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Submitting Your Work to Professional Journals

A Letter from Dr. Heather Norton

Submitting an article for publication can be both an intimidating and exciting experience. In many ways, just getting the article itself written feels like a major achievement, but often the work does not stop there. Preparing an article for journal submission, and then dealing with subsequent reviews (and re-reviews) can be a time-consuming and daunting process, although the end result is worth the effort. What follows is a brief and general description of the basic steps that go into preparing an article for publication—some details may change depending on the journal or field that you publish in, but the general procedure remains the same.

Writing

I know it seems obvious, but before you can go through the fun of submitting an article you need to actually get the paper written (and written well) first. While the point of this piece is not to give you instructions on how to write a journal article, there are probably a few tips that would come in handy. First, and perhaps most importantly, you must understand that writing these articles is not the sort of thing that one can dash off in a single night, the way you might throw together a last-minute term paper. It requires considerable thought and effort to put together a cogent paper that clearly describes your data and analyses and makes strong arguments supporting your conclusions. I find it helpful to set aside some time each day to work on writing—this time is non-negotiable: I do not schedule meetings during this time, or answer my phone, respond to email, or meet with students. This not only helps to make writing a habit, but it also makes the task of putting together an article much less daunting by working on it a little bit each day rather than trying to cram everything into a few furious days of writing. Second, give yourself time to not only write the paper, but time for others (fellow students, your advisor, other professors, co-authors) to read and critique the paper. Better to get constructive critical feedback now, from people you know (and like) than to get nailed by a harsh (unknown) reviewer later. Finally, before you begin to write you should have some idea of where you are planning to submit your paper: different journals may have different requirements for length, organization, etc. These can all be found on the journal’s website in the Guidelines for Authors section. Following these guidelines from the beginning can save you considerable time and hassle down the road.

Submitting

Once your paper is written and the co-authors have all signed off, it is time to submit it to your desired journal. While this is certainly faster than writing the paper itself, even with the streamlined online submission portals that most journals use today the submission process itself can sometimes be lengthy. Generally a number of additional details are required: keywords, affiliations of all co-authors, running titles, supplemental data, etc—this is not taxing information, but it takes time to compile. In addition to all of this, you must also supply a cover letter and the names of suggested reviewers. In the cover letter briefly describe your article: its title, the problem that you were addressing, how you addressed it, what you found, and how it will make an impact on the field. The trick is to find a concise way to do this without simply cutting and pasting your abstract into the body of the letter. Think of this as your opportunity to convince the editor and/or associate editor (AE) that your paper should not only be sent out for review, but that it is an important piece of work that should be published in the journal. Finally, think carefully about your list of suggested reviewers—you don’t want to recommend someone with an obvious conflict of interest (a close friend, or someone working on the exact same problem), nor do you want to just provide a who’s-who of important names in the field. Think specifically about researchers that may be able to speak to the methods used or the questions addressed in your paper—they may be the best choice.

Responding to the Reviews

After you submit your paper, you may spend a lot of time anxiously checking your email, waiting to see if your paper has been sent out for review, or, better yet, accepted. Be patient. A lot of behind-the-scenes work occurs on the journal’s end before your paper is sent out for review. While many journals ask that reviews be returned within two weeks, the reality is that some reviewers may take much longer. After the reviews come back, it is the job of the AE to read the reviewers’ comments and to synthesize them with his or her own views of the merits of the paper. Ultimately the AE makes a recommendation that is
passed on to the editor. Then and only then are you made aware of the decision. There are basically three outcomes to this, each requiring different actions on your part.

**Accepted**

Congratulations! You worked hard, presented your data well, and made a clear and convincing argument. You may have some minor stylistic changes to make (at the editor’s recommendation), but both the editors and reviewers feel that your work was important and well-written enough to merit publication. Now go call your mom and tell her that you are going to be published!

