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RESEARCH ARTICLE

Education and Training in Forensic Anthropology

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ABSTRACT: The qualifications for a discipline are composed of the education and/or training requirements considered necessary to provide individuals with adequate knowledge to perform discipline-related tasks, including certification or licensing (Passalacqua & Pilloud 2018). Currently there are few available guidelines and no standards for the qualifications of a forensic anthropologist.

To examine the qualifications of current practicing forensic anthropologists and to generate consensus-based criteria for the development of standards for qualifications for forensic anthropology, the authors generated an electronic survey. Results demonstrate that the qualifications of practicing forensic anthropologists are varied and do not always align with the qualifications currently outlined by the Scientific Working Group for Forensic Anthropology or the American Board of Forensic Anthropology. These findings do not mean these individuals are unqualified to practice forensic anthropology, but rather that there is currently little oversight or assistance for those individuals who do not fit the current models of perceived qualification, and no means of determining who does or does not have the adequate knowledge to perform forensic anthropological analyses. As forensic anthropology grows as a discipline, the standardization of qualifications will become increasingly important, both in terms of setting requirements for education and training and for the certification of practitioners. Further, there need to be clearer standards for education and training, which are currently lacking in the discipline.

KEYWORDS: forensic anthropology, qualifications, standardization, professionalism, certification, education, training

Introduction

Within the United States, discussions about qualifications and competency within the practice of forensic anthropology have grown increasingly frequent. Within these discussions, *qualifications* are often defined as the education and training of an individual. Here, *education* can be defined as the formal academic coursework from an accredited school, college, or university, resulting in a degree; while *training* can be defined as the formal, structured process of teaching and assessment at a laboratory or other non-educational institution, often resulting in a certificate (Passalacqua & Pilloud 2018; Scientific Working Group for Forensic Toxicology 2015). Qualifications are typically demonstrated via *credentials* that are meant to "acknowledge, restrict, or protect the use of a title, and/or activities" (Pryzwansky 1993:220). Credentials are verified via documents detailing the extent to which the quality of a practitioner's abilities have been examined, and they can range from transcripts and certificates to licenses. Typically, credentials are created to ensure a minimum standard for individuals who claim to represent a profession (Pryzwansky 1993). *Competency* is the application of knowledge, skills, and abilities to correctly complete specific tasks. While *proficiency* refers to levels of requisite competency to effectively complete work, it is a means to measure mastery of a subject area. It is important to recognize the inverse of competency as incompetency; that is, if a profession requires competence for completing a task, individuals lacking proficiency in that area are incompetent and therefore are not qualified to perform such tasks (Mirabile 1997:75).

Passalacqua and Pilloud (2018) argued that within forensic anthropology, qualifications are not well defined or widely accepted and that there are few available guidelines and no standards for the qualifications of a forensic anthropologist. Further, at present there are no standards for, or widely accepted practices of, establishing competency or proficiency in forensic anthropology; nor are there available standards for subject matter areas or tasks in which all forensic anthropologists are required to be competent. The Scientific Working Group for Forensic Anthropology (SWGANTH) previously generated guidelines for qualifications and education and training in forensic anthropology. The SWGANTH is currently on indefinite hiatus and its website is no longer available because the SWGs were essentially replaced by the Organization of Scientific Area Committees (OSAC). While the OSAC is working on further refining and publishing guidelines and standards for the practice of forensic anthropology, the SWGANTH documents are currently available

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at https://www.nist.gov/topics/forensic-science/anthropology-subcommittee (for further discussion see Passalacqua & Pilloud 2018:42).

In their Qualifications guideline, the SWGANTH outlined three levels of forensic anthropology qualifications (Forensic Anthropologist [FA] I–III) with varying degrees of education and responsibilities associated with each of the three levels (SWGANTH 2010). In this scheme, the lowest level (FA I) represents entry-level individuals (theoretically, active graduate students) holding a bachelor's or master's degree without certification in forensic anthropology by an accredited body. The following level (FA II) represents journeyman-level individuals with a completed master's degree who may or may not be certified by an accredited body. The highest level (FA III) represents individuals who have completed a PhD, are certified by an accredited body, and hold top-tier membership in relevant professional organizations (i.e., Fellow in the American Academy of Forensic Sciences [AAFS]).

In a document separate from that of qualifications, the SWGANTH presented primary and secondary knowledge areas that should be covered in university-level coursework, as well as areas that should be covered in some form of training program (SWGANTH 2013). However, nowhere has the SWGANTH or any other organization formally established the areas in which a forensic anthropologist must be competent, or the true scope of forensic anthropological practice. For example, many forensic anthropologists would argue that the creation of a dental chart is outside the purview of a forensic anthropologist, yet in the past the American Board of Forensic Anthropology (ABFA) has included multiple questions related to dental charting on their certification exams. Additionally, multiple states within the United States have laws restricting the creation of dental casts/impressions to licensed dentists or dental assistants, while many individuals would consider the creation of such impressions within the scope of biological and forensic anthropologists.

