Lafayette Instrument

Lafayette Tech Talk:
Understanding the Lafayette ESS-M Narrative Summary

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The Empirical Scoring System – Multinomial (ESS-M) is an important update to the statistical reference distributions and decision model for ESS. ESS is an evidence-based, standardized method for test data analysis with comparison question test (CQT) formats. ESS is a modification of the Federal 3-position scoring method, based on work at the University of Utah and Johns Hopkins University. First published in 2008, ESS has been used extensively in polygraph research and legal contexts, and has become one of the most widely used methods for polygraph test data analysis throughout the United States. and other countries.

ESS-M was published in 2017 and includes a Bayesian decision model. Bayesian analysis uses the test data, together with available prior information about the likelihood of deception or truth-telling, and some form of likelihood function (a device to obtain a statistical value for the test data) to calculate a posterior odds of deception or truth-telling. The likelihood function for the ESS-M is a multinomial reference distribution based on the theory of the polygraph test.

An important advantage of Bayesian analysis is that posterior odds have more intuitive and practical meaning than the p-values that were used as the statistical classifier in the original ESS. Whereas the ESS p-values can only represent the likelihood of the observed data under the reference model opposite to that of the categorical test result, the Bayesian results from ESS-M are intended to quantify the strength of the posterior evidence for the categorical conclusion itself.

Using ESS-M in the field is, in most ways, identical to the original ESS. Scoring features, numerical transformations, and decision rules are all unchanged from the original ESS. One of the differences that is immediately apparent when using ESS-M is that cutscores have changed slightly from the original ESS. Another important difference is that the narrative summary is written to describe application of Bayesian analysis with the polygraph test data.

In the same way that a polygraph test report can be thought of as the story of the polygraph test, the narrative summary can be thought of as the story of the test data analysis. The beginning of the narrative summary will tell readers what kind of analysis was completed, and will orient readers to foundational concepts necessary to understand the analytic result. Following is the introductory paragraph from the Lafayette ESS-M narrative summary.

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Narrative summary: paragraph 1.

> Recorded physiological data were evaluated with the Empirical Scoring System - Multinomial (ESS-M). The ESS-M is an evidence-based, standardized protocol for polygraph test data analysis using a Bayesian classifier with a multinomial reference distribution. Bayesian analysis treats the parameter of interest (i.e., deception or truth-telling) as a probability value for which the test data, together with the prior probability, are a basis of information to calculate a posterior probability. The multinomial reference distribution is calculated from the analytic theory of the polygraph test - that greater changes in physiological activity are loaded at different types of test stimuli as a function of deception or truth-telling in response to relevant target stimuli. The reference distribution for this exam describes the probabilities associated with the numerical scores for all possible combinations of all possible test scores for all recording sensors.

The first sentence of the introductory paragraph explains what method of analysis was used, in this case ESS-M. The second sentence provides information about the analysis – what should readers know about ESS-M – that it is evidence-based, standardized, and uses Bayesian analysis with a multinomial likelihood function. The third sentence provides information to help readers to understand Bayesian analysis – for which the goal is to calculate a posterior probability (of deception or truth-telling) using the test data, along with a prior probability and a likelihood function. The fourth and fifth sentences explain that the multinomial likelihood function is based on the analytic theory of the polygraph, and is used to calculate probability values associated with the test scores. The introductory paragraph of the Lafayette ESS-M narrative summary is written in a form that can be generalized to all comparison question test formats.

In the same way that the first paragraph of the narrative summary will serve to inform readers about what kind of analysis was completed, the second paragraph of the narrative summary will begin to inform readers about input parameters, in addition to the test data, that could influence the analytic result. In other words, what events or decisions were made prior to or during the analysis. Following is the second paragraph of the Lafayette ESS-M narrative summary.

Narrative summary: paragraph 2.

> These results were calculated using a prior probability of .5 for which the prior odds of truth-telling were 1 to 1. A credible-interval (Bayesian confidence interval) was also calculated for the posterior odds of truth-telling using the Clopper-Pearson method and a one-tailed alpha = .05. The credible-interval describes the variability of the analytic result by treating the test statistic (posterior odds) as a random variable for which the limits of the credible interval can be inferred statistically from the test data. A test result is statistically significant when the lower limit of the credible interval for the posterior odds has exceeded the greater value of the prior odds or the required minimum cut-ratio.

