

A Pilot Study in Latent Print Conflict Management

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Abstract

Due to its subjective nature, the latent print comparison methodology possesses inherent potential for disagreement between experts examining the same friction ridge impressions. To regulate these differences, management of latent print sections typically involves conflict resolution policies that outline appropriate action for handling differences of opinion regarding friction ridge impressions. As the forensic science culture shifts toward standardization, what approach is the appropriate way to resolve these situations? This study analyzes responses from surveyed latent print examiners in an attempt to develop a recommendation through the analysis of current methods for mitigating conflict. Results show inconsistent handling of conflict resolution across respondent agencies.

Keywords: Latent prints; Latents; Fingerprint; Verification; Consultation; Conflict; Conflict resolution

Introduction

The fingerprint methodology possesses the potential for conflict as a subjective forensic science discipline. Conflict arises when two examiners do not agree on the analytical decision of value, or an evaluative conclusion of identification, exclusion or inconclusive. Recognizing the potential for conflict, some agencies implement preemptive policies to mitigate its presence, such as minimum point or feature standards. The purpose of these standards is to pre-emptively determine the examiner's ability to progress to the comparison phase and to subsequently yield an evaluative conclusion for verification. Yet experience and training differences remain, which have shown to affect an examiner's ability to identify minutia presence and types from competing factors such as pressure, distortion effects, background interference or processing technique [1-4]. To understand the potential for conflict, empirical analysis on the four-staged fingerprint methodology is presented before an analysis of responses from surveyed latent print examiners to elucidate trends in the management of latent print conflict.

Literature Review

While prior research separates each individual component of the analyse, compare, evaluate and verify (ACE-V) methodology for assessment, it typically uses ground truth impressions that do not demonstrate the real-world results of disagreements and how implemented policies work to mitigate conflict. Despite the call for transparency regarding errors from the 2012 National Institute of Justice committee on human factors, research lacks analysis of consultation and conflict resolution procedures.

Analysis

Analysis is arguably the most important step in the ACE-V process as the examiner determines the sufficiency, or relative value, of a friction ridge impression. Value is used to determine ability to compare

and to subsequently formulate an evaluative conclusion (i.e. identification, exclusion or inconclusive). The examiner will also assign a relative weight for each observed feature as well as associated tolerances for variations in appearance [5,6]. Problematically, there is no agreed upon definition for friction ridge features because examiners exhibit highly variable results in extracting this data [1]. Despite the seemingly regimented analytical procedure, differences exist due to the lack of definitional requirements and expert skill level.

A key argument for friction ridge examiner validity relies on the expert's ability to differentiate actual friction ridge detail from background interference, pressure and distortion. However, these factors can affect the weight assigned to each observed minutia as examiner confidence varies [7]. Research visualizing weight has used a color-coded system based upon a stop-light, where green equalled high confidence and weight and red equalled low confidence and weight. Results from this research confirm differences in the ability to analyse impressions as the results show both inter- and intra-agency minutia identification variances. Moreover, results show daily variances in the number of reported minutia from the same analyst examining the same impression. Standardized training showed reduced variances in minutia selection as differences were less prevalent from participating Dutch examiners. Additional research into the comparison and resulting evaluative decisions allow for an understanding in differences between conclusions.

Comparison and evaluation

Empirical analysis of the comparison and evaluation phases of the ACE-V methodology focuses on the examiner's ability to render the correct conclusion. Results have shown examiners to be extremely accurate when identifications occur with erroneous identification rate of 0.1%-0.68%; however, accuracy dwindles for exclusionary conclusions as the erroneous exclusion rate rockets to 7.5%-7.88% [2,8-10]. It is argued that examiners attempt to avoid erroneous decisions by reverting to an inconclusive conclusion and that erroneous exclusions occur far more often because there is no generally agreed upon standard upon which an examiner should exclude [11]. The low error rate of latent print experts lends itself to the

argument that anyone could compare latent print impressions and thereby segues into other error rate studies. Examination into the verification stage is also required for an understanding of how conflicts arise.

