Education and the Biological Profile: Survey data on the construction of the biological profile

Ashley C. Smith, MSc[1]; Alexis R. Dzubak, MS[2]; Alexandra Saly, MSc[1]; Evonne Turner-Byfield, MS[2]; Justin R. Maiers, MS[3]

[1]University of Toronto, Toronto, ON; [2]The Ohio State University, Columbus, OH; [3]University of South Florida, Tampa, FL

24 February 2022, American Academy of Forensic Sciences, Seattle, WA

Anthropology Session II – A98

Introduction

- One of the primary functions of forensic anthropology is skeletal identification
- Basis for skeletal identification is the biological profile (BP)
  - Ancestry, Sex, Age, Stature
- BP based on morphoscopic and metric analysis
- Recently sections have come under debate
- Different methodologies, theories, and errors can develop different profiles
  - Highlights need for education and practice in methods
- Methodologies and theories not standardized between institutions
- Some, methodologies taught in absence of accompanying theories
- Differences and errors can be found in all four primary aspects of BP

Ancestry

- Most beleaguered of the parts of the biological profile
- Debate over usefulness dates back several decades, if not to the foundations of biological anthropology itself
  - Create distinct biological categories
- Based on morphoscopic and metric traits
- 1950's & 60's debate started to shift away from distinct categories to range of variation
  - Based on clinal continuum; groups demonstrate significant overlap
- As field progressed debated shifted to merits of ancestry determination
  a) Pragmatic, describe potential group affiliation
  b) Problematic, does not represent range & does not acknowledge negative connotations

Sex and Gender

- Often thought as one of the easiest to discern
- Most all of skeleton is sexually dimorphic
- Wide degree of methodologies
  - Metric and Morphoscopic
- Debates as to which methods are best
  - Scored or Dichotomized
  - Problematic with intersex individuals
- Forgets Gender
  - Transgender, Non-binary, Gender non-conforming individuals
  - An individual may have identified with a different gender than what is recorded in the osteological record using current anthropological practices
  - Particularly true when given the increase in governments allowing gender-change on documents.

Age & Stature

Age

- Large variety of methods
- Mostly morphoscopic in adults
- Scoring systems murky and subjective
- Produces wide ranges at high confidence intervals
  - ≈ ±20 years

Stature

- Mostly metric in analysis
- Requires knowledge of sex in many cases for more accurate results
- Requires complete elements*
- Slight errors in measurements can magnify in final analysis
- Produces wide stature ranges
  - ≈ ±3-5”

Project Research Questions

- How is the biological profile taught across American universities at the undergraduate and advanced levels?
- How does instruction impact the efficacy of the biological profile in the field?
- Given the recent debate, in what way(s) have the significance of the biological profile changed?

