October 31 - November 2, 2023 | Orlando, FL

Hosted by OUC

UtilityAnalytics® WEEK

Smart Scale Construction

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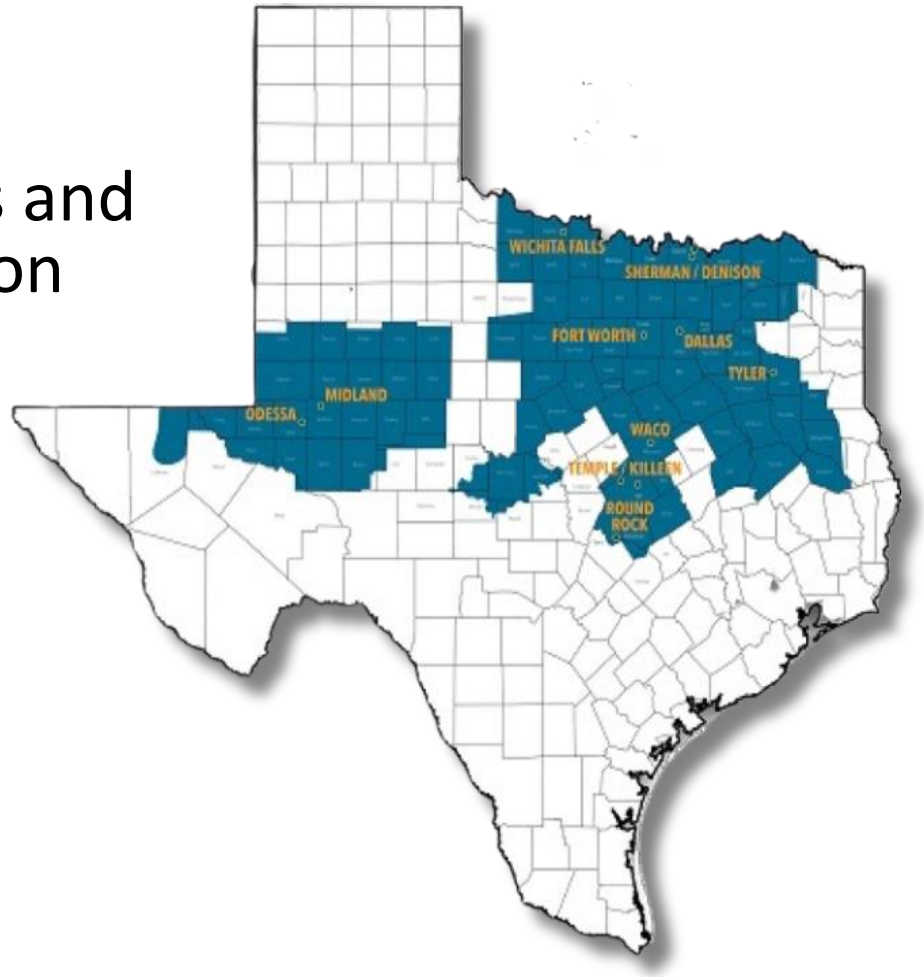
Unlock the Universal Power of Data

#UtilityAnalytics #UAWeek

Who are we?

The largest electric delivery company in Texas and one of the largest transmission and distribution companies in the nation

13+ Million Texans	$28B Total Assets	
Proudly serves 408 communities 98 counties	141,000+ miles of transmission and distribution lines	~3.9M Advanced Meters (2% Annual Growth)
4,100 Employees	Texas: 20% Wind Generation (32,000 MW)	85,000 MW ERCOT Peak Demand



Goals of Smart Scale Construction

1

- We want to **accurately and precisely** measure customer attitudes for statistical tracking and modeling.

2

- We want to capture the **full breadth** of customer attitudes so that we can respond to changes.

3

- We want decision makers to **trust** the metrics we report.

Why Should We Care About Scale Construction?

- **Scale construction affects how survey takers respond.**
  - People are more likely to agree with positive statements than with negative ones
  - People are more likely to choose extreme responses when there are fewer response options
- **Scale construction determines the types of analytical options at our disposal.**
  - Likert-type scales, most common in our field, are at the ordinal level: categorical (non-numeric) and ordered
  - They are not at the interval level: The difference between 1 and 2 equals the difference between 2 and 3, but we can't assume that the difference between *Strongly disagree* and *Somewhat disagree* equals the difference between *Somewhat disagree* and *Neutral*
  - **We can't:**
    - Take the mean of non-interval data
    - Use non-interval data as interval data in mean-based statistical models (e.g., linear regression)
  - **We can:**
    - Aggregate non-interval scale categories and report as percentages (e.g., top-box scoring)
    - Use models that don't assume data is at the interval level (e.g., ANOVA, logistic regression)

Research Community

Oncor's Energy Collaborative Community provides an online forum for Residential and Small-Medium Business (SMB) customers to share ideas and complete research activities.

