

Is There a Need for 100% Verification (Review) of Latent Print Examination Conclusions?

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Abstract: This research attempts to provide insight on the extent of verification as currently practiced within the latent fingerprint community. Ten questions were posed to this community regarding various aspects of verification; 56 agencies responded. The study results indicate that nearly every agency is performing verifications on 100% of reported fingerprint identifications. The study results also indicate that exclusion, inconclusive, and “no value” decisions are not being verified to the same extent. Interestingly, erroneous identifications constitute the minority of technical fingerprint errors, whereas erroneous exclusions, missed identifications, and inappropriate “inconclusive” and “no value” decisions are far more numerous.

Introduction

The verification phase is the final phase in the methodology practiced by the latent print examination community. This methodology, known as ACE-V (analysis, comparison, evaluation, and verification), was first introduced as ACE by Huber in 1959 [1, 2]. Although there are various types of verification, the purpose of verification is fairly straightforward and consists of three objectives [3]:

1. To examine the scientific validity of a reported conclusion
2. To examine the scientific validity of the methodology employed (ACE) to draw a conclusion
3. To examine the ability of a conclusion to withstand scientific scrutiny

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The verifying examiner should be checking to see that the available physical evidence supports the conclusion(s) of the initial examiner. To accomplish this, the verifying examiner should have access to all data from the initial examiner. In fact, this is how science is practiced. For example, the 2009 National Research Council Report on forensic science in the United States stated, "Verification occurs when another qualified examiner repeats the observations and comes to the same conclusion, although the second examiner may be aware of the conclusion of the first." [4] This amounts to peer review in science where the second scientist has access to the original scientist's data, thus allowing for an attempt to falsify the conclusions [2]. Ashbaugh wrote, "Verification is a form of peer review and is a part of most sciences...its purpose is to verify process and objectivity as opposed to only checking results" [5]. Similarly, Mankevich said, "...good scientific practices embody the validation of the experimental conditions, experimental data and experimental observations, not a mere reproduction of the conclusions." [6] However, if the requisite documentation is either incomplete or nonexistent, the verifying examiner essentially cannot determine whether ACE was performed properly.

Definitions

The following terms will be used in this article and it may be beneficial to the reader to have them defined here. All definitions are taken from the glossary of the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST) [7].

Blind verification – the independent examination of one or more friction ridge impressions by another qualified examiner who has no expectation or knowledge of the conclusion of the original examiner.

Erroneous exclusion – the incorrect determination that two areas of friction ridge impressions did not originate from the same source.

Erroneous individualization (identification) – the incorrect determination that two areas of friction ridge impressions originated from the same source.

Missed identification – the failure to make an identification (individualization) when, in fact, both friction ridge impressions are from the same source.

Verification – the final step of the ACE-V method. A review and independent analysis of the conclusion of another examiner.

Background

Practical experience and interaction with numerous agencies have shown the author that nearly every agency is performing verifications on 100% of reported fingerprint identifications. This likely comes as no surprise to the latent print community. In addition, the author has found that exclusion, inconclusive, and no value decisions are not being verified as a matter of course. Once again, this may not surprise most examiners. However, and what *may* come as a surprise, is that erroneous identifications do not comprise the bulk of latent print examination technical errors. Rather, most technical errors involve erroneous exclusions, missed identifications, and inappropriate inconclusive and no value decisions. (Inappropriate decisions will be discussed later in this paper). The preceding information was gathered, in part, by informally interviewing students in training classes conducted by the author across the United States. It was also gathered during the author's 16 years of experience as a latent print examiner with two different agencies, as well as during audits of various latent print units. In addition, Ulery et al. reported, in the black box study, an overall false negative (erroneous exclusion) rate of 7.5%, compared to a false positive (erroneous identification) rate of 0.1% [8].

The current research was undertaken in an attempt to assess the current state of verification in the latent print community. It was hoped that the community would benefit from seeing how verification is performed in different agencies. The author was also interested in how the research results would compare with his experience. To accomplish these objectives, the following questions were posed [9]:

1. What percentage of identifications does your agency verify?
2. What percentage of exclusions does your agency verify?
3. What percentage of inconclusives does your agency verify?
4. What percentage of no value conclusions does your agency verify?
5. Do you review actual items of evidence that were processed by the initial examiner?
6. Do you verify all nonmatch respondents from AFIS searches?
7. What are the reasons for not performing verifications on all conclusion decisions? Please be specific.