Methodology

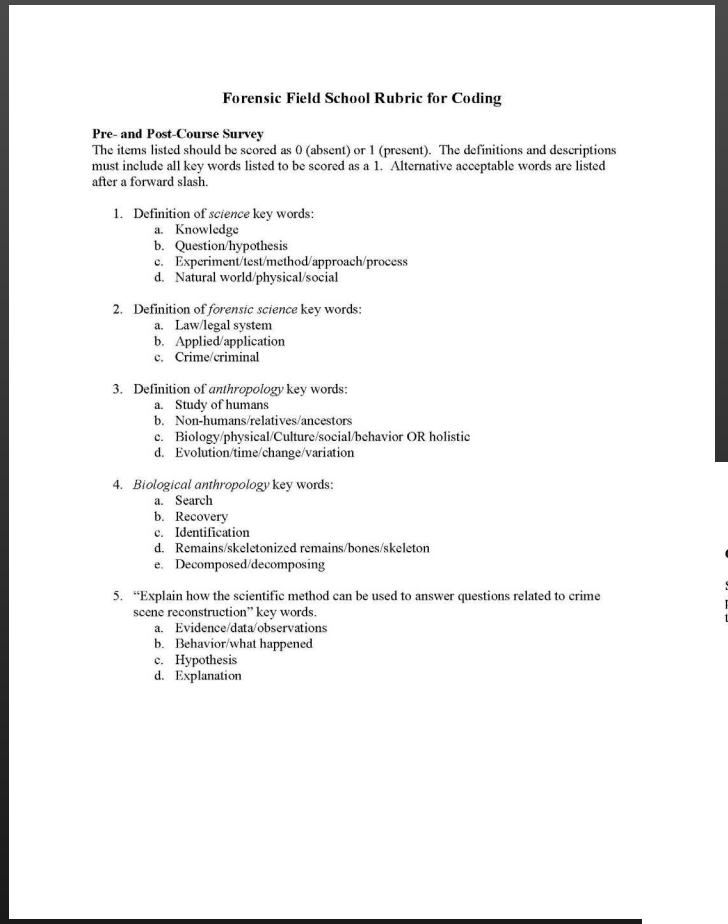
- Pilot Project
- 76 Respondents
  - 4 Graduate and 72 Undergraduate
- Over 4 Years
- Taken Pre- & Post-Completion of Forensic Field School
- All Taken from The Ohio State University

Methodology

- Qualitative and Quantitative
- Focused on students' knowledge of forensic anthropology
  - Relationship to wider medico-legal community
- Questions Focused on:
  - Definitions of science and field
  - How forensic anthropologists get involved in crime scenes
  - What leads to identifications
  - How the biological profile promotes or assists police with identification
- Responses were coded as 0, 1, or N/A

Methodology

- Responses Reviewed by 3 Reviewers
- Selected key-words and phrases marked as Present/Absent
- Percent "Present"
- Chi-Squared
- Responses and Reviewer Scores
- Gathered over multiple years



Forensic Field School Rubric for Coding

Pre- and Post-Course Survey
The items listed should be scored as 0 (absent) or 1 (present). The definitions and descriptions must include all key words listed to be scored as a 1. Alternative acceptable words are listed after a forward slash.

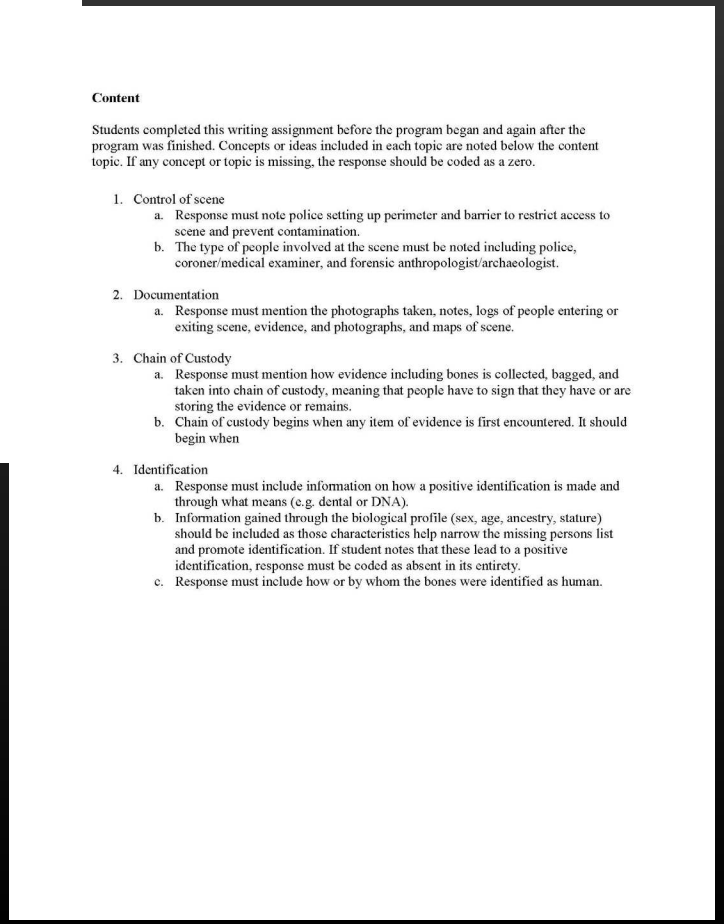
1. Definition of *science* key words:
   a. Knowledge
   b. Question/hypothesis
   c. Experiment/test/method/approach/process
   d. Natural world/physical/social

