of evidence-based practice”, when the Chinese ILS (Staff Version) is used to evaluate the implementation leadership of head nurses.
Content Validation

- To evaluate the relevance of the specific items for representing the concepts being measured
  - A four-point scale (1=not relevant, 2=somewhat relevant, 3=quite relevant, 4=highly relevant)
  - An open-ended question: comments or suggestions on wording revisions were encouraged through an open-ended question at the end of the questionnaire.

(Streiner, 2008; Pilot & Beck, 2006)
Sample of Content Validation

- Ten experts, who are knowledgeable about the construct of leadership in the content area of EBP in healthcare

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Content Validation (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>5</td>
</tr>
<tr>
<td>Master Degree</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>2</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td></td>
</tr>
<tr>
<td>Hospital Administrator</td>
<td>2</td>
</tr>
<tr>
<td>Clinical Unit Leaders</td>
<td>3</td>
</tr>
<tr>
<td>Researchers</td>
<td>3</td>
</tr>
<tr>
<td>Senior Nurse Leader</td>
<td>2</td>
</tr>
<tr>
<td><strong>Working Years</strong></td>
<td></td>
</tr>
<tr>
<td>11~20</td>
<td>6</td>
</tr>
<tr>
<td>&gt;20</td>
<td>4</td>
</tr>
</tbody>
</table>
Content Validity Index

- **Item-level content validity index** (I-CVI, percentage of experts rating an item as “relevant” or “highly relevant”): 0.80-1.00 (0.78, **good**)
- **Scale-level CVI/averaging calculation** (S-CVI/Ave, mean of the I-CVIs for all items on the scale): 0.98 (0.90, **good**)
- **Scale-level CVI/universal agreement calculation** (S-CVI/UA, percentage of items on a scale rated as “relevant” or “highly relevant” by all the experts): 0.83 (0.80, **good**)
- **Item-level modified Cohen’s coefficient kappa** (k*) : 0.79-1.00 (≥0.75, **good**)

(Streiner, 2008; Pilot & Beck, 2006)
Summary of Translation, Linguistic Validation, Content Validation

• 12 months to complete

• Having the original instrument developers involved enhanced the robustness of the translation and validation process.
  – when these stages were complete
  – revisions or adaptations to the tool were necessary
  – the potential benefits and/or disadvantages of each revision
  – the most unclear and important changes
Psychometric Testing

• Validity
  – Structural validity: Confirmatory Factor Analysis
  – Convergent validity: Correlation with MLQ

• Reliability
  – Internal consistency: Cronbach Alpha

• Acceptability
  – Time length: Seconds
  – Easy to response: 0-4 (“Not at all” to “Very great extent”)
  – Relevancy: 0-4
  – Clarity: 0-4

(Streiner, 2008; Tabachnik & Fidell, 2013)
Sample of Psychometric testing

• A convenience sample
• Shanghai Ninth People’s Hospital, which is an academic health institution affiliated with Shanghai Jiaotong University
• Nursing staff who had worked more than one year in their current positions
Participants

- 234 nurses/285 nurses (response rate: 85.26%)
  - 35 units (Mean 6.67/unit, 3/unit to 16/unit)
  - Position Working Years: Mean 8.55, Median 7, Range 1-33

Gender

- Female, 231, 99%
- Male, 3, 1%

Education

- Diploma, 88, 38%
- Bachelor, 144, 61%
- Master, 2, 1%
Structural Validity

Confirmatory Factor Analysis

- Factor loadings: Item level **0.79-0.95**, Domain Level **0.87-0.98** (>0.6 **good**)
- Model fit Index
  - Normed chi-squared: **2.00** (<3 **good**)
  - RMSEA (Root Mean Square Error of Approximation): **0.07** (<0.05 good, <0.08 **adequate**)
  - RMSEA 90% CI: **0.04 -0.08** (<0.08 **good**)
  - CFI (Comparative Fit Index): **0.98** (>0.95 **good**)
  - TLI (Tucker-Lewis Index): **0.97** (>0.95 **good**)
  - Standardized RMR (Root Mean Squared Residual): **0.034** (<0.05 **good**)

(Tabachnik & Fidell, 2013)
# Convergent Validity

<table>
<thead>
<tr>
<th>Multifactor Leadership Questionnaire</th>
<th>Implementation Leadership Scale</th>
<th>Proactive</th>
<th>Knowledgeable</th>
<th>Supportive</th>
<th>Perseverant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspirational Motivation</td>
<td>0.53**</td>
<td></td>
<td>0.58**</td>
<td>0.59**</td>
<td>0.57**</td>
<td>0.63**</td>
</tr>
<tr>
<td>Intellectual Stimulation</td>
<td>0.52**</td>
<td></td>
<td>0.56**</td>
<td>0.59**</td>
<td>0.56**</td>
<td>0.62**</td>
</tr>
<tr>
<td>Individualized Consideration</td>
<td>0.40**</td>
<td></td>
<td>0.45**</td>
<td>0.45**</td>
<td>0.50**</td>
<td>0.50**</td>
</tr>
<tr>
<td>Idealized Influence</td>
<td>0.52**</td>
<td></td>
<td>0.57**</td>
<td>0.60**</td>
<td>0.552**</td>
<td>0.63**</td>
</tr>
<tr>
<td>Transactional Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingent Reward</td>
<td>0.49**</td>
<td></td>
<td>0.52**</td>
<td>0.56**</td>
<td>0.54**</td>
<td>0.59**</td>
</tr>
</tbody>
</table>

Note: ** p<0.001

\[ r > 0.3 \text{ adequate} \] (Cohen, 1988)
Reliability—Internal Consistency

<table>
<thead>
<tr>
<th>ILS</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.95</td>
</tr>
<tr>
<td>Proactive</td>
<td>0.86</td>
</tr>
<tr>
<td>Knowledgeable</td>
<td>0.90</td>
</tr>
<tr>
<td>Supportive</td>
<td>0.89</td>
</tr>
<tr>
<td>Perseverant</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Cronbach’s Alpha(s) ≥ 0.70 good (Streiner, 2008)
Acceptability

- Participants spend average **80 seconds** (30-240) finishing the ILS.
- 56.8% participants strongly agree that these questions are **easy to answer**.
- 66.7% participants strongly agree that these questions are **relevant**.
- 66.6% participants strongly agree that these questions are **clear**.
Conclusion

• In this study, we used a rigorous and systematic methodology to translate and validate the Implementation Leadership Scale into Chinese nursing context.

• The Chinese ILS has the potential to be a foundational factor in research on the development of implementation leadership in Chinese nursing; it can provide a common language for investigators conducting research in China to investigate and understand leadership within implementation science.
Research Team

Gregory A. Aarons
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University of California

Mark G. Ehrhart
Professor
University of Central Florida
Up next: Denise Harrison

• Barriers and Facilitators to using recommended pain management for infants & children