Within forensic anthropology, there are currently four certifying bodies: the ABFA, the Asociación Latinoamericana de Antropología Forense (ALAF), the Forensic Anthropology Society of Europe (FASE) and the Royal Anthropological Institute (RAI). However, currently the ABFA is the only certifying body that is accredited (in their case, by the Forensic Specialties Accreditation Board). In order to be certified by the ABFA, an individual must have (1) completed a PhD in anthropology or a closely related field (demonstrated via transcripts), (2) experience in forensic anthropology (demonstrated by submitted case reports authored by the applicant in addition to letters of recommendation), and (3) knowledge of forensic anthropology (demonstrated through the successful completion of the ABFA certification exam). The reality is relatively few practicing forensic anthropologists meet the ABFA's application requirements, and fewer pursue ABFA certification (based on our data below, only ~18% of practicing forensic anthropologists are ABFA-certified). Moreover, the actual qualifications of practicing forensic anthropologists and the perceptions of needed qualifications for forensic anthropology have never been investigated. Thus, this project is a survey designed to (1) examine the current qualifications of practicing forensic anthropologists and to (2) generate consensus-based criteria for the development of standards for qualifications in forensic anthropology.

Materials and Methods

A digital survey consisting of 96 questions was generated addressing forensic anthropologists' backgrounds, qualifications, and casework experience, as well as their perceptions of certifying organizations, the need for qualifications, and what criteria should be required to practice forensic anthropology. This survey was hosted using Qualtrics survey software (Snow & Mann 2012), a digital data-collection platform. Prior to distribution, the survey was reviewed and approved by the internal review boards of both authors' institutions (Western Carolina University and University of Nevada, Reno). This survey was distributed electronically, with prior permission, on a number of biological and forensic anthropology listservs and to the members of various professional organizations. Participation was open to any adult individual (age 18+ years) who received the survey link. The survey was not limited to U.S. respondents, and attempts were made to reach international forensic anthropologists; however, the distribution of the survey was primarily through U.S.-based associations (primarily composed of U.S. members), which did bias the survey toward information to U.S.-specific forensic anthropology practitioners.

Survey responses were collected from 26 March to 12 November 2018. During this period 364 respondents answered at least one of the survey questions. As this survey was designed to be completed by practicing forensic anthropologists, the first question was, "Have you ever assisted with, or sole-analyzed a forensic anthropology case? Or do you consider yourself qualified to perform forensic anthropological casework?" If respondents answered yes they entered the rest of the survey; if they responded no they were exited from the survey. Note that these data only reflect individuals who have worked on forensic anthropological casework, and exclude individuals who had reported not working on casework but considered themselves qualified anyway. The average time to complete the survey was approximately 21 minutes. The survey did not require respondents to answer all questions; instead, respondents were directed to sets of questions based on their experiences and background (as assessed by their responses). For example, based on how a respondent answered the question "Are you a member of the

Anthropology Section of the AAFS?" the survey would then lead to follow-up questions such as "What is your membership level in the AAFS?" or "If you are NOT a member of AAFS, why are you not a member?" The survey also had a mix of set responses and free-response text boxes. Because of this structure, and because answering any of the questions was voluntary, the number of respondents varied per question. Overall, 216 individuals answered the majority of relevant survey questions. Logistic regression analyses were performed to evaluate trends in the data using the statistical computing environment R (R Core Team 2013).

Results

Respondent Demographics

Rather than reporting sex, respondents were asked to report their gender in a free-response text box. Based on responses, the gender breakdown of respondents was 151 women, 58 men, and 2 non-binary individuals. The average age of participants was 43 years (SD = 13 years). Figure 1 presents the distribution of respondents who that reported both age and gender.

Respondents were also asked what year they completed their undergraduate and gradaute degrees. Taking time off between degrees is not uncommon (Passalacqua & Garvin 2018), so we argue that the year of undergraduate degree completion is a more representative variable for how junior or senior an individual may be in the discipline. Years of undergraduate degree completion are presented in Figure 2.

