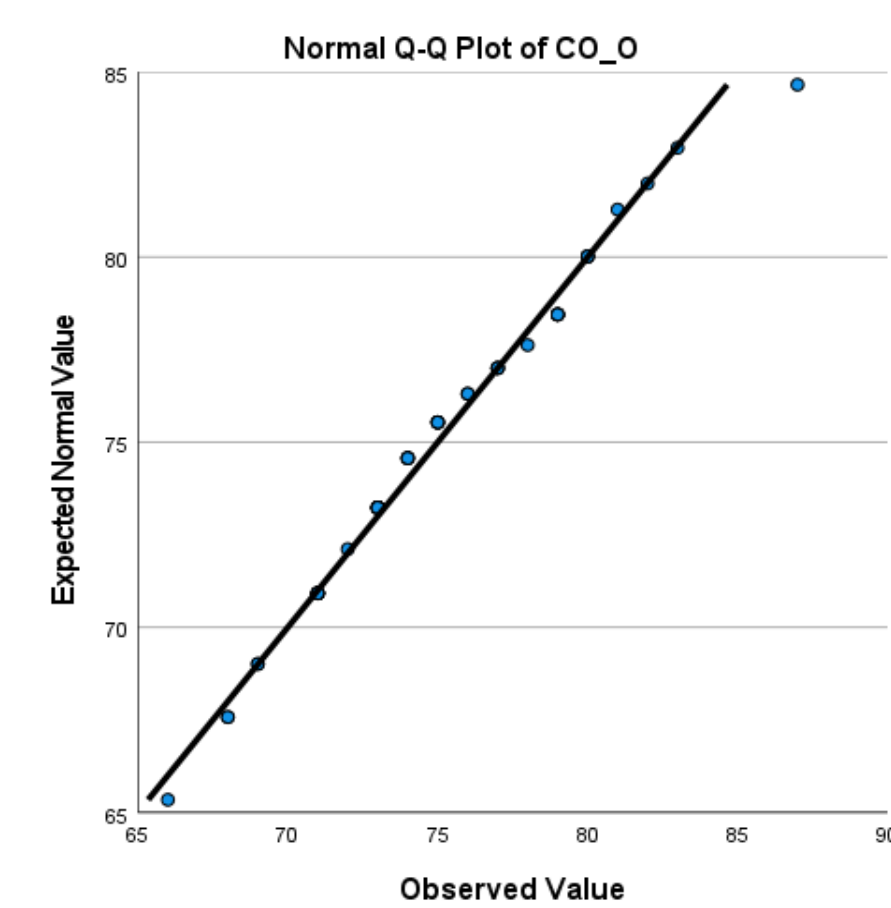
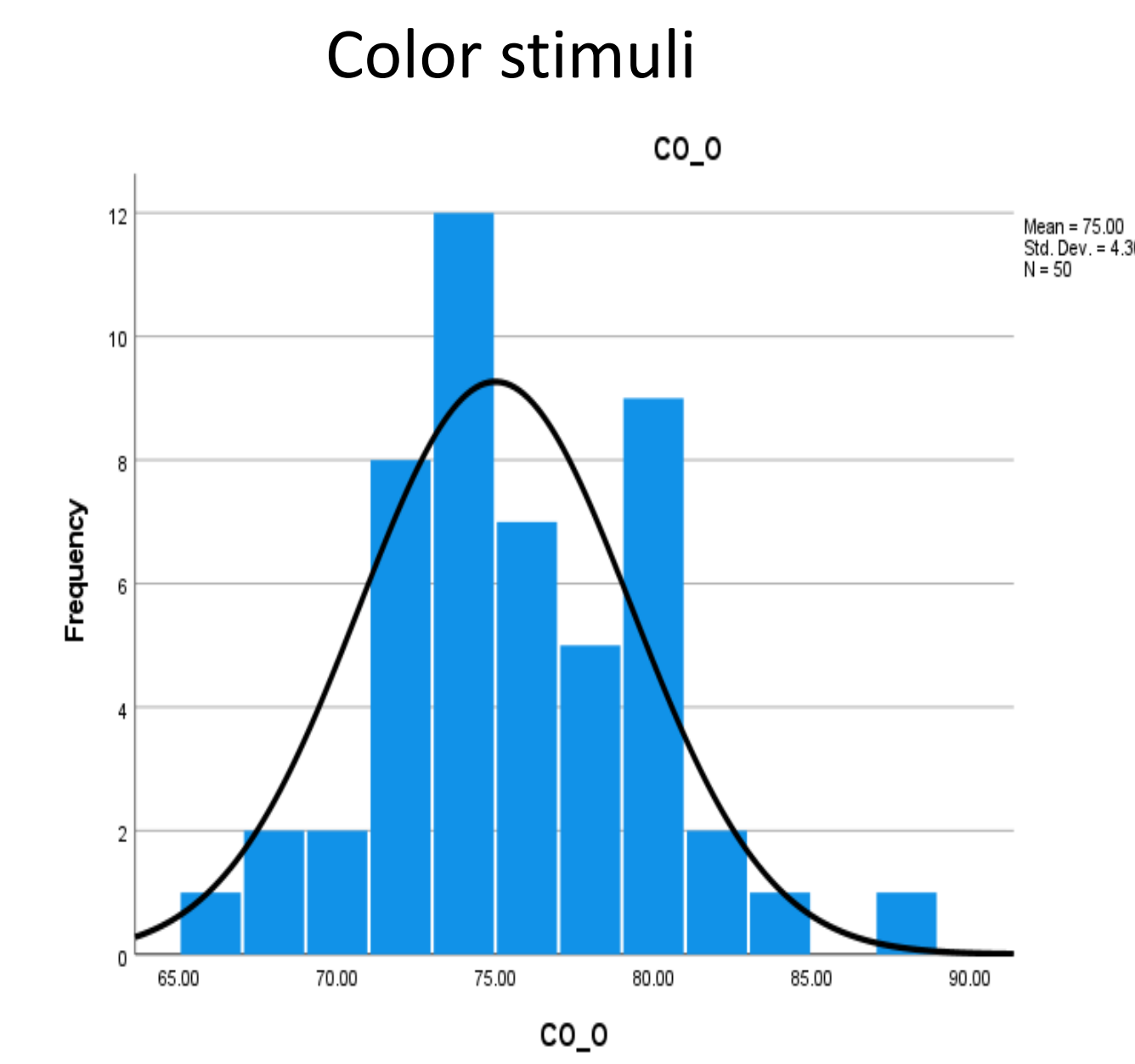


