Prepare Like a Ninja: Survey Conceptualization and Development

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What does it mean to become a “Survey Ninja?”
Espionage.
Infiltration.
Chaos.

Ninjas have special training that prepared them for difficult challenges.
Never doubt.
Never fear.
Never overthink.

Ninjas have a can-do attitude and don’t give up.

Experienced merciless training regimen!
No garlic.
No onions.
Remain in the shadows.

Ninjas do whatever it takes to be successful.
Ninjas active during the 15th-17th centuries in the Iga Province area (modern-day Japan)
A Samurai

Ninjas were highly strategic and found ways to be unusually effective.
We’d welcome your feedback!

Thank you for visiting our website. You have been selected to participate in a brief customer satisfaction survey to let us know how we can improve your experience.

The survey is designed to measure your entire experience, please look for it at the conclusion of your visit.

This survey is conducted by an independent company ForeSee, on behalf of the site you are visiting.

Yes, I’ll give feedback

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If you would be willing to participate, we would love to understand your level of awareness and perception of student veterans. If you have any further questions, please contact nicole.borstad@ndsu.edu.

Here is the survey link: https://ndstate.co1.qualtrics.com/SV/?SID=SV_a25WwRmFMgl8QLP

Thank you and we appreciate your input,

Amie Northagen, Nicole Borstad, Anne Ehresmann, Taylor Marshall

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Tuesday Two’s are two questions that gauge the general stance of the student body on a variety of student issues. Today’s questions are about your voice on campus.

Follow this link to take the survey: https://ndstate.co1.qualtrics.com/SV/?SID=SV_4ZtwBZghrQ2eb
Challenges in survey administration

▪ Declining response rates
▪ Non-response bias from poor sampling strategies or survey invitations
▪ High survey drop-out rates
▪ Surveys with no clear purpose or theoretical foundation
▪ Poorly developed questions
▪ Sloppy data analysis or too much data analysis

...together results in **wasted time** and failure to gather the **data you need**!
Printing your survey on PINK paper is NOT going to save you.
We want to blame our failed survey on “survey fatigue”…

...instead of blaming our poorly designed, poorly conceptualized, poorly implemented survey process.
Our goal: Unusually effective surveys.

This requires giving STRATEGIC attention to TOTAL SURVEY DESIGN.

Will you commit to doing what it takes to have an effective survey?
This requires giving STRATEGIC attention to TOTAL SURVEY DESIGN.

Today:
- Survey conceptualization
- Identifying target population and sampling frame
- Selecting a sampling methodology
- Evaluating existing surveys or preparing to write your own items (if you must)
Survey Conceptualization
Start with 3 critical questions:

1. Why do you want to do a survey?
2. Why do you want to do a survey?
3. Why do you want to do a survey?

**Bad example:** I need to gather some data on first generation college students.

**Better example:** Explore first generation students’ transition to college and their academic and social experiences.
Bad example: Find out women’s perceptions of health care, their self-image, exercise and nutrition habits, satisfaction with clinic visits, overall health, health goals, favorite exercise facilities, likelihood to use a swimming pool, places where they purchase exercise equipment, hobbies, and television viewing tendencies.

Better example: Examine the factors that are related to a woman’s likelihood to obtain a mammogram.
If you don’t know why you are doing a survey, how will you know what to do?

If you don’t know what you want to learn from a survey, how will you know if you’ve learned it?
“Why do you want to do a survey?”

Write your answer to this question in 15 words or less. Share with your neighbor.

Neighbors: Help each other answer this question with more clarity.

Please send a copy of your 15-word answer to jeremy.penn@ndsu.edu
Why you want to do a survey

Select the constructs that describe the “thing(s)” you want to survey

Identify the theories that explain the relationships of the constructs
I am depressed:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**VS.**

1. My future seems hopeless.
2. The pleasure and joy has gone out of my life.
3. I feel sad, blue, and unhappy.
4. ...etc.

This is built on a construct: Groups of beliefs, behaviors, or attitudes that together facilitate understanding human behavior.

This is what you get when you don’t understand the construct!
Why do you need to understand the construct? Consider our example about “depression”

▪ What is depression? Do your survey respondents all know what you mean when you say “depression”?