Verification

Verification research focuses on the ability to identify erroneous conclusions and prevent them from being reported. While examiners prevent all false positives from being reported, examiners failed to recognize all false negatives [12]. Prior knowledge that verification processes were in place was also noted to increase the number of erroneous exclusions by the primary examiner. However, when differences of opinion occurred, most were resolved in consultation between the examiners wherein each discussed his/her opinion. This type of discussion, or persuasion, from one analyst to another to justify a conclusion allows for each examiner to re-analyze and re-compare the latent print impression; however, there have been several challenges to this practice by cognitive bias researchers [13]. When conflict occurs, studies show that half of the decisions were ultimately reported inconclusively while half resulted in definitive conclusions. Moreover, when examiners disagree on value, value is usually reported, but the comparison ultimately yields an inconclusive decision. While years of experience did not predict responses for matching trials, exclusion trials show analysts with more than ten years' experience were more likely than those with less than ten years' experience to exclude than deem the comparison inconclusive [6].

While these examinations provide valuable information, the field is lacking research into the resolution of conflict as it occurs in real-world scenarios that do not have the safety net of ground truth knowledge. This study reports results from surveyed latent print examiners regarding conflict resolution policies of agencies in the United States.

Method

Latent print examiners were asked to complete a survey, disseminated through a fingerprint interest group consisting of latent print examiners and maintained by a colleague at the Houston Forensic Science Centre. This group contains over 700 individual contacts in the forensic science community. Participants contacted from this list remained anonymous to the authors, who have no personal knowledge of the fingerprint group's composition.

Individuals completing the survey were asked a series of questions pertaining to their respective agency state location, accreditation status, number of latent print examiners, number of certified latent print examiners, existence of a conflict resolution policy, believed conservative or liberal bias post-conflict and reporting status. Participation in the survey was completely voluntary, examiners could skip questions they could or did not feel comfortable answering and results were submitted and recorded anonymously.

Results

Forty-seven respondents participated in this survey, rendering a response rate of approximately 6.7%. Over half of the respondents reported from the states of Texas (n=16) and California (n=8); however, respondents across the nation also participated. Figure 1 visualizes state representation of participants completing the survey. Accreditation status shows that a majority (n=29) of respondents are employed at accredited agencies. Of the respondents reporting that

their agency was not accredited, four reported from California, five from Texas, four from Washington and one each from Colorado, Florida, Louisiana, Michigan, and Nebraska (Figure 2).

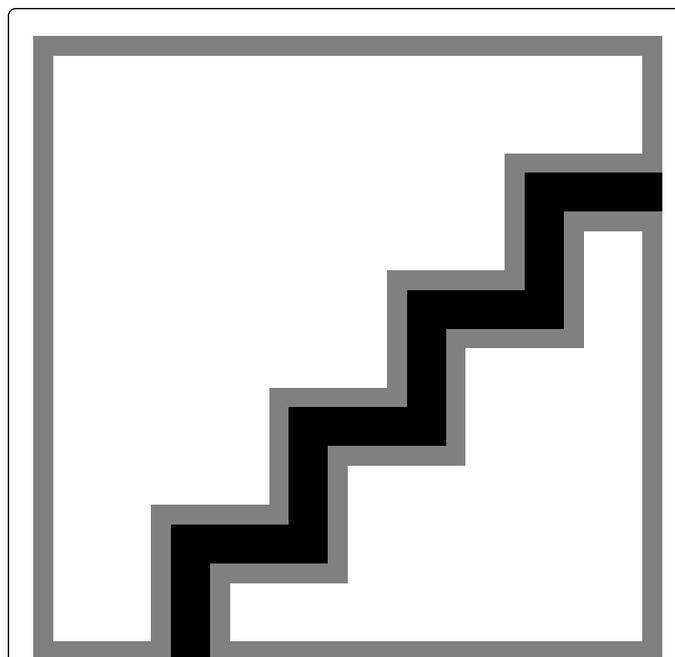


Figure 1: This figure depicts respondent agency state-level representation. Furthest west was Alaska to furthest east Maryland. One respondent did not report agency's state location.