## Introduction:

- Perceptual Organization (PO) is a mid-level cognition skill that organizes and transforms unprocessed perceptual information into meaningful representations.
- The PO threshold task by Kurylo et al. (2017) examines perceptual grouping abilities based on similarities in color, gabor, and luminance under various degrees of noise/disorganization.
- Due to the pandemic and consequent restriction of in-person assessments, we developed and tested the online implementation of the PO task.
- The online format has longer stimulus presentation times in order to accommodate for possible network transmission delay.
- We compared the data collected following the online format and the previous data collected in-person.
- We hypothesized that similar with the in-person data, the online data would follow normal distributions. The variance of four output threshold levels for each participant would not be significantly different for the two formats. The online format would have significantly lower threshold level.

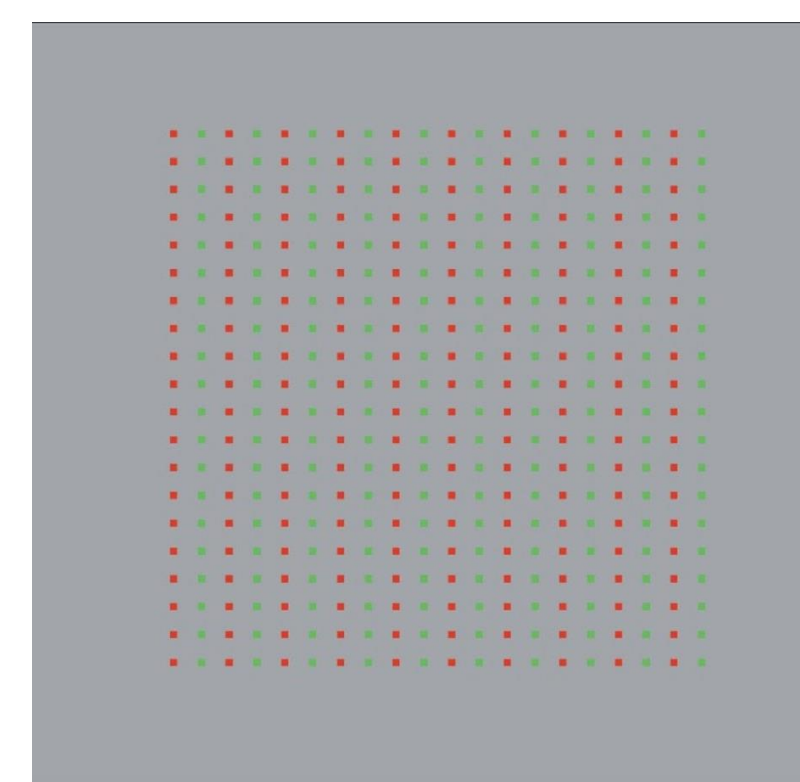
## Methods:

- $n = 50$  (18 males; Mean age: 23.58 yrs). All participants had normal/corrected vision, with no history of visual deficits
- The test administrator shared their screen through Zoom and enabled participants to control the PO tasks remotely on their computers. Participants were presented with a grid of dots that can be perceptually organized as either a vertical or horizontal pattern, to which they indicated through keyboard inputs. Participants responded by pressing keys to indicate stimulus orientation.
- In each stimulus condition, the task began with a perfect organization (i.e., 100% threshold level). The stimuli increased the level of disorganization by 2% after the participant made two consecutive correct responses (more difficult). The stimuli decreased the level of disorganization by 6% after the participant made one incorrect response (i.e., reversal). After each reversal, the program recorded the last level of disorganization that was correct and produced an output of a threshold level. After four reversals, the program automatically stopped and produced four threshold levels.
- The threshold level is the percentage of dots conforming to the organization, with a lower threshold level being less organized; hence better performance.
- We collected the mean and variance of the four threshold levels for each participant and compared them with the corresponding in-person data.

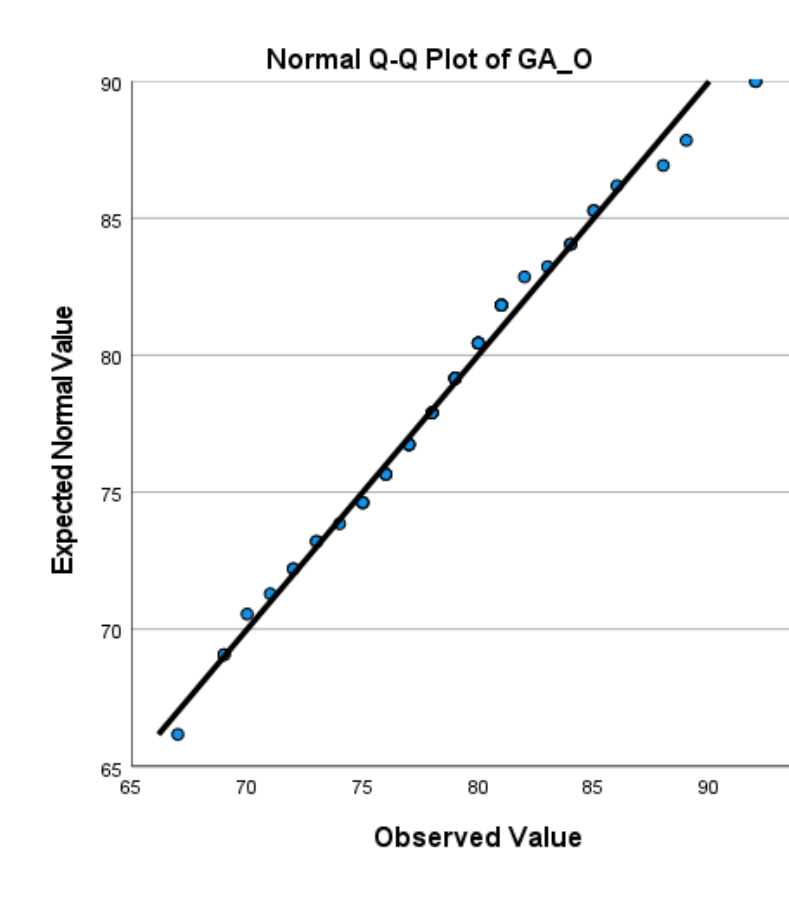
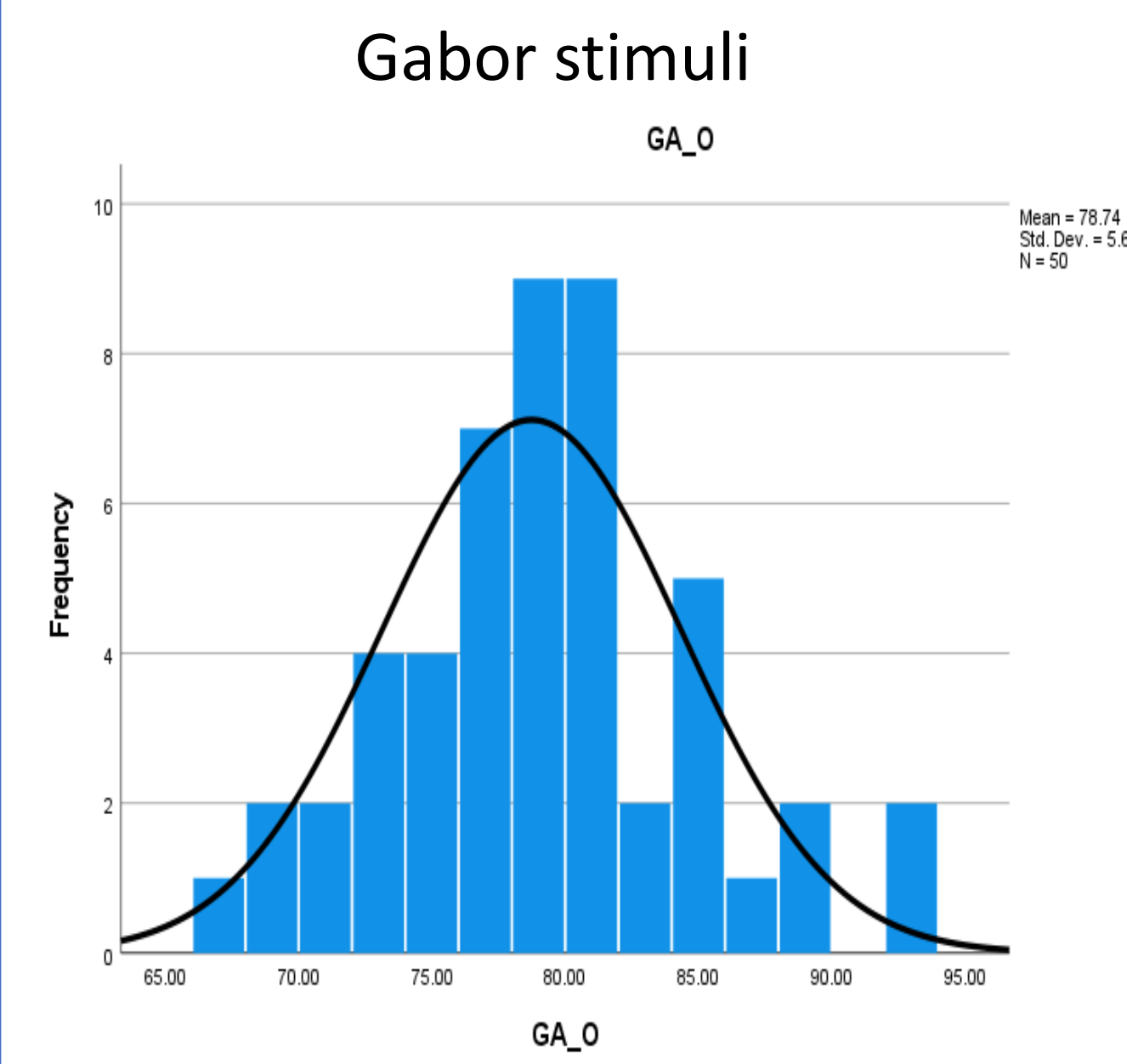
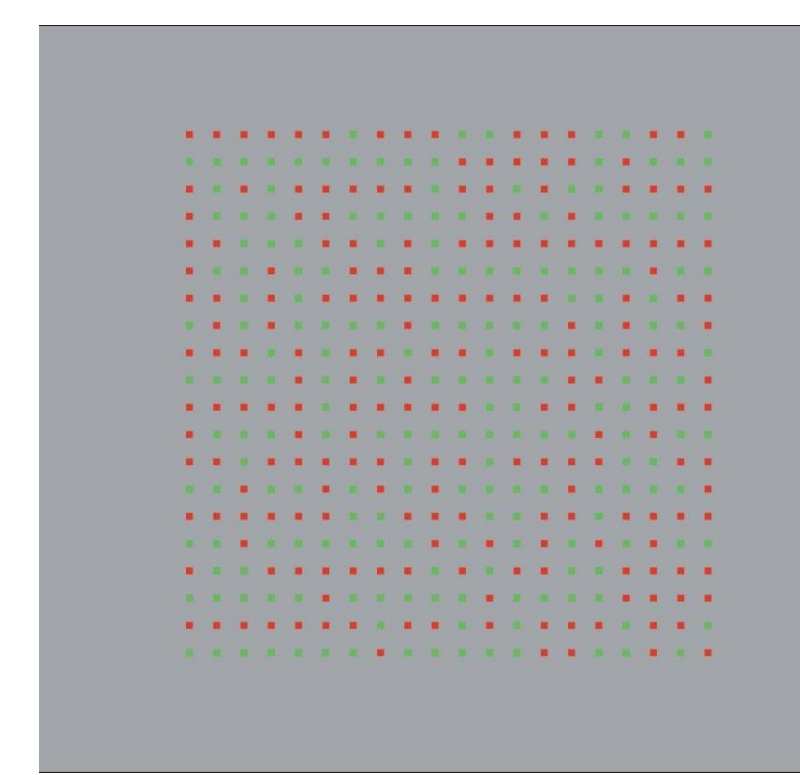