Employment and Professional Membership

Approximately 75% (161/216) of respondents practiced forensic anthropology in the United States, with other regions less represented (Table 1). Table 2 presents the current employment of respondents. From these data, ~59% (125/213) were primarily employed in academia or were current students, while ~32% (69/213) were professionals primarily employed outside of academia. This breakdown is similar when comparing the number of active ABFA-certified

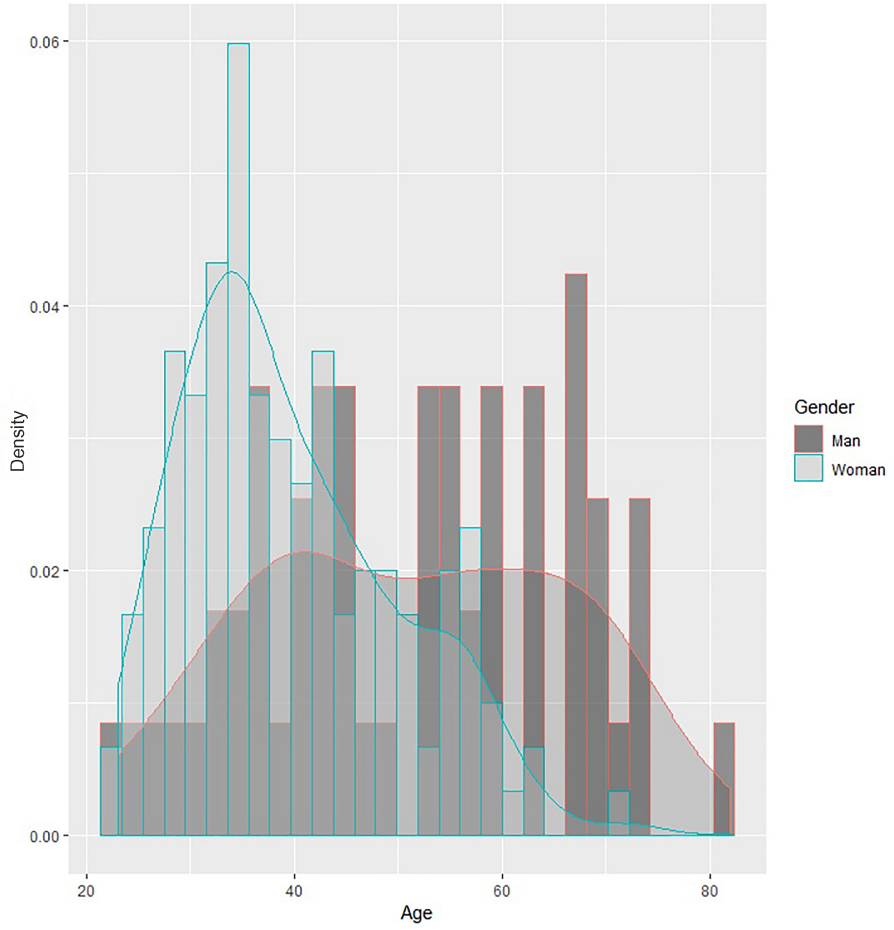

FIG. 1—*Respondents' age and gender.*

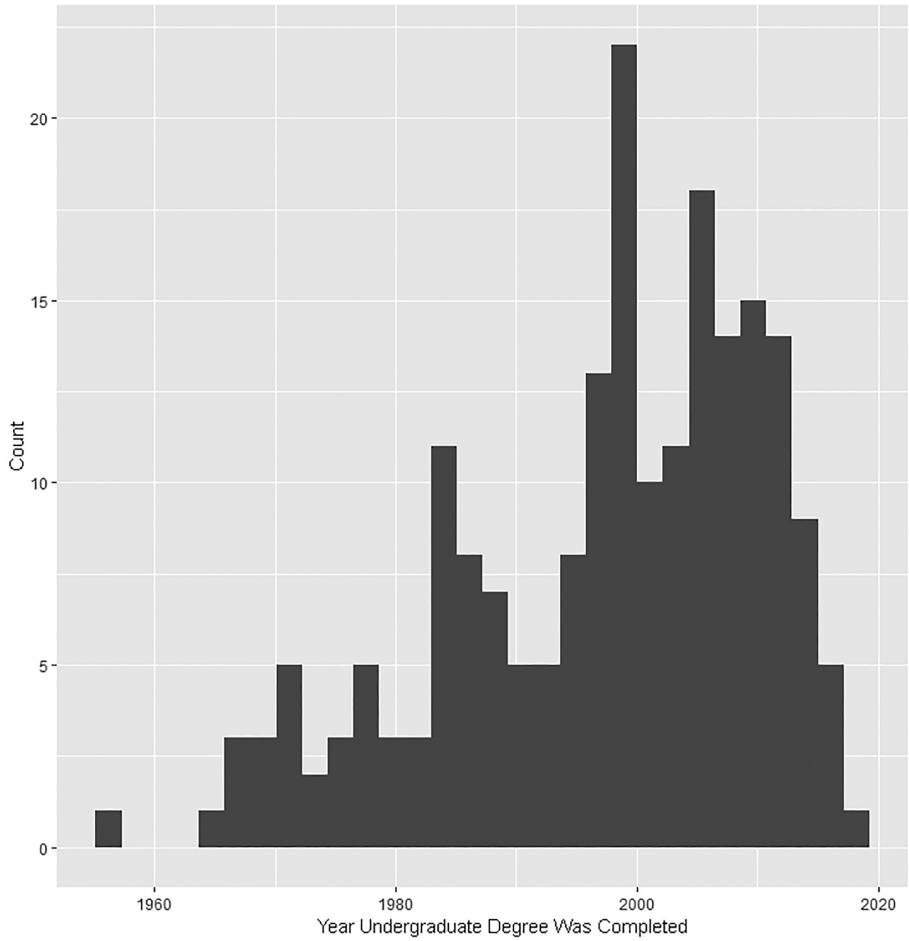

FIG. 2—*Respondents' year of undergraduate degree completion.*

TABLE 1—*Location of forensic anthropology practitioner respondents.*

Location	Number of Respondents
United States	161
South America	13
Canada	9
Europe	8
United Kingdom	5
Central America	4
South Africa	2
New Zealand	1
Middle East	1
Australia	1
TOTAL	216

TABLE 2—*Current employment of respondents.*

Current Employment	Number of Respondents
Anthropology faculty (tenure track)	44
Student	35
Forensic anthropologist at Coroner/ME office	23
Other government (e.g., museum, FBI)	17
Anthropology faculty (non-tenure track)	15
Anatomy faculty	13
Other academia/faculty	13
Other professional organization (e.g., NGOs)	8
Retired	8
Contract anthropologist at the DPAA	7
Employed outside of anthropology	7
GS anthropologist at the DPAA	6
non-forensic anthropology position at Coroner/ME office	6
Postdoctoral position (academic)	5
Postdoctoral position (applied)	3
Unemployed	4

forensic anthropologists' primary affiliation, with ~56% in academia and the rest in applied positions (Passalacqua & Pilloud 2018:43–44).

Regarding membership in professional organizations, ~72% (158/218) reported being members of the Anthropology Section of the American Academy of Forensic Sciences (Table 3), with another 5 five individuals reporting AAFS membership at various levels in other sections. Of respondents, ~61% (132/216) said they regularly attend the annual meeting of the AAFS. Similarly, ~62% (158/217) reported being members of the American Association of Physical Anthropologists (AAPA), with ~38% (158/217)

TABLE 3—*AAFS Anthropology Section membership levels of respondents.*

Membership Level	Number of Individuals
Student	20
Trainee affiliate	10
Associate member	32
Member	36
Fellow	57
Fellow (retired)	3

regularly attending meetings of the AAPA. The following professional organizations were also represented: ALAF ($n = 23$); FASE ($n = 13$); and the Society of Forensic Anthropologists ($n = 22$). Additionally, 40 individuals reported currently being or having been a member of the Anthropology Consensus Body of the American Academy of Forensic Sciences Standards Board, the Anthropology subcommittee of the OSAC, or SWGANTH.