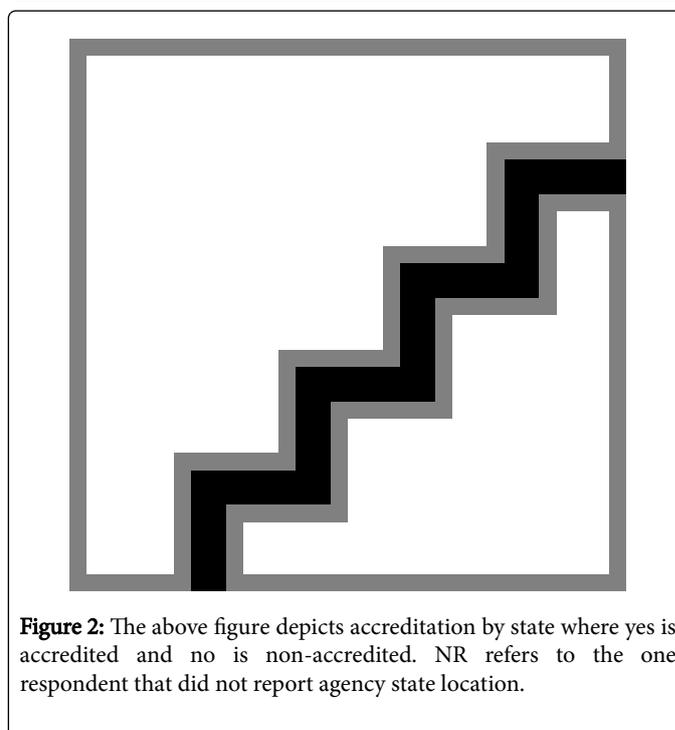
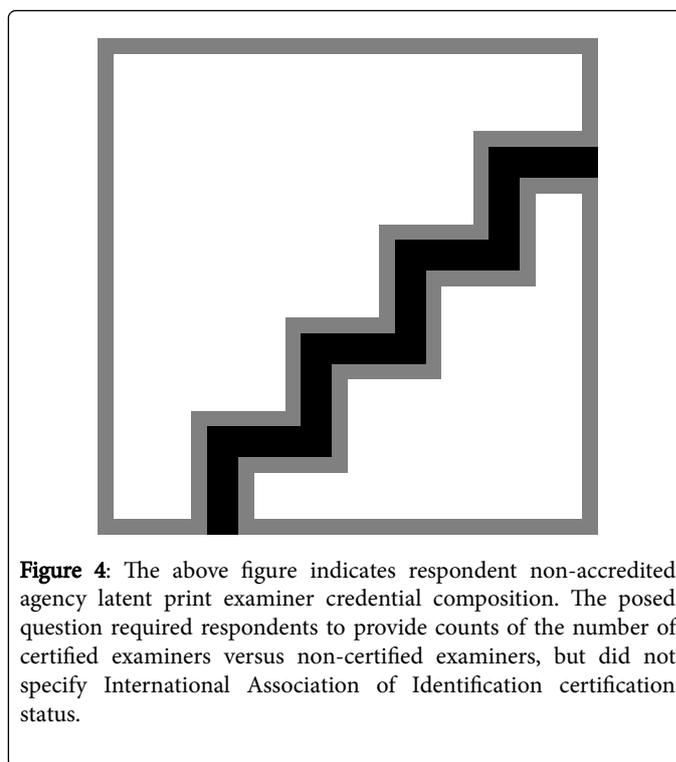
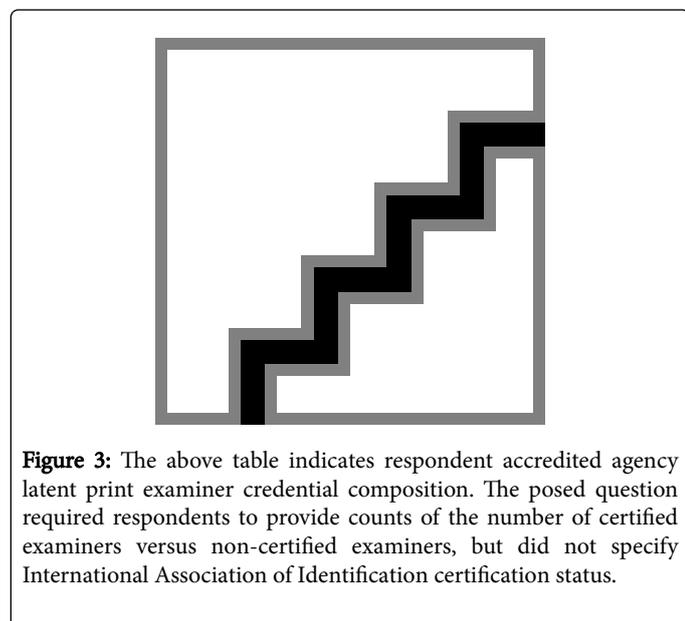


Figure 2: The above figure depicts accreditation by state where yes is accredited and no is non-accredited. NR refers to the one respondent that did not report agency state location.