Color

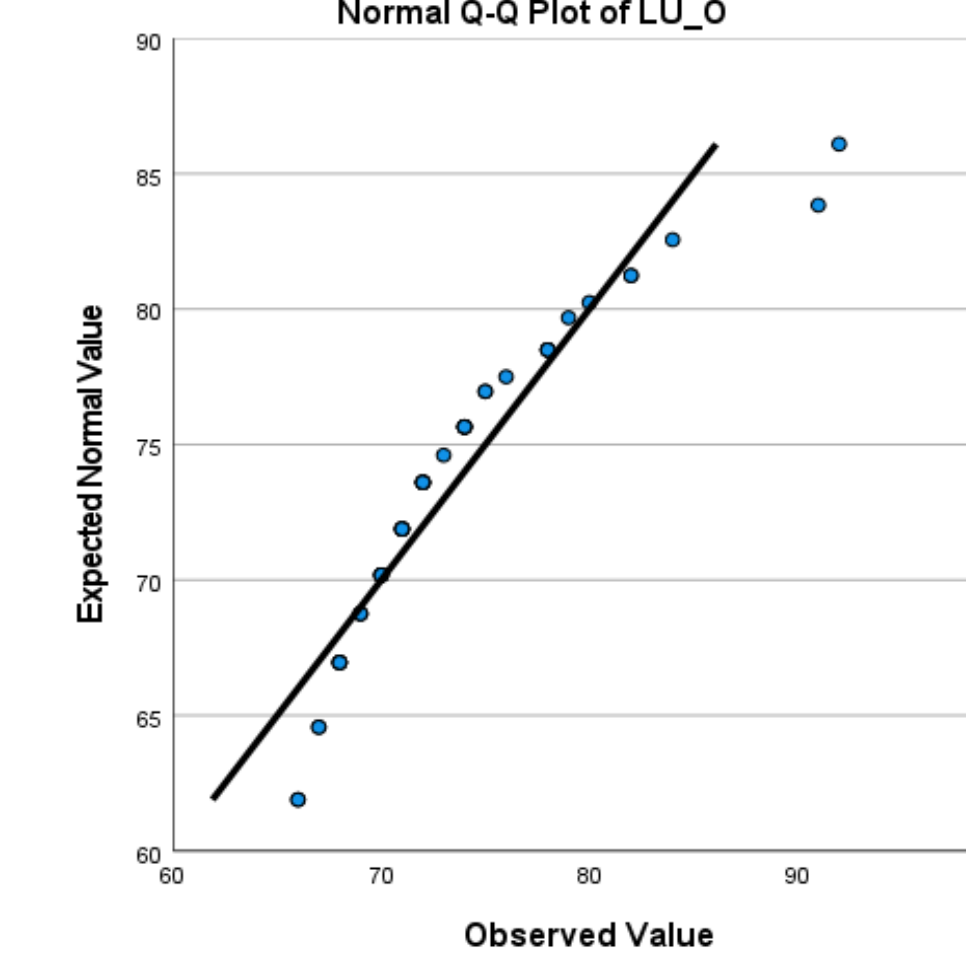
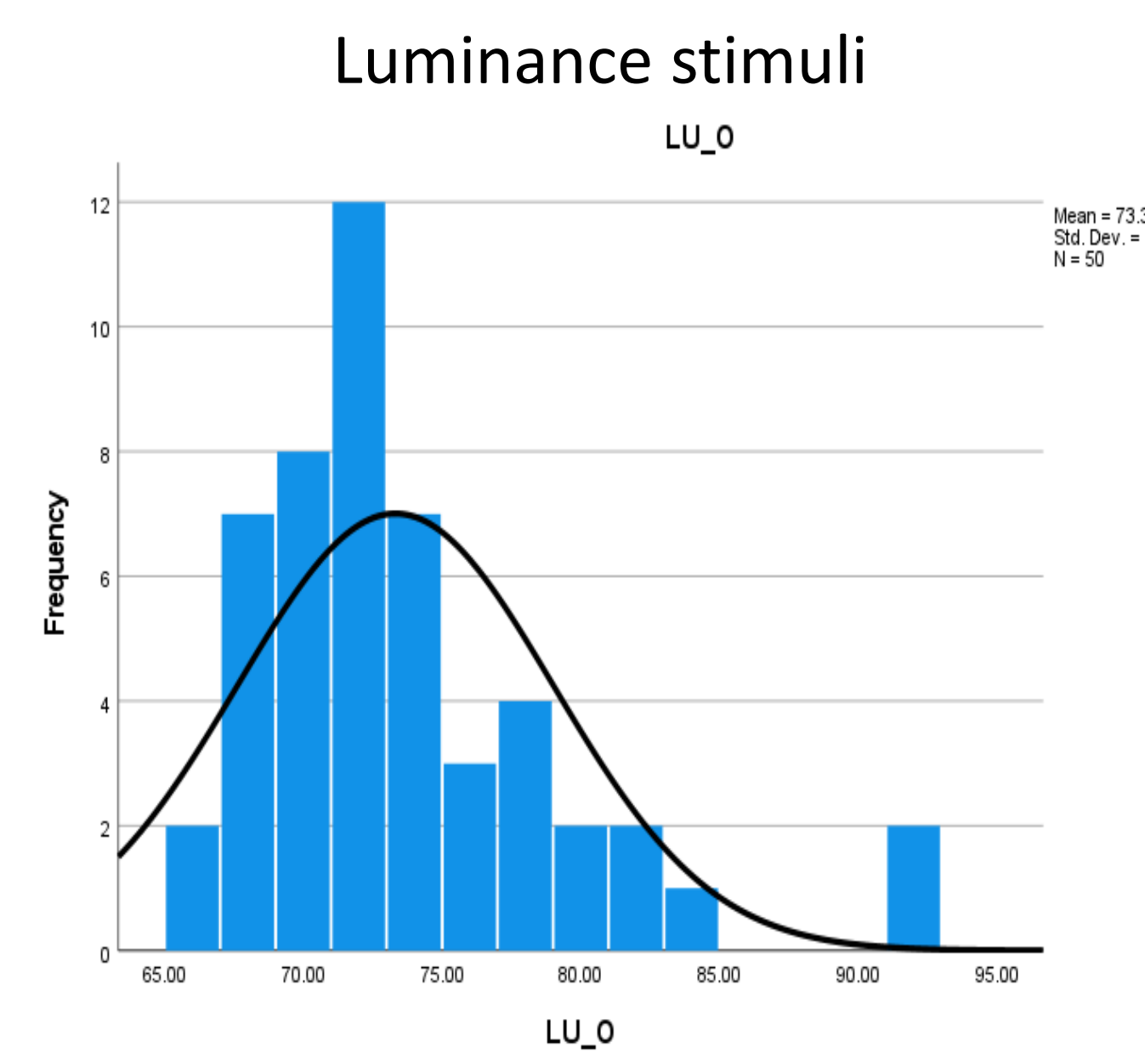