8. Do you agree with the concept of 100% verification? Why or why not? Please be specific.
9. How many latent print examiners does your agency employ?
10. What is the average caseload per month for each examiner?

Participant Demographics

Fifty-six agencies responded to the survey questions, which were initially posted on the Complete Latent Print Examination website (clpex.com), one of the most recognized avenues for information exchange within the latent print community. Participation was voluntary and there were no criteria to participate, because the intent of the survey was to assess the state of verification as currently practiced. Fifty-four of the agencies are in the United States, one is in Canada, and one is in the United Kingdom. The number of latent print examiners per agency ranged from 2 to 60, with the average being 8 examiners per unit. Representation within the United States was distributed between local, state, and federal agencies: police departments – 18; sheriff's offices – 14; state laboratories – 17; federal laboratories – 5. Overall, there were more than 430 latent print examiners represented in the study.

Results and Discussion

Extent of Verification

The overall survey results are listed in Tables 1 and 2. Table 1 lists the survey results for federal, foreign, and state agencies, and Table 2 shows the results for local police departments and sheriff's offices.

Responses to the first four questions in the survey are listed in Table 3, which lists the extent of verification performed by the responding agencies. As expected, nearly every agency (96%, $n = 54$) indicated it verifies 100% of reported identifications. One exception was an agency that does not verify all identifications made to sets of elimination prints. The other exception was an agency that does not verify victim identifications. Another agency that currently verifies all identifications stated that prior to 2003, it did not verify elimination identifications. A management change prompted the switch to its current practice.

Agency	% Identifications Verified	% Exclusions Verified	% Inconclusives Verified	% No Value Verified	Review Processed Items?	Review Nonmatch AFIS Respondents?	# LPEs	Avg. Caseload Per Month Per Examiner
Federal 1	100	0	NA	0	no	no	12	20
Federal 2	100	0	0	0	up to TR	no	15	1.2
Federal 3	100	100	100	0	no	no	3	40
Federal 4	100	unavailable	unavailable	unavailable	no	no	60	10
Federal 5	100	0	0	0	no	no	6	23
Foreign 1	100 (90)	75	60	20	occasionally	no	2	25
Foreign 2	100	10	limited	limited	no	no	8	36
State 1	100	100	100	0	no	no	19	36
State 2	100	100	100	100	no	no	4	30
State 3	100	100	100	100	no	no	6	13
State 4	100	10 - 15	10 - 15	10 - 15	yes - 10%	no	7	25
State 5	100	100	100	100	limited	no	10	37
State 6	100	death (8-10%)	death (8-10%)	death (8-10%)	death (8-10%)	no	7	28
State 7	100	100	100	0	occasionally	yes	4	40
State 8	100	100	discretion	discretion	no	no	16	27
State 9	100	100	0	0	yes	no	2	30
State 10	100	100	100	100	no	no	2	30
State 11	100	depend on Q/Q	100	0	occasionally	yes	2	19
State 12	100	100	100	100	only 1st year	yes	4	30
State 13	100	100	100	100	no	no	6	22
State 14	100	murder/sex	murder/sex	0	no	yes	9	20
State 15	100	1	0	1	no	no	5	50
State 16	100	100	0	0	no	no	12	15
State 17	100	1	5	1	no	no	6	30

Note: For Agency "Foreign 1", there are two numbers indicated in the "% Identifications Verified" column. The first (100%) represents the extent of verification performed on identifications to suspects or previously unknown parties. The second (90%) is indicative of the extent of verification performed on latents identified to elimination fingerprints.

Table 1
Survey results for federal, foreign, and state agencies.