▪ Is depression dichotomous? Is it a “yes / no” question, or is it more of a continuum?

▪ Are people accurately able to tell you whether or not they are depressed?

▪ If you wanted to publish your findings, would anyone believe your findings given how you asked this question?
What is a “construct”?

A “construct” is a **hypothetical concept** that is a product of the **informed scientific imagination**, that attempts to **explain human behavior**.

E.g., observe two different common behaviors at a dinner party. One type of person likes to be the life of the party, and is very sociable, while the other type seems to be more shy, concerned with own thoughts, and sits quietly. As a researcher, you might follow these two types of people more closely to examine how their upbringings were different. You might even give names to these two groups to try to simplify your study of their lives and behaviors, say, “extrovert” and “introvert.” These two terms have now become constructs (this is a simplification, of course, but hopefully you get the idea!)!
Thinking of depression as a construct

- Can see clear definitions and numerous examples for how it is measured
- Can quickly see how theories have associated it with other constructs or behaviors (e.g., people who are depressed also tend to experience significant anxiety) that makes it easier to understand human society

**It also makes it much easier to identify the questions you need to ask in your survey**
Briefly

▪ Constructs: the psychological traits you will measure in your survey
▪ Theories: describe how constructs change over time or how constructs relate to each other

How it improves your survey:
▪ People who are sad and how they do in school

Vs.
▪ We know *depression* is related to *anxiety*, but how is that related to *academic achievement*? –this is much better and more likely to lead to something interesting!
“Great!” you’re thinking. But how do I actually do this?

Let’s say you have a construct in mind – say, “awareness of the force” (from Star Wars).

How would you use that thinking about a construct to actually turn it into survey items and something you can actually use?
The quick 6 strategies to “broaden, refine, or verify the construct to be measured” in your survey.

Use one or more of these 6 strategies to better develop the constructs in your survey.
#1: Content analysis

- Ask open-ended questions about the topic or construct of interest (e.g., “how does a depressed person behave?” or, “how is the behavior of a Jedi different from a non-Jedi?”)

- Group responses into topical categories that become the basis for generating items (e.g., “sad, lethargic, difficulty completing tasks, etc.” or, “able to move rocks with their mind”)

- A more systematic approach would be called a two-phase, exploratory mixed methods research project
  - Phase 1: Qualitative exploration of the topic through focus groups, interviews, observations; goal of developing themes
  - Phase 2: Use themes to develop quantitative survey instrument that is administered to a larger group of participants
#2: Review of research

- Always a good place to start
- Is there an existing instrument that you can use or adapt?
- How is the construct of interest or the issue of interest defined by others?
- What are the key aspects or elements of the construct as defined in the research literature?
  - E.g., critical thinking – which definition will you use in your survey, or will you (in a totally survey novice move) make up your own definition?
#3: Critical incidents

- Identify a list of behaviors related to the issue of interest
- Focus on extremes – say, very high performers and very low performers (e.g., the most depressed person you can think of versus the least depressed)
- These performance gaps then become the basis for defining the issue and generating items
- May require watching all of the Star Wars movies over again (except for Phantom Menace. I can’t think of any good reason to watch that movie.)
#4: Direct observations

- Actual observations of the situations and persons of interest (e.g., “here is how I have seen depressed students behave, so I expect in class they would...” or, “this is what Luke would do in this situation”)

- Use to help identify experiences and practices that should be included in the survey (e.g., “how frequently in class do you...”)

#5: Expert judgment

- Get input from experts in the area
- Use a questionnaire or personal interviews
- Delphi method also popular (panel of experts try to reach consensus in rounds of discussion)
  - E.g., developing agreement on “Intercultural competence” (see Deardorff)
#6: Instruction objectives

- If your survey relates to a growth or development domain (such as developing leadership expertise), use the curriculum plan to inform your definition of the construct.