2. Definition of *forensic science* key words:
   a. Law/legal system
   b. Applied/application
   c. Crime/criminal

3. Definition of *anthropology* key words:
   a. Study of humans
   b. Non-humans/relatives/ancestors
   c. Biology/physical/Culture/social/behavior OR holistic
   d. Evolution/time/change/variation

4. *Biological anthropology* key words:
   a. Search
   b. Recovery
   c. Identification
   d. Remains/skeletonized remains/bones/skeleton
   e. Decomposed/decomposing

5. "Explain how the scientific method can be used to answer questions related to crime scene reconstruction" key words.
   a. Evidence/data/observations
   b. Behavior/what happened
   c. Hypothesis
   d. Explanation



Content

Students completed this writing assignment before the program began and again after the program was finished. Concepts or ideas included in each topic are noted below the content topic. If any concept or topic is missing, the response should be coded as a zero.

1. Control of scene
   a. Response must note police setting up perimeter and barrier to restrict access to scene and prevent contamination.
   b. The type of people involved at the scene must be noted including police, coroner/medical examiner, and forensic anthropologist/archaeologist.

2. Documentation
   a. Response must mention the photographs taken, notes, logs of people entering or exiting scene, evidence, and photographs, and maps of scene.

3. Chain of Custody
   a. Response must mention how evidence including bones is collected, bagged, and taken into chain of custody, meaning that people have to sign that they have or are storing the evidence or remains.
   b. Chain of custody begins when any item of evidence is first encountered. It should begin when

4. Identification
   a. Response must include information on how a positive identification is made and through what means (e.g. dental or DNA).
   b. Information gained through the biological profile (sex, age, ancestry, stature) should be included as those characteristics help narrow the missing persons list and promote identification. If student notes that these lead to a positive identification, response must be coded as absent in its entirety.
   c. Response must include how or by whom the bones were identified as human.

Results (Quantitative)

- Students' knowledge differed in their understanding of the biological profile and its uses pre- and post-completion of the course

All Years Combined			
Pre-test Average 1	0.265	Post-test Average 1	0.296
Pre-test Average 2	0.307	Post-test Average 2	0.629
Pre-test Overall	0.286	Post-test Overall	0.462

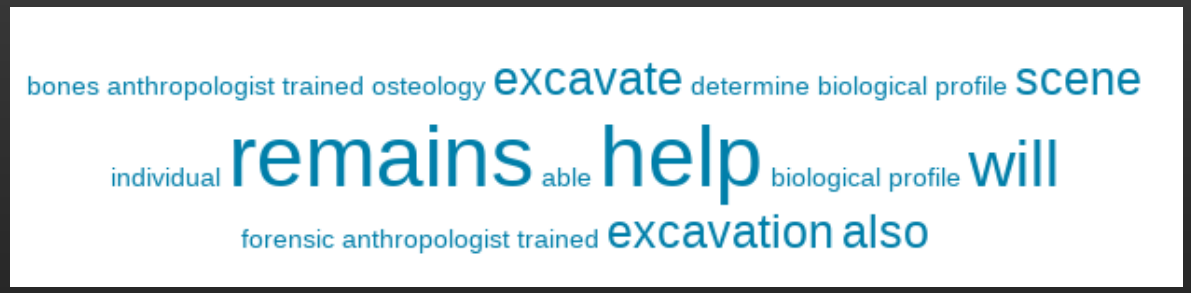
Results (Quantitative)