Education

The institutions from which respondents received their undergraduate degrees were varied, with 188 responses representing 127 different institutions. The most common were Louisiana State University ($n = 6$), Michigan State University ($n = 6$), the University of Florida ($n = 5$), the University of Tennessee, Knoxville ($n = 4$), and the University of Toronto ($n = 4$). The vast majority of respondents earned undergraduate degrees in anthropology (~80%; 167/210), followed by biology (~6%; 13/210).

From the respondents, 194 individuals had completed or were currently enrolled in anthropology (or related) master's programs at the time of survey. Of these individuals, the vast majority had already completed their master's degree (~95%; 185/194). Note, four individuals reported practicing forensic anthropology without having completed a master's or doctoral degree; however, all of these individuals were practicing outside of the United States. In terms of institutions from which respondents received their master's degrees, less variation was present, with 164 responses representing 79 different institutions. The most common were Mercyhurst University ($n = 13$), the University of Tennessee, Knoxville ($n = 12$), Louisiana State University ($n = 9$), and California State University, Chico ($n = 7$). Regarding master's thesis topics, most individuals reported that their research topics were focused on forensic anthropology (~45%;78/172), followed by bioarchaeology (~29%; 50/172), human biology (~7%; 12/172), evolutionary anthropology (~3%; 5/172), and paleopathology (~2%; 4/172).

From the respondents, 173 individuals had completed or were currently enrolled in anthropology (or related) doctoral programs at the time of survey. Of these individuals, the majority had already completed their doctoral degree (~83%; 143/173). In terms of institutions from which respondents received their doctoral degrees, 125 responses represented 61 different institutions. The most common were the University of Tennessee, Knoxville ($n = 18$), the University of Florida ($n = 13$), Ohio State University ($n = 10$, the University of Toronto ($n = 6$), and Michigan State University ($n = 5$). Regarding dissertation topics, most individuals focused on bioarchaeology (~34%; 47/139), followed by forensic anthropology (~29%; 41/139), human biology (~7%; 10/139), evolutionary anthropology (~5%; 7/139), and dental anthropology (~3%; 4/139).

