

# How to Choose and Where to Find Tools for Your Research Study



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Are you planning a research study and aren't sure where to begin looking for instruments to measure the key concepts in your research plan? Are you interested in implementing an assessment tool for patients with depression, but aren't sure where to begin? Are you unsure of how to judge whether one instrument is of higher quality than another?

In this "How To" brochure we will discuss factors that should be considered when you select a research tool, how to identify sources of research tools, and what you should do before using a copyrighted tool. Let's begin...

## Step 1

What factors should you consider when selecting an instrument? Think about what your ideal tool would look like. The ideal tool:

- Measures the variable you want to measure. For example, if you are interested in assessing coping skills, you want to select a tool that measures coping, not some other concept like hope or courage.
- Has been used successfully (normed) on your population of interest. The information on reliability and validity should have been established on the same population that you want to assess. For example, if you are interested in studying adults, you probably don't want to select an instrument that has only been used with pediatric subjects. Likewise, if you are focusing on transplant patients you probably want to find an instrument that has been used successfully with transplant patients before. If not, pilot test **the** tool first with a small sample of your potential subjects.
- Has acceptable reliability and validity.
  - 1) **Reliability** is the degree of consistency or dependability with which an instrument measures something (Polit & Beck 2008). There are several types of reliability for you to consider:
    - a. **Test-retest**- Assurance that you will obtain the same score each time the measurement is used, unless a real change in the value has occurred (Polit & Beck). For example, if you are measuring trait anxiety and you are using

the State-Trait Anxiety Inventory®, the trait anxiety score should be the same each time test is given.

- b. **Parallel Forms** - Degree to which two or more forms of the same instrument are equivalent. For example, if you took two versions of the CCTN examination, your scores should be highly correlated.
- c. **Internal consistency** - Extent to which all items on a tool measure the same variable. This reliability is usually tested by comparing different parts of the tool. Split-half reliability compares one half of the



instrument with the other half. Co-efficient alpha (Cronbach's alpha) compares each item with the entire set of items and calculates the reliability of the entire instrument.

- 2) **Validity** refers to the degree to which an instrument measures what it is intended to measure (Polit & Beck). There are several types of validity for you to consider:
- a. **Content validity** - focuses on the degree to which the items in an instrument adequately represent the entire concept being measured. You should ask yourself, "Does the tool appear to measure what it says it measures?" Content validity is based on subjective opinions of others and is a necessary but not sufficient indication of validity. There are two types:
    - i. **Face Validity** involves subjective judgments by experts about the degree to which the instrument appears to measure the relevant variable. This is also called "arm chair" validity!
    - ii. **Logical Validity** - Extent to which items adequately represent major aspects of the relevant variable. This is also determined by a panel of experts. The experts determine if all major aspects are covered and if any are left out. For example, for the Heart Transplant Symptom Checklist® a comprehensive review of literature was conducted by the authors for heart failure symptoms and the list of symptoms was then reviewed by an expert panel. Another example will help clarify this for you. If you are developing a test to determine knowledge of the seven danger

signals of cancer, to have logical validity, the tool must include questions about each of the 7 danger signals.

- iii. For example, if content validity was being established for an instrument that measured the symptoms of heart failure, the author of the instrument would conduct a comprehensive review of the literature related to symptoms of heart failure, seek the endorsement of the instrument's symptoms by heart failure patients, and assess adequate content validity if no new symptoms were added over time.
- b. **Criterion-related validity** - is the extent to which a score on the instrument can be related to a criterion. The criterion is the behavior that the instrument is supposed to predict or measure. There are two types of criterion-related validity, concurrent and predictive. In concurrent validity, the criterion measure is obtained at the same time that the instrument is given. With predictive validity, the criterion measure is obtained at some future time.
- c. **Construct validity** - is the degree to which the instrument measures the construct under investigation (Polit & Beck). This validity is based on closely examining groups that are very different with regards to the construct that is being measured. For example, if the construct validity of a tool to measure the symptoms in heart failure patients was under development, the researcher would test the instrument in working versus non-working heart failure patients. If the construct validity was high, non-working patients would score very differently on the tool because of the presence of more symptoms. There are four kinds of construct validity:
  - i. **Known Groups** - the instrument would be administered to groups that are known to be different on the construct being measured. For example, if we were measuring the construct of pain, we would want to measure a group of transplant patients who were known to have no pain and a similar group with pain.
  - ii. **Changes** - is the extent to which scores change over time in the expected direction. For example, a measure of anxiety would be administered before surgery and after successful surgery with an expected pre- to postoperative decrease in measured anxiety level.