**Revise and resubmit**

Sometimes reviewers have mixed feelings about an article. They may feel that the question addressed is an important one, but that the methodologies or analyses were flawed in some way. If these are minor to moderate flaws that could be corrected by additional analyses, or perhaps even a small amount of additional data collection, they may suggest to the AE that the authors do some additional work to strengthen their argument. If the AE agrees you may be instructed to do the follow-up work and then re-submit the paper for a second round of review. It is important to have a thick skin when reading these reviews. After all, you put blood, sweat, and tears into this work, and to have someone tear it apart can be rather demoralizing. An all too common reaction to negative reviews is to think “This reviewer is clearly an idiot. They are simply too stupid to understand what we were trying to do here!” While sometimes you do get a bad review that just makes no sense, in my experience nearly all reviews (both positive and negative) usually contain at least one suggestion that ultimately improves the paper. This is not to say that you must make all of the recommended changes, but that you should consider them carefully. When you resubmit your article you will need to include a cover letter detailing how you address the reviewers’ criticisms in your revised version—if you have chosen not to perform the requested additional analyses, be prepared to justify that choice (and also be prepared for the editor to disagree with your decision).

**Rejection**

Sometimes a paper is sent out for review, but the reviewers find it so unsuitable that they recommend rejection without any opportunity to revise and resubmit. This may be because they have found serious flaws in the article, or it may be because they think that the work is simply inappropriate for that particular journal (if the latter, they or the AE may recommend a journal that would be more suitable). Now you are faced with a difficult decision. You could simply reformat the paper and shop it around to a different journal without making any major changes. Alternatively, before submitting to a new journal you could try to address some of the problems identified by the reviewers. As I mentioned above, it is rare that a review does not have something in it that will ultimately improve the quality of the paper, so you may wish to consider addressing some of the identified problems before submitting the article to a new journal. In some cases the paper does not even make it out to review—usually this is because the editor or AE feels that it is not suitable for the journal. This type of rejection is often more frustrating than those that come with reviews (even very harsh reviews), because you are left with little guidance on how to improve. Your best option here may be to simply reformat the paper and submit it to a different journal. If possible, have a colleague look at the paper again to see if he or she can spot any potential areas for improvement.

The path to getting an article published can be a long and difficult one—even after the data is collected and analyzed and the actual text written you must be prepared to go through several rounds of editing, to perform new analyses, and to accept criticism from both colleagues and anonymous reviewers. Like any skill, the ability to produce high-quality journal articles takes both time and practice. Write often, and get in the habit reading and reviewing your peers’ writing—feedback from such group sessions may go a long way to helping your article get accepted without excessive revisions. When given the opportunity to write something for publication, such as in a student journal—take it. The more you write, the easier it becomes.
Facebook Trade Experiments: Behind the Closed Doors of Social Networks

Key Beck

The dinner table was set with the aromas of wine, sweet potatoes, duck and other succulent dishes. Lively friends were gathered around the table talking about various topics ranging from politics to different types of garden gnomes. The conversation was as diverse as the group, made up of graduate students, professionals, and lay-people. The group was meeting because Thanksgiving was upon us, and no one wanted to spend the holiday at home alone.

The conversation continued to progress, but took a turn towards humor, often using the "gnome with his hand in his pocket" and "whip it out" as the interwoven punch lines. That is when Amy, the non-profit worker, says, "Be careful you may end up on YouTube." The informal setting allowed me to observe the discussions about Facebook and other Web 2.0 applications in both a participatory and detached role. Discussions about technology will shape the ways the participants experience that media. The ways people talk about technology and the media practices influence the ways people engage in its usage. Further clarification of the relationship between the experience and participation of the audience is covered in Dornfield's (2002) discussion of television. The turn in the conversation was also interesting because I never expected Web 2.0 or its implication to enter the conversation at Thanksgiving dinner, especially since there was no technology in sight. As the conversation continued, other phrases such as, "Facebook me", "I sent a Facebook invite, but they didn't respond", or "Post it" began to appear in the dialogue. This impromptu discussion of Web 2.0 was unexpected, but was welcomed as an informal setting outside the scope of my project; it provides research that could further illustrate the ways people navigate Facebook, in the virtual and actual world.