The first input parameter decision that could influence the analytic result is the prior probability or prior odds of deception or truth-telling, and is described in the first sentence of the second paragraph. Results from Bayesian analysis can be thought of as *posterior conditional probabilities*. That is, the posterior probability or posterior odds is a result of the prior probability conditioned on the test likelihood statistic using Bayes' theorem. It can also be thought of as the test likelihood statistic conditioned on the prior probability.

Regardless of how the direction of conditionality is described, selection of a different prior probability could result in a different posterior probability in the same way that different test data could produce a different posterior probability. Whereas frequentist inference is often completed with no assertions or declarations about available knowledge or information prior to a scientific test or experiment, an important feature of Bayesian analysis is a requirement to explicitly state – prior to a test or experiment – what is known or assumed about the probabilities associated with different possible outcomes. Objective prior information should be used whenever it is available. However, it is often the case that objective information is not available to quantify any possible outcome as more likely than another. In the absence of other information, the different outcome possibilities can be assumed to be objectively equal. In the polygraph testing context this means that the prior probabilities for deception and truth-telling will be equal to .5 (prior odds = 1 to 1).

The second sentence of paragraph 2 describes the calculation of a Bayesian confidence interval – also referred to as a *credible interval* – for the posterior conditional probability. It is well known that polygraph testing cannot actually measure deception *per se*, and that all test results are subject to some expected variation or variability if it were possible to conduct numerous repetitions of the test, even under the same testing circumstances. The Bayesian ESS-M classifier makes use of the Clopper-Pearson method to calculate this interval, and this is stated explicitly because a range of methods exist to calculate this type of coverage interval.

The Clopper-Pearson confidence interval was selected because of characteristics that are useful and advantageous to the polygraph contexts: it provides results that remain coherent even at probabilistic extremes, and the intended coverage interval can be considered cautious because it can be expected to always exceed the 1-alpha level. Fundamental to the calculation of any confidence interval is the declaration of the alpha tolerance for uncontrolled variation or random error. The general solution in many areas of science and testing is to set alpha = .05, signifying a declared acceptable tolerance of 5%. The coverage area for the Bayesian credible interval is equal to 1 – alpha x 100%, so that 1 - .05 x 100% is 95%. The coverage interval is referred to as a 95% *confidence interval.*

The third sentence of paragraph 2 provides the reader with more information about the meaning of the Bayesian confidence interval. In practical terms, the Bayesian confidence interval tells us the likelihood of obtaining a similar categorical test result upon re-examination. This can also be thought of as the likelihood that re-examination will provide a similar deceptive or truthful conclusion – and this can be further generalized as the likelihood that re-examination would be indicative of deception or truth-telling similar to the present observed test result. Because only the lower limit has any interpretive value in the polygraph context, the alpha boundary is explicitly one-tailed. For this reason, with alpha = .05 and the 1-alpha x 100% confidence interval indicates a likelihood of 95% that re-examination under the same testing circumstances would lead to a similar categorical test result. Of course, a change in the testing circumstances (e.g., selection of different testing targets due to admissions or other information) may increase the likelihood of different conclusion.

The fourth sentence of paragraph 2 explains the practical importance of the Bayesian credible interval. A test result is statistically significant, at the 1-alpha level, whenever the lower limit of the posterior odds of deception or truth-telling has exceeded the prior odds. In other words, a test result is significant for deception or truth-telling whenever the prior odds are not contained within the credible interval. Said differently, a test result is significant when the 1-alpha Bayesian confidence interval excludes the prior odds. In even more simple and practical terms, a numerical cutscore can be determined by selecting the minimum score for which the lower limit of the credible interval exceeds the prior odds.

The third and final paragraph of the Lafayette ESS-M narrative summary is the end or conclusion of the analysis story. This paragraph provides the categorical result along with the numerical and probability scores that support the categorical conclusion. Following is an example of a conclusion paragraph from the Lafayette ESS-M narrative summary for an event-specific diagnostic polygraph for which the test result indicates truth-telling.

Narrative summary: paragraph 3a (TSR, truthful result).

> The categorical test result was parsed from the probabilistic result using two-stage decision rules. Two-stage rules are based on an assumption that the criterion variance of the test questions is non-independent, and make use of both the grand total and subtotal scores. The grand total score of 19 equaled or exceeded the required numerical cut-score (3). The posterior odds of truth-telling was 59 to 1, for which the posterior probability was .98. The lower limit of the 1-alpha Bayesian credible interval was 17.0 to 1, which exceeded the prior odds (1 to 1). This indicates a likelihood of 95% that the posterior odds of truth exceed the prior odds. The posterior information for this examination was increased by a Bayes Factor of 59. These analytic results support the conclusion that there were NO SIGNIFICANT REACTIONS INDICATIVE OF DECEPTION in the loading of recorded changes in physiological activity in response to the relevant test stimuli during this examination.

