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Bracketing off population does not advance ethical reflection on EVCs: A reply to Kayser and Schneider

In a recent contribution to this journal, Kayser and Schneider reviewed the relevance of external visible characteristics (EVCs) for criminal investigation [1]. Their aim was to broaden the debate about the scientific, legal, and ethical dimensions of the use of EVCs for criminal investigation, which will help to achieve a firm legal basis for the application of EVCs eventually. While we applaud Kayser's and Schneider's overall very thoughtful and nuanced discussion of this topic, we were surprised to read that they suggest that a discussion of 'the challenges of using problematic definitions of populations [...] has to be kept separate from using EVCs' (p158). In contrast to these authors, we contend that questions about defining populations – both at the level of scientific research, and the application of EVCs in criminal investigation – lie at the core of most social, ethical, and legal issues raised by the translation of EVCs into forensic and police practices.

Issues around population are partly of a technical nature, insofar as they concern questions of how a population can be defined and population-neutral markers can be developed [2]. They involve pressing normative questions that are and should continue to be part of ongoing research agendas in forensic genetics [3]. How a certain population is defined in the laboratory and in forensic practice has much more far-reaching implications. Next to the three EVC markers discussed by Kayser and Schneider, red-hair, blue and brown eyes, EVCs include STRs and SNPs typically located on the Y-chromosome and mtDNA. Y-chromosomal DNA and mtDNA are passed down virtually unaltered from generation to generation and therefore allow for tracing back paternal and maternal lineages, which includes offspring and siblings, but extends also to intergenerational relationships between individuals and their Y chromosomal and mtDNA ancestors [4]. The latter enables inferences about the probable ethnicity, as defined in population genomics, of the originator of a biological trace [3, 5-7]. Thus, as Kayser and Schneider indicate, it is pivotal to keep in mind that EVCs provide no more than statistical probabilities calculated on the basis of aggregate

data; they do not, and cannot, individualize. The establishment of protocols regarding the utilization of such probabilistic information on ethnic background in police investigations will be a crucial step towards preventing unintended consequences.

In the Dutch case, where legal provisions are in place, politicians and legislators have welcomed DNA-based EVCs as useful tools in serious and high-profile cases where criminal investigators have no useful clues about the suspect. The idea is that DNA-based EVCs will generate investigative leads, and sometimes also solicit clues about the suspect (e.g. when broadcasted on national television). It is not hard to imagine that in case of a serious crime in a neighborhood of a Western European city, the following two profiles will not only have different operational value but also different social implications:

Profile 1: Male suspect, likely of Western European ancestry; likely to have blue eyes; unlikely to have red-hair.

Profile 2: Male suspect, likely of Mediterranean ancestry; likely to have brown eyes; unlikely to have red-hair.

Profile 1 does not give many operationally useful clues, as it would apply to a good proportion of the population of our fictional city. Yet EVCs can be and has been used to exclude suspects from ethnic minorities. While this is certainly a positive effect of the use of EVCs in criminal investigation, the flip side of the coin is that the second profile foster exactly the opposite, namely forms of racial profiling and the incrimination of a whole population. Such cases have occurred in recent history and lead to violations of basic rights of large groups of people (for descriptions see [8-12]). Infringements of the rights of groups of individuals typically occur when volunteers – approached according to criteria that correspond with certain presumed ethnicities – are requested to provide samples 'voluntarily'. If such requests are declined, individuals may find themselves reclassified as suspects, from which, in various jurisdictions, DNA-samples can be taken by force [13]. Because their suspect-status – in this case – derives from the mere fact that they are assumed to belong to a certain ethnic group, this must be seen as violation of their rights to bodily integrity and privacy.

It is however crucial to emphasize that EVCs, even when they are robust and prudently implemented, will in many cases depend on eye-witness accounts to solve a crime. For in a large scale genetic study based on 'volunteer' samples may not always be permitted or, then again, it may not result in the inclusion of the suspect. More generally, EVCs are part of a criminal investigation employing a number of different technologies, e.g. profiling, fingerprint analysis, and CCTV footage. Different forensic data are thus combined

and interpreted, and subsequently merged into knowledge about the unknown suspect [14]. It is not possible to attest ethicality to the application of one certain technological tool as if it were used in isolation.

Furthermore, in certain countries the male suspect in our example, who – according to DNA-based EVC analysis – is likely to be brown-eyed and of Mediterranean ancestry, is likely to be assumed to be 'Moroccan'. If this is an assumption that is made in the public realm, it increases the risk of stigmatization of individuals and groups, reinforces racial categories [3, 8-12, 15], and clusters an entire population group into a 'suspect population' [16]. If such assumptions enter investigative considerations as well, then members of such 'suspect populations' will have to be actively excluded as possible perpetrators e.g. by means of DNA dragnets. Furthermore, these assumptions, when they become part of investigative considerations, are problematic also in the sense that they bias and effectively unduly limit the pool of possible suspects.

If individuals are turned into quasi-suspects merely because they resemble an EVC profile, or because they belong to a certain ethnic group that the perpetrator is assumed to belong to, and then need to prove their innocence by providing a 'voluntary' DNA sample, the onus of proof is shifted from the Office of Public Prosecution to the 'volunteer'. This compromises, if not effectively abolishes, the presumption of innocence [10, 17]. While it could be argued that the same is the case when people become suspects because they fit an eye-witness description, the case of DNA-based EVC is different as incrimination here is achieved through population genetics instead of crime-related leads and clues. This poses the question whether such forms of 'genetic policing'[17] are desirable in an atmosphere in which DNA-technologies are seen by many stake holders as infallible 'truth machines' (for comments see [18, 19]), and knowledge of forensic science in the police force is generally low [20].

As our examples show, EVCs have moved the problem of defining population centre stage [8]; what is at stake are not only individual rights but civil rights of entire groups of people. Avoiding unintended consequences of the use of EVCs for forensic and policing purposes will not be achieved by discussing scientific and operational issues alone. Given the risk and potential social consequences, forensic geneticists, police examiners as well as experts on the ethical, legal, and social aspects of EVCs should engage in ongoing debate as to safeguard proper use of this technology [3, 8].

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