



Towards a forensic anthropology of structural vulnerability

Robin C. Reineke^{a,b,*}, Angela Soler^c, Jared Beatrice^d

^a The Southwest Center, University of Arizona, 1401 E. First St., P.O. Box 210185, Tucson, AZ, 85721-0185, USA

^b School of Anthropology, University of Arizona, P.O. Box 210030, Tucson, AZ, 85721-0030, USA

^c Forensic Anthropology Unit, Office of Chief Medical Examiner of New York City, 421 E 26th St, New York, NY, 10016, USA

^d The College of New Jersey, Social Sciences Building Room 317, P.O. Box 7718, 2000 Pennington Rd., Ewing, NJ, 08628, USA

ARTICLE INFO

Keywords:

Forensic anthropology
Structural vulnerability
Human identification
Profiling
Skeletal indicators of stress

ABSTRACT

Anthropologists have theorized structural vulnerability as a way to understand forms of violence that disenfranchise certain parts of a population, leading to poorer health outcomes and increased risk of death. Recently, forensic anthropologists have used these theories to better understand the ways in which individual decedents in forensic contexts may be linked collectively through structural conditions. A recent example is the proposal of a “structural vulnerability profile.”

Based on research and casework done in the context of migrant deaths along the US-Mexico border, we caution against the use of a “profile,” which suggests a categorical approach that could lead to negative unintended consequences in the future. Instead, we argue for continued development of practices that allow for observation, documentation, and interdisciplinary discussion of evidence of structural violence revealed during a death investigation. Specifically, we argue for an approach that grounds such observations within a particular social and historical context.

1. Introduction

The late Paul Farmer [1] challenged anthropologists to better integrate history, biology, and political economy in order to understand how structural violence operates and how it is hidden. He specifically called for more attention to the dead: “An anthropology that tallies the body count must of course look at the dead and those left for dead. Such inquiry seeks to understand how suffering is muted or elided altogether” ([1]:307). Continuing, he called specifically for the integration of forensic expertise: “To tally body counts correctly requires epidemiology, forensic and clinical medicine, and demography” ([1]:308). As the field of anthropology as a whole has begun to pay closer attention to such “body counts” [2] a growing number of forensic anthropologists have recently begun to use their skills as both osteologists and anthropologists to make visible the links between social marginalization and premature and violent death [3–16].

The work of these anthropologists to document and share evidence of structural violence and other forms of marginalization represents a radical shift in domestic forensic anthropological discourse, which has traditionally been focused on individual “cases.” These practitioner-researchers are not only beginning to document, as Zoe Crossland

stated, “how extreme poverty can be embodied in the skeleton” ([17]:xiii) but also as articulated by Byrnes and Sandoval-Cervantes, “how marginalization influences forensic science and how forensic science can create marginalization” (16:xxviii). We are proud to be a part of this disciplinary shift, and join others in arguing that forensic anthropologists have a responsibility to document evidence of structural vulnerability and violence.

However, the complicated, creative, and messy work of changing a discipline involves extensive dialogue and careful consideration of future possibilities, both positive and negative. In this article we aim to critically engage with the recent discussion around the documentation of structural violence in a forensic context by highlighting several possible unintended consequences that could bring harm to those very same people we wish to help. First, we discuss dangers we perceive in proposals for a “structural vulnerability profile,” [13,14]. In a close reading of these discussions, we find a potentially dangerous categorical approach to human variation (both biological and social) lurking at the margins. We fear that without precise language and humility around what a structural vulnerability assessment practice is capable of accomplishing, a “structural vulnerability profile” could be lost in translation in future medicolegal work in ways that could perpetuate

* Corresponding author.

E-mail addresses: reineke@arizona.edu (R.C. Reineke), drangelasoler@gmail.com (A. Soler), beatricj@tcnj.edu (J. Beatrice).

<https://doi.org/10.1016/j.fs SYN.2023.100332>

Received 1 December 2022; Received in revised form 3 May 2023; Accepted 5 May 2023

Available online 16 May 2023

2589-871X/© 2023 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

stigmatization [37] and marginalization. Second, it is important to delineate that the embodied manifestation of structural vulnerability is inherently very distinct from assumed hereditary traits or “ancestry,” and that the methodological assessment of structural vulnerability should not be assumed to mitigate the complications inherent in the forensic anthropological assessment of ancestry or population affinity.

