

**Effects of contextual information on the verification phase of fingerprint comparisons and experts' motivation to carry the ACE-V process**

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**1 WHY IS THIS IMPORTANT?**

- In the past there have been some cases where fingerprint examiners made some misidentifications (Dror, 2013):
  - 2004 Madrid Bombing – **Brandon Mayfield** was wrongfully identified by the FBI. Afterwards he was released and paid compensation for this error (OIG, 2006).
  - 1997 Detective **Shirley McKie** was accused of leaving her fingerprint in a murder scene. In 1999 the jury accepted the evidence that the identification was wrong (Champod & Chamberlain, 2013).
- Some ACE-V exams were made without 16 agreement minutiae in past fingerprint examinations (Champod & Chamberlain, 2013).
  - The **Official Guidelines have changed**, and now examiners do not have a specific number of minutiae to refer, but the examinations need to be peer-reviewed by, at least, three independent experts (ACE-V).

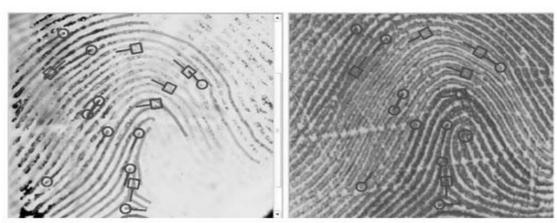


Fig.1 Illustration of 16 agreement minutiae in terms of ridges in sequence.



**2016 FESTIVAL POSTGRADUATE RESEARCH**

**2 WHAT PREVIOUS RESEARCH HAS FOUND**

- Official reports have been asking the forensic community about the possibility of making forensic experts aware of possible cognitive contaminations during their work (National Institute for Standards and Training, 2012; U.S. National Institute of Justice, 2012; U.S. National Research Council of the National Academy of Sciences, 2009).
- Decision-making processes in forensics still need more research in topics such as the factors that affect examiners' work in the laboratory or when providing testimony in court (Thompson, Tangen & McCarthy, 2014).
- In a recent study Ulery, Hicklin, Buscaglia and Roberts (2012) demonstrated that examiners who do not repeat their examinations can have different quality standards from their peers.
- Another study (Ulery, Hicklin, Buscaglia & Roberts, 2011) shows that examiners frequently did not perform blind verification, which is not in accordance to ACE-V's guidelines.
- Coen-Cagli and colleagues' study (2009) have used technology such as eye-tracker to better understand how experts work. Another study, this time with fingerprint experts, made by Yu, Busey and Vanderkolk (2011) focused mainly on differences between senior experts and novices.
  - The authors claim the possibility of having a reliable and accurate tool like eye-tracker to measure subjects with "high-quality empirical data" regarding their eye movements (p.212).

..... WHAT FINGERPRINT EXAMINERS THINK ABOUT THEIR WORK? .....

**IT IS MORE THAN ERRORS**

..... WHAT TYPE OF FACTORS CAN AFFECT EXAMINERS' PERFORMANCE? .....

**3 SAMPLE AND METHODOLOGY**

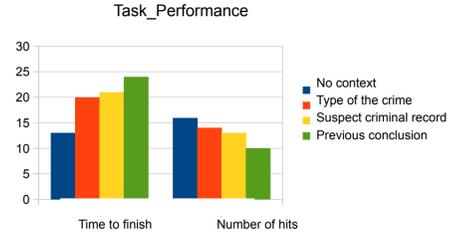
- 1. Computer-based experiment**
  - 8 Countries [England, Scotland, U.S., Belgium, Netherlands, Germany, China, Brazil]
  - N=35 participants with a range of experience between senior experts [more than 15 years] and novices [less than 5 years].
  - Different approaches were carried within participants bureaus: Numerical and Holistical.
  - The experiment consists in comparing pairs of images similar to fingerprints (latent prints and known prints). Participants were asked if the pairs MATCH or NON MATCH. To do that, participants had only 30seconds as this was intended to be a rapid decision task in order to observe the effects of different types of contextual information.
  - There were 4 blocks (1. No context/control; 2. Type of crime; 3. Suspect's criminal record; 4. Previous conclusion). In each block 20 trials were done by participants.
  - In total **2800 comparisons** were done in this experiment.

- 2. Individual Interviews**
  - N=45 participants that participated in a semi-structured interview where topics related to the methodology fingerprint experts follow within their case work such as:
    - ACE-V process [International guideline for fingerprint comparisons];
    - Motivation to carry the ACE-V process;
    - Standards and accreditation processes within each bureau;
    - Suggestions and improvements in this specific area.

**4 RESULTS AND DISCUSSION**

Results show that the effects of contextual information are different in each block. Seems that there is a block where performance was lower than in the others → **PREVIOUS CONCLUSION**.

Also, it seems that the time examiners need to finish the task in each block is bigger when any type of contextual information is shown.



There are two types of motivation that fingerprint experts have when thinking about their work: (1) Mastery Orientation and (2) Normative Orientation.

These explicit different types of motivation lead us to re-think the guidelines for new accreditation processes for H2020.

MOTIVATION GOAL ORIENTATION	MASTERY ORIENTATION (INTELLECTUAL ORIENTED) (Senko et al., 2011; Pinch, 2000)	NORMATIVE ORIENTATION (CONTEXTUAL ORIENTED) (Senko et al., 2011; Elliott & Miller, 2003)
ACCREDITATION PROCESSES	HIGHER MOTIVATION (see table 2)	HIGHER MOTIVATION* (see table 2)
PRESSURES FROM OTHER DEPARTMENTS	LOWER MOTIVATION (see table 2)	LOWER MOTIVATION (see table 2)
FEEDBACK	SIMILAR MOTIVATION (see table 2)	

These results are a good indicator to show that the research on contextual information within case work needs more investment, and definitely to include the experts in these discussions.

Official guidelines started to mention that examiners need to be blind about contextual information, although some types of contextual information have the same/similar effects as when examiners don't have any type of contact with context. And more, some contextual information seem to increase expert's motivation during their work flow.

These results can only serve to support further research as the setting is different from real case work → **which will happen in September/October 2016 with forensic bureaus in the UK.**

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