- Coding consistently difficult for the definitions fitting into a forensic investigation
  - Anthropology
  - Osteology
  - Archaeology
- Respondents often failed to see how scientific method fits into forensic investigation

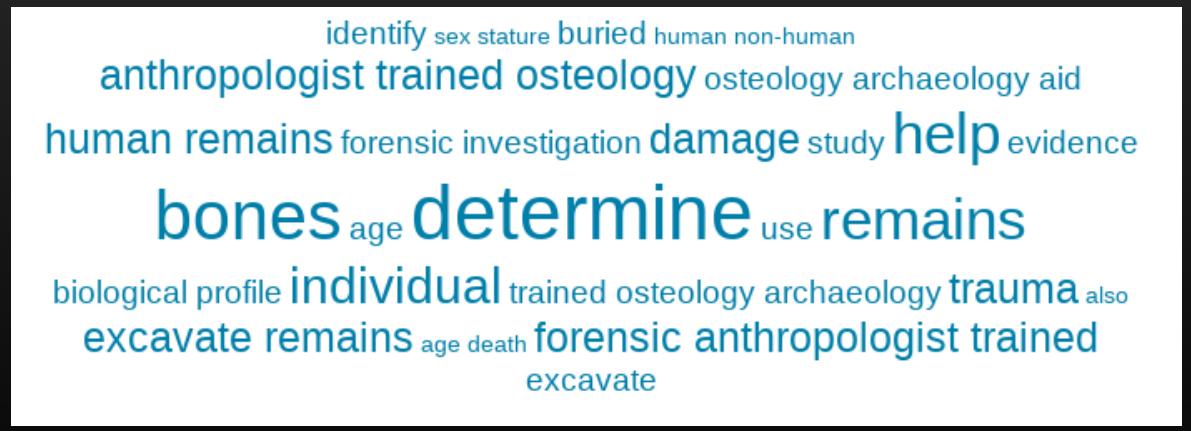
	2013	2014	2015	2016
Forensic Science	**2.68E-10**	**0.001264**	**0.00016**	**2.68E-10**
Anthro	0.545	0.721	0.721	0.469
Scientific Method	0.734	0.399	0.933	0.254

Results (Qualitative)

- Word-Cloud demonstrated:
  - Search aspect infrequent
  - Decompose also infrequent
  - Identification through biological profile common idea pre-course
  - More varied responses post-course highlighting all aspects of forensic anthropology



Pre-course (above); post-course (below)



Results (Qualitative)

Forensic anthropology "Often involves…biological profile for the purposes of narrowing down identity"

"A biological profile is best used to gain a general idea of who the individual may have been in life; it does **not** help beyond possibility of narrowing down a missing person list."

"The biological profile methods were difficult to learn as so much seems based unclear or confusing terminology"

"The biological profile is only useful if someone has the correct information in a government database"

"We mostly learned how to do the biological profile in classes while the field school taught us the practical, more hands-on component of forensic anthropology"

"A forensic anthropologist can estimate what groups people might belong to…help law enforcement narrow down a missing persons list

"Basically the biological profile gives forensic investigators a trail to follow and pursue possible leads hopefully following an unbiased scientific method approach

Conclusions

- Respondents see both the difficulties of the biological profile as well as its usefulness
- Education doesn't emphasize the other aspects of forensic anthropology as much as the biological profile
  - i.e. search and recovery, scene context, documentation, chain of custody, etc.
- Despite education and practice in the biological profile, methods remain confusing
- Respondents often view the biological profile as the *only* aspect of forensic anthropology

Future Research

- Wider study being conducted
  - Expands institutions
  - Includes undergraduate *and* graduate students
  - Includes professionals

Recommendations

- Teach theory along side methodology
- Education needs to highlight the complexities of the biological profile
  - Where/when it is best applied
- Balance out biological profile with other aspects of forensic anthropology
- Reflect on material post-course
  - Does knowledge learned match objectives
  - Specifically with regards to students who do not pursue the field

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