We argue for continued documentation, interpretation, and discussion of evidence of structural vulnerability, but caution against the creation of a “profile” linked to such findings. In addition, we advocate for approaches to assessing structural vulnerability that integrate layers of contextual information—historical, sociopolitical, environmental, local, case-specific—with the biological expression of pathological conditions. At minimum, forensic anthropologists should only consider the documentation and interpretation of structural vulnerability if they have access to scene documentation and autopsy findings, a critical part of understanding the context within which the individual lived and died. Forensic anthropologists wishing to document and interpret structural vulnerability should also consider a dialogue with impacted communities, social scientists, and public health experts about the specific social and environmental risks in a particular place and time.

2. A reconsideration of terminology: skeletal “profiles,” structural vulnerability, and the dangers of categorization

The creation of skeletal “profiles,” or a set of biological characteristics of unknown human remains, has a long history in the field of forensic anthropology. The “biological profile,” which includes the estimation of biological sex, age-at-death, population affinity, stature, and identifying features, assists investigators in narrowing down a list of potential missing person cases for comparison. Even in the current age of advanced DNA technology, the postmortem anthropological analysis is often the most efficient, and sometimes the only, lead for timely collection of antemortem data or family reference samples for comparison to unknown decomposed or skeletonized remains. In some instances, families (especially those who come from structurally marginalized communities) are not comfortable providing their DNA for CODIS upload and may only agree to give a family reference sample if there is a direct comparison or they have strong reason to believe their loved one is deceased. In the border context, families of migrants often cannot submit their DNA to CODIS due to jurisdictional issues, and a separate private database created specifically for the identification of migrants is the only option. For these reasons, the accurate estimation of a biological profile of an unknown individual allowing for that person to be compared to missing individuals (and then hopefully successfully identified) continues to be one of the most significant contributions of forensic anthropology to the medicolegal context.

In recent decades, forensic anthropologists have noted how skeletal characteristics and contextual data beyond the traditional biological profile may assist in the process of identifying unknown remains by attempting to interpret broader social context. We will briefly discuss the evolution of these approaches in the context of migrant deaths along the US-Mexico border. Forensic practitioners at the Pima County Office of the Medical Examiner in Tucson, Arizona, have advocated for the practice of predictively discerning between the remains of those likely involved in migration (whether or not they are identified and known to be migrants) and individuals not involved in migration for two reasons: 1) this allows for the efficient comparison of unidentified remains to the right set of missing person reports, and 2) this allows for a more accurate count of the number of migration-related fatalities each year [18].

“The UBC Profile” introduced by Anderson and Parks [18] combines geographical context, personal effects, and postmortem findings to predict whether an unknown individual is likely a foreign national who died while crossing the US-Mexico Border. Simultaneously, Birkby et al. [19] proposed the “cultural profile,” to include tattoos, cosmetic dental modifications, and biological indicators of poverty, such as short stature and oral pathology, to aid in the identification of migrants in the border

context. However, as Reineke and Anderson [20] explained, a majority of the features utilized in the “cultural profile” were in fact reflections of socioeconomic status or poverty and not specific to Latin American culture or identity. Drawing upon these previous formulations, Beatrice and Soler [3] then described a “biocultural profile” of migrants in southern Arizona that included skeletal indicators of non-specific stress. The “biocultural profile” was conceptualized to emphasize that embodied stressors—likely the result of socioeconomic forces interacting with human biologies—are one of several lines of evidence useful in distinguishing the remains of migrants along the border and potentially elsewhere in the US. The intention of the UBC, cultural, and biocultural profiles was to accurately count the number of migrant deaths, and, when appropriate, to direct investigators to consular offices and non-profit organizations in contact with families of missing migrants. Importantly, and in contrast to the traditional biological profile, these subsequent “profiles” combine biological and contextual information—none are based solely on biological findings.

We understand the development of a “structural vulnerability profile” to be both an ethical move that seeks to make the impacts of structural violence visible as well as a scientific move that seeks more accuracy in documenting the social, political, and economic factors behind disproportionate levels of illness and premature death among those sectors of society that have been socially marginalized. We join our colleagues in arguing for ethical and accurate documentation of violence through casework, research, and scholarship. However, we now critically reflect upon use of the term “profile,” and warn against extending the practice of documenting possible evidence of structural violence into a practice of attempting to categorize the inherently continuous and complex nature of human lived experience. In fact, recent work [4,9,10] has clarified that biological manifestations of structural vulnerability and the life experiences of migrants who lose their lives crossing the US-Mexico border are actually quite diverse and cannot be broadly generalized, and, as Soler et al. have emphasized, “that biological indicators of marginalization are not exclusive to undocumented migrants ... or any individual who crosses the border, nor are they static over time” [10:6].