Agency	% IDs Verified	% Exclusions Verified	% Inconclusives Verified	% No Value Verified	Review Processed Items?	Review Nonmatch AFIS Respondents?	# LPEs	Avg. Caseload Per Month Per Examiner
Local PD 1 ^a	100	100% of 10%	100% of 10%	100% of 10%	NA	no	7	30
Local PD 2	100	0	0	0	no	no	5	90
Local PD 3	100	felonies/court only	100	only if going to court	no	no	2	70
Local PD 4 ^b	100	0	0	0	no	yes	3	35
Local PD 5	100	100	100	100	no	no	6	17
Local PD 6	100	100	100	100	no	no	7	15
Local PD 7	100	0	0	0	no	no	2	11
Local PD 8	100	0	0	0	NA	no	17	55
Local PD 9	100	100	100	100	no	no	7	19
Local PD 10	100 ^c	0	0	0	rarely	yes	2	30
Local PD 11	100	100	100	100	no	no	6	20
Local PD 12	100	100	100	100	no	no	5	32
Local PD 13	100	100	100	0	yes	no	3	100
Local PD 14	100	0	0	0	no	no	3	35
Local PD 15	100	100	100	100	no	yes	3	20
Local PD 16	100	100	100	100	no	no	5	12
Local PD 17	100	100	100	examiner discretion	no	no	3	80
Local PD 18	100	100	100	100	no	no	3	15
Local SO 1	100	capital cases only	capital cases only	capital cases only	no	no	9	150
Local SO 2 ^d	100	case by case	0	0	porous IDs only	no	6	22
Local SO 3	100	100	100	0	no	no	6	70
Local SO 4	100	100	100	100	no	yes	17	25
Local SO 5	100	0	0	0	NA	no	2	15
Local SO 6	100	only if requested	only if requested	0	no	no	3	30
Local SO 7	100	100	100	100	no	small % of cases	4	22
Local SO 8	100	100	100	100	no	no	8	20
Local SO 9	100	100	100	100	yes	no	2	10
Local SO 10	100	100	100	100	yes	yes	10	50
Local SO 11	100	100	100	capital cases only	yes	capital cases only	8	47
Local SO 12	100	100	100	100	no	no	8	17
Local SO 13	100	limited	limited	limited	NA	no	7	82
Local SO 14	100	100	100	0	no	no	30	50

a 100% of 10% means that these types of conclusions are reviewed in all cases that undergo technical review (murders, aggravated robberies, and sexual assaults), which is approximately 10% of their caseload.
b Approximately 10% of their caseload.
c All identifications other than victim identifications are verified.
d "Porous ids" refers to re-examining chemically processed porous items during verifications of identification of prints from those items.

Table 2

Survey results for local police departments (PD) and sheriff's offices (SO).

Extent of Verification	Number of Agencies (out of 56)	% of Agencies
100% of identifications	54	96
100% of exclusions	31	55
100% of inconclusives	29	52
100% of 'no value' decisions	20	36
100% of all conclusions	20	36

Table 3

Extent of verification as reported by responding agencies.

Thirty-one agencies (55%) stated that they verify 100% of reported exclusions. Five of the other agencies stated that they verify exclusions only in the case of violent crimes (e.g., murder, sex crimes) or at the request of the initial examiner.

Twenty-nine agencies (52%) verify 100% of reported inconclusive decisions. As with exclusions, four of the remaining agencies verify inconclusive decisions only in the case of violent crimes or at the request of the initial examiner.

Only 20 responding agencies (36%) verify all no value decisions. Although the percentage on this particular conclusion is lower than it is for the others, it is still higher than the author expected. In addition, one agency stated that it only verifies the no value decisions if a case is going to court.

Twenty of the 56 (36%) responding agencies verify all conclusions. Again, this supports the author's experience that the minority of agencies are performing 100% verification, but the percentage was slightly higher than expected.

Unit Size and Caseload

The number of latent print examiners per agency ranged from 2 to 60, with the average being 8 examiners per latent print unit (LPU). Overall, the case output per month per examiner ranged from 10 to 150, with the average being 35. For those agencies conducting 100% verification (all conclusions), the average LPU consists of 6 examiners, with each examiner producing 24 cases per month. For those agencies not conducting 100% verification, the average LPU consists of 9 examiners, with an average output of 42 cases per month per examiner.

