Experimental Groups, Hybrid Constellation Consulting Experiment Study

David Boje with David Trafimow Oct. 31, 2026, Session at Lake Caballo, New Mexico

Constellation Therapy Experimental Design		
Experimental Conditions	**Pretest**	**Posttest**
Group A: AI Only Group B: Psychotherapist Only Group C: Hybrid of AI & Psychotherapist Group D: Control	Before the Experiment Conditions (a) subjects fill out 15-minute Vujade™ Survey on-line, (b) Subjective well-being, (c) Negative & Positive Affect Scale, (d) Optimism Scale (e) Depression Scale	After the Experiment Conditions (a) subjects fill out 15-minute Vujade™ Survey on-line, (b) Subjective well-being, (c) Negative & Positive Affect Scale, (d) Optimism Scale (e) Depression Scale

Halloween meeting with David Trafimow and David Boje at Lake Caballo

David Trafimow agrees to act as advisor to the study. David T. stressed:

- Every time we add a condition, we must increase sample size.
- We can apply KISS and only put in a condition (group) if it is super important.
- At the get-go, specify why we want to do the study in the first place.
    a. To use David Trafimow statistical methodology, instead of MANOVA, with its p-values.
- And specify what we want to measure.
    a. **Main Hypothesis**: Since Constellation Therapy is high on visual materials , then we expect a higher probability that subject with higher Vujade (https://Vujade.ai) visual, than kinesthetic and or/auditory will score higher in Subjective well-being, Positive Affect, Optimism, and low on depression scales.
- Assume that your measures have a skew normal distribution, rather than a normal one. A **skew-normal distribution** is a continuous probability distribution that extends the classic normal (bell-shaped) curve by adding an extra shape parameter—usually called α (alpha)—that allows the curve to lean or tilt to the left or right.

Key Differences: Normal vs. Skew-Normal

Feature	Standard Normal Distribution	Skew-Normal Distribution
Symmetry	Perfectly symmetric (mirror image on both sides).	Asymmetric (one side has an elongated tail).
Shape Parameter (α)	Does not exist (equivalent to α = 0).	Controlled by α: • α = 0 → Normal distribution • α > 0 → Right (positive) skew (longer tail on the right) • α < 0 → Left (negative) skew (longer tail on the left)
Mean, Median, and Mode	All fall at the exact same center point.	Separate from one another depending on the direction and strength of the skew.
Skewness Value	Always 0.	Non-zero (positive or negative).

How It Works Mathematically

The probability density function of a skew-normal distribution multiplies the standard normal bell curve by a shaping factor based on the error function or cumulative distribution function.

- When α = 0, that extra shaping factor simplifies to 0.5, and the curve collapses back into a normal distribution.
- As the absolute value of α grows larger, the lean and the tail become more pronounced.

Why Use a Skew-Normal Distribution?

- **Real-World Data:** Most real-world data (such as income distribution, reaction times, or test scores) is rarely perfectly symmetrical.
- **Flexibility:** It lets statisticians model data that looks "mostly" normal (bell-shaped with a single peak), but has a lean to it, without having to switch to a completely different type of distribution (like a log-normal or gamma distribution).
- **Modeling:** You can implement and fit skew-normal curves using statistical tools like Python's `scipy.stats.skewnorm`

We assume that there is likely skew normal distribution in our pre- and post-test measures:

(a) Vujade™ Survey,
(b) Subjective well-being,
(c) Negative & Positive Affect Scale,
(d) Optimism Scale
(e) Depression Scale

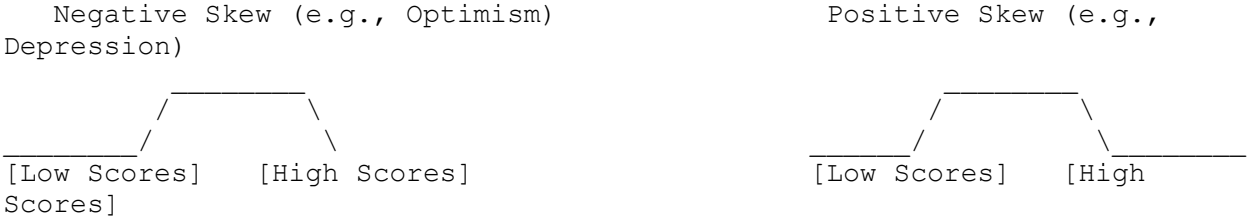
- **Subjective Well-Being (SWB): A person's self-evaluation of their life, combining cognitive judgments of life satisfaction with emotional balances.** It is traditionally framed as three interconnected pillars: high positive affect, low negative affect, and a high subjective rating of overall life satisfaction.