The term, “profile,” according to the Merriam-Webster Dictionary, has several meanings, the first of which is listed as “a representation of something in outline, especially: a human head or face represented or seen in a side view” [21]. In this sense, the construction of a biological profile by forensic anthropologists would simply refer to a physical description of a particular unidentified individual. However, Merriam-Webster also lists another meaning of the term: “a set of data often in graphic form portraying the significant features of something, especially: a graph representing the extent to which an individual exhibits traits or abilities as determined by tests or ratings” [21]. This latter meaning of the term “profile” suggests its use to describe efforts at “profiling,” or the practice of categorizing individuals into groups based on traits or behaviors. It is this latter meaning, rather than simply describing and documenting individual skeletal characteristics aimed at identification, that we warn could invite predictive categorizing if misinterpreted in the future.

Whether our aims are humanitarian or not, forensic anthropologists are part of a larger system of state practices of identification. Forensic anthropologists must take constant care to aid in human identification without perpetuating further harm to individuals, their surviving families, or greater communities. There has been heated debate recently within the field of forensic anthropology about the discipline’s long-standing practice of assessing “race” or “ancestry” [22–25]. While this debate is beyond the scope of this article, it demonstrates how the social

construction of categories has long-lasting effects that can be very difficult to change. Particularly dangerous are those categories that are constructed by states, as opposed to those that emerge within locally-meaningful social processes, which tend to be context-specific and fluid.¹

There are numerous historical and current examples of state-constructed or imposed categories that blend dominant perceptions and stereotypes of race, class, ethnicity, gender, and political ideology that have facilitated stigmatization, criminalization, and violent repression. One example has played out recently in the context of the Mexican government's ongoing "war on drugs" where the state has deployed the concept of "delinquency" to categorically describe and criminalize poor, Indigenous, or politically radical parts of the population [29–31]. Brian Whitener [29] has traced how the social construct of the *delincuente* (delinquent) has emerged as a "mobile category" used both by the state and elite sectors of society that can be used to describe anyone who is marginal or a threat to state power [29]. Importantly, this new social category of *delincuente* collapses previous constructed social categories in ways that render it "post-racial" while also allowing it to quickly turn "even the most innocent into disposable bodies" [29:45]. Bolstering this state-constructed category are volumes of academic research seeking to validate it by describing the "profile" of the delinquent.²

While trying to document the impact of social marginalization and structural violence, forensic anthropologists must be diligent that such documentation is scientifically rigorous, accurate, and cautious—there are diverse lived experiences that could produce similar skeletal manifestations. Trying to categorize this diversity based on skeletal evidence alone could contribute to the construction of categories that are used to surveil and limit the movement of already vulnerable individuals. Social scientists of surveillance and governance have warned that modern states and corporations often seek out new methods and technologies that enable the grouping of individual bodies into discrete categories [28,34,35]. The seduction of such profiling is the idea that it can predict future conditions or behaviors and specifically, to detect people who might commit a crime before they have committed an offense. These classifications, according to David Lyon, then come to "directly and indirectly affect people's choices and life-chances" [34:119]. How one is categorized can come to have consequential impacts through "statistical discrimination" [36] affecting all aspects of one's life including education, job placement, access to affordable and safe housing, healthcare, maternal health, and, as forensic anthropologists have begun to document, in the treatment of one's remains and next of kin after death [9,26,28,34,38–40].

3. The importance of context

While human bodies may record evidence of physiological disruption or a lack of regular access to dental or medical care, only context can help reveal the structural origins of these findings. Unlike healthcare practitioners, we cannot ask our patients to report on their self-identity and experiences of discrimination based on their gender, sexual preference, race, citizenship, or socioeconomic status. Biological profile data may be informative when coupled with skeletal and dental indicators of stress or evidence of unhealed pathologies, but does not in itself demonstrate that an individual experienced sexism, ageism, racism, or discrimination of any kind. Consideration of the postmortem scene context, local jurisdictional context, and broader social, cultural, and

socioeconomic context are crucial to any postmortem evaluation of structural vulnerability. We argue that without these contextual considerations and input from impacted communities, a method based exclusively on skeletal findings poses three serious risks 1) it could produce inaccurate conclusions, 2) it could mix various distinct experiences of marginalization in ways that could unintentionally reinforce long-standing racist ideas that link behavior with inherited traits, and 3) it could be used as a "voice for the voiceless" approach that has the unintended consequence of silencing those who can speak most accurately about their own experiences. We will discuss each risk in turn.