At first glance, it may seem that those agencies not conducting 100% verification are more productive. The author does concede that 100% verification will take more time. In fact, Maceo recently reported that it takes about 25% more time for her LPU to review all conclusions as opposed to verifying only identifications [10]. Nevertheless, the reader must consider the types of cases being handled. Some agencies are doing only comparison work, whereas others are doing comparison work and AFIS entry. Still other agencies are doing comparison and AFIS work along with evidence processing or crime scene response.

In a recent training class conducted by the author (April 2011), examiners from four agencies stated that they had implemented 100% verification. Three of these agencies reported no noticeable decrease in productivity, stating that they are practicing verification as a type of review with access to all the initial examiner's data. The other agency stated that it is struggling with a mounting backlog, but acknowledged it is conducting a complete re-examination of each case as its verification procedure.

There may also be another confounding factor present here. A number of agencies have increased the extent to which they document the examination process. This increase in documentation may have also contributed to some of the reduced case output. Consider the following response:

“Average caseload based on 100% verification from Jan. 1 through Feb. 18, 2010, is 20 cases per month per examiner. It should be noted that during this time frame, we also implemented more extensive note sheets and are currently testing four different note sheets for further modification/adoption contingent upon SWGFAST standards for documentation of analysis, comparison, evaluation and verification.

Prior to 100% verification, conducting independent verification, our average caseload was 31 cases per month per examiner. During this period of time, our notes were minimal. Caseload numbers reflect comparisons on AFIS cases and full case comparisons. Most AFIS case comparisons involve comparing one impression to one subject. The full case comparisons can involve many impressions to multiple subjects – no specific data is available. We discontinued evidence processing in March 2008 – no evidence processing numbers are included in the listed caseloads.”

Suggestions for Reducing the Time Burden of 100% Verification

Although the adoption of new procedures is rarely without growing pains, these pains can be minimized by streamlining the documentation process. Electronic worksheets can be created with radio buttons and dropdown menus so that much of the documentation can be performed with a few mouse clicks. Electronic or written checklists can contain acronyms or abbreviations that are specific to your latent print unit. As long as another qualified examiner can determine what you did and how the conclusions were drawn, there should be no problems.

Also, consideration should be given to conducting verification as a type of review with access to all data from the initial examiner. Blind verification, although a good quality control measure in certain situations, may indeed amount to a re-examination of the evidence in its entirety. Langenburg et al. reported that, in implementing blind verification, "...essentially each case (regardless of the first examiner's conclusion) would be worked twice by independent examiners." [11]

Error Rate

The Daubert decision considers, as one of its prongs for the admissibility of scientific evidence, that a scientific technique has a known or potential rate of error [12]. The author suggests that, because of the way the science of fingerprints is currently practiced regarding the extent of verification, the true error rate for casework will never be accurately determined. Perhaps the most that can be done is to establish an error rate for erroneous identifications (false positives), because practically 100% of identifications are subject to the verification phase. If that is all the courts are concerned with, then perhaps the error rate question can be satisfactorily answered. However, if the concerns regarding error rate are deeper, then the answer will not come until all conclusions are verified.

Perhaps of greater significance in any given courtroom would be knowledge of the performance history for both the latent print examiner and his or her agency. This could be relevant to the examiner's credibility and could certainly affect the weight the court gives to the proffered testimony. Unfortunately, complete performance histories for most examiners and agencies are unknown because all conclusions are not being verified as a matter of course. And even if 100% verification is practiced, it may not produce an accurate error rate. This is because casework

is being performed – as opposed to a research effort where the ground truth is known – and there may be no way to know whether the verifier is making the same mistake(s) as the original examiner.

Potentially, 100% verification should allow examiners to catch a significant number of errors. Therefore, it is reasonable to assume that agencies performing 100% verification will detect – and hopefully rectify – more errors than those agencies that do not verify all conclusions. Also, because more errors would be detected, then it would be possible to develop a fuller understanding of how and why these errors are being made. The importance of this understanding cannot be overstated. When a given agency understands why errors are being made, then measures can be implemented to reduce the number of errors. For example, if an examiner is making technical errors on highly distorted prints, then more training could be conducted in this area. Another possibility is that some examiners may experience diminished visual acuity over time. If this is the case, then it can be addressed. But if all conclusions aren't being verified, then there is no way to know how many errors are being made and reported.