- The objectives from a well-written curriculum plan can often directly be used in the development of a survey.
  - (See my to-be-proposed course on “The History of the Force”)
Without a theory guiding and framing your survey you will be wandering in the dark, asking a jumble of questions that won’t get you anywhere. This is what is done by a SURVEY NOVICE!
It will be **IMPOSSIBLE** to select a good survey or to write effective survey items without the guidance provided by a theoretical foundation and a clear definition of the survey construct(s) you seek to measure.
Theory Example

- Bandura’s social cognitive theory suggests people are shaped by interaction between behavior, thoughts, environment
- You might use this theory to compare the differences between depressed persons and non-depressed persons in how they experience the university environment
- This provides a clear direction and purpose for your survey and provides the groundwork needed to create an exceptionally effective survey
- Without using theory, you could end up asking a bunch of random questions and hoping that something will “come up” as related to depression! That is a total *survey novice* move 😊!
The best surveys:
1. Are clear about what questions they want to answer and how the results will be used.
2. Use a theoretical framework and clearly defined constructs,
3. Use a systematic process to support the framework and constructs (such as review of research and exploration of the constructs), and
4. Use a theory to frame the design of the survey.
Survey Novice:
• I’m doing a survey on college students and mental health.

Survey Ninja:
• The purpose of this survey is to explore the relationship between depression (REFERENCE) and academic success (REFERENCE).
Survey Novice:
• I’m going to make-up my own questions based on my personal experiences.

Survey Ninja:
• I will have a focus group with students with depression, will build my items based on the research literature, and have my sample items reviewed by a depression expert.
Survey Novice:
• I hope to find statistically significant results so I can get published.

Survey Ninja:
• Results will inform how we support students with depression to ensure the best mental health and academic success.
Discussion with a neighbor

- What constructs will you use in your survey? What theory or theories frame the design of your survey?

- Which of the 6 activities will you use to fill in, enrich, or flesh out your survey’s constructs?
  1. Content analysis
  2. Review of research
  3. Critical incidents
  4. Direct observations
  5. Expert judgment
  6. Instruction objectives
Identifying target population and sampling frame
Survey Novices don’t think about the target population and sampling frame and that gets them into trouble, particularly when it comes to drawing inferences.

In short: NO ONE WILL BELIEVE YOUR SURVEY RESULTS.
Target Population

- The group of persons (or animals, institutions, etc.) about which you wish to draw some conclusions
- The goal of your survey is to provide information about this group that can be used to inform decisions, create interventions, understand
- Knowing this group will allow you to accurately craft your questions, improve survey administration, and so on
- The “big” group
- “People” is not a target population
  - This is not a finite group and it is generally impossible to draw conclusions about all “people”
- “Students attending public higher education institutions in North Dakota” is one possible target population
Sampling Frame

- “The units of the frame are the units to which the probability sampling scheme is applied.” (Särndal, Swensson, & Wretman, 2003)
- The group of people (or animals, institutions, etc.) that you could potentially contact and invite to participate in the survey.
- EX. Target population: “Students attending public higher education in North Dakota”
  - Sampling Frame: “Students attending NDSU” (selected because, say, you don’t have access to contact information for students attending the other institutions)
Ideally your sampling frame would **match the target population** – if not, this could lead to errors in the inferences you draw about the target population.

In our example, we would wonder if our results would represent the beliefs of students who are attending public community colleges (because they are in the target population but not the frame!)

From: http://www.theanalysisfactor.com/target-population-sampling-frame/
What to do when the target and the frame don’t match?

- Improve your sampling frame so it will represent the target population
  - Can you invite collaborators from a community college to get them to participate in the study?
- Change the target population to be more realistic
Activity: Write down your target population and your sampling frame. Be specific and realistic!
Sampling Methodology
Survey Novices sample haphazardly, using whomever they can get.

Survey Ninjas are strategic and use an appropriate sampling strategy designed to give them the results they want.
Why shouldn’t I just sample everyone?

▪ You often won’t have the ability to contact everyone in your target population

▪ The more people you contact, the more it spreads out your resources available for providing incentives, making contact, and so on; likely this will reduce your response rate

▪ A better response rate, from a smaller group, is better than a lower response rate from a bigger group – non-response bias can be an issue in both situations, but generally people are more accepting of the former

▪ If we all sampled everyone all the time, this would result in more surveys being sent to each person and a (likely) continuing reduction in response rates
How many responses are “enough”? 