First, an important consideration of using a profile to assess skeletally embodied structural vulnerability is the extent to which the individual variables used to generate the profile are actually measuring lived inequities. While it is possible to link skeletal pathologies to structural forces using careful, contextualized analysis [41], such connections are very seldom certain or straightforward. At least for certain types of lesions, it is overstating the case to consider them markers of inequality in a strict sense. As an example, porotic cranial lesions have many possible immediate causes (e.g., metabolic diseases, infections, various forms of anemia—including hereditary types), not all of which can be linked ultimately to structural vulnerability. One must also consider the overlap in the response of skeletal and dental tissues to various external sources of physiological disruption and the potential for intrinsic factors (e.g., nutrition status, individual variation in immune response) to influence pathological changes [41–43]. Especially given the diversity of human social organization and political economy through both time and space, individuals experiencing inequities that could become skeletally embodied may exhibit diverse or overlapping suites of skeletal lesions.

It is also important to be mindful of the fact that our own current conversation about documenting the impact of structural vulnerability is itself contextually and culturally situated. Before formulating a "structural vulnerability profile," there needs to be much more dialogue between US-based forensic anthropologists and those researching similar biological conditions in different places, historical eras, and contexts. While human tissue may react to external forces in universal ways, these forces are context-specific. In one country, the skeleton of an individual who experienced social marginalization may exhibit porotic cranial lesions, whereas in another place or time, the experience of social marginalization may be only evidenced by healed trauma. Winburn and colleagues stated that "[h]uman societies create and maintain structures in which individuals and groups experience varying degrees of inequity and suffering that may be skeletally and dentally embodied" [14]. How these structures are created and the specific impact that they have on individuals may be vastly different between contexts. For example, individuals who risk their lives to cross the US-Mexico border may exhibit porotic hyperostosis or linear enamel hypoplasias due to a childhood of systemic food insecurity coupled with parasitic infections or high pathogen loads, but we cannot and should not presume that these same non-specific indicators of stress would be reflected with the same frequency in the remains of individuals who experience structural marginalization in the United States. Furthermore, additional research is needed to understand how the impact of social marginalization or structural racism presents skeletally in countries with universal healthcare. Clinical studies of developmental enamel defects in Australian children, for example, have found associations between hypoplasia prevalence and lower socioeconomic status [44, 45]. However, data linking most other non-specific stress indicators with structural inequality in similar contexts are currently unavailable.

Second, some recent proposals for a "structural vulnerability profile" collapse various complex experiences of marginalization and violence under one label in ways that could be misread as validating old inaccurate racist ideas about heritable behaviors. For this reason, we caution against making assumptions of structural vulnerability based on population affinity or ancestry. While one's lived experience of ethnicity and race may be factors that contributed to structural vulnerability, the two are not explicitly intertwined, and vary globally. By replacing ancestry

¹ Scholars have discussed the complex ways in which externally created categories can become locally meaningful. A dialogical process often exists between imposed social categories and those with which individuals identify. See [26–28].

² For examples of scholarship seeking to validate this socially constructed category, see [32,33].

or population affinity with structural vulnerability, are we inadvertently implying that there is a direct correlation between the two? For example, Winburn et al. described, “an analytical future in which forensic anthropologists who identify traits indicating a decedent’s lived experiences of social marginalization would report these findings in the work products they provide to medicolegal and law enforcement agencies” [13:138]. We draw attention here specifically to the word “trait.” The definition of “trait,” according to Merriam-Webster is “a distinguishing quality (as of personal character)” and “an inherited characteristic” [21]. In other words, “trait,” suggests something that is heritable. While this may be more of a connotation and we do not want to unnecessarily critique our colleagues as we recognize their broader intentions, we highlight this because we believe there is real risk of misinterpretation, especially given the long history of racism whereby inaccurate associations have been made between human behavior and heritability. While it is true that in the United States non-white individuals are more likely to experience systemic marginalization and structural violence, this fact does not hold in some contexts globally.