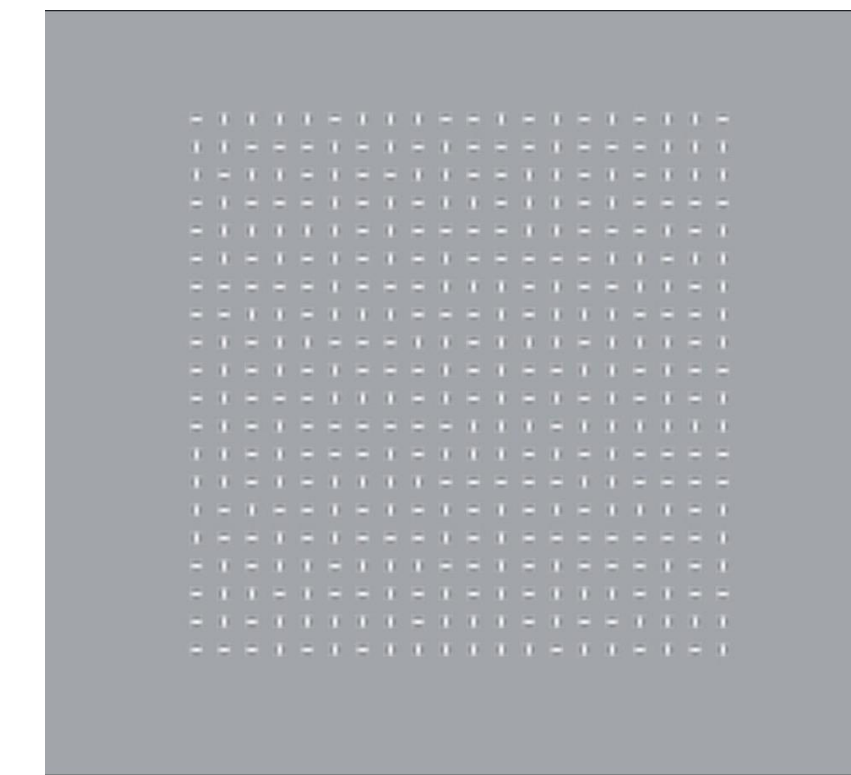
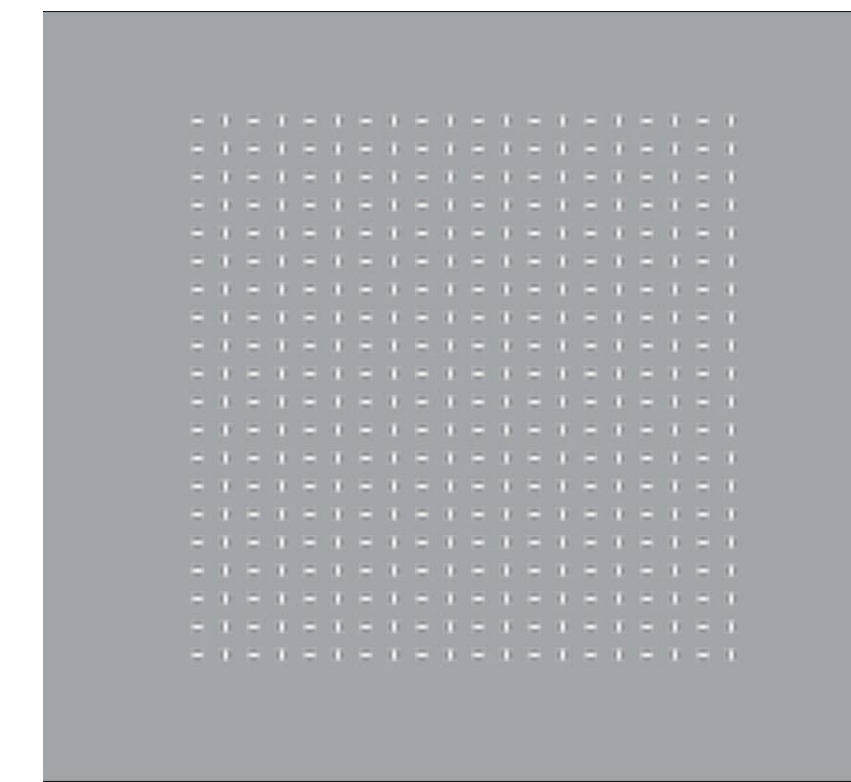
100% Organization



