

Challenges and Opportunities for the Next Generation of Nurse Researchers

Denise F. Polit

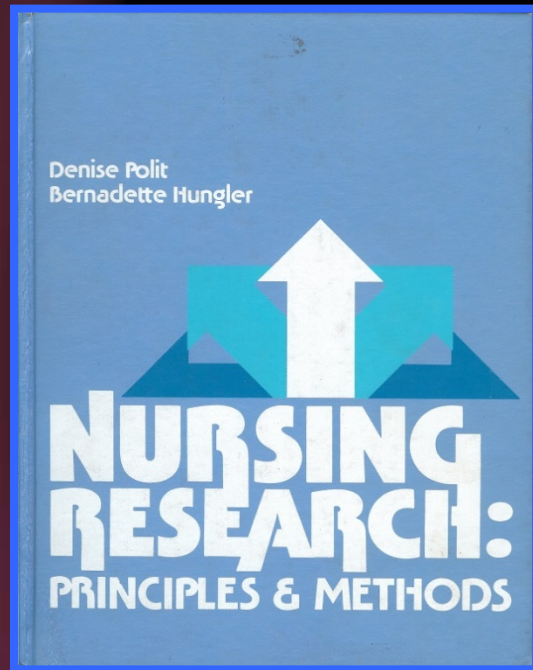
www.denisepolit.com

June 11, 2014

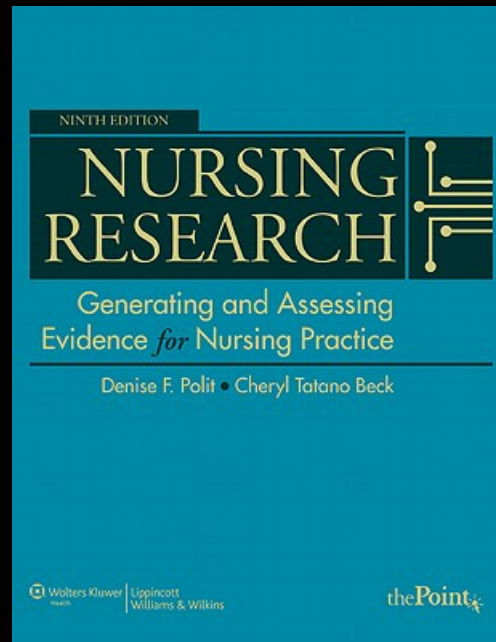
A Great Personal Journey

A brief look back:

1st edition (1978)



9th ed. (2012)



10th ed. (2016)



- I couldn't have predicted 36 years ago how far and how fast nurse researchers would travel!

Major Changes in Past 36 Years

- An explosion of research conducted by nurses!
 - Particularly spectacular growth among nurse researchers in Europe and Asia
 - AND, the quality of research is getting better
- An explosion of dissemination options
 - There are hundreds of nursing journals—and they are more accessible than in 1978
 - Now > 100 nursing journals have Impact Factors
- Surge in systematic reviews

Major Changes in Past 36 Years

- **Growth in sophistication in research methods**
 - e.g., more RCTs, more careful development of complex interventions, more triangulated designs
- **Greater sophistication of statistical methods**
 - *T*-tests and ANOVA have been largely replaced by complex multivariate analyses—some of which I could not undertake

Major Changes in Past 36 Years

- Tremendous technological progress with implications for:
 - Substantive advances (e.g., Internet-based interventions)
 - Research methods (e.g., data collection on smart phones or tablets)
 - Dissemination (e.g., open-access journals)
- Growth in funding opportunities
 - Larger, more complex studies are now possible

Major Changes in Past 36 Years

- Appreciation of the important contribution of qualitative research
 - In my first edition, no index entry for qualitative research!
 - And, obviously, nothing about mixed methods (MM) research
- Appreciation of the importance of doing research that matters to nurses and their clients (evidence-based practice, EBP)
 - And more interest in figuring out how to translate research findings to real-world settings

The Future: Humble Prognostication

- It may be presumptuous for me to make predictions about the future
- But I offer a few thoughts about possible directions for the next generation of nurse researchers
 - There are many new opportunities, but also challenges

Tensions: Past, Present, Future

- Tensions in research circles can lead to creative solutions and advances
- e.g., Qualitative-Quantitative: Decades ago there was tension about what the best approach was
 - Now we know the “best” approach depends on what question is being asked; and often different questions are relevant in a single inquiry: **Mixed methods research is burgeoning**

Current & Future Tensions



At the moment, **innovation** is a very big buzzword in the U.S. (e.g., at National Institute of Nursing Research)

Who Could Denounce Innovation??