Our third and final caution is that no methodological approach should be seen as capable of finding structural vulnerability solely through skeletal evidence as it privileges a single way of knowing, in this case osteological expertise, above other forms of knowledge. As forensic anthropologists, we only contribute one line of evidence. We join Winburn and colleagues [14] in highlighting that in most contexts, there are others producing similar evidence from medicine, public health, social anthropology, sociology, and most importantly, from communities that have themselves experienced violence, structural or otherwise. While it may be true that some aspects of “lived experiences can be reconstructed through skeletal material” [46:56] this should only be accomplished in dialogue with those who have either lived those experiences and/or researched them. Otherwise, advocating that forensic anthropologists do this work because “[i]f not us, then who?” [47:224] replicates an evidentiary regime [48] that suggests a form of scientific authority that is seen as more true than, for instance, witness accounts, survivor testimony, ethnography, or history [49–51]. While some biological reactions to social marginalization can be appreciated skeletally and then documented by forensic anthropologists, care must be taken not to assume that the complex social experiences, identities, affiliations, and strategies of human beings can also be approximated solely by forensic anthropologists.

Instead, we argue that any effort by forensic experts to document and understand structural vulnerability should be undertaken using multiple lines of evidence, not just that from the skeleton, and ideally should involve dialogue with experts in other fields. As with any comprehensive death investigation, scene observations, associated evidence, and the totality of the postmortem findings are essential to interpret the skeletal and dental findings and to make any assessment regarding structural vulnerability. For example, the geographical location and death scene findings can be incredibly informative, providing clues regarding irregular migration, housing status, human trafficking, domestic violence, socioeconomic status, or struggles with alcohol or drug addiction. Similarly, associated evidence and personal effects may reflect the cultural, socioeconomic, gender, or professional experiences of an individual within a particular place and time. These findings, evaluated in conjunction with postmortem findings, such as cause and manner of death, autopsy/anthropological results, and skeletal indicators of stress, disease, or poor medical or oral health care are more constructive than any one feature considered in isolation.

Recent discussions of structural vulnerability within the US-Mexico border context have integrated biological observations with contextual findings such as geography and personal effects. In addition, this work has involved input and collaboration with scholars with expertise not only in osteology, paleopathology, and human identification, but also social anthropology, sociology, and border history [4,10,52–54]. Good examples include the work of Moore and Kim [47] and Winburn et al. [14] when highlighting the importance of scene and postmortem

findings along with local jurisdictional and broader socio-historical context, in the interpretation of how associated evidence and biological indicators may reflect poverty and structural marginalization. Moore and Kim [47] in particular weave a rich understanding of local Detroit politics and history to explain how postmortem scene location, personal effects, skeletal findings, and lack of access to mortuary practices reveal structural marginalization in the remains of individuals recovered in Wayne county. Such locally-grounded, context-specific, and collaborative approaches to the important task of documenting violence is the best way towards a forensic anthropology of structural vulnerability.

4. Conclusion

Our goal in this article has been twofold: 1) to highlight some of the potential dangers inherent in the construction of new socio-biological categories as part of forensic anthropological analyses, and 2) to emphasize the importance of situating forensic anthropological observations of possible embodied social marginalization within local and historical context. To be clear, we are not suggesting that documenting skeletal and dental lesions that may reflect embodied structural vulnerability lacks utility in forensic anthropology practice. Indeed, we have elsewhere argued forcefully that it does. Moving forward, we should continue to promote standardized and replicable ways of collecting and interpreting this data. We should also make efforts to ensure that exposure to diverse causes and manifestations of skeletal pathology is a routine component of forensic anthropology education and training. Doing so would minimize the chances of misinterpretation, including overinterpretation in which normal variation is misidentified as pathology or structural vulnerability. We should be clear-eyed about the limitations of linking skeletal changes to specific lived experiences of inequity. Contextualized assessments of lesions can make a strong case that structural vulnerability was the ultimate cause of physiological disruption. However, for reasons outlined above, greater specificity may not be possible, and the assumption that skeletal evidence alone can predict an individual’s lived experience may not only be inaccurate but actually harmful. We should consider carefully whether the potential benefits of generating “profiles of vulnerability” might be outweighed by the dangers in this extension of the profile concept.

We hope that our contribution raises more questions (something we acknowledge can be hard for us as forensic practitioners!) and we invite further discussion. We hope for a continuation of the radical and responsible conversation our field is currently having about structural violence, and the ways in which forensic experts can best engage in ongoing efforts to make visible the deeply destructive impacts of discrimination and social exclusion.