At the master's level, respondents reported having an average of 1.75 (SD = 1.37) faculty in their program(s) who taught courses specifically related to forensic anthropology methods, theory, or practice, with an average of 0.67 (SD = 0.83) ABFA-certified faculty teaching in their master's programs. When examined over time by year of master's degree completion compared to number of ABFA-certified faculty teaching in a graduate program, the $R^2 = 0.075$, indicating no correlation between date and number of ABFA-certified faculty available. At the doctoral level, respondents reported having an average of 1.42 (SD = 1.89) faculty in their program(s) who taught courses specifically related to forensic anthropology methods, theory, or practice, with an average of 0.62 (SD = 0.71) ABFA-certified faculty teaching in their dissertation programs. When examined over time by year of doctoral degree completion compared to number of ABFA-certified faculty teaching in a graduate program, the $R^2 = 0.002$, again indicating no correlation.

Qualifications

As forensic anthropology is typically considered a subfield of biological anthropology, there are no set courses for students pursuing a career in forensic anthropology, nor are there doctoral degrees specifically in forensic anthropology. While there is a push to accredit undergraduate programs in forensic sciences via the Forensic Science Education Programs Accreditation Commission (FEPAC), no such standardization currently exists within forensic anthropology at any level. Therefore, both required and elective coursework vary greatly from institution to institution. As shown in Table 4, human osteology was by far the most common course taken by respondents, with 88% completing this course in graduate school. Statistics, archaeological theory, and forensic anthropology methods were the next most common courses. When asked "Do you think developing standards for education and training in forensic anthropology would be beneficial?" ~98% of respondents answered yes (167/171). When asked "Do you think developing an accreditation for forensic anthropology educational programs would be beneficial?" ~96% of respondents answered yes (127/133).

TABLE 4—*Courses taken by respondents during graduate school.*

Course	Frequency	Percent
Human osteology	177	88
Statistics	166	83
Archaeological theory	148	74
Forensic anthropology methods	148	74
Archaeological methods	139	69
Bioarchaeology	136	68
Human variation	130	65
Evolutionary theory	125	62
Cultural anthropology theory	124	62
Gross anatomy	118	59
Introduction to forensic anthropology	112	56
Paleopathology	111	55
Skeletal trauma	93	46
Growth and development	91	45
Zooarchaeology	87	43
Taphonomy	68	34
Molecular anthropology/genetics	62	31
Ethics	41	200
GIS	37	18

TABLE 5—*Training/experiences respondents had while attending graduate school that prepared them for work in forensic anthropology.*

Experience	Frequency	Percent
Assisted faculty with lab-based casework	155	82
Assisted faculty with field-based casework	142	75
Attended forensic anthropology short-course	88	47
Internship at coroner/ME office	58	31
Internship in academic biological anthropology laboratory	50	26
Worked as forensic anthropologist at coroner/ME office	39	21
Assisted with human-rights-related casework	39	21
Visiting scientist at a medical examiner's office	31	16
Internship/Forensic Science Academy at the DPAA (or previous iteration: JPAC, CILHI)	18	10
Postdoc in forensic anthropology within academia	17	9
Postdoc in forensic anthropology at coroner/ME office	14	7
Worked as medicolegal death investigator	12	6

In addition to traditional coursework (i.e., education) in forensic anthropology, experience, training, and other mentoring experiences are common during graduate school. The majority of respondents indicated that during graduate school they had assisted faculty with lab-based casework (82%) and with field-based casework (75%). Others sought opportunities beyond their institutions as interns or postdoctoral scholars at coroner/medical examiner's offices or the Defense POW/MIA Accounting Agency (DPAA) (Table 5).

As there are no current standards for education (aside from a PhD in anthropology or a closely related field as dictated by the ABFA) or applied experiences to be a forensic anthropologist, we asked practitioners which knowledge areas they felt were most important to possess. The responses were consistent with the courses taken, with the most important area of knowledge being human osteology, followed by forensic anthropology methods (Table 6). Interestingly, statistics falls lower in the list of necessary knowledge areas, despite being a course many had taken. Along these same lines, we asked what experiences were necessary to be a forensic anthropologist. The most common answer was having worked with a certified forensic anthropologist (74%), followed by attainment of a master's degree (60%) graduate work supervised by a certified forensic anthropologist (58%). Only half of respondents felt certification in forensic anthropology was necessary, and less than half (45%) felt a PhD was necessary (Table 7).