- We will talk about this more later.
- There is no magic number (other than, say, 100%).
- The issue is the extent to which the sample you selected represents the target population — differences between these two groups result in biased results.
- You should perform a power analysis to determine a better estimate for the sample size you need.
  - But, to be able to perform a power analysis you need to have a good understanding of what statistics you want to calculate from your results — which requires being clear about what you want to accomplish with your survey!
Numerous sampling choices

- Bernoulli sampling (i.e., rolling a die for each member of the frame and including if you roll, say, a 6; results in a random sample size)
- Simple random sampling (i.e., assign a random number to every member of the frame, then draw in order until you reach the desired number)
- Systematic sampling (i.e., selecting every 5th student)
- Poisson sampling (unequal probability of inclusion, otherwise similar to Bernoulli sampling)
- Probability proportional-to-size sampling (probability of selection is related to another study variable)
- Stratified sampling (population divided into nonoverlapping subpopulations called strata; then probability sample (usually simple random) drawn from each strata)
- Convenience sampling (e.g., asking the first 50 people who walk by you in the Union; the burden is then high to demonstrate the sample is representative of the target population! WHY WOULD A SURVEY NINJA EVER DO THIS?)
You can take a whole class on sampling and its implications....

...therefore I recommend using either simple random or stratified sampling (or work with an expert).
Stratified sampling

- Use when:
  - You want to estimate parameters for specific subgroups
  - You want to reduce the error of estimation in a cost-effective manner (works when the within-strata variance is small)
  - You have to use different sampling strategies across different strata

- Requires weighting
  - Can be easily calculated and used in statistical software (turn weighting “on”)
  - Two main choices for weight calculations:
    - For population weights: \( \frac{\text{Total number in the strata } k}{\text{Number of participants in strata } k} \)
    - To keep sample size the same: \( \frac{\text{Number of members in group } k \text{ in the population} / \text{Total population}}{\text{Number of respondents in group } k / \text{Total number of respondents}} \)
Summary: Prepare like a ninja!

- Commit to doing what it takes to have an unusually effective survey
- When things go wrong, they can go really wrong!
Kevin A. Ranson
MovieCrypt.com

No, no, no, No, NO!
Original Score: 1/5

Stephen Hunter
Baltimore Sun

Here’s the concept: These ninjas surf!

Desmond Ryan
Philadelphia Inquirer

What do ninjas and surfers have to do with each other? You’ve got me, and I heroically sat through all of Surf Ninjas.

Jeff Shannon
Seattle Times

Oh, gee, have I given too much away? Is there something in this lyrical narrative that can’t be detected in the first five minutes?

Alex Sandell
Juicy Cerebellum

Mystery Science Theater could have a field-day with this!

James Berardinelli
ReelViews

It’s a real riot when a guy goes tumbling and thudding down a 300-step flight of stone stairs only to climb back up and do it again. What inspired comedy!
• Write out, in 15 words, why you want to do a survey (and please send this to me, Jeremy.penn@ndsu.edu)
• Identify the theory / theories that guide your work and the construct(s) you want to include in your survey
• Take action, such as reviewing research, to support your use of these constructs
• Carefully define your target population and the sampling frame
• Consider appropriate sampling strategy

Never doubt.
Never fear.
Never overthink.
Next session: Terrify your enemies by writing highly effective survey items

- If you will be using an existing survey, bring it next time
- If you will be creating a new survey, bring the theory you will be using and the construct(s); draft a few sample items for each construct

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sample items</th>
</tr>
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<tbody>
<tr>
<td>Depression (definition = “…..”)</td>
<td>“I feel blue,” “I have trouble getting out of bed”</td>
</tr>
<tr>
<td>Anxiety (definition = “…..”)</td>
<td>“I feel anxious”</td>
</tr>
</tbody>
</table>

If you have questions between now and our next meeting, please feel free to contact me through typical ninja methods (e.g., hiding in my office in the dark and then jumping out and surprising me), or, if you must, at jeremy.penn@ndsu.edu