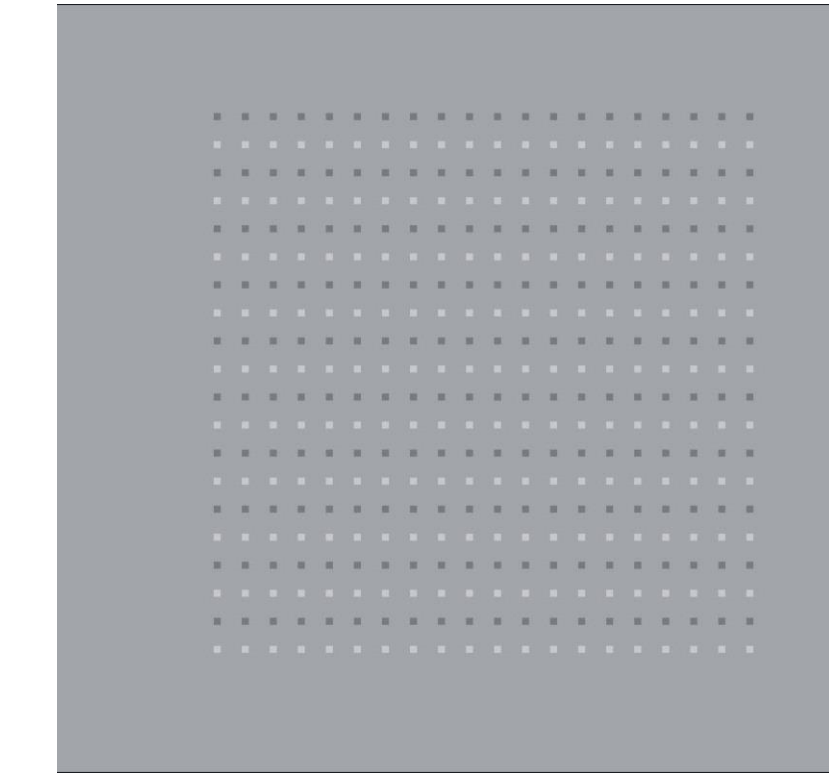
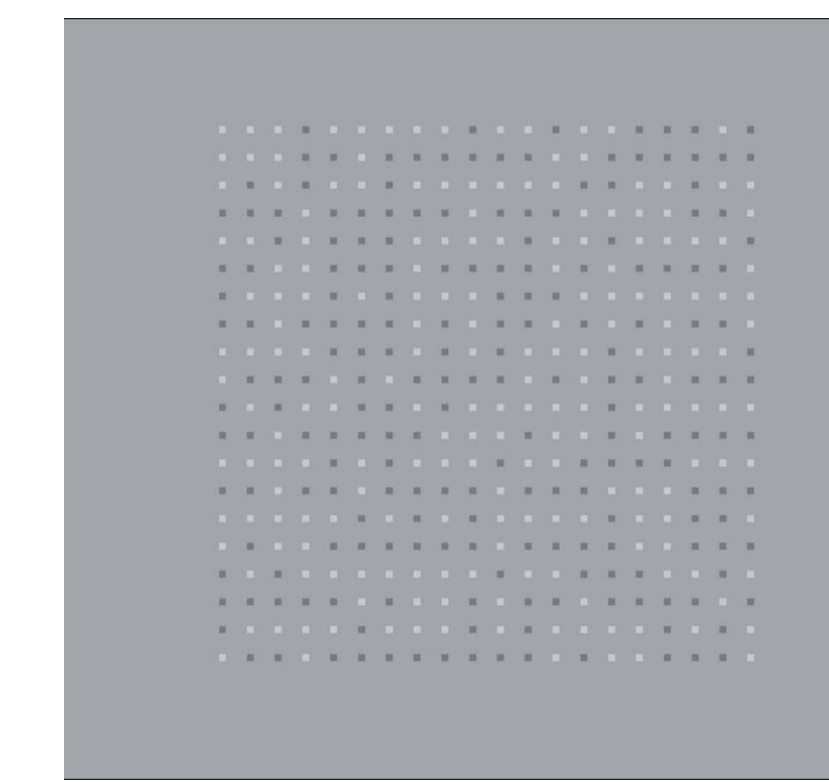
70% Organization