This paragraph can be used whenever the TSR is used, including both event-specific diagnostic exams and single-issue screening exams. The first sentence of the conclusion in paragraph 3a informs the reader of the decision rule that was used to parse the categorical test result from the test data. In this example, the two-stage rule (TSR) is described. Inclusion of the decision rule is useful because the selection of a decision rule is an expression of the assumptions with which the test data were analyzed. The second sentence of paragraph 3 provides the reader with more information about the TSR – that it makes use of both grand total and subtotal scores – and explains that use of the TSR is premised on an assumption that the test questions are non-independent (i.e., that response variance for the different questions could conceivably influence responses to other questions). The TSR is an evidence-based decision rule, with criterion accuracy similar to the grand-total-rule (GTR, which uses only the grand total score), but which offers the potential to decrease the occurrence of inconclusive results while increasing test sensitivity to deception.

The third sentence of paragraph 3a provides documentation of the test score and numerical cutscores. This information can be intuitively useful to other polygraph professionals, but may not be highly informative to other readers. The fourth sentence provides information about the probabilistic strength of the test result. Probabilistic information is more universally informative to professionals of all backgrounds. Probabilistic information for ESS-M results is provided in the form of the posterior odds (in this case the odds of truth-telling). Use of the odds is intended to increase the intuition and utility of the information by clearly illustrating that all probabilities are a comparison of some possibility with some other possibility. Probability information is also provided in the form of a decimal value for professionals who are accustomed to the intuition of decimal probabilities.

The fifth sentence of paragraph 3a describes the lower limit of the 1-alpha x 100% credible interval for the posterior probability. For the ESS-M Bayesian classifier, it is the lower limit of the credible interval that actually determines the categorical test result. A simple intuition for the lower limit value is to compare the lower limit to the prior. For example, with alpha = .05, a test result is statistically significant at the 95% level whenever the lower limit of the 95% credible interval has exceeded the prior probability.

The sixth sentence provides an explanation of the meaning of the lower limit statistic. When the lower limit has exceeded the prior, it can be said that the likelihood exceeds 95% that the test has added or strengthened the available information to support the categorical test result. Said differently, when the lower limit of the credible interval exceeds the prior – when the prior is outside of the credible interval – it is reasonable to infer a likelihood of 95% that a similar test result would be observed if the test were repeated under the same testing circumstances. In other words, the likelihood is 95% or greater that re-examination under similar testing circumstances would produce a similar result. Another possible interpretation is that the likelihood is 95% that numerous re-examination attempts, under similar testing circumstances, would produce a similar test result that is indicative deception or truth-telling.

The seventh, penultimate, sentence in paragraph 3a provides the Bayes' Factor, which indicates the relative strength of the posterior information compared to the prior information in support of the categorical test result. For example, a Bayes' Factor of 3 would indicate that the strength of the posterior information is three times greater than the prior information. Similarly, a Bayes' Factor of 59 indicates that posterior information has improved, compared to the prior, by a factor of 59 times. Bayes' Factor is among the most useful and intuitive ways of describing the posterior test result because it is robust against differences in the prior. In other words selection of any different prior will lead to the same Bayes' Factor. In contrast, the posterior probability will be different when calculated under a different prior.

Although the use of Bayesian analysis, and Bayes' theorem, permit a more direct intuition and interpretation of the meaning of the posterior probability (i.e., more direct and intuitive than frequentist p-values) – and permit the use of the notion of a *probability of deception* or *probability of truth-telling* – these probabilities are only permissible as *posterior conditional probabilities.* In other words, posterior probabilities are conditional on the prior, meaning that posterior probabilities are non-robust against the selection of a different prior.

The fact that Bayes' Factor is robust against the selection of different priors makes it a preferred way to discuss and document a test result. Bayes' Factor describes the change in the strength of information in support of the categorical conclusion, regardless of the selection of any different prior. An observable characteristic of Bayes' Factor is that when the prior odds are 1 to 1 the Bayes Factor will be equal to the posterior odds. However, once again, Bayes' Factor will be the same regardless of the selection of any different prior. Bayes' Factor indicates the magnitude of change in the strength of information available to support the categorical conclusion.