Respondents also reported from a wide range of agency sizes consisting of a mixture of both certified and non-certified latent print examiners. The largest agency represented forty latent print examiners,

thirty-three of which were certified, while the smallest reported zero latent print examiners. It is unclear whether the respondent meant that there were no individuals dedicated solely to latent print examination duties *via* job title or whether the agency outsourced latent print examination casework. Most respondents (27) noted that their agencies possessed less than ten total examiners while twenty respondents reported latent print sections consisting of over ten examiners. Examining accreditation status, respondents from larger agencies (examiners>10) reported agency accreditation; however, four agencies (two agencies of eleven examiners, one with twelve and one with thirteen examiners) reported that their agency was not accredited. Fourteen respondents from non-accredited agencies worked for those with fewer than ten latent print examiners. Most of the reported unaccredited agencies (n=11) have four or fewer latent print examiners. Figure 3 visualizes relative number of latent print examiners versus certified latent print examiners per accredited agency state by respondent and Figure 4 depicts non-accredited agencies.



Examination of conflict resolution policies reveals that most respondents (76.5%) are employed at agencies that have implemented a conflict resolution policy. Eleven total respondents reported being employed at agencies with no conflict resolution policy, three of which were accredited. Those without a conflict resolution policy also reported from smaller agencies employing less than six examiners, three agencies without a conflict resolution policy only had one examiner on staff. Looking at those with conflict resolution policies, fifteen (42%) reported that the conflicted latent print would be sent to the supervisor who could yield the final decision on the latent print or send the impression out to the section to form a consensus opinion. One respondent indicated that the latent print would be reported out as inconclusive as a result of the contested nature of the conclusion. Six respondents (17%) with resolution policies noted that any impression involved in a difference of opinion would be sent out for blind verification to resolve the conflict. Remaining resolutions for conflict involved sending the impression to the section for consensus reporting.

Participants also provided insight into documentation and reporting procedures. While most reported that their respective agencies possessed a conflict resolution policy, not all required documentation of consultation occurring between examiners. In fact, seven respondents whose agencies implemented a conflict resolution policy indicated that documentation was not required for consultation between examiners. Only 80% of respondents with conflict policies reported that documentation was required during consultation. When asked whether the response indicated a conservative bias (conflict resulted in inconclusive being reported) or liberal bias (conflict typically resulted in identification or exclusion being reported), a majority of examiners reported conservative bias (72%) while 12% reported a liberal bias and 14% did not respond. Consensus regarding reporting procedures shows that a majority (80%) do not report conflicted results in their reports, requiring an attorney to request the

notes in discovery to reveal the conflict. Figure 5 depicts accredited agency conflict resolution policy and documentation policy existence. Figure 6 visualizes the same for non-accredited agencies. Figure 7 visualizes response bias.

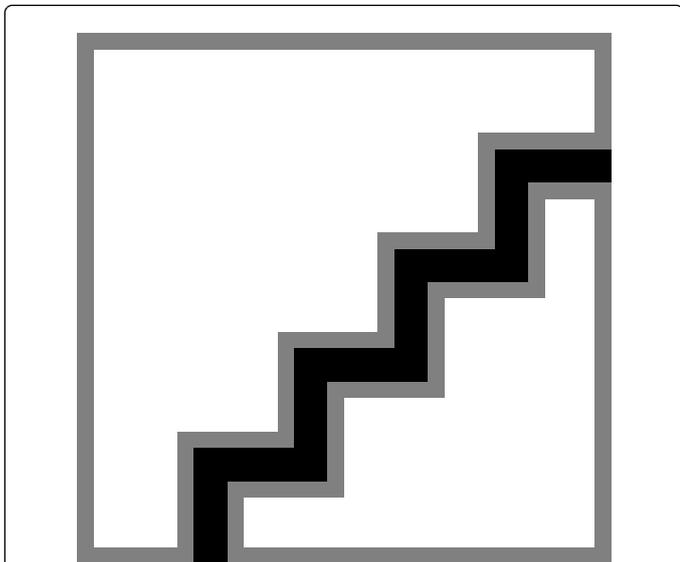


Figure 5: The above figure indicates whether the respondent accredited agency has a conflict resolution policy. While most accredited agencies have a conflict resolution policy, ten percent of those responded that their agency does not have one. This is concerning as there is no documented standardized procedure for handling disagreements between examiners. Furthermore, most of these agencies require documentation of the disagreement, but not all agencies with a conflict resolution policy require the documentation of the disagreement and subsequent resolution.