TABLE 6—*Knowledge areas respondents think should be required to practice forensic anthropology*

Topic	Frequency	Percent
Human osteology	169	97
Forensic anthropology methods	164	94
Skeletal trauma	164	94
Archaeological methods	161	93
Taphonomy	155	89
Human variation	151	87
Human decomposition	145	83
Bone biomechanics	140	80
Gross anatomy	138	79
Statistics	138	79
Introduction to forensic anthropology	137	79
Dental anthropology	134	77
Growth and development	133	76
Paleopathology	127	73
Ethics	125	72
Research methods	117	67
Radiology	113	65
Zooarchaeology	112	64
Bioarchaeology	108	62
Laboratory management	92	53
Archaeological theory	73	42
Evolutionary theory	66	38
Molecular anthropology/genetics	62	36
Chemistry	49	28
Cultural anthropology theory	47	27
GIS	40	23
Pedagogy	22	13

TABLE 7—*Education/training experiences respondents think should be required for an individual to practice forensic anthropology.*

Experience	Frequency	Percent
Some period of work supervised by a certified forensic anthropologist	128	74
Master's degree in anthropology	104	60
Graduate education supervised by certified forensic anthropologist	100	58
Some amount of continuing education	98	57
Membership in relevant professional organization	95	55
Advanced applied training	92	53
Certification	87	50
PhD in anthropology	78	45
Some period of time working/interning/assisting in coroner/medical examiner's office	75	43
Professional service to the forensic anthropology community	67	39
Peer-reviewed publications in a forensic anthropology journal	51	29
Work in an accredited laboratory	33	19

In order to examine potential variables that may explain if a respondent chose whether a master's degree or doctoral degree should be required to practice forensic anthropology, logistic regressions were performed. In both cases the variables included were if the respondent had previously completed a master's degree, if the respondent had previously completed a doctoral degree, if the respondent believed ABFA certification was beneficial, the number of cases the respondent analyzed in their career, the number of cases the respondent analyzed per year, and if the respondent had ABFA certification. There were no significant associations for any of these variables at the 0.05 level or below for either preference of a master's or doctoral degree.

Respondents were also asked what they felt made them qualified to be forensic anthropologists (as a free response), particularly given the broad variation in training that currently exists. Experience and education were by far the most common responses (Table 8). These were followed by training and then by having a network of professionals, either colleagues or mentors that could be used as a resource for case-related assistance. Certification by the ABFA was not considered an important factor in making a person qualified to practice forensic anthropology, although few respondents identified as being ABFA-certified (see below).

Conversely, respondents were asked what would make a person *unqualified* to practice forensic anthropology (as a free response). These responses were largely in line with what makes one qualified, with a focus on lack of experience, training, and education. Additional areas of concern include the use of outdated methods, inclusion of unsupported results in a report, lack of a graduate degree, lack of understanding of the legal system, unethical behavior, and a failure to have their reports peer reviewed (Table 9). Regarding peer review, the majority of practitioners did have their reports peer reviewed in some manner (Table 10). For individuals who did not routinely have their case reports reviewed, the most common reasons were because they were sole practitioners (31%, 12/39) or because peer review was not required (26%, 10/39).

Finally, when asked "Have you been asked to consult on a case you felt unqualified to work on?" ~71% (128/180) responded no while ~29% (52/180) responded yes. For those who were asked to consult on cases they felt unqualified to work on, only one individual accepted the case anyway. The rest of the individuals referred the case to another specialist (~41%, 7/17), collaborated on the case with another specialist whom they believed was qualified (~35%, 6/17), or only provided an unofficial/preliminary opinion on the case (~24%, 4/17).

TABLE 8—*Responses to the question "What makes YOU qualified to practice forensic anthropology." Synthesized from free response text.*

Trait	Frequency	Percent
Experience	131	79
Education	100	60
Training	48	29
Professional network	25	15
ABFA certification	16	10
Related research	13	8
Staying up to date with methods	10	6
Being ethical	3	2
Other certification	2	1

TABLE 9—*Reasons someone could be considered unqualified to practice forensic anthropology. Synthesized from free response text.*

Topic	Frequency	Percent
Lack of experience	57	42
Lack of training	57	42
Lack of education	37	27
Routine use of outdated/incorrect methods	22	16
Providing unsupported conclusions in report/testimony	16	12
Lack of a graduate degree	15	11
Lack of understanding of the legal system	13	10
Unethical/unprofessional behaviors	12	9
Lack of peer review of reports	10	7
Specifically lacking in ability to analyze trauma	10	7
Lack of certification in forensic anthropology	7	5
Lack of understanding of human variation	6	4
Lack of mentorship by a forensic anthropologist	6	4
Lack of anatomy/physiology background	3	2
Lack of forensic anthropology research publications	3	2

TABLE 10—*Responses to the question "Do you routinely have your case reports peer reviewed?"*

Response	Frequency	Percent
Yes, peer review is managed by my institution and performed by a fellow staff anthropologist	68	43
Yes, I personally arrange to have my reports peer-reviewed remotely via email	26	16
Yes, Other	24	16
No	42	26