In my attempt to adequately cover the various ways that people navigate Facebook, I will use ethnographic research methods involving several types of users in varied settings, contexts, and times. The majority of my ethnographic fieldwork was conducted through semi-structured and formal interviews and meetings with respondents at their homes or workplace. The respondents consisted of various types of users, but most were graduate or post-graduate students who used Facebook in some capacity. I had the opportunity to talk informally with a smaller group of individuals who did not use Facebook. The inclusion of a variety of participants adds a layer of thickness to my research. I have identified major trends that give some indication as to how people navigate Facebook, based upon ten weeks of ethnographic work and archival research. Facebook has the ability to connect people regardless of location, a barrier that still exists in many parts of the world, especially those without internet access.

Facebook: Where’s The Beef?

Facebook allows people to connect with each other regardless of the distance, but the superficial levels of its reach are not able to catch all populations. Facebook was able to bypass this barrier by allowing users to access the site with cell phones, computers, wireless devices, print media, and actual events in cities around the world. Facebook took this grasp of the audience to a different level by giving users the ability to create personal spaces and events that can be shared with a network of individuals. These networked individuals were only part of the intended Facebook community, so Facebook also allows for unilateral networking, connecting through third-party sites, which the previous Web 1.0 had no capability of doing without knowing the content and its location.

Consumers are able to link a plethora of content by simply clicking a button that will either broadcast the content as a status update or message. In a nutshell, Facebook allows its users to create the infrastructure rather than only consume the content that is being delivered to them. This accessibility helps facilitate an active audience because the integration of content was dependent on them for sustainability, improvement, or change.

The increasing availability of people accessing and utilizing Facebook has proven to be fruitful as a place of research. My research is specifically concerned with “localized” production aspects of Facebook, this being the content that the users create and share with their personal networks rather than with the entire Facebook community. I am interested in the ways users become the producers and create content in the form of updates, messages, events, and linked information that will be shared with the Facebook community. In order to look at the production side of the user, it was also necessary to
examine the content that Facebook produces as forms of empowerment for users to create new media. Empowerment of an active audience is a main motivator for the popularity of Facebook. Many of my respondents stated they like Facebook because they can update their status and let people know what they are doing, as well as check on what people in their network are doing also. This coincides with the results from research on Facebook use and the motivation of student-users to be an active participant (Pempek et al, 2009; Ross et al., 2009, Amichai-Hamburger and Vinitzky, 2010). The simple act of adding content is important, but it is equally important to decipher what type of content should be shared on Facebook.

Facebook has shown to be a leader in the social network site realm, as it boasts on its homepage, it is “a social utility that connects people with friends and others who work, study and live around them” (Facebook site, accessed December 5, 2010). On social networking sites where users add the content, there have always been concerns over what content should be shared, how much content should be shared, and with whom should it be shared. In an attempt to address many of these issues, Facebook is continually implementing discretionary ways of limiting content that is not acceptable for the space. Examples of actions include a laxly-enforced age requirement, approval of handle, and Terms of Service and Privacy Statement. Facebook has also worked hard to allow for content to be easily shared, and shared with a wider audience. Some strategies for this is the “check-in” option, where users can give people within their network their location to facilitate a meet up, Friend Finder, or Groups.

There is an overall expectation on the type of content that is shared in this social environment, and these expectations shape the ways in which the application is defined and imagined. Facebook has supported the user’s utilization of formative fictions, to borrow the term from Gürsel (2010:38), to maintain and police the type of content that is present on the site. Formative fictions are the set of standards to which users of a specific media adhere. Linguistically, certain terminology, such as spam and forums troll, are types of user-generated standards based on formative fictions. It is not desirable for users to post multiple posts in a short amount of time, thus other users will police the situation by classifying the text as spam. The poster could also be labeled a forum troll, if they continually wait for people to post, in order to post a reply. Both of these actions are moderated by the users, rather than Facebook, based upon their views of proper etiquette on the social networking site. These standards are mostly agreed upon through communal actions, rather than a stated set of rules. This maintenance and policing is further supported by the “report the content” option, “like” option, and linking of information from third-party sites. Recently, Facebook underwent changes to make the profiles more personal and open to using the site to create networks, as seen in USA Today (Dec. 2010).