The author concedes that the perceived benefits of 100% verification would be more meaningful with supporting data, but is unaware of any that currently exist. However, the author is aware of some agencies that are investigating their error rates both prior to and after implementation of 100% verification. It is hoped that these results will be published for the benefit of the latent print community.

This brings the focus back to examiners knowing their error rates, as well as those for their agencies. For example, do you know whether you, or another examiner in your agency, has ever made an erroneous identification? What about an erroneous exclusion? What about missed identifications? How many times have you called a latent print “no value” only to find out later that someone disagreed with your value assessment and was even willing to identify the latent? If an examiner or agency cannot answer all of these questions, then there is no way to evaluate the overall quality of the work product. Can this continue? Is your current practice acceptable? Can you offer the legal system information regarding the quality of your overall work product if asked? These questions are not intended to be critical, but rather are intended to make you think about how and why your agency conducts the extent of verification it does.

“Inappropriate” Decisions: Are They Necessarily Errors?

“Inappropriate” inconclusive and no value decisions were mentioned earlier in this paper. The obvious question is, Who determines whether one of these conclusions is inappropriate? Would it be the verifying examiner, a supervisor, or the quality manager? The answer to this question is likely determined by an agency’s standard operating procedures regarding verification, conflict resolution, and root-cause analysis. However, should inappropriate inconclusive and no value decisions actually be considered technical errors? Some discussion on this debatable question will now be offered, beginning with the no value decisions.

One of the most common disagreements between latent print examiners is in determining whether a particular latent print is of value. For instance, Examiner A has decided, after a thorough analysis, that a latent print is of value to advance to some further process step in the methodology. Examiner B has decided the same latent print is of no value and stops the examination at this point. Is Examiner B necessarily wrong? If Examiner B has less experience than Examiner A, and the latent print is rather difficult, then Examiner B has likely *not* made a technical error. If Examiners A and B have the same relative experience, then Examiner B may simply be opting for a more conservative approach. That still doesn’t mean that Examiner B has made a technical error. However, if Examiner B is trained to competency and *routinely* declares difficult latent prints as no value, then perhaps these are inappropriate decisions, and technical errors are being made. Further investigation would be necessary.

Determining inappropriate inconclusive decisions can be a gray area. Some agencies have different meanings for an inconclusive decision, as reported by Maceo [13]. Perhaps the most common, and appropriate, use of the inconclusive decision is when the latent print is of value but the known prints are insufficiently recorded to permit a complete examination. Yet another appropriate use of inconclusive is when the overall agreement of information between the latent and known prints is insufficient to warrant identification or exclusion decisions. In this example, the limiting factor is the latent print. An example of an inappropriate inconclusive decision is as follows: An examiner has determined a latent print to be of value and is confident regarding both the area of friction ridge skin that made the impression and the proper search orientation. Also, the known impressions are sufficiently recorded in the area(s) to be searched. If the examiner does not find agreement between the

latent and known prints after a thorough comparison, the inconclusive decision is not warranted because it is not supported by the physical evidence. However, the author has been told by numerous examiners that, in the previous example, they (or their agency) would select the inconclusive decision because they are concerned that they may have simply missed an identification if one existed. This would be inappropriate and would likely be a technical error.

At this point, the responses to the remaining questions in the survey will be examined.

Do you review actual items of evidence that were processed by the initial examiner?

The majority (n=37, 66%) of respondents stated that they do not have a second examiner review processed items of evidence, whereas only a handful (n=5) indicated they do (presumably in all cases). Ten agencies conduct a partial review of processed items of evidence. Four of the agencies do not process evidence so this question does not apply to them (Tables 1, 2).

Do you verify all nonmatch respondents from AFIS searches?