Certification

When asked "Do you think certification in forensic anthropology is beneficial?" ~92% responded yes (158/172). When asked "Do you think ABFA certification is beneficial?" ~83% responded yes (139/168). However, only ~18% (39/214) of respondents reported having certification from the ABFA. For individuals lacking certification from the ABFA, ~41% (87/214) were ineligible at the time of the survey and ~41% (88/214) were eligible but had not pursued it for various reasons. The most common responses for individuals who were eligible but had not pursued certification by the ABFA are presented in Table 11. For individuals certified by the ABFA, when asked why they pursued ABFA certification, the majority said it was to give them additional credentials or to support their credibility in court (71%, 25/35), while 20% (7/35) said it was required in order for them to do casework or was required by their employer.

TABLE 11—*Most common reasons for not pursuing ABFA certification.*

Reason	Frequency	Percent
Certification is not necessary to practice	23	29
ABFA organization/certification process is flawed/biased	10	13
Lack of casework to apply	10	13
No time to prepare for ABFA examination	7	9

As discussed previously, the ABFA is currently the only accredited certifying body in forensic anthropology, although other certifications are available from the ALAF, FASE, and RAI. At the time of the survey, ~49% (100/206) of respondents were aware of at least one of these other certifications in forensic anthropology; however, very few reported holding certification from these organizations (less than five individuals in each).

Discussion

Based on these survey results, there is general consensus that education, experience, and training are necessary in order for someone to have the knowledge required to practice forensic anthropology; however, certification is not. In regard to education, based on the courses taken by practicing forensic anthropologists (see Table 4), it is clear that educational programs do not focus on the majority of subject matter areas considered to be required for the practice of forensic anthropology (see Table 6). This finding likely stems from the lack of a standard of core courses or competencies required to be a forensic anthropologist. Instead, graduate students are subject to the requirements of their individual academic programs and available course offerings. Further, the overall accessibility of ABFA-certified individuals as faculty supervisors/mentors at academic institutions has not significantly increased over time. This situation is likely related to the relative increase of graduate students and programs over time.

Sixty percent of respondents agreed that a master's degree should be required to practice forensic anthropology, while only 45% agreed that a doctoral degree should be required. This finding demonstrates general consensus, regardless of respondent background, that master's-level individuals should be allowed to practice forensic anthropology. Additionally, there are no doctoral degrees in "forensic anthropology," nor are master's degrees in forensic anthropology common (at the time of writing the authors know of only one program in the United States that grants a master's degree in forensic anthropology, as opposed to anthropology or biological anthropology). This distinction is important, because at present there is no way to demonstrate forensic anthropological education based on a graduate degree alone. In many cases, the degree may indicate "anthropology," which may not distinguish between graduate work focused on sociocultural anthropology from graduate work focused on forensic anthropology (Passalacqua & Pilloud 2018:44–45). Further, the ABFA currently requires a PhD "in anthropology or a related field" but provides no clear guidelines for what makes a field "related to anthropology" or how to demonstrate degree equivalency.

We argue that it may be necessary to implement an accreditation for graduate-level educational programs that focus on forensic anthropology, similar to FEPAC accreditation for forensic science programs. This would make the most sense to implement at the master's level, as the majority of individuals believed a master's degree was sufficient to practice forensic anthropology. Such an accreditation could require standardized course offerings as part of a curriculum, some amount of faculty with demonstrated qualifications balanced with program enrollment, and program assessment that focuses on learning objectives and core competencies (Langley & Tersingi-Tarrant 2019). Accreditation of forensic anthropology educational programs would reduce or eliminate the need to demonstrate degree equivalency, and it could be based on courses and criteria considered required by currently practicing forensic anthropologists (e.g., osteology and methods in forensic anthropology and archaeology).

Only 50% of respondents said that certification should be required to practice forensic anthropology, slightly greater than the amount of respondents who said a PhD should be required to practice (45%). Instead, 75% of respondents said "some period of work supervised by a certified forensic anthropologist" should be required, while 58% of respondents said "graduate education supervised by a certified forensic anthropologist" should be required. This result is important when we consider that both master's and doctoral programs had an average of less than one ABFA-certified forensic anthropologist on their faculty, and that there are currently no permanent, rotating postdoctoral or residency-type positions in forensic anthropology meant to provide individuals with supervision and/or training by certified forensic anthropologists. These results demonstrate a clear disconnect between what is considered required to practice forensic anthropology and the reality of the availability of these requisite experiences. It is also worth noting that there are essentially no structured training opportunities in forensic anthropology meant to generate competency in any subject matter area. To address this issue, the Harris County Institute of Forensic Sciences began a formal, structured forensic anthropology fellowship and internship program in 2010. This program serves as a rigorous training and mentorship program, and it was recently accredited by ANAB (American National Standards Institute-American Society of Quality National Accreditation Board). This program can serve as a model for forensic anthropology as we move forward in developing qualifications and additional training programs (Pinto & Pierce 2019).