The final sentence of paragraph 3a provides the categorical test result in the form of a complete sentence that is anchored to the analytic theory of the polygraph test. In this example the categorical test result itself is provided in capital letters. This is for easier reading by persons who may wish to merely skim the explanatory detail and quickly observe the categorical test result – returning to the details later as time permits.

Several variations of the final paragraph have been constructed for various outcomes using different decision rules. Following is an example of the final paragraph of the Lafayette ESS-M narrative summary for a diagnostic polygraph for with the result is indicative of deception.

Narrative summary: paragraph 3b (Two-stage Rules, deceptive result).

> The categorical test result was parsed from the probabilistic result using two-stage decision rules. Two-stage rules are based on an assumption that the criterion variance of the test questions is non-independent, and make use of both the grand total and subtotal scores. The grand total score of -19 equaled or exceeded the required numerical cut-score (-3). The posterior odds of truth-telling was 59 to 1, for which the posterior probability was .98. The lower limit of the 1-alpha Bayesian credible interval was 17.0 to 1, which exceeded the prior odds (1 to 1). This indicates a likelihood of 95% that the posterior odds of deception exceed the prior odds. The posterior information for this examination was increased by a Bayes Factor of 59. These analytic results support the conclusion that there were SIGNIFICANT REACTIONS INDICATIVE OF DECEPTION in the loading of recorded changes in physiological activity in response to the relevant test stimuli during this examination.

The structure and content of paragraph 3b is similar to that of paragraph 3a, and this paragraph is also usable for both event-specific diagnostic exams and single-issue screening exams. However, the direction of interpretation changed. When using the TSR with event-specific diagnostic exams it is possible that the grand total is not statistically significant (i.e., inconclusive) while a subtotal score is statistically significant for deception. Following is an example of the final paragraph when a deceptive conclusion is based on a subtotal score.

Narrative summary: paragraph 3c (TSR, deceptive subtotal score).

> The categorical test result was parsed from the probabilistic result using two-stage decision rules. Two-stage rules are based on an assumption that the criterion variance of the test questions is non-independent, and make use of both the grand total and subtotal scores. The lowest subtotal scores of -7 equaled or exceeded the required numerical cutscore (-7). The posterior odds of deception was 2.3 to 1 (with statistical correction for multiplicity), for which the posterior probability was .7. The lower limit of the 1-alpha Bayesian credible interval was 1.1 to 1, which exceeded the prior odds (1 to 1). This indicates a 95% likelihood that the posterior odds of deception exceed the prior odds. The posterior information for this examination was increased by a Bayes Factor of 2.3. These analytic results support the conclusion that there were SIGNIFICANT REACTIONS INDICATIVE OF DECEPTION in the loading of recorded changes in physiological activity in response to the relevant test stimuli during this examination.

The structure and content of paragraph 3c also applies to both event-specific diagnostic exams and single-issue screening exams, and is similar to that of paragraph 3a and 3b with the exception that the lowest subtotal is used to classify the test result as deceptive. Notice in paragraph 3c that the fourth sentence describes the use of a statistical correction for the posterior odds of deception. The purpose of the statistical correction is to reduce the effect of statistical multiplicity, thereby reducing the inflation of testing and classification error that is known to occur whenever multiple statistical comparisons (for the subtotal scores) are made for a single classification. The preceding example describe both truthful and deceptive outcomes of diagnostic polygraph exams.

It is inevitable that some proportion of all polygraph test results are not statistically significant for deception or truth-telling. The next two examples show the final paragraph of the narrative summary when the test result is inconclusive. Following are the conclusion paragraphs for an inconclusive diagnostic polygraph, using the TSR, when both the grand total score and lowest subtotal score are less than or equal to zero.

Narrative summary: paragraph 3d (TSR, inconclusive, lowest subtotal <= 0).

> The categorical test result was parsed from the probabilistic result using two-stage decision rules. Two-stage rules are based on an assumption that the criterion variance of the test questions is non-independent, and make use of both the grand total and subtotal scores. The lowest subtotal score of -5 did not equal or exceed the required numerical cutscore (-7). These data produced a Bayes factor of 1.8. The lower limit of the posterior odds of deception did not exceed the required minimum cut-ratio of 1 to 1. These analytic results are NOT STATISTICALLY SIGNIFICANT for deception or truth-telling. NO OPINION is supported by the loading of recorded changes in physiological activity in response to the relevant stimuli during this examination, and these results are therefore INCONCLUSIVE.