Forty-five agencies (80%) reported that they do not verify all nonmatching respondents resulting from AFIS searches. Nine agencies stated they do check nonmatching respondents in every case. One agency reportedly does this in only a small percentage of cases, whereas another agency performs these checks only in capital cases (Tables 1, 2).

The responses to this question are likely not surprising. After all, many of these nonmatches (exclusions) are effected after examination of the overall ridge flow (a.k.a. Level 1 detail or pattern type) only, a reliable practice provided the AFIS operator (i.e., examiner, technician, officer, etc.) can trust the ridge flow in the latent print. Prior to this, however, the operator should have conducted a thorough analysis of the latent print to understand its appearance.

This question also points to another potential area of concern. AFIS operators can specify the number of respondents to be returned subsequent to an AFIS search. If that number is relatively low, such as ten, and the operator does not find a potential matching respondent from the list, is it *possible* a potential match would be found if more respondents were returned? The answer, of course, is yes. However, there is a trade-off because as more respondents are returned, more time must be spent to examine their known prints.

Do You Agree with the Concept of 100% Verification?

Reasons for Conducting Less than 100% Verification

The following comments are from agencies in the study that do not conduct 100% verification. They are provided for the reader's edification; however, the agencies attributed to the comments remain anonymous.

- “In theory, yes. It would be nice to ensure that no errors of any kind were being made and to catch any training issues immediately, before they can worsen. However, we do not see such a thing as ever being feasible under realistic constraints of time, money, manpower, etc. We verify the absolute conclusions (i.e., identification, exclusion) but currently we are just too far behind to double-check every type of decision (e.g., value, AFIS quality, inconclusive).”
- “They are not required by our standard operating procedures.”
- “Backlog concerns...”
- “Lack of time and manpower in the unit.”
- “Until about 2004, this lab DID verify every lift in a case whether it was conclusive or not. But the backlog became so excessive, the rules changed to verifying identifications only or any cases with 10 or fewer lift cards. It basically came down to a productivity issue.”
- “No, it’s a knee-jerk reaction for having incompetent workers.”
- “It is not only a time/personnel crunch, but also a morale issue – you do need to trust your examiners’ abilities and judgment somewhere along the line.”
- “Conceptually, I agree with 100% verification, but I do not believe that it is feasible for agencies with large caseload/examiner ratios. If an agency has 50–75 cases/month/examiner it might be plausible, as in essence you would be doubling everyone’s case load to 100–150 cases, which is difficult but doable. However, when you consider 150 cases/month/examiner, doubling that would be ludicrous. Documentation requirements (ASCLD accredited laboratories, proposed SWGFAST standards, etc.) have a significant effect on turnaround time. By adding in 100% verification, things would come to a screeching halt.”

Actually, 100% verification would not necessarily double an agency's caseload. It depends on how an agency conducts the verification. For example, if the verification is conducted concurrently with the technical review, where the verifying examiner has access to the case record (bench notes, conclusions, etc.), then the workload is not doubled. In this example, if the initial examiner has reported an identification, the verifier's task is simply to try to falsify this conclusion. The verifier does not have to conduct a search of all record prints in the case as did the initial examiner. Rather, the verifier can now focus on the area of friction ridge skin identified and try to show it is not an identification. If the verifying examiner is not able to falsify the initial conclusion, then the conclusion has been verified and is likely to be correct. Of course, for conclusions other than identifications, more work is created because the verifier may indeed have to compare all known prints submitted.

Many will argue, and the author will acknowledge, that confirmational bias may be introduced in this type of verification practice. This really should present no problem for the verifying examiner if the examiner adopts the proper mindset when performing the verification – trying to falsify the initial conclusion [2]. Quoting from Mankevich, “The term ‘falsify’ is used in order to convey the meaning that the scientific method requires that the data be collected so that upon further study it can signal that the hypothesis (of an individualization) is false. Good scientific practices require that a means be designed into the experimentation to permit the data to yield unambiguous signals that the hypothesis is either true or false.” [6] However, if the verifying examiner adopts the position of confirming, upholding, or rubber-stamping the initial conclusion, then the stage is set for technical errors to occur, not just once, but twice.