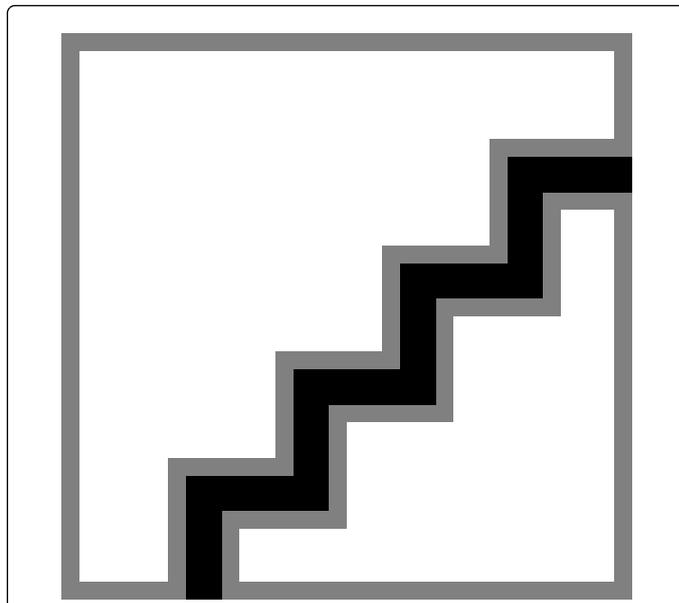


Figure 6: The above figure indicates whether the respondent non-accredited agency has a conflict resolution policy. While most non-accredited agencies have a conflict resolution policy, almost half of those responded that their agency does not have one. This is concerning as there is no documented standardized procedure for handling disagreements between examiners. Furthermore, most of these agencies do not require documentation of the disagreement and subsequent resolution.

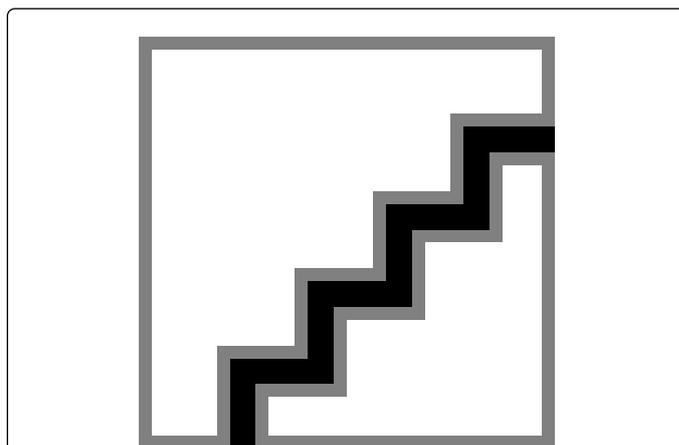


Figure 7: This figure visualizes responses to the question: Does the conflict resolution policy show a conservative response (latent reported as no value or inconclusive) or a liberal response (identification or exclusion is reported). Most examiners note the conservative response, an inconclusive decision.

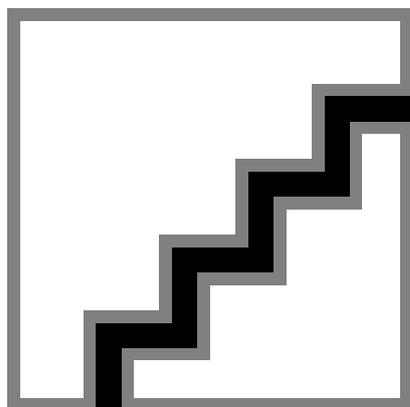


Figure 8: The above figure indicates whether respondents report to an agency with a minimum point standard for value or determination of evaluative conclusions like identification or exclusion. Most respondents do not report to agencies with these type of standards; however, minimum point standard policies for those reporting yes resonated around 6-8 minutiae. Some respondents also reported differentiating between the distal phalange (finger) and the rest of the palm where in the finger requires 6-8 minutiae and the palm around 16. Respondents from agencies with minimum point standards for evaluative conclusions reported orientation clues, or anchor points, known distal orientation and minimum minutiae counts.