Key Characteristics

- Representation of Oncor's service area
- Managed research and forum discussions
- Monthly community engagements
- Rewards program for participants
- Various research methods

Research Questions & Design

- **Two main questions:**
  - Should we use larger scales (0-100) or smaller scales (0-10)?
  - Should we measure sentiment on a bipolar scale (positive to negative) or as two independent items for positive and negative sentiment?
- **Design**
  - 277 participants from our Energy Collaborative Community
  - Asked participants to think of their most recent customer service experience with Oncor and respond to items

Customer Satisfaction (CSat)*	Customer Effort Score (CES)	Service Relative to Expectations	Meeting Needs	Sentiment	Service Quality

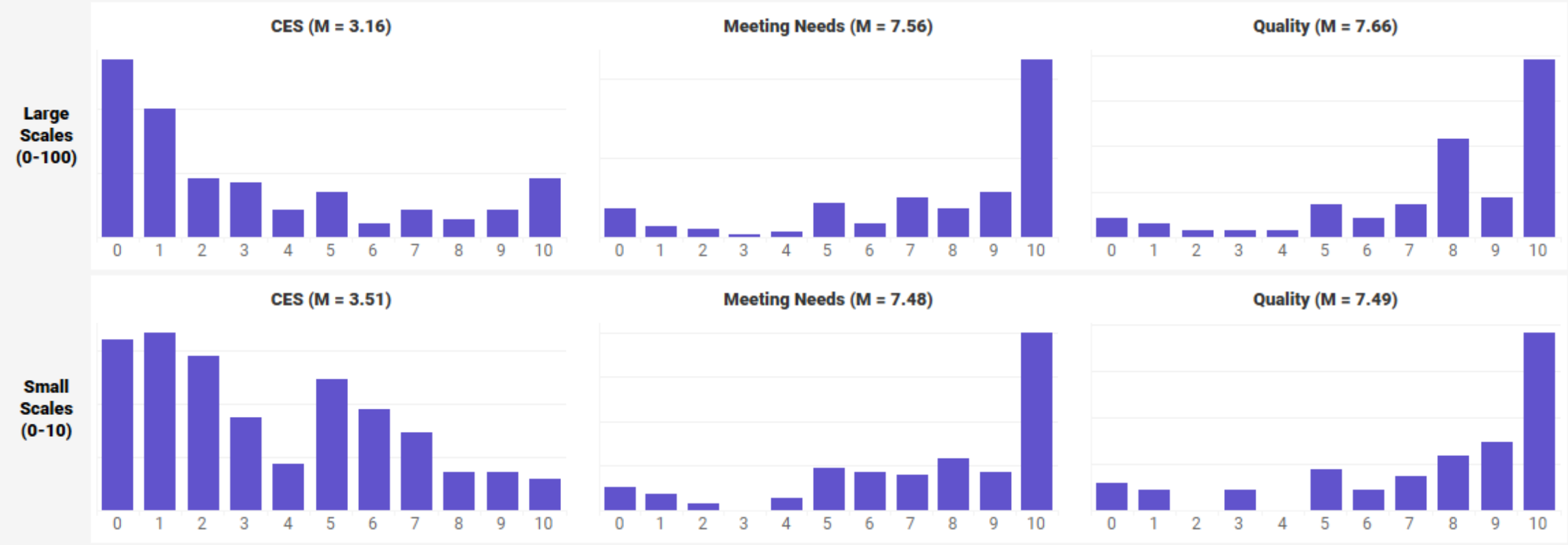
* CSat was measured on a 5-point Likert-type scale in order to be consistent with years of data collection on that existing metric.

