Practical Polygraph: CQT Formats by the Numbers

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Comparison question test (CQT) formats have been developed for single issue and multiple issue exams with two, three and four relevant questions (RQs). That is, polygraph test formats with two, three and four RQs have been developed for both single issue and multiple issue exams[1].

Single issue polygraphs are commonly used for event-specific diagnostic exams, conducted in response to a known incident or known allegation. These event-specific diagnostic exams focus on a single behavior, or, at times, on multiple facets of a singular event. Single issue polygraph formats can also be used for single issue screening. Single issue and event-specific exams should more effectively be interpreted with an assumption that RQs are not independent – that they have shared response variance.[2,3,4,5,6,7] In other words, factors that affect responses to each individual RQ – emotion, cognition, attention, behavioral experience – may also influence responses to other RQs.

1 American Polygraph Association (2011). Meta-analytic survey of criterion accuracy of validated polygraph techniques. Polygraph, 40(4), 196-305.
2 Podlesny, J. A. & Truslow, C. M. (1993). Validity of an expanded-issue (modified general question) polygraph technique in a simulated distributed-crime-roles context. Journal of Applied Psychology, 78, 788-797.
3 Krapohl, D. J. (1998). A comparison of 3- and 7- position scoring scales with laboratory data. Polygraph, 27, 210-218.
4 Krapohl, D. J. & Norris, W.F. (2000). An exploratory study of traditional and objective scoring systems with MGQT field cases. Polygraph, 29, 185-194.
5 Senter, S M. (2003). Modified general question test decision rule exploration. Polygraph, 32, 251-263.
6 Senter, S. M., Dollins, A. B., & Krapohl, D. J. (2004). A comparison of polygraph data evaluation conventions used at the University of Utah and the Department of Defense Polygraph Institute. Polygraph, 33(4), 214-222.
7 Handler, M., Nelson, R., Goodson, W., Hicks, M. (2010). Empirical scoring system: a cross-cultural replication of manual scoring and decision rules. Polygraph, 39(4), 200-215.

The assumption of non-independence between RQs will ultimately influence the way that test data are interpreted. In practical terms, interpretation means several things, including the calculation of a statistical result from the numerical data, parsing and reporting the categorical result from the numerical and statistical data, parsing and reporting the results for individual questions, and the preparation of a coherent explanation of the actual meaning of the test result so that others can make use of the test result with consideration for both the practical effect size and limitations of the test result. In field practice this is often operationalized in the form of a procedural decision rule such as the grand total rule (GTR), two-stage rule (TSR) or other variants such as the Federal zone rule (FZR).[8] All CQTs will include both RQs and comparison questions (CQs), along with other procedural questions. Knowledgeable and experienced field examiners can easily identify a polygraph test format by inspecting the RQ labels. Shown below in Table 1 are commonly used polygraph test formats for single issue exams.

Table 1. Test formats for single issue polygraphs.

		Two RQs		
Federal You Phase (BiZone)	R5	R7		
Backster You Phase	R33	R35		
Matte MQTZCT	R33	R35		
AFMGQTv1 (2RQs)	R4	R6		
AFMGQTv2 (2RQs	R4	R5		
DLDT	R1	R2		
BOST	R4	R6		
		Three RQs		
Backster ZCT	R33	R35	R37	
Federal ZCT	R5	R7	R10	
AFMGQTv1 (3RQs)	R4	R6	R8	
AFMGQTv2 (3RQs)	R4	R5	R7	
CPC/RCMP A Series	R5	R7	R10	
IZCT	R6	R9	R12	
Utah 3-Question	R1	R2	R3	
Utah 3-Question	R5	R8	R11	
		Four RQs		
Utah 4-Question (Raskin Technique)	R1	R2	R3	R4
Utah 4-Question (Raskin Technique)	R5	R6	R8	R9
AFMGQTv1	R4	R6	R8	R10
AFMGQTv2	R4	R5	R7	R8
Reid GQT (MSU, Arther, Marcy)	R3	R5	R8	R9

[8] Nelson, R. (2018) Practical polygraph: a survey and description of decision rules. APA Magazine, 51(2), 127-133.

Multiple issue polygraphs are commonly used in screening contexts, in which the test is conducted in the absence of any known incident or allegation. The goal of a screening test is to investigate the possible existence of unknown problems. Although screening exams can be conducted in response to a single issue of concern – wherein all RQs address a single unknown issue – screening polygraphs are commonly formulated as multiple issue exams.

Multiple issue polygraphs are interpreted with an assumption of independent criterion variance. In other words, the criterion of interest (i.e., involvement in the different behaviors described by different RQs) is assumed to be independent. In practical terms, it is conceivable that a person may have engaged in none, some or all of the behavioral targets of a multiple issue screening exam. For this reason, results of multiple issue screening polygraphs are commonly interpreted using the subtotal score rule (SSR). Although effect sizes for multiple exams are less precise than for single issue exams – due to combination of factors including increased attentional and cognitive demands, statistical multiplicity, and a reduced quantity of information for subtotal scores (compared to the grand total score) – multiple issue screening polygraphs are often useful because they can increase the sensitivity of the polygraph screening test to a wider range of possible problems. Table 2 shows commonly used polygraph formats for multiple issue exams.