Another type of verification is blind verification – a practice that prohibits the verifying examiner from having access to the initial examiner's notes and conclusions. In this scenario, the second examiner must conduct a re-examination of all latent and known prints in a given case, a practice that will certainly double an agency's caseload. (An exception would be if an agency has an established policy for conducting blind verification in single conclusion cases only.) Furthermore, because the intent of verification is to check not only the conclusion(s) but also the process, blind verification must be conducted in a sequential unmasking. This is accomplished by the verifier repeating the examination, as mentioned previously, thus verifying the conclusion. Afterwards, the verifying examiner can be

granted access to the original examiner's notes and conclusions. At this point, the verifier can check the process and basis for the decision(s).

- "...we are severely backlogged as it is. We do all our own latent print processing and crime scene processing in addition to comparison work. We recognize an erroneous identification as the most severe type of error and for that reason, we are committed to 100% verification of identifications. We even take the extra step of performing blind verifications on single-ID cases. However, we do not have the manpower necessary to recheck 100% of the work being done in the lab (i.e., value decisions, inconclusives). We do perform these checks during the training period, but once the examiner is signed off for independent casework, we trust them to do it correctly. The only exception to this is if problems are discovered in an examiner's work and it is subsequently subjected to additional scrutiny. Then we may begin to check all of the examiner's decisions again as the case warrants."

Of interest here is this agency's belief that an erroneous identification is the most serious error that can be committed in fingerprint examination. Indeed, it is safe to say that this view is shared by the vast majority of latent print examiners. There is a term in statistics known as the utility function, which basically is defined as the cost versus risk or penalty [14]. Examiners believe that verifying all identifications is worth the effort because of the ramifications of an erroneous identification, not only for the accused person, but also for the examiner or agency. Therefore, an agency that verifies less than 100% of exclusions is essentially saying it does not view the erroneous exclusion as seriously as the erroneous identification. This may also be reflected in the latent print certification examination administered by the International Association for Identification. Once certified, an examiner may lose his or her certification as a result of an erroneous identification, but not for an erroneous exclusion or missed identification. For a detailed discussion on how utility is incorporated into the decision process, see Biedermann, et al. [15]

Perhaps this is why SWGFAST recommends different verification practices for different conclusions. For example, in its ACE-V documentation standard, SWGFAST states, "All individualizations shall be verified. Exclusions and inconclusive results

may be verified.” [16] SWGFAST’s simultaneous impression standard states, “The conclusion of individualization shall be verified. The conclusion of exclusion or inconclusive should be verified.” [17] The “Friction Ridge Examination Methodology for Latent Print Examiners” document states, “All individualizations (identifications) must be verified. Exclusion or inconclusive results may be verified.” [18] However, a revision of this document states, “A conclusion of individualization shall be verified. All other conclusions resulting from the evaluation phase should be verified.” [19]

Comments in Favor of 100% Verification

The following comments are from agencies that support 100% verification. As with the previous section, the anonymity of the agencies is preserved.

- “We have found multiple occasions of false exclusions.”
- “Quality measures are extremely important. A recent situation in our department of reviewing an outside agency’s work enforced our belief in conducting total case review.”
- “I agree because I’ve seen its value.”
- “I do agree with the concept. Although it can be time consuming, I think it is an added measure of protection for an examiner.”
- “We instituted an all conclusion verification policy three years ago. Prior to the verification of all conclusions, our unit was verifying IDs and exclusions, although the verification of exclusions was at the discretion of the examiner. We felt that to incorporate the inconclusives would require very little additional reanalysis by the verifying examiner. We also felt that peer review was essential to the quality control measures our lab had established. Therefore, the “true” application of the scientific method (ACE-V) required the peer review of all conclusions. We realize this may not protect against all errors, and that is why our SOPs include a documentation process regarding conflicting and differing conclusions. However, there have been a number of latent prints over the years that if the inconclusives had not been included in the verification process, the discovery of the ID by the

verifying examiner would have never been reported. We realize that only a handful of labs have instituted an all conclusion verification policy and this is new territory for most latent print units. However, in speaking for all of our examiners, the advantages have definitely outweighed the disadvantages.”