Evaluation Approach

- **How are items distributed?**
  - Closer to bell curve is better
  - Observed sparseness, clustering around extreme values, skewness, and kurtosis
- **How do the means compare when scales are standardized?**
  - For sentiment, if positive and negative affect are highly correlated, can treat it as single item (bipolar scale)
  - For testing scale size, if mean differences based on scale size aren't statistically significant, we can assume scales are functionally similar
- **How well do the items predict overall satisfaction?**
  - Used logistic regression to predict CSat
  - Looked for higher effect size, greater variance explained (R^2), and lower AIC (model parsimony)
- **What did respondents say about the scales?**

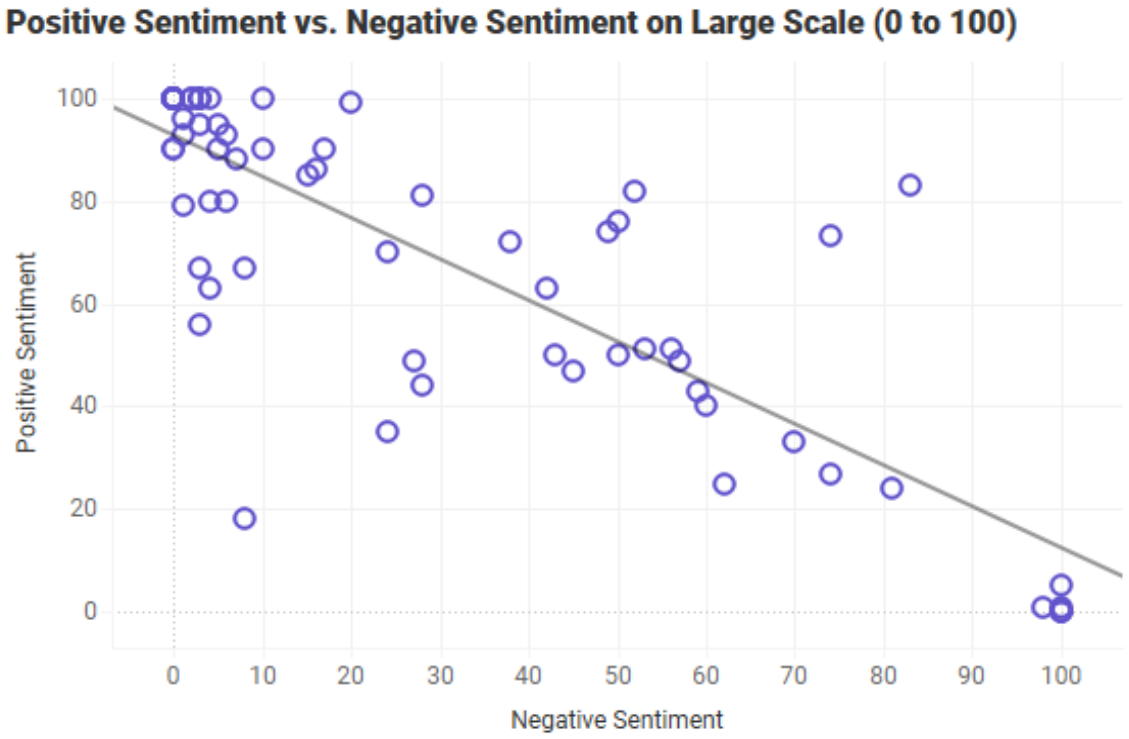
Results: Scale Size

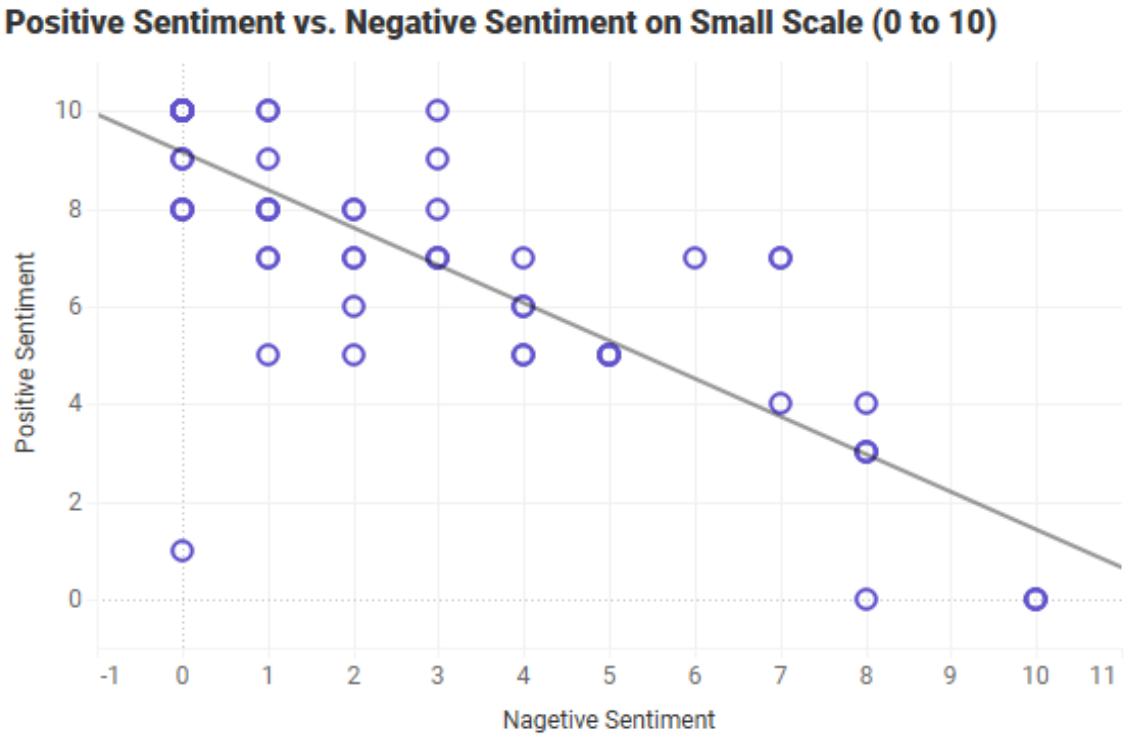
- Scale size not significantly associated with response mean for any items