Gabor



Luminance



Comparison of Variance Between Two Formats

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Color	0.719	64	.475	1.999	2.781
Gabor	0.707	64	.482	2.927	4.140
Luminance	0.229	65	.819	1.072	4.671

Comparison of Threshold Level Between Two Formats

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Color	-6.801	64	.000	-8.594	1.264
Gabor	-4.192	64	.000	-7.135	1.702
Luminance	-4.175	65	.000	-6.592	1.579

## Results:

- Visual inspection of frequency histograms and Q-Q plots, as well as calculation of Skewness and Kurtosis z-scores, demonstrated that the distribution of threshold levels of all stimuli except for the online luminance was normal.
- Standard deviations of threshold levels for both formats were all highly similar
- No significant differences of the variances of four output threshold levels were found between the two formats
- The threshold levels of the online format were significantly higher compared with the in-person format

Statistics

	CO_IP	CO_O	GA_IP	GA_O	LU_IP	LU_O
N	Valid 16	50	16	50	17	50
	Missing 131	97	131	97	130	97
Mean	83.59	75.0000	85.8750	78.7400	79.9118	73.3200
Skewness	-.202	.344	-.662	.252	.269	1.489
Std. Error of Skewness	.564	.337	.564	.337	.550	.337
Kurtosis	.093	.060	-.159	.149	.963	2.591
Std. Error of Kurtosis	1.091	.662	1.091	.662	1.063	.662

- CO\_IP: Color threshold level (in-person)
- CO\_O: Color threshold level (online)
- GA\_IP: Gabor threshold level (in-person)
- GA\_O: Gabor threshold level (online)
- LU\_IP: Luminance threshold level (in-person)
- LU\_O: Luminance threshold level (online)

## Discussion:

- Participants with psychiatric disorders such as schizophrenia were found to perform significantly worse on the task (Kurylo et al., 2018).
- Online PO assessments allow flexibility and convenience for both participants and researchers. Especially with the growing prevalence of telehealth, it can be integrated as a new efficient implementation method.
- The limitation include the inability to perform in-person and online testing within the same population. Therefore, a repeated measure design may allow needed for direct sample comparison, counterbalance testing orders' impact, and quantifying significant correlation via simple linear regression.

## References:

- Kurylo, D. D., Waxman, R., Kidron, R., & Silverstein, S. M. (2017). Visual training improves perceptual grouping based on basic stimulus features. *Attention, Perception, & Psychophysics*, 79(7), 2098-2107.
- Kurylo, D. D., Waxman, R., Silverstein, S. M., Weinstein, B., Kader, J., & Michalopoulos, I. (2018) Remediation of perceptual organisation in schizophrenia. *Cognitive Neuropsychiatry*, 23(5), 267-283.