# Development of a Satisfaction Construct for Usability Evaluation of Questionnaires

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# Survey instrument usability evaluation

Three aspects of survey instrument usability:

- Effectiveness – Completion, accuracy
- Efficiency – Cost, resource consumption (e.g., time)
- Satisfaction – **Subjective feeling about the experience of completing a survey**

Usability Definition:

Extent to which a product can be used by *specified users* to achieve *specified goals* with **effectiveness**, **efficiency** and **satisfaction** in a *specified context of use*.

*(ISO 9241-11)*

# How to measure satisfaction?

- Satisfaction: A latent variable.

- Can only be measured through self-reporting.

- No suitable instruments for measuring satisfaction with survey completion.



The System Usability Scale (SUS)

# Research motivation and approach

1. <u>Motivation:</u> To develop an instrument to adequately measure satisfaction with survey completion

2. <u>Approach:</u>
   A. Develop a survey satisfaction construct from empirical data
   B. Create items of measuring aspects of survey satisfaction, based on the construct
   C. Design an instrument composed of the items
   D. Establish validity and reliability of the instrument

# Research motivation and approach

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# Research questions

Primary question:

- What does "satisfaction with survey" mean to a respondent?

Secondary question:

- Is "satisfaction with survey" (survey-specific satisfaction construct) different from, or the same as, the general feeling of "being satisfied" (general satisfaction construct)?

# 6-question interview

1. Normally, when you say, "I am satisfied with something," what do you actually mean?

2. If "you are NOT satisfied with something," what do you actually mean?

3. After you complete a survey, what would make you to say "I am satisfied with completing this survey?"

4. Based on today's experience, list THREE things that make you feel satisfied with completing this survey?

5. After you complete a survey, what would make you to say "I am dissatisfied with completing this survey?"

6. Based on today's experience, list THREE things that make you feel dissatisfied with completing this survey?

# "General" vs "survey-specific" satisfaction

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# Satisfaction vs Dissatisfaction

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# Data collection

1.  Data were collected from 79 English-speaking adults, who were recruited from residents in the United States as a convenience sample.

2.  Participants could read and comprehend survey questions.

3.  The 6-question interview was conducted in-person immediately following the individual's participation in usability testing of an online survey instrument.

4.  Oral responses to the six questions were recorded verbatim.

# Phase 1: Thematic analysis

Two researchers independently analyzed data, with a third researcher serving as an arbiter for reconciling differences.

"Satisfaction phrase" abstraction

Phrases classification

Classification reconciliation

Final classification

# Step 1: "Satisfaction phrase" abstraction

Identify phrases in responses to 6 questions that reflect respondent's feeling of satisfaction/dissatisfaction.

> Q3: *After you complete a survey, what would make you to say "I am satisfied with completing this survey?"*
> R1: Easy and painless to get through
> R2:  A survey looks like a good use of time and serves a useful purpose.
> R3: The survey was not a frustrating experience.

|         | Q1  | Q2  | Q3  | Q4  | Q5  | Q6 | Total |
|---------|-----|-----|-----|-----|-----|----|-------|
| Phrases | 132 | 113 | 118 | 103 | 136 | 68 | 670   |

**222 unique phrases**

# Steps 2-4: Phrase classification and reconciliation

**Researcher-1 classification:**
- State of Person
- General feeling about experience
- Quality of task performance
- Effort of task performance

**Researcher-2 classification:**
- Emotion (positive or negative)
- Neutral experience
- Positive comment
- Ability/effort to complete task

**Final classification:**
- ❖ **Affection -** Emotion generated from completing a survey (e.g., not a frustrating experience)
- ❖ **Cognition -** Rational assessment of completing a survey (e.g., a useful purpose)
- ❖ **Process -** Experiences in completing a survey (e.g., easy, painless)

# Distribution of phrases across themes by questions

| Theme | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Total |
|-------|----|----|----|----|----|----|-------|
| Affection | 37 | 31 | 5 | 1 | 2 | 0 | 76 |
| Cognition | 47 | 30 | 36 | 27 | 30 | 1 | 171 |
| Process | 48 | 52 | 77 | 75 | 104 | 67 | 423 |