CRedit authorship contribution statement

Robin C. Reineke: Conceptualization, Writing – original draft, Writing – review & editing. **Angela Soler:** Conceptualization, Writing – review & editing. **Jared Beatrice:** Conceptualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] P. Farmer, An anthropology of structural violence, *Curr. Anthropol.* 45 (3) (2004) 305–325, <https://doi.org/10.1086/382250>.
- [2] J. Quesada, L.K. Hart, P. Bourgois, Structural vulnerability and health: latino migrant laborers in the United States, *Med. Anthropol.* 30 (2011) 339–362, <https://doi.org/10.1080/01459740.2011.576725>.

- [3] J.S. Beatrice, A. Soler, Skeletal indicators of stress: a component of the biocultural profile of undocumented migrants in southern Arizona, *J. For. Sci.* 61 (5) (2016) 1164–1172, <https://doi.org/10.1111/1556-4029.13131>.
- [4] J.S. Beatrice, A. Soler, R.C. Reineke, D.E. Martínez, Skeletal evidence of structural violence among undocumented migrants from Mexico and Central America, *Am. J. Phys. Anthropol.* 176 (4) (2021) 584–605, <https://doi.org/10.1002/ajpa.24391>.
- [5] E.A. DiGangi, J.D. Bethard, Uncovering a lost cause: decolonizing ancestry estimation in the United States, *Am. J. Phys. Anthropol.* 175 (2) (2021) 422–436, <https://doi.org/10.1002/ajpa.24212>.
- [6] G. Goad, Expanding humanitarian forensic action: an approach to U.S. cold cases, *For. Anthropol.* 3 (1) (2020) 50–58, <https://doi.org/10.5744/fa.2020.1006>.
- [7] A. Michael, M. Isa, L. Redgrave, A. Redgrave, Structural vulnerability in transgender and non-binary decedent populations: analytical considerations and harm-reduction strategies, in: Presented at the 73rd Annual Meeting of the American Academy of Forensic Sciences, 2021.
- [8] R.C. Reineke, B.E. Anderson, Missing in the US-Mexico borderlands, in: D. Congram (Ed.), *Missing Persons: Multidisciplinary Perspectives on the Missing and Deceased*, Canadian Scholars Press, Toronto, 2016, pp. 249–268.
- [9] A. Soler, J.S. Beatrice, R.C. Reineke, D.L. Martínez, Beyond identification: structural vulnerability and the investigation of migrant deaths, in: Presented at the 72nd Annual Meeting of the American Academy of Forensic Sciences, 2020. Anaheim, CA.
- [10] A. Soler, J.S. Beatrice, D.L. Martínez, Oral pathologies as a reflection of structural violence and stigma among undocumented migrants from Mexico and Central America, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington, New York, 2022, pp. 3–36.
- [11] S.D. Tallman, C.D. Kincer, E.D. Plemons, Centering transgender individuals in forensic anthropology and expanding binary sex estimation in casework and research, *Anthropol.* 5 (2) (2021) 161–180, <https://doi.org/10.5744/fa.2020.0030>.
- [12] K.E. Weisensee, M.K. Spradley, Craniofacial asymmetry as a marker of socioeconomic status among undocumented Mexican immigrants in the United States, *Econ. Hum. Biol.* 29 (2018) 122–127, <https://doi.org/10.1016/j.ehb.2018.02.007>.
- [13] A.P. Winburn, M.G. Marten, T. Walkup, E. Plasencia, A. Hutson, Theorizing social marginalization for forensic anthropology: insights from medical anthropology and social epidemiology, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington, New York, 2022, pp. 121–150.
- [14] A.P. Winburn, K.A. Miller Wolf, M.G. Marten, Operationalizing a structural vulnerability profile for forensic anthropology: skeletal and dental biomarkers of embodied inequity, *For. Sci. Int.: Synergy* 5 (2022), 100289, <https://doi.org/10.1016/j.fsisyn.2022.100289>.
- [15] C.L. Znachko, M.D. Hamilton, B.E. Anderson, M.K. Spradley, J.T. Watson, Impacts of biosocial environment on developmental plasticity among unidentified presumed migrant skeletal remains recovered along the United States-Mexico border, in: Paper Presented at the 72nd Annual Meeting of the American Academy of Forensic Sciences, 2020. Anaheim, CA.
- [16] J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington Books, New York, 2022.