- Innovation is hard to criticize—innovation is essential in our rapidly changing world
- We need to embrace creativity, innovation, original ideas

Multiple Forms of Innovation

- Substantive Innovation
 - Genomics and its integration into clinical practice
 - Telehealth
 - Robotics (e.g., telepresence robots)
- Methodological innovation
 - To be discussed!
- Structural innovation
 - New visions about interdisciplinary health education

Innovation: A Caution

- We should applaud innovation, BUT...my worry:
 - Innovation is NOT always the right “next step” to improving clinical care and patient outcomes
 - The push for innovation may overshadow the need for planned replication

Innovation and EBP

- Emphasis on innovation can conflict with EBP and translation science, creating a possible tension
 - EBP requires consolidation and replication so we can confirm knowledge and understand the generalizability of results
 - The cornerstone of EBP is the systematic review, which requires multiple replications

Innovation: A Caution

- A particular concern of mine:
 - The emphasis on innovation with students (i.e., in theses and dissertations), who may not yet be ready to be inventive
 - Innovation *per se* should not be the goal

Another Tension

Additional challenges that nurse researchers face:

- The tension between statistical sophistication and the need to communicate with practicing nurses
 - One possible solution: sensitivity analyses that involve testing whether results are robust to changes in the statistical methods

Another Tension

- The tension between using precious research resources for the conduct of a study versus disseminating the results
 - Only a small percentage of nursing research papers are published as **open-access articles**, which can affect visibility and impact

Translation Science

- Translation science is definitely in our future: using systematic approaches to foster the application of knowledge in clinical practice
- Lots of opportunities for next generation of nurse researchers
 - But a lot of challenges, too

Translation Science

- Concern: There's a lot of “end state” effort (e.g., work on “translating” evidence from a systematic review to a practice guideline, or into a multi-site pragmatic trial)
- I think more thought needs to be given to translation earlier
 - Framing research studies with “the end in mind”

Translation Science

- Early in the planning process for a study, more thought needs to be given to long-term feasibility & scalability in real-world settings
- There's a dire need for cost effectiveness studies in nursing
- How can a decision-maker adopt (“translate”) a new intervention without knowing its costs/benefits in \$ or



– Desirable (but unaffordable) strategies abound

Translation Science

- Another suggestion: There needs to be more concern with sustainability
- Sustainability has two aspects:
 - At the individual level, we don't know much about the long-term effects of nursing interventions
 - At the institutional level, translation studies tend not to examine how sustainable an approach is—when the innovation is not being tested, can it continue?

Elimination of Bias

- I can't avoid bringing up work I've done to document that nursing research has been persistently plagued with a bias that threatens the extrapolation of key findings—and thus undermines EBP:

Gender bias

- Young nurse researchers need to turn this around

What Is Gender Bias in Research?

- In research, gender bias is a sampling bias—systematic over-representation of one of the sexes in research samples
- In the 1980s feminist researchers documented gender bias in medical research: study participants in clinical trials were disproportionately male
 - Led to many changes **But are nurses guilty of reverse discrimination?**

Gender Bias Studies (Polit & Beck)

- A reviewer criticized examples used in one edition of our book as favoring studies with women, and so Cheryl Beck and I did some research to test this hypothesis:
 - **Nurse researchers systematically over-represent females in their studies**

Gender Bias Studies (Polit & Beck)

- Highlights of our findings, based on a total sample of about 2,000 studies:
 - On average, > 70% of all participants in client-focused nursing studies were female
 - About 33% of studies had all-female samples (only 3% had all male samples)

Is Gender Bias International?

- Yes! (but highest in US & Canada):
- Selected results by country:
 - **Sweden** 61.9%* N=60
 - Australia 63.1%* N=29
 - Taiwan 63.2%* N=55
 - United Kingdom 66.2%* N=59
 - Korea 66.5%* N=27
 - **Norway** 68.8%* N=10
 - Other European 68.3%* N=18
 - USA 72.7%* N=238
 - Canada 75.6%* N=40

* = Significantly > 50%

Pervasiveness of Bias

- Gender bias (> 50% female participants) was persistent, found in:
 - all age groups of participants
 - Both qualitative and quantitative studies
 - Funded and unfunded research
 - In almost all specialty areas (not cardiovascular)
 - Lead authors of all academic ranks*
 - *Gender bias was significantly higher if lead author was a student: mean = 85% female

But....A Consistent Exception

- Authors' sex mattered
- Study 3: Sex composition of researchers
- | | <u>Mean % Female</u> | |
|---------------------------------|----------------------|---------|
| – Only 1 author, female: | 85%* | (N=21) |
| – Multiple authors, all female: | 79%* | (N=128) |
| – Multiple authors, some male: | 69%* | (N=148) |
| – All male authors: | 57% | (N=3) |

*Significantly > 50%

Group difference, $p = .002$

Some Implications: EBP

- Findings suggest that evidence from nursing studies is disproportionately about women and girls
 - Raises the question of whether findings from the bulk of nursing studies can be generalized to males
 - Hopefully, our research will serve as an impetus for reflection among future researchers

Lots of Innovation in Methodology!