Facebook as a research site proves to be a great place to conduct cyberethnographies by anthropologists; one can employ the same methods as an ethnographer in the actual world. The respondents’ actions and behaviors will enlighten the anthropologist to the contexts in which they live. Boellstorff (2010) discusses the usefulness of cyberethnography pertaining to his anthropological research on Second Life and online environments. He states that the ethnographer is interested in the everyday contexts in which people live and this is as possible in the virtual world as it is in the actual world. He reports that his employment of participant-observation and focus groups are similar in methodology between the real and virtual worlds, and a written corpus is still recorded and analyzed. Anthropologists are in a privileged position to be able to access this information, and they have the tools to critically analyze and interpret the findings.

Where Did It All Begin?

Social networking sites tend to be populated by users who wish to engage in online communities, but also this space can be used as a place of research. Many contemporary researchers of media and online environments are looking to these sites as a valuable setting for observing the way people interact with online environments. Much of the research on Facebook is done by scholars outside the field of Anthropology. A multidisciplinary approach is needed to fully grasp the ways in that Facebook is influential as a place of research.

Social scientists, journalists, computer scientists, and education scholars all contribute to the growing literature of Facebook as a research site (Eltaheway, 2008; Dalsgaard, 2008; Ross et al., 2008; Mazzer, Murphy, and Simonds, 2009; Madge, Meek, Wellens, and Hooley, 2009; Baran, 2010; Pempek et. al, 2009; Amichai-Hamburger, 2010). Anthropologists and journalists alike are interested in Facebook due to the political implications of the technology. Today, politicians have access to a newly tapped market of consumers. Navigation through this online environment gives them access to a continually growing audience of media producers and consumers. There is a unique relationship between news correspondents and anthropologists. They are both interested in examining the ways humans experience the world, and both are charged with the
duty to record, contextualize, and interpret the information they gather, and present it to the world. The type of content is very similar, but the next steps are where the two paths diverge. While anthropology looks at the structural effects of the media producers to the audience, news correspondents examine the way information was effectively used in the face of censorship.

Dalsgaard (2008), a digital anthropologist, examines the ways that Facebook was utilized during the 2004 Presidential Inauguration. He credits much of the success of the Obama campaign to his navigation of Facebook and other social networking sites. Users had the ability to post questions and information on the campaign page, upload their pictures, and create other forms of media that proved Facebook as a site of convergence. Archival research of blogs and Facebook pages allowed Dalsgaard (2008) to examine the ways multiple users navigated Facebook in response to political movements. The archival data alone does not present a sufficient thick description of the ways users navigate Facebook for political means, so it was important for anthropologists to integrate the media producers into the research. Anthropologists often rely on news correspondents to relay information to researchers when they investigate political situations, such as Hannerz (2004). Adding this perspective is necessary when exploring the political uses of Facebook. Eltahaway (2008) wrote from the perspective of an active participant with the media technologies that existed since the integration of the online environments in the Middle East. Her perspective as a journalist allows for media scholars to examine the ties that connect the participant-consumers to the media producers, as well as examine the ways in which users in positions of power can utilize this social media for their desired outcome.

The political uses of Facebook are reminiscent of Himpele (2002) and his realization during his ethnographic work that both anthropologists and media producers, and I would add users who create content, use narratives as a way of representing social processes that are relevant to particular audiences. The power struggle that exists between cultural producers and their intended audience was highlighted above. Users must be participatory in the social practice of using Facebook in