Narrative summary: paragraph 3e (TSR, inconclusive, all scores > 0).

> The categorical test result was parsed from the probabilistic result using two-stage decision rules. Two-stage rules are based on an assumption that the criterion variance of the test questions is non-independent, and make use of both the grand total and subtotal scores. The grand total score of 2 did not equal or exceed the required numerical cutscore (3). These data produced a Bayes factor of 1.5. The lower limit of the posterior odds of truth-telling did not exceed the required minimum cut-ratio of 1 to 1. These analytic results are NOT STATISTICALLY SIGNIFICANT for deception or truth-telling. NO OPINION is supported by the loading of recorded changes in physiological activity in response to the relevant stimuli during this examination, and these results are therefore INCONCLUSIVE.

Notice that the first three sentences of paragraphs 3d and 3e provide the type of information as 3a, 3b, and 3c. Paragraphs 3d and 3e differ from the preceding in that neither the posterior odds nor posterior probabilities of deception or truth-telling are provided, because these are not statistically significant, as explained by the fact that the test score did not equal or exceed the numerical cutscore. However, the Bayes Factor is provided in the fourth sentence. The fifth sentence of these paragraphs states that the lower limit of the Bayesian confidence interval did not exceed the prior odds. In other words, the analysis could not exclude the prior odds from the 1-alpha (95%) confidence interval or expected range of variability that would be observed upon numerous repetitions of the examination. The sixth and seventh sentences explain that the test result is not statistically significant for deception or truth-telling, and is therefore inconclusive.

Like the preceding paragraphs, 3d and 3e can be used for both event-specific diagnostic exams and single-issue screening exams.

The preceding five examples pertain to event specific polygraph examination. Following is an example of the conclusion paragraphs from the narrative summary for a multiple issue screening polygraph.

Narrative summary: paragraph 3f (SSR, truthful result).

> The categorical test result was parsed from the probabilistic result using decision rules for subtotal scores. Subtotal score rules are based on an assumption of independent criterion variance for the questions. A positive (deceptive) classification is made when any subtotal score is significant for deception. All subtotal scores must be significant for truth-telling to achieve a negative (truthful) classification. The lowest subtotal score of 1 equaled or exceeded the required numerical cutscore (1). The posterior odds of truth-telling was 2.6 to 1 (with statistical correction for multiplicity), for which the posterior probability was 0.72. The lower limit of the 1-alpha Bayesian credible interval was 1.2 to 1, which exceeded the prior odds (1 to 1). This indicates a likelihood of 95% that the posterior odds of truth-telling exceed the prior odds. The posterior information for this examination was increased by a Bayes Factor of 59. These analytic results support the conclusion that there were NO SIGNIFICANT REACTIONS INDICATIVE OF DECEPTION in the loading of recorded changes in physiological activity in response to the relevant test stimuli during this examination.

Narrative summary: paragraph 3g (SSR, deceptive result).

> The categorical test result was parsed from the probabilistic result using decision rules for subtotal scores. Subtotal score rules are based on an assumption of independent criterion variance for the questions. A positive (deceptive) classification is made when any subtotal score is significant for deception. All subtotal scores must be significant for truth-telling to achieve a negative (truthful) classification. The lowest subtotal score of -7 equaled or exceeded the required numerical cutscore (-3). The posterior odds of deception was 12.2 to 1, for which the posterior probability was 0.92. The lower limit of the 1-alpha Bayesian credible interval was 3.3 to 1, which exceeded the prior odds (1 to 1). This indicates a likelihood of 95% that the posterior odds of deception exceed the prior odds. The posterior information for this examination was increased by a Bayes Factor of 59. These analytic results support the conclusion that there were SIGNIFICANT REACTIONS INDICATIVE OF DECEPTION in the loading of recorded changes in physiological activity in response to the relevant test stimuli during this examination.

Paragraph 3f and 3g are similar in structure and content to paragraph 3a, except that these paragraphs describe the result when using the SSR, as commonly used with multiple-issue screening polygraphs. The following paragraphs show the conclusion narratives for multiple-issue screening polygraphs for which the result is not statistically significant.

Narrative summary: paragraph 3h (SSR, inconclusive, lowest score <= 0).