Evaluation of point standards reveals that agencies of most respondents (66%) do not apply them for delineating latent print value nor do they adhere to them when making a comparative conclusion. If an agency required a minimum number of points or features to determine value (n=16), only nine required the same to formulate an evaluative conclusion. If a respondent reported that his/her agency possessed a point standard for value, most indicated that their agency required eight minutiae for a latent print to be of value; however, minutia counts as low as five and as high as ten were reported. Three participants indicated using a standard that separated palms from finger impressions by requiring more features to be noted in the palm impression to be deemed of value. Figure 8 visualizes reporting of required minimum point or feature standards.

Most agreement between respondent agencies occurred with reporting procedures. The majority of respondents (81%) indicated that their agencies do not report that the reported conclusion was a result of a conflict resolution decision. A smaller subset indicated that their agencies reported the conflict. Figures 8 and 9 visualize these findings.

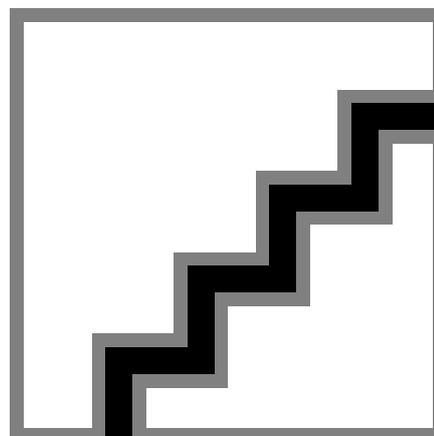


Figure 9: This figure visualizes response to the question: Does the final report indicate that the conclusion was reported as a result of your agency's conflict resolution policy? Most agencies do not report this fact.

Discussions

Results from this survey provided insight into the prevalence of conflict resolution policies across the United States. While many respondents noted that their agency possessed conflict resolution policies, they were typically centered in agencies with more than six examiners. Written policies allow for a uniform method in managing differences of opinion regarding friction ridge impression interpretation. Agencies without a written policy may not consistently handle their conflicts in the same manner; however, this survey did not delve into casework to evaluate this.

An analysis of specific agencies was not included in order to protect anonymity; however, paraphrased policy descriptions provided an understanding of the respective agency's policy. Blind and consensus procedures prevail; however, additional research is needed to gauge the ability to remove bias from the process. An examination of potentials for personal bias should be examined when a supervisor is involved or when the fact that an impression is known to be under conflict. Finally, an analysis of the agency examiners could reveal whether section examiners are aware that a conflict occurs before each is presented with the impression for a consensus agreement, or blind procedures. This analysis would allow for the potential to determine pre-existing biasing effects before the resolution has been initiated. Moving past the policy itself, the survey also provided important insight into documentation and reporting procedures.

Evaluation of documentation during consultation phases indicated that it was not always required. As examiners discuss the impression, one individual may move toward a different conclusion. This movement could be the result of confirmation bias, yet documentation provides transparency regarding the events occurring within the methodology. While most respondents reported that their agency required documentation throughout the ACE-V process, including any consultation and conflict between examiners, many did not include evidence of conflict on official reports. Most respondents indicated that discovery requests are required, which allow for the notes to be delivered to criminal justice practitioners of the court. Further analysis

is needed regarding transparency of conflicted results in reports and testimony is required for a recommendation regarding disclosure. While transparency has been urged by the committee on human factors, there is a lack of research regarding how this type of disclosure would ultimately affect the trier of fact.

Conclusions

Important insights from this study revealed that while conflict resolution policies and minimum point or feature standards varied across respondents, most reported that conflicts were not reported thereby reducing transparency of the examination process. While this study revealed inconsistencies in the existence of conflict resolution policies and reporting procedures, additional research is required. Policies that require consult with an outside agency seem to safeguard against internal bias; however, further examination is also needed here. An in-depth analysis of casework and reporting outcomes for conflicted comparisons would provide a more complete understanding of how the reported policies function *in vivo*.

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