Table 2. Test formats for multiple issue polygraphs.

	Two RQs			
DLST	R1	R2		
AFMGQTv1 (2RQs)	R4	R6		
AFMGQTv2 (2RQs)	R4	R5		
		Three RQs		
AFMGQTv1 (3RQs)	R4	R6	R8	
AFMGQTv2 (3RQs)	R4	R5	R7	
			Four RQs	
AFMGQTv1	R4	R6	R8	R10
AFMGQTv2	R4	R5	R7	R8
Army MGQT	R3	R5	R8	R9

Notice that some test formats, such as the AFMGQTv1 and AFMGQTv2, may be used as either an event-specific[9](single issue or multi-facet) or multiple issue focus– depending on the target(s) of the investigation. It is not the name of the test format that makes it an event-specific or multiple issue polygraph technique. In-

[9] Nelson, R. et al (2017). APA Research Committee Report: Proposed Usage for an Event-specific AFMGQT Test Format. Polygraph, 43(4), 155-167.

stead, the differentiating characteristic of these is whether RQs are formulated with an assumption of independent or non-independent criterion variance. This decision will influence the selection of the decision rule used to interpret and classify the test result as deceptive or truthful.

The AFMGQTv1 and AFMGQTv2 are highly adaptable formats that can be used with two, three or four RQs. Reduction of the AFMGQTv1 to three RQs and two RQs is a matter of simple intuition. In field practice, differences may be observed among examiners as to whether or not a CQ is retained at the end of the question sequence (such as with the LEPET variations), and there no basis in the scientific evidence to date to support the rejection of either solution. Some differences in intuition may be observed in the way that the AFMGQTv2 is reduced from four RQs. For example, removal of the second of each pair of RQs would leave R4 and R7 in the question sequence, while removal of the first of each pair will leave R5 and R8. Again, there is no basis in scientific evidence to support the rejection of any of these solutions as invalid. Validity, after all, is not simply a matter of declaration. Although there are some advantages to a highly standardized approach, when variation is actually disruptive, in this case, there is no evidence to support any assumption or expectation of any differences in validity or effect sizes as a result of the different solutions when adapting the AFMGQT to three or two RQs. The AFMGQT format provides a good example of the natural state of tension between standardization and adaptation.

Selection of a polygraph test format is not a matter of memorized dogma, but of science. Decades of research on the comparison question polygraph technique has laid a solid foundation for polygraph examiners to rely upon when deciding which polygraph principles to exercise. The decision-making process is a simple matter of answering two questions.[10] Firstly, is the examination a diagnostic test, conducted in response to a known incident or allegation? Or is it a screening test, conducted in search of a possible problem in the absence of any known incident or allegation? Secondly, how many RQs are to be included in the test format? For single issue exams the use of more RQs will generally increase the sensitivity and specificity of the test, increasing the accuracy of results and decreasing the likelihood of an inconclusive result – at the expense of added effort in formulating and presenting additional RQs. For multiple issue exams, the use of more RQs will generally increase the test sensitivity to deception, while potentially reducing false-negative errors among deceptive persons – at the expense of some potential increase in false-positive errors and inconclusive results among truthful persons.

[10] Nelson, R. & Handler, M. (2017). Practical polygraph: how to select a polygraph test format. APA Magazine, 50(2), 72–81.

In practice, field polygraph examiners may select a polygraph test format in compliance with department or agency policy. And field practice policies are ideally based in scientific evidence. Some agencies may restrict practices to a single accepted format, with the advantage of administrative consistency. Other agencies may permit field examiners to choose from a small number of accepted formats. A potential advantage of the use of a structured menu of examination formats is the development of increased professional expertise in the selection and development of solutions that are individualized for each case.

It is also common that field polygraph examiners may select and use a polygraph technique at an over-learned or automatic level, wherein the procedure can be executed with a high degree of skill with little conscious attention. Although beneficial in terms of freeing attentional and cognitive resources for devotion to the issue under investigation, a potential consequence of overlearning is the reduction of awareness of the foundational issues and principles that led to, and support the validity of, a defined testing procedure or field practice. In field practice, this can sometimes lead to a narrowing of skill repertoire to a small number of commonly used solutions, along with a reduced ability to adapt or select solutions that may be ideally suited for each situation. In the most extreme cases we may observe the use of a *one-size-fits-all* approach to polygraph testing, with little thought as to whether the chosen format is optimally suited to the reason for referral for examination. The antidote to this narrowing of professional competence is simple: memorize and maintain a conscious awareness of the variety of different polygraph test formats. An easy way to do this is to use the RQ labels to quickly and accurately recognize the variety of polygraph test formats.