Percent phrase distribution
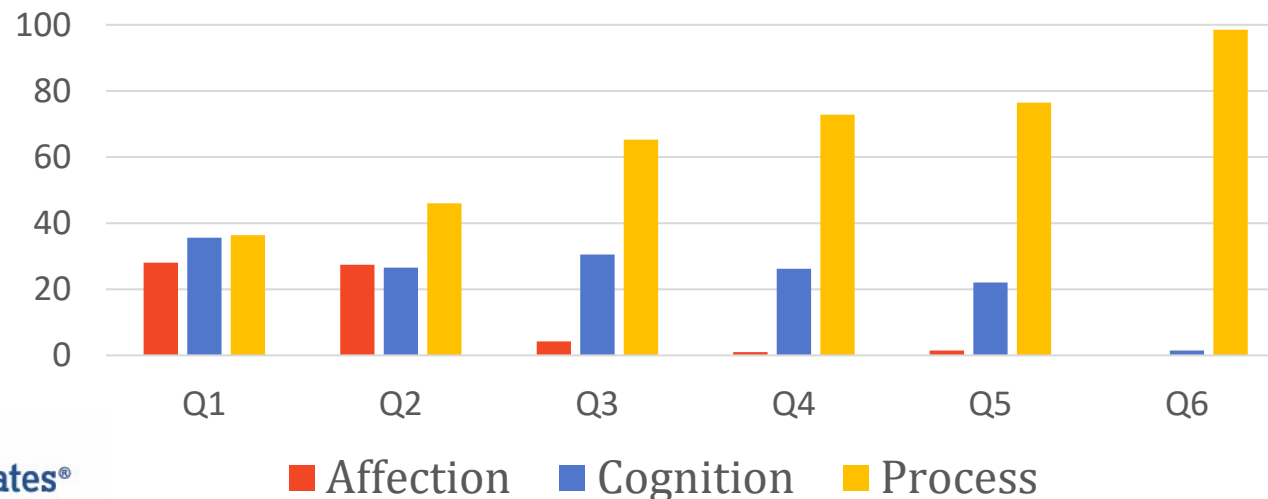


Q1: General satisfaction

Q2: General dissatisfaction

Q3: Survey satisfaction

Q4: Survey satisfaction examples

Q5: Survey dissatisfaction

Q6: Survey dissatisfaction examples

# Phase 2: Quantitative assessment of theme distributions

Does the distribution of phrases across the three themes (Affection, Cognition, Process) differ between general and survey-specific satisfaction?

Methods:

- Multinomial logistic regression modeling
- Hypotheses:
    1. **Similar distributions** between *general* satisfaction and dissatisfaction
    2. **Similar distributions** between *survey* satisfaction and dissatisfaction
    3. **Different distributions** between *general* satisfaction/dissatisfaction and *survey* satisfaction/dissatisfaction

# Similar phrase distribution between satisfaction and dissatisfaction

## *General* satisfaction vs *General* dissatisfaction: **No significant differences**

n = 245

| Theme | Odds Ratio | 95% CI | Wald Statistic | p |
|---|---|---|---|---|
| Affection vs Cognition | 1.313 | [0.677, 2.543] | 0.6497 | .4202 |
| Cognition vs Process | 0.589 | [0.393, 1.476] | 2.9556 | .4202 |
| Process vs Affection | 0.773 | [0.417, 1.434] | 0.6646 | .4149 |

## *Survey* satisfaction vs *Survey* dissatisfaction: **No significant differences**

n = 255

| Theme | Odds Ratio | 95% CI | Wald Statistic | p |
|---|---|---|---|---|
| Affection vs Cognition | 0.465 | [0.084, 2.565] | 0.7735 | .379 |
| Cognition vs Process | 0.638 | [0.363, 1.120] | 2.4517 | .117 |
| Process vs Affection | 0.296 | [0.056, 1.567] | 2.0492 | .152 |

# Different phrase distribution between general satisfaction and survey satisfaction

*General* vs *Survey:* **Significantly different**

n = 500

| Theme | Odds Ratio | 95% CI | Wald Statistic | p |
|---|---|---|---|---|
| Affection vs Cognition | 0.118 | [0.051, 0.275] | 24.5622 | <.0001 |
| Cognition vs Process | 0.481 | [0.320, 0.723] | 12.3503 | < 0.001 |
| Process vs Affection | 0.057 | [0.025, 0.129] | 47.4880 | <.0001 |

# Summary

1. A **bottom-up approach** to constructing a construct of survey satisfaction

2. The survey satisfaction construct consists of three components: **Affection, Cognition,** and **Process**

3. The survey satisfaction construct and the general satisfaction construct share the same components, but have **different weight** on each component.

# Next steps

1. Develop survey satisfaction instrument items
2. Compose an instrument for measuring survey satisfaction
3. Establish validity and reliability of the instrument

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