- Lot of exciting stuff happening to make research stronger—I'll just mention a few
 - Mixed methods research
 - Advances in undertaking meta-analyses and metasyntheses
 - Sophisticated approaches to constructing multi-item scales via item response theory
 - Developments relating to clinical significance

Item Response Theory (IRT)

- Quick mention of **IRT** before discussing clinical significance
 - I think that in the not-too-distant future the majority of outcomes of interest to nurses will not be measured using traditional summated rating scales
 - In IRT, items are carefully calibrated in a way that makes possible very **precise, accurate measurement with few items**

IRT and PROMIS®

- A major health measurement initiative in the U.S. has created item banks for measuring important health outcomes via IRT (e.g., pain intensity, sleep disturbance, depression, fatigue)
 - Items can be administered as a **computerized adaptive test (CAT)**, with a tailored set of questions and instantaneous scoring & information about norms

IRT and PROMIS®

- Translations of these item banks is underway, and translations of some paper-and-pencil short form scales using items from the item banks have been completed, for example:
 - Pain interference (Danish, Norwegian, Swedish)
 - Physical function (Danish, Norwegian)
 - Sleep disturbance (Danish, Norwegian)

“Significance”

- In the “good old days,” researchers mainly reported ***p* values** (i.e., statistical significance)
- Now it’s increasingly expected that researchers will report:
 - **95% CIs**—confidence intervals (precision)
 - **Effect size** values (magnitude)
- Hopefully, nurse researchers will increasingly report on **clinical significance** as well



Clinical Significance



- There is a goldmine of opportunity for nurse researchers relating to **clinical significance**
 - For 25-30 years, medical researchers have been defining and operationalizing clinical significance
 - But nurse researchers seldom mention it, or only vaguely explain what they mean by it

SHAME ON ME! But I'm on a mission now!

Clinical Significance

- Key distinction: Group-level vs. individual-level clinical significance
 - At the group level, clinical significance is most often assessed via effect size indexes
- BUT...Most advances in defining and assessing clinical significance concern individual change—i.e., whether a patient has improved or deteriorated to a meaningful degree

Focus on Individual Patients

- Traditional statistical methods fail to tell us about individuals
 - Knowing that intervention-control group means are 70 vs. 60 on a quality-of-life scale isn't too informative, even if it's statistically significant
- To translate findings into clinical decision-making (EBP), we need to learn how health care strategies affect individual patients

Clinical Significance

- There are several conceptualizations of clinical significance at the individual level, for example:
 - A change in an outcome that is real (reliable)
 - A change that moves a patient to “normal” or desirable functioning
 - A change that brings patients to a state that is acceptable to them
 - A change in score values on an outcome that is minimally important

Clinical Significance

- Each conceptualization can be operationalized (measured) in various ways
 - But they all require establishing a benchmark (threshold) so that researchers can come to a conclusion about whether each patient experienced a clinically significant change

Clinical Significance

- A definition offered in 1989 (Jaeschke et al.) for a benchmark called the minimal clinically important difference (**MCID**), has been quoted in hundreds of medical journal articles:
 - “The MCID can be defined as the smallest difference in score in the domain of interest which patients perceive as beneficial and which would mandate, in the absence of troublesome side effects and excessive cost, a change in the patient’s management”

Clinical Significance

- At least 13 different methods have been used to operationalize the MCID (sometimes called **MIC—minimal important change**) for health measures
 - But nurse researchers have not been part of this discussion, and have not made efforts to establish the MIC for nurse-sensitive outcomes or widely-used patient scales
 - **This MUST change!**

Clinical Significance

- When you know the MIC of an outcome measure, you can do a **responder analysis** that classifies each patient in a study with regard to whether or not s/he has had a clinically significant change on a key outcome, based on change scores relative to the MIC
 - This is better than group means for translation science!

Responder Analysis

- Example: Pain is often measured with a visual analog scale (VAS) on a 0-100 cm scale. In a German study of patients with neck pain, the MIC on the VAS was **8 cm**
 - Patient 1: VAS scores decreased from 79 to 70—a clinically significant improvement
 - Patient 2: VAS scores decreased from 79 to 72—NOT a clinically significant improvement

Responder Analysis

- Each person is classified as a responder or a non-responder
- Then, we could say (for example) that $xx\%$ of the people getting an intervention had clinically significant improvement, compared to $yy\%$ who did not receive it

Conclusion

- There's a very bright future ahead for nurse researchers, which should involve:
 - Exciting knowledge development for both male and female patients,
 - Innovative health care strategies & methods—but not at the expense of planned replication that ensures a solid evidence base and good prospects for translation,
 - Better grasp of the costs/benefits of innovations, &
 - Better understanding of how nursing interventions result in clinically meaningful improvements

One last thing...

GOOD

LUCK

Troll.me

on your research
journey into the
future

From your biggest fan!