Despite these deficiencies, 82% of respondents reported having assisted faculty with lab-based casework during their graduate education and 75% of respondents reported having assisted faculty with field-based casework, demonstrating that students are assisting with forensic anthropology casework during their graduate degrees with faculty who are not certified in forensic anthropology themselves. At present there is no way to know if these faculty are competent to perform the casework, or if they are educating their students to perform forensic anthropological casework competently.

It is particularly interesting that training by a certified forensic anthropologist was considered important for an individual's qualifications, yet certification was not. However, it is worth noting that there was no survey option for "training by an uncertified practicing forensic anthropologist," so respondents had no option for training by someone without certification. This original choice was made by the authors as certification is currently the closest proxy to demonstrating competency in forensic anthropology. Very few respondents were certified by the ABFA, ALAF, FASE, or RAI. When asked why they had not pursued certification, comments were mixed (see Table 11). Some individuals were in the process of pursuing certification, others said they planned to apply in the future, while others said they did not find it necessary, nor did they have the casework background needed for the application. Others, however, expressed dissatisfaction with the ABFA certification procedure itself, with responses focused on the legitimacy of the organization and/or the certification exam. One individual called the organization "bogus," another doubted the "efficiency, fairness and ethics of the process," and one called the exam "fundamentally flawed." Others attacked the ABFA more directly, questioning its objectivity, calling it "elitist," and further implying that ABFA diplomates were "outdated" in their application of methods.

The ABFA and its certification process are often considered to be flawed but not beyond remedy. Overall, respondents saw the benefits of having a certification within forensic anthropology but felt the ABFA's current system did not serve the discipline adequately, with multiple individuals calling for reform. These efforts need to continue, and we urge the ABFA to question: the accessibility of ABFA certification to master's-level professionals, the role or format of the certification exam, the content of this exam (in order to reflect the areas considered to be required to practice forensic anthropology), what ABFA certification means in terms of competency, and how the structure of the exam allows examinees to actually demonstrate skills and knowledge related to competency. Further, the ABFA should consider recertification through some manner of examination to demonstrate competency or proficiency, in order to address the concerns of many about the usage of outdated methods by ABFA-certified individuals. The current system of recertification does not require any sort of reexamination, only the demonstration of activity within the discipline of forensic anthropology through publications, teaching, casework, and a variety of continuing education opportunities.

A number of professions have moved beyond private certification or licensing to having regulations at the state or federal level via laws that define either the use of titles such as "psychologist" or "dentist" (referred to as *certification acts*) or laws that restrict certain practices to a group of professionals that hold a certain title (referred to as *licensing acts*) (Pryzwansky 1993:221). Such laws have resulted in rigid control of various tasks, as well as the required usage of qualified individuals for these tasks, which could also be applied to forensic anthropology likely at the state-level (Vincent Sava, personal communication 2018).

Ethics was not seen as particularly important for practicing anthropologists, as only 9% of respondents said that unethical individuals should be considered unqualified. We have argued elsewhere that professionalization, qualifications, and ethics are all inextricably linked (Passalacqua & Pilloud 2018). To have a strong set of qualifications, ethical practices must be incorporated, as accepting casework beyond one's expertise is unethical. Professional organizations like the ABFA, ALAF, FASE, or RAI are best positioned to lead the charge in defining and enforcing such ethical codes. As qualifications become codified, ethical codes can be incorporated into training and as part of the certification and recertification processes.

Conclusions

The education and training of practicing forensic anthropologists are varied and do not always align with the current qualifications outlined by the ABFA. This is not to say that these individuals are not qualified to practice forensic anthropology; rather, there is currently little oversight or assistance for those individuals who do not fit the existing models of perceived qualification, and no means of determining who does or does not actually have the adequate knowledge to perform forensic anthropological analyses. As forensic anthropology grows as a discipline, the standardization of qualifications will become increasingly important, both in terms of setting requirements for education and training and for the certification of practitioners. Professional organizations need to be relevant and accessible, and the current system for ABFA certification should be addressed. Further, there need to be clear standards for education and training, which are currently lacking in the discipline.

We argue that the implementation of standardized training and core competencies akin to the FEPAC may be necessary within forensic anthropology, and that the ABFA and other accrediting and certifying bodies should incorporate these standards into their exams. It is increasingly apparent that standards need to be set for the discipline, not

only to keep unqualified individuals from practicing forensic anthropology but also to legitimize the discipline and to illustrate to the forensic science community the relevance and importance of the work forensic anthropologists perform.

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