- [17] Z. Crossland, Foreword: a reimagining of forensic anthropology, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington Books, New York, 2022.
- [18] B.E. Anderson, B.O. Parks, Symposium on border crossing deaths: introduction, *J. Forensic Sci.* 53 (1) (January 2008), <https://doi.org/10.1111/j.1556-4029.2007.00608.x>.
- [19] W.H. Birkby, T.W. Fenton, B.E. Anderson, Identifying Southwest Hispanics using nonmetric traits and the cultural profile, *J. For. Sci.* 53 (1) (2008) 29–33, <https://doi.org/10.1111/j.1556-4029.2007.00611.x>.
- [20] R.C. Reineke, B.E. Anderson, Sociocultural Factors in the Identification of Undocumented Migrants, Presented at the 61st Annual Meeting of the American Academy of Forensic Sciences, 2010. Seattle, WA.
- [21] Merriam-Webster Dictionary. <https://www.merriam-webster.com/dictionary>. (Accessed 29 November 2022).
- [22] E.A. DiGangi, J.D. Bethard, Uncovering a lost cause: decolonizing ancestry estimation in the United States, *Am. J. Phys. Anthropol.* 175 (2) (2021) 422–436, <https://doi.org/10.1002/ajpa.24212>.
- [23] N. Sauer, Forensic anthropology and the concept of race: if races don't exist, why are forensic anthropologists so good at identifying them? *Soc. Sci. Med.* 34 (2) (1992) 107–111, [https://doi.org/10.1016/0277-9536\(92\)90086-6](https://doi.org/10.1016/0277-9536(92)90086-6).
- [24] K.E. Stull, E.J. Bartelink, A.R. Klaes, G.E. Berg, M.W. Kenyhercz, E.N. L'Abbé, M. C. Go, K. McCormick, C. Mariscal, Commentary on: Bethard JD, DiGangi EA. Letter to the Editor—moving beyond a lost cause: forensic anthropology and ancestry estimates in the United States, *J. Forensic Sci.* 65 (5) (2020) 1791–1792, <https://doi.org/10.1111/15564029.14513>. *J. Forensic Sci.* 66, 1 (2021) 417–1792, <https://doi.org/10.1111/1556-4029.14616>.
- [25] S.D. Tallman, C.D. Kincer, E.D. Plemons, Centering transgender individuals in forensic anthropology and expanding binary sex estimation in casework and research, *Anthropol.* 5 (2) (2021) 161–180, <https://doi.org/10.5744/fa.2020.0030>.
- [26] D. Lyon (Ed.), *Theorizing Surveillance: the Panopticon and beyond*, Willan Publishing, 2006.
- [27] K. Ball, K. Haggerty, D. Lyon (Eds.), *Routledge Handbook of Surveillance Studies*, first ed., Routledge, New York, 2012.
- [28] J. Caplan, J. Torpey (Eds.), *Documenting Individual Identity: the Development of State Practices in the Modern World*, Princeton University Press, Princeton, 2018.
- [29] B. Whitener, *Crisis Cultures: the Rise of Finance in Mexico and Brazil*, University of Pittsburgh Press, Pittsburgh, 2019.
- [30] C. Moon, J. Treviño Rangel, “Involved in Something (Involucrado En Algo)”: Denial and Stigmatization in Mexico's “War on Drugs.” *Br. J. Sociol.* n/a (n/a). Accessed August 5, 2020. <https://doi.org/10.1111/1468-4446.12761>.
- [31] D.P. Paley, Cold War, neoliberal war, and disappearance: observations from Mexico., *Lat. Am. Perspect.* 48 (1) (2021) 145–162, <https://doi.org/10.1177/0094582X20975001>.
- [32] A. Rueda, A. Ampudia, G. Santaella Hidalgo, Perfil de personalidad del delincuente Mexicano. <http://132.248.161.133:8080/jspui/handle/123456789/4930>, 2016.
- [33] A.A. Mendoza, El adolescente procesado en el sistema de justicia de México: ¿delincuente amateur? *Sociologias* 23 (2022) 50–78, <https://doi.org/10.1590/15174522-117925>.
- [34] D. Lyon (Ed.), *Surveillance as Social Sorting: Privacy, Risk and Automated Discrimination*, first ed., Routledge, New York, 2003.
- [35] S.A. Cole, *Suspect Identities: A History of Fingerprinting and Criminal Identification*, Harvard University Press, Cambridge, 2002.
- [36] O.H. Gandy, *Statistical surveillance: remote sensing in the digital age*, in: *Routledge Handbook of Surveillance Studies*, Routledge, 2012.
- [37] C. Bird, J.D.P. Bird, Devaluing the dead: the role of stigma in medicolegal death investigations of long-term missing and unidentified persons in the United States, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington, New York, 2022, pp. 93–118.
