Turas Confidence

Transparent. Trustworthy. Tangible insights.

Quantifies how reliable your estimates are—margin of error, credibility intervals, sample quality. Calculates precision estimates around survey percentages and means, telling you exactly how much you can trust your numbers.

What This Module Does

Every survey estimate has uncertainty. When you report "65% prefer Brand A," the true population value might be 61-69%. Confidence provides rigorous interval estimates using multiple methods—so you know the precision of every number you report.

The module supports four methods for proportions (Normal approximation, Wilson score, Bootstrap, Bayesian credibility) and three for means (t-distribution, Bootstrap, Bayesian). This flexibility lets you choose the right approach for your sample type and reporting needs.

What You Get

Interval Methods for Proportions

- **Normal approximation (MOE):** Classic margin of error—simple, widely recognized
- **Wilson score (recommended):** Statistically superior, never produces impossible values
- **Bootstrap percentile:** Resampling-based, works for any statistic
- **Bayesian credibility:** Incorporates prior information, probability-based interpretation

Key Outputs

- **Confidence/credibility intervals:** Lower and upper bounds at your chosen level (90%, 95%, 99%)
- **Effective sample size:** DEFF and n_eff for weighted data
- **Method comparison:** Run multiple methods to validate results

How It Works

Wilson Score (Recommended Default)

Adjusts the interval calculation to avoid impossible values (negative percentages or >100%). Produces asymmetric intervals near extremes—which is statistically correct. Recommended by professional statisticians for all sample sizes.

Bootstrap (Resampling)

Treats your sample as a mini-population, resamples 5,000 times with replacement, calculates the statistic each time, and takes the 2.5th and 97.5th percentiles. Shows sampling variability without distributional assumptions.

Bayesian Credibility

Uses prior information (from previous waves or uninformed defaults) combined with current data. Interpretation: "There's a 95% probability the true value lies in this interval." Useful for tracking studies with historical data.

Technology Used

All packages are peer-reviewed, open-source R packages available on CRAN.

Package	Why We Use It

Base R stats	Core statistical functions (qnorm, qt, qbeta)—universally validated
future / future.apply	Parallel processing for computationally intensive bootstrap
openxlsx	Professional Excel output

Strengths

- ✓ **Multiple methods:** Four approaches for proportions, three for means—choose what fits
- ✓ **Theoretically sound:** Uses established methods with known statistical properties
- ✓ **Transparent assumptions:** Clear about when traditional CIs are valid vs. descriptive intervals
- ✓ **Weighted data support:** Properly accounts for design effects and weighting efficiency
- ✓ **Bayesian option:** Credibility intervals with uninformed or informed priors
- ✓ **Efficient processing:** Parallel bootstrap for large batch calculations

Limitations

- ⚠ **Cannot fix bad samples:** No interval method can correct selection bias in non-random samples
- ⚠ **Requires honest assessment:** Users must know if they have random or non-random samples
- ⚠ **Prior specification:** Bayesian methods require thoughtful prior selection
- ⚠ **Computational time:** Bootstrap can take several seconds for large datasets

Sample Size Requirements

For reliable intervals: n≥30 for means, n≥100 for proportions near 50%, larger for extreme proportions. Small subgroups (n<30) will have wide intervals—flag as "interpret with caution." Note that margin of Error calculations are not appropriate for non-random samples and should be applied with caution.

Best Use Cases

Ideal For

- ✓ Random samples needing defensible confidence intervals
- ✓ Non-random samples where you want to show sampling precision (with caveats)
- ✓ Tracking studies using previous waves as Bayesian priors
- ✓ Weighted surveys needing proper effective n adjustment

Not Ideal For

- ⚠ Claiming precision from biased samples without caveats
- ⚠ Complex multivariate estimates
- ⚠ Real-time streaming data (this is batch-oriented)

Key Takeaways

- ✓ Wilson score is the recommended default for proportions—statistically superior to MOE
- ✓ For random samples, confidence intervals have statistical guarantees
- ✓ For non-random samples, intervals show sampling variability only—caveat selection bias
- ✓ Bootstrap validates parametric methods without distributional assumptions
- ✓ Weighting reduces effective sample size—always report n_eff for weighted data

The Bottom Line

Precision is not accuracy. You can have very precise estimates of a biased sample. Turas Confidence calculates the right interval for your data—but you must honestly assess whether you have a random sample. The module provides multiple methods so you can choose what's appropriate, with transparent reporting of assumptions and limitations. No false precision, no hidden caveats.

About The Research LampPost

Turas is developed and delivered by **The Research LampPost**, an organisational member of the Southern African Marketing Research Association (SAMRA). Duncan Brett is a SAMRA accredited researcher with 30+ years of market research experience. If you have questions about whether Turas is right for your project, if there is interest in the statistical documentation or module-specific information, or you would like a copy of our credentials, please get in touch at duncan@researchlamppost.co.za

Ready to discuss your project?

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