- **Positive & Negative Affect Scale (PANAS):** A self-report questionnaire designed to measure two distinct, independent dimensions of mood. Positive Affect (PA) tracks how enthusiastic, active, and alert a person feels. Negative Affect (NA) gauges subjective distress and unpleasurable states like anger, guilt, and fear.
- **Optimism Scale:** Commonly operationalized via tools like the Life Orientation Test-Revised (LOT-R), these measures generalized outcome expectancies. It quantifies whether an individual intrinsically expects positive or negative outcomes in their future.
- **Depression Scale:** Clinical and screening tools (such as the PHQ-9 or BDI) designed to quantify the severity of depressive symptoms. They track components like persistent low mood, anhedonia, fatigue, and cognitive distortions over a specific window of time.

Are there Skew-Normal Distribution Likelihoods?

Yes, skew-normal distribution likelihoods are highly applicable and increasingly utilized for these specific psychological scales.

While traditional psychometrics historically relied on the assumption of a symmetric normal (bell-curve) distribution for statistical convenience, real-world data from these scales routinely violate normality.



1. Why the Data is Inherently Skewed

The psychological constructs you listed exhibit structural boundaries and natural ceiling or floor effects based on the population being sampled:

- **Depression & Negative Affect Scales:** In a general, non-clinical population, the vast majority of people score very low on these scales. This creates a severe floor effect, resulting in a **positively skewed (right-skewed)** distribution where a long tail extends toward high severity.
- **Optimism & Subjective Well-Being Scales:** Conversely, general populations often display a "positivity bias" or high baseline well-being. Scores cluster heavily at the upper end of the scale, creating a **negatively skewed (left-skewed)** distribution with a tail dragging out toward very low scores.

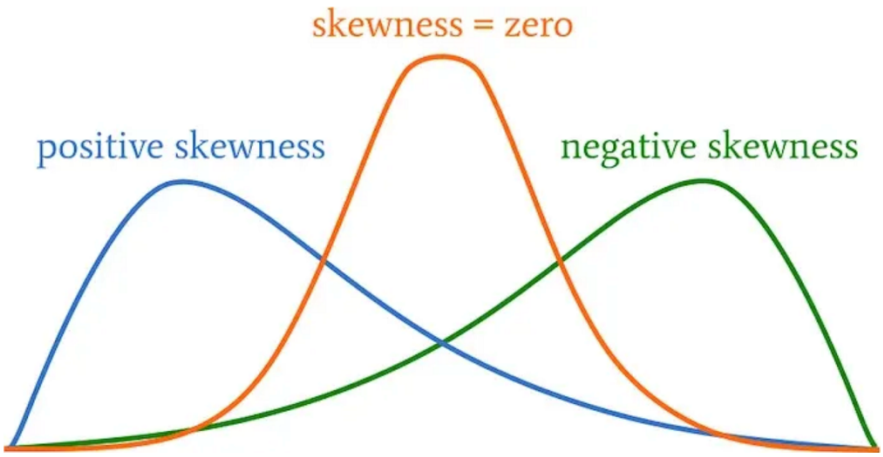
2. The Role of Skew-Normal Likelihoods

The **Skew-Normal (SN) distribution**—originally introduced by statistician Adelchi Azzalini—adds a dedicated shape parameter (α) to the standard location (ξ) and scale (ω) parameters.

When analyzing or modeling relationships between these variables (for instance, evaluating if higher Subjective Well-Being predicts a faster drop in Depression scores over time), researchers use **Maximum Likelihood Estimation (MLE)** or **Bayesian estimation** based on skew-normal likelihood functions.

Using a skew-normal likelihood provides key advantages over traditional methods:

- **Preserves Inferential Power:** Unlike mathematical data transformations (e.g., taking the log or Box-Cox transformation of a depression score), a skew-normal likelihood allows researchers to model the data directly on its original, interpretable scale.
- **Reduces Error Rates:** Treating inherently skewed scale data as symmetric standard-normal introduces severe biases, inflating both Type I (false positive) and Type II (false negative) error rates.



References

Subjective Well-Being (SWB)

- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*(1), 71–75. doi.org

Positive & Negative Affect Scale (PANAS)

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Optimism Scale (LOT-R)

- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, *67*(6), 1063–1078. https://doi.org/10.1037/0022-3514.67.6.1063

Depression Scale (PHQ-9 / BDI)

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- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-II*. Psychological Corporation.

David Trafimow (Skew-Normal Approach & Precision Metrics)

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David Trafimow provided estimates of sample size.

The decision on sample size, begins with the experimenters. What Confidence Level do we want. I am happy with 90% with .1 precision. With four condition groups, that means 212 people, randomly assigned.

Assume shapes = .1, assume scales = 2 and 1, vary precision and confidence in table.

			n	each group						N	4 groups	
Precision	Confidence	0.8	0.85	0.9	0.95		Precision	Confidence	0.8	0.85	0.9	0.95
0.1		43	47	53	61		0.1		172	188	212	244
0.15		30	34	38	44		0.15		120	136	152	176
0.2		23	25	29	35		0.2		92	100	116	140