*Instrument  
Variable Measured  
Population  
Description  
Reliability  
Validity  
Languages  
Copyrighted  
Fee  
Source  
References*

iii. **Convergent** - is the extent to which scores from one instrument resemble the scores from a second instrument that measures the same construct. For example, if you were measuring state anxiety using the State Anxiety scale of the State-Trait Anxiety Inventory<sup>®</sup> and if you administered the Beck Anxiety Inventory<sup>®</sup> at the same time, you would expect the scores from each of these state anxiety inventories to be highly correlated.

iv. **Discriminant** - is the extent to which scores from a given instrument are dissimilar to scores from a second instrument that measures a different construct. For example, you would not expect self-esteem scores to be highly correlated with locus of control scores — because self-esteem and locus of control are theoretically unrelated constructs.

- Is feasible for use in your research plan. Questions that you will want to consider include:
  - 1) Does administration require face-to-face contact?
  - 2) Can instruments be mailed?
  - 3) What languages do your respondents speak?
  - 4) Is the instrument available in those languages?
- Is appropriate for your respondents. You should consider whether the tool is appropriate for the targeted population in terms of:
  - 1) Cultural appropriateness
  - 2) Literacy
  - 3) Reading grade level
  - 4) Time burden to complete

## Step 2

Where should you be looking for your instrument?

You can find tools by examining:

- Other published research studies
- Compendia of research tools
- Texts on outcome measures
- Annual research reviews
- Dissertation Abstracts International
- Internet
- International Transplant Nurses Society Website ([www.itns.org/research/resources](http://www.itns.org/research/resources)). The ITNS website summarizes the characteristics of 105 instruments that have been used in research involving transplant patients or families, presented in an easy-to-use table format. The following information is summarized about each instrument:
  - 1) Instrument's name
  - 2) Information about variables measured
  - 3) Population(s) tested
  - 4) Description of the tool

- 5) Reliability and validity data
- 6) Languages
- 7) Copyright information and fees (if any)
- 8) Sources (where to get tool)
- 9) References

## Step 3

If the tool that you are interested in using is copyrighted, then you must obtain permission from the copyright holder to use the tool. This information can be found on the ITNS website for some tools.

Finding the best tool for your research study or for use on clinical practice is critical. We hope that these steps will assist you in locating the tool that adequately measures what you want to measure!

## References

Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*. (8th ed.). New York: J. B. Lippincott.



## Summary:

# *Finding Tools for Your Research Study*

Steps	Key Point	Activity
Step 1	Factors to consider	<p>Does the tool measure the variable(s) you want to measure? Has the tool been used successfully (normed) on your population of interest? Does the tool have acceptable reliability and validity?</p> <ul style="list-style-type: none"><li>• Test-retest</li><li>• Parallel Forms</li><li>• Internal consistency</li><li>• Content validity</li><li>• Face Validity</li><li>• Logical Validity</li><li>• Criterion-related validity</li><li>• Construct validity<ul style="list-style-type: none"><li>• Known Groups</li><li>• Changes</li><li>• Convergent</li><li>• Discriminant</li></ul></li></ul> <p>Is it feasible for use in your research plan? Is it appropriate for your respondents?</p>
Step 2	Finding tools	<p>Where should you be going to look for your instrument?</p> <ul style="list-style-type: none"><li>• Other published research studies</li><li>• Compendia of research tools</li><li>• Texts on outcome measures</li><li>• Annual research reviews</li><li>• Dissertation Abstracts International</li><li>• Internet</li><li>• International Transplant Nurses Society Website (<a href="http://www.itns.org/research/resources">www.itns.org/research/resources</a>)</li></ul>
Step 3	Copyrights	<p>If the tool that you are interested in using is copyrighted, then you must obtain permission from the copyright holder to use the tool. This information can be found on the ITNS website for some tools.</p>

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