We set the OSS-3 scoring rules to make truthful classifications with alpha at .10, while comparing an individual score to the bootstrap cumulative distributing of confirmed deceptive cases in the training sample. This means that a case would be classified as truthful if the examinee produced a less intense deceptive score than 90 percent of bootstrap estimate of the population of deceptive examinees. Deceptive classifications were made using an alpha of .05, when comparing an individual score to the bootstrap cumulative distribution of confirmed truthful cases in the training sample, or when the subjects truthful score was less intense than 95 percent of the bootstrap estimate of the population of truthful examinees. Because we are using bootstrap cumulative distribution functions for truthful and deceptive populations, we were unconcerned about the the ranking or proportion of our subject relative to the discrete training sample.

It is important to note that this model employs separate distribution functions for truthful and deceptive examinees. It would be convenient to assume symmetry and uniformity of the distributions of scores among truthful and deceptive persons, but human physiology and psychology, but such assumptions would require a nearly complete working comprehension about the myriad of variables at work in human psychology and physiology, and such assumptions are presently unsupported. The OSS-3 model thus reflects the reality that the CQT polygraphy represents two concurrent significance tests, one for truthfulness and one for deception.

While pragmatic discussion among field examiners will always emphasize a simple dichotomy between truth and falsehood, the mathematical realities of inferential statistics used to justify measurement, classification and decision models in the sciences of physiology and psychology, along with the remaining philosophical limitation surrounding discussions of epistemology, knowledge, and what it means to say that someone or something is truthful or false, inform us that is may be both overly simplistic and erroneous to assume uniformity between the two. For this reason, we had previously investigated changes to the use of an arbitrarily symmetrical alpha when facing the differential challenges inherent in making truthful and deceptive classifications.

Our experiments with the training dataset suggested that a large proportion of inconclusive cases might be correctly classified as truthful. We were reminded that alpha thresholds are regarded as somewhat arbitrary, and that the general principles involve using a lower alpha threshold when the cost false classification exceeds the cost of failed classification, while higher alpha thresholds are useful when the cost of failed classifications becomes a more pressing concern.

We completed a double bootstrap Bonferonni test, using $M=292^2$ resample sets, with replacement, of the N=292 confirmed ZCT cases in the training sample, to evaluate the results patterns using a symmetrical alpha at .05 for both deceptive and truthful classifications and asymmetrical alphas of .05 and .10 for deceptive and truthful classifications. See Table 8 for information for the results of that experiment. Using alpha at .05 for both deceptive and truthful classification produced 94.1% mean decision accuracy, which did not differ significantly (p=.445) from 93.9% mean decision accuracy observed while using alpha at .05 and .10 for deceptive and truthful classifications respectively. A significant reduction in mean inconclusive rates was was observed (p=<.001), with 13.0% mean inconclusives using the symmetrical alpha at .05 for deceptive and truthful classifications and 4.4% inconclusives when using alpha at .05 and .10 for deceptive and truthful classifications. Mean sensitivity rates did not differ significantly (p=.210) with the symmetrical alpha condition returning a mean sensitivity rate of the 88.7% and the asymmetrical alpha condition returning 90.6% sensitivity to deception. Specificity to truthfulness, or the ability to reject truthful persons from further concern was significantly different between the two conditions (p=<.001) with the symmetrical alpha model returning correctly classifying a mean of 74.8% of the truthful cases in the training sample, and the asymmetrical model providing a mean of 88.9% correct classification of truthful cases. Differences in mean false positive rates were not significant (p=.143) with the asymmetrical condition returning a mean false positive rate of 4.9% compared with 7.0% for the symmetrical condition. Mean false negatives were observed at 6.7% with the asymmetrical alpha model, compared with 3.3% for the symmetrical model, with an observed significance level of .028, which we considered not significant compared to the corrected alpha of .008 in our Bonferonni test.

Table 8. Double Bootstrap Bonferonni test – symmetrical and asymmetrical alpha

Double-bootstrap t-test of $M=292^2$ resample sets, with replacement, of N=292 confirmed ZCT cases.

Using Senter Rules	**.05 / .10**	**.05 / .05**	**sig.**
Correct Decisions	93.9%	94.1%	.445
INC	4.4%	13.0%	<.001
Sensitivity	90.6%	88.7%	.210
Specificity	88.9%	74.8%	<.001
FN	6.7%	3.3%	.028†
FP	4.9%	7.0%	.143

† Not Significant.

symmetrical and asymmetrical