- [38] E.A. DiGangi, D. Santamaria Vargas, Que pena con usted: the struggle for victim identification in Columbia, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington Books, New York, 2022, pp. 65–92.
- [39] R.C. Reineke, Necroviolence and postmortem care along the U.S.-México border, in: T. Sheridan, R. McGuire R (Eds.), *The Border and its Bodies: the Corporeality of Risk along the U.S.-Mexico Line*, University of Arizona Press, Tucson, 2019.
- [40] R.C. Reineke, Forensic citizenship among families of missing migrants along the U.S.-Mexico border, *Citizen. Stud.* 0 (0) (2022) 1–17, <https://doi.org/10.1080/13621025.2021.2018675>.
- [41] H.D. Klaus, Paleopathological rigor and differential diagnosis: case studies involving terminology, description, and diagnostic frameworks for scurvy in skeletal remains, *Int. J. Paleopathol* 19 (2017) 96–110, <https://doi.org/10.1016/j.ijpp.2015.10.002>.
- [42] S.N. DeWitte, C.M. Stojanowski, The Osteological Paradox 20 years later: past perspectives, future directions, *J. Archaeol. Res.* 23 (2015) 397–450, <https://doi.org/10.1007/s10814-015-9084-1>.
- [43] S.N. DeWitte, C.M. Stojanowski, The Osteological Paradox 20 years later: past perspectives, future directions, *J. Archaeol. Res.* 23 (2015) 397–450, <https://doi.org/10.1007/s10814-015-9084-1>.
- [44] P. Arrow, Risk factors in the occurrence of enamel defects of the first permanent molars among schoolchildren in Western Australia, *Community Dent. Oral Epidemiol.* 37 (2009) 405–415, <https://doi.org/10.1111/j.1600-0528.2009.00480.x>.
- [45] D. Ford, W.K. Seow, S. Kazoullis, T. Holcombe, B. Newman, A controlled study of risk factors for enamel hypoplasia in the permanent dentition, *Pediatr. Dent.* 31 (2009) 382–388.
- [46] S. Mathena, M. Zuckerman, Embodying industrialization: inequality, structural violence, disease, and stress in working-class and poor British women, *Bioarchaeol. Struct. Viol.: A Theoretic. Framework Indust. Era Inequal.* (2020) 53–79.
- [47] M.K. Moore, J.J. Kim, Marginalization, death, and decline: the role of forensic anthropology in documenting the osteology of poverty and evidence of structural violence in Detroit, Michigan in the 21st century, in: J.F. Byrnes, I. Sandoval-Cervantes (Eds.), *The Marginalized in Death: A Forensic Anthropology of Intersectional Identity in the Modern Era*, Lexington, New York, 2022, pp. 203–229.
- [48] Z. Crossland, Evidential regimes of forensic archaeology, *Annu. Rev. Anthropol.* 42 (1) (2013) 121–137, <https://doi.org/10.1146/annurev-anthro-092412-155513>.
- [49] T. Keenan, E. Weizman, *Mengelle's Skull: the Advent of a Forensic Aesthetics*, Sternberg Press, 2012.
- [50] A. Rosenblatt, *Digging for the Disappeared: Forensic Science after Atrocity*, first ed., Stanford University Press, 2015.
- [51] Z. Crossland, Forensic Afterlives. *Signs Soc.* 6 (3) (2018) 622–647, <https://doi.org/10.1086/699597>.
- [52] C.E. Hughes, B.F.B. Algee-Hewitt, R.C. Reineke, E. Clausing, B.E. Anderson, Temporal patterns of Mexican migrant genetic ancestry: implications for identification, *Am. Anthropol.* 119 (2) (2017) 193–208, <https://doi.org/10.1111/aman.12845>.
- [53] D.E. Martínez, R.C. Reineke, R. Rubio-Goldsmith, B.O. Parks, Structural violence and migrant deaths in southern Arizona: data from the Pima county office of the medical examiner, 1990–2013, *J. Migrat. Human Security* 2 (4) (2014) 257–286, <https://doi.org/10.1177/233150241400200401>.
- [54] D.E. Martínez, R.C. Reineke, G.A. Boyce, et al., Migrant Deaths in Southern Arizona: Recovered Undocumented Border Crosser Remains Investigated by the Pima County Office of the Medical Examiner, 1990 - 2020. Binational Migration Institute, University of Arizona, 2021, p. 39. https://sbs.arizona.edu/sites/sbs.arizona.edu/files/BMI%20Report%202021%20ENGLISH_FINAL.pdf.