- “I think verifications don’t take that long and are an essential part of our job. I take my job very seriously, and I welcome another person’s verification. None of us are so perfect that we can’t have another person validating our work. That is how mistakes are found, even if they are just clerical errors. Also, each examiner is at a different level at what he or she determines to be a good usable print. Aren’t we here to improve our skills and do the best job possible? If a more experienced examiner can find a print usable that I can’t, it should be looked at by that person. If we don’t verify 100% of all prints, how would we ever catch those prints?”
- “Yes, I do agree with 100% verification. The only exception, as I have said, would be the non-matches remaining on an AFIS candidate list after an identification has been made. I believe that having a verifier catch misses can be just as important as catching a misidentification. I think it is necessary for a senior or trainer to verify inconclusive and no value determinations in order to properly evaluate the competency of all the examiners working in an office. This also provides a mechanism by which discrepancies may be found and discussed. In my experience, I have seen latent lifts that were indicated as “no value” transform into an AFIS “hit” based on the experience and skill of a different examiner.”
- “In my opinion, all mark identifications that are to be reported should be verified by two other examiners. It is to provide a robust checking system, and in over a hundred years of use in the courts, it has stood us in good stead. Yes, we have had errors, but what is the percentage to the number of good identifications made? Not zero, but not anywhere near 1%. Even this is too much, but in every field of human endeavor you will find mistakes. This is why we need to recognize cognitive bias and its impact in our decision making

and ask verifiers to try and disprove the identification rather than proving it.”

The preceding comment introduces an interesting concept. Are two verifiers better than one? In other words, will multiple verifiers potentially detect more errors than a single verifier? It is possible, of course, for a lone verifier to repeat an error made by the original examiner. But would a second or third verifier also make the same mistake? Although this can happen, as shown in the Mayfield case [20], reported cases of this happening are extremely rare. The author is aware of several agencies that routinely use multiple verifiers but is unaware of any data that may exist to justify this as a superior practice to a single verifier. Multiple verifiers may also contribute to reduced case output, but the benefit would be that more errors should be detected. Each agency will have to decide how to operate as efficiently as possible while producing an accurate work product.

Questions to Ponder

Prior to concluding this article, there are some questions listed below for consideration.

1. Are identifications to additional suspects being missed by not conducting 100% verification?
2. Are additional identifications being missed on suspects already identified?
3. Is the extent of verification a scientific or an administrative issue?
4. Why isn't the latent print community verifying all conclusions?
5. Why isn't your agency verifying all conclusions?
6. Why are practically 100% of identifications being verified when erroneous identifications comprise an extremely small percentage of technical errors?

Conclusion

Ultimately the decision to perform 100% verification (review) is up to the individual agency or examiner. Numerous comments both for and against 100% verification have been presented, along with several questions for consideration. Not surprisingly – and understandably so – the most frequent arguments against this practice were large case backlogs coupled with insufficient personnel. It *will* take more time to implement the review of all reported conclusions, a sacrifice many agencies are unwilling to make either for the reasons previously given or perhaps simply because of the fear of the unknown. Contrary to popular belief, 100% verification (done as a type of review with access to all the initial data) should not double an agency's caseload. However, blind verification of all conclusions would double the caseload because a re-examination of each case would be necessary, a practice not likely to be implemented by most agencies.

Although an improvement in overall quality may be achieved with 100% verification, one must consider that fewer cases may get worked. As a result of this in casework, fewer suspects may be identified in a timely manner, thus leading to delayed apprehension of these individuals. In the meantime, these individuals may commit additional crimes. Some agencies may simply feel that this is not an acceptable situation and will therefore reject the practice of 100% verification.

However, 100% verification should lead to a decrease in the number of reported technical errors, thus creating a better work product. In addition, knowledge of both examiner and agency error rates is attainable using this practice. Examiners and agencies may also gain an understanding of how errors are made and take steps to mitigate these errors in future examinations. And yes, 100% verification may reduce agency or examiner liability. Therefore, it is essential that the latent print community do everything possible to ensure that scientifically correct conclusions are reached. Verification of all conclusions is a necessary step in this direction to minimize the technical errors that can, and will, occur.

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