> The categorical test result was parsed from the probabilistic result using decision rules for subtotal scores. Subtotal score rules are based on an assumption of independent criterion variance for the questions. A positive (deceptive) classification is made when any subtotal score is significant for deception. All subtotal scores must be significant for truth-telling to achieve a negative (truthful) classification. The lowest subtotal score of -2 did not equal or exceed the required numerical cutscore (-3). These data produced a Bayes factor of 1.9. The lower limit of the posterior odds of deception did not exceed the required minimum cut-ratio of 1 to 1. These analytic results are NOT STATISTICALLY SIGNIFICANT for deception or truth-telling. NO OPINION is supported by the loading of recorded changes in physiological activity in response to the relevant stimuli during this examination, and these results are therefore INCONCLUSIVE.

Narrative summary: paragraph 3i (SSR, inconclusive, lowest score > 0).

> The categorical test result was parsed from the probabilistic result using decision rules for subtotal scores. Subtotal score rules are based on an assumption of independent criterion variance for the questions. A positive (deceptive) classification is made when any subtotal score is significant for deception. All subtotal scores must be significant for truth-telling to achieve a negative (truthful) classification. The lowest subtotal score of 1 did not equal or exceed the required numerical cutscore (0). These data produced a Bayes factor of 1. The lower limit of the posterior odds of deception did not exceed the required minimum cut-ratio of 1 to 1. These analytic results are NOT STATISTICALLY SIGNIFICANT for deception or truth-telling. NO OPINION is supported by the loading of recorded changes in physiological activity in response to the relevant stimuli during this examination, and these results are therefore INCONCLUSIVE.

Paragraphs 3h and 3i are similar in structure and content to paragraphs 3d and 3e, but describe inclusive results when using the SSR.

Summary and conclusion

The sample paragraphs in this document can be saved as boilerplate segments that can be copy-pasted into reports as needed. A useful workflow is to highlight all numerical values in the saved boilerplate because these details require attention and editing for each individual examination. Then remove the highlighting upon editing each numerical detail, and continue until all highlights are removed. When working with these boilerplate examples, a note of caution is in order: it will be a mistake to provide only the third and final paragraph of the narrative summary (omitting the analysis context and input parameters). Doing so would be akin to telling the end of a story without allowing readers to know the type of story or what happened prior to the ending. Reporting an analytic result without foundational information about the type of analysis and input parameters (which could affect the analytic results) would deny readers any access to information that would support the reproducibility of the analytic result without the need for unscientific guesswork.

Readers, of this document and any polygraph test report, are cautioned against attempting to think of a categorical test result as a physical object nor a physical action. A test result or conclusion is a description, and test data are a basis of information or evidence to support a conclusion. A categorical test result is the selection of one possible conclusion over one or more other possible conclusions, based on the strength of information. The purpose of any scientific test is to quantify amorphous phenomena that cannot be subject to deterministic observation or direct physical measurement. An intended purpose of any test data analysis method is to provide a conclusion that is reproducible by others, and also provides a realistic quantification of the probabilistic strength, or change in strength, of the information in support of the test result.

The Lafayette ESS-M narrative summary is a carefully constructed description of the analytic process and analytic result. The narrative summary includes complete and sufficient information for other professionals to reproduce the analysis and categorical conclusion. The narrative summary can be thought of as the story of the test, data analysis, and analytic conclusion. Stories have a beginning, to introduce the context and topic, a middle, to provide information about what things happened during the process that could influence the outcome, and an ending or conclusion that that helps readers to experience and understand what transformation has occurred, if any, from the beginning to the end of the story. All stories, if they are interesting and complete, will have a beginning, middle, and ending.

Professionals who wish to develop and strengthen their expertise in the reporting and discussion of polygraph test results are encouraged to work through the construction of the narrative summary with their own field examinations. A few experiences will solidify both understanding and competence with the Lafayette ESS-M narrative summary and the principles and concepts of Bayesian analysis. Although perhaps unfamiliar at the onset, the concepts for Bayesian analysis are ultimately straightforward and simple. Most importantly, Bayesian analysis permits a simple and intuitive discussion of the probabilistic meaning of the test result. After working with these boilerplate examples a few times, a more convenient procedure will be to make use of the abundant computing power that is available to all professionals today – the Lafayette ESS-M report generator, accessible through the LXSoftware manual score sheet, and can fully automate the construction of an ESS-M report and narrative summary that can be easily integrated into a field examiner's workflow and reporting process.