- Similar shapes, but slightly fewer extreme values on **smaller scales**
- Larger effect sizes for logistic regression models predicting CSat when using **small scales**
- **Conclusion:** Smaller scales preferred



Results: Sentiment

- Correlations between positive and negative sentiment were -.82 to -.83
- No significant difference between positive and reverse-coded negative sentiment
- **Conclusion:** Positive and negative sentiment regarding the customer experience are dependent, meaning we can use the bipolar scale





Respondent Feedback

76% of 111 respondents who gave open-ended feedback said there was nothing confusing about the scales

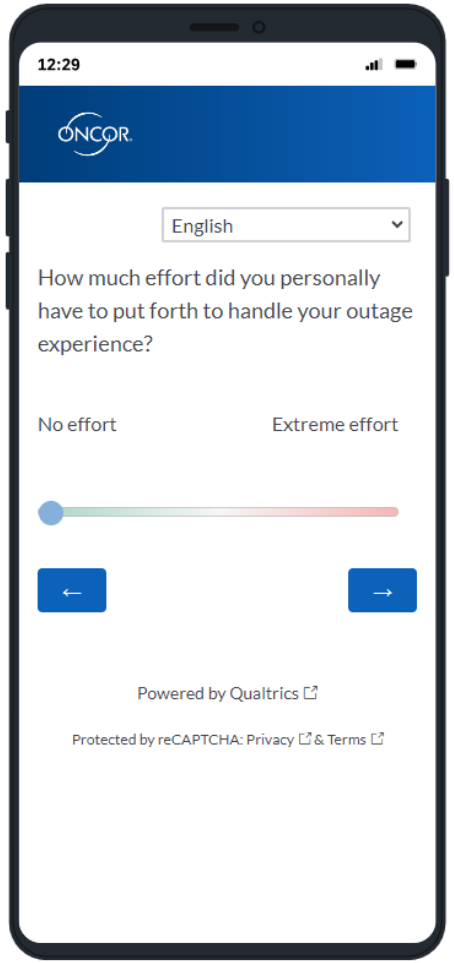
Too Much Choice

A few mentioned that the 0-to-100 scales were overwhelming

Scale Consistency

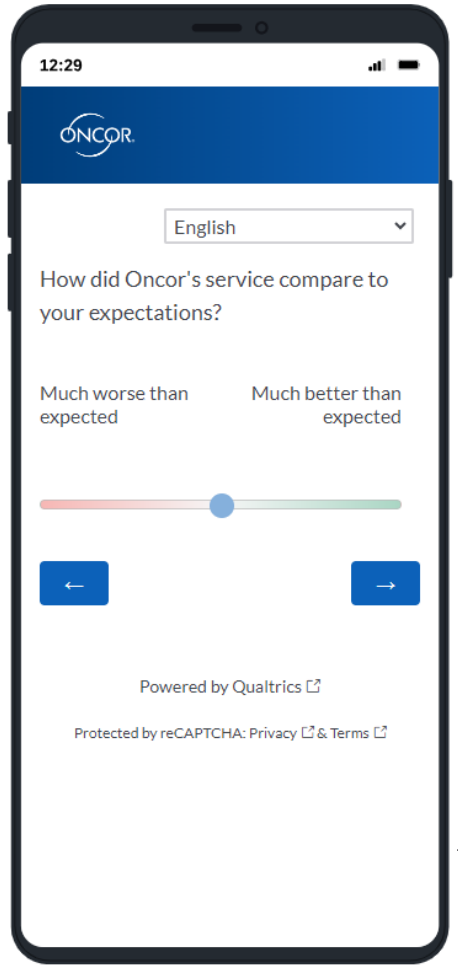
A few others mentioned that having some scales go from negative values to positive ones was confusing when most of the scales began at 0

