CASE STUDY · HEALTHCARE SURVEY RESEARCH

Which words calm patients before an injection?

Statistical analysis of a patient-reassurance survey for a US physician-led research team.

SAMPLE	DESIGN	TIMELINE	TOOLS
851 US adults, online panel	12 statements, 4 framing strategies, randomized order	About 4 weeks, March to April 2026	R: lme4, emmeans, rstatix, ggplot2

THE CHALLENGE

Many patients feel anxious right before an injection, and the words a clinician chooses in that moment may matter. The research team surveyed 851 US adults, who rated 12 short reassurance phrases on a 5-point scale, picked the single most reassuring phrase and reported their own injection anxiety.

The phrases covered four framing strategies: time-framing, naming the sensation, the sensation plus a completion cue, and the sensation plus a simile. The brief was a list of open questions: which phrases and strategies reassure most, whether the differences are statistically significant, and how results vary by anxiety level, gender, age, region, income and device type.

MY APPROACH

01 **Analysis plan.** Translated the open questions into a pre-specified statistical analysis plan with defined outcomes, groupings (anxious vs. non-anxious) and correction for multiple testing.

02 **Non-parametric core.** Likert ratings are ordinal and repeated within each person. Statements and strategies were therefore compared with Friedman tests and Bonferroni-corrected Wilcoxon signed-rank tests, subgroups with Kruskal-Wallis tests.

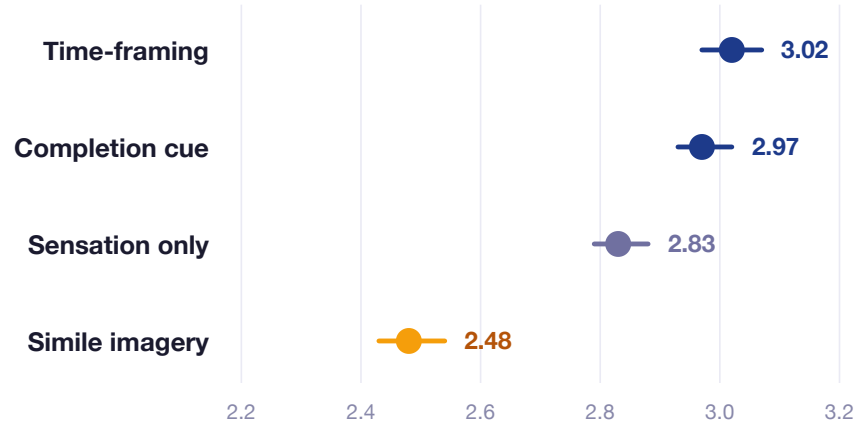
03 **Multivariate model.** A linear mixed-effects model with a random intercept per respondent (10,212 ratings) estimated the effect of framing while controlling for anxiety and demographics. Likelihood-ratio tests checked for interactions.

04 **Validation.** Rating-based rankings were cross-checked against respondents' single-choice picks, and key results were confirmed by both the non-parametric and the model-based approach.

KEY FINDINGS

MEAN REASSURANCE BY FRAMING STRATEGY

1 = not at all, 5 = extremely reassuring · dot = mean, line = 95% CI · N = 851



- **Time-framing and completion cues reassured most** (M = 3.02 and 2.97). Differences between strategies were highly significant (Friedman $\chi^2(3) = 321.6$, $p < .001$); the two leading strategies did not differ from each other.
- **Simile-based imagery backfired.** It ranked last and lowered reassurance for all three base statements, by up to 0.66 scale points ($p < .001$).
- **Completion cues helped.** Adding "then it's done" raised reassurance for two of three base statements.
- **One guideline fits all.** The ranking of strategies was the same for anxious and non-anxious respondents (no interaction in the mixed model).
- **Demographics mattered for overall responsiveness,** most strongly household income and age.

DELIVERABLES

- 28-page statistical report (Word + PDF) with executive summary, 11 figures and 10 tables
- Supplementary analyses answering the team's follow-up questions
- Reproducible, fully commented R script covering every table and figure

OUTCOME

The practical message was simple: tell patients how briefly it will last and when it is over, and avoid comparisons. The client returned for a larger replication study (N = 1,000, 18 statements, six strategies), which confirmed the pattern, and later for a separate longitudinal study.

Client details and exact survey wording are withheld for confidentiality.