How We Used the Research



Emphasize visual cues over text

Starting point of slider is at the neutral or non-existence point



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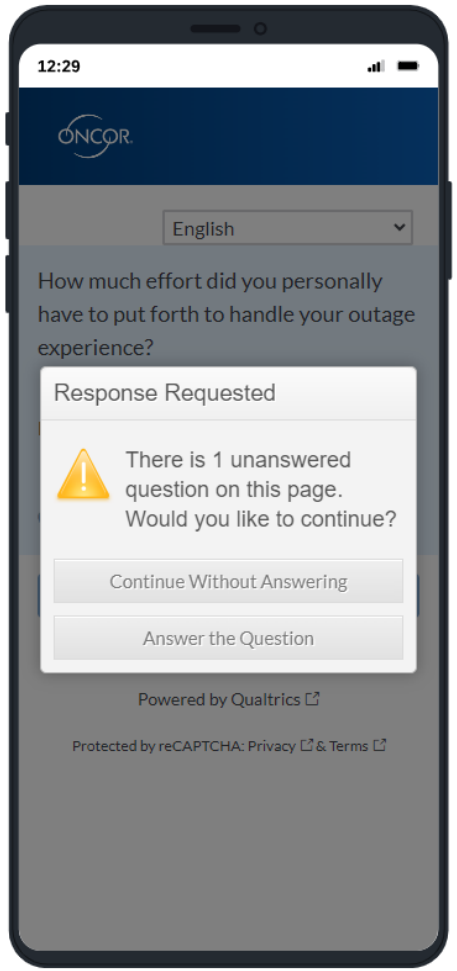
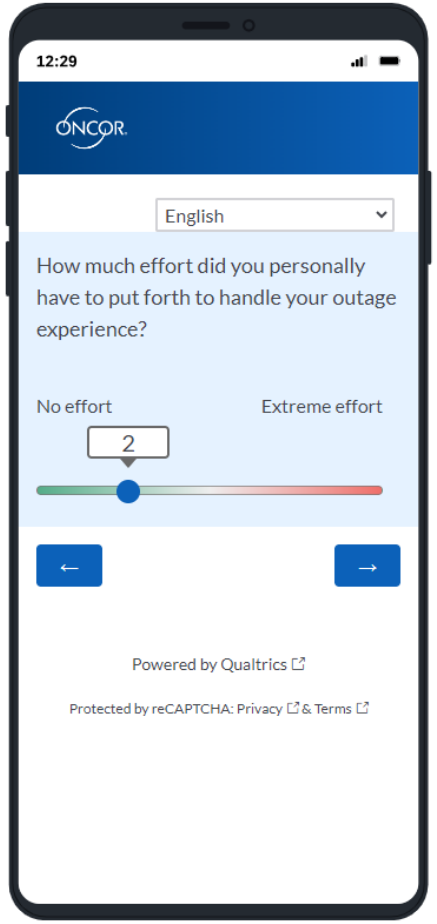
How We Used the Research



Request responses when no option selected

We show the number as respondent drags slider



Takeaways for Customer Survey Building

- **Make room for the full breadth of opinions**
  - Consider how much nuance there is likely to be regarding the concept measured
  - Having too few response options can lead to imprecise data that may not meet your analytical needs
  - Having too many response options can overwhelm respondents and result in more extreme responses
- **Differentiate amounts from polar opposites**
  - Try to use scales from zero on up when measuring an amount of something, such as effort, where zero represents *no effort* and 10 (or 7!) represents *max effort*
  - Try to use scales from -10 to 10 (or -5 to 5!) when measuring polar opposites, such as positive vs. negative sentiment, but make sure the poles are exact opposites
- **Rigorously focus on how customers interact with your survey**
  - Design for mobile-first survey taking
  - Make the scales as intuitive as possible
  - Bonus: Never add a survey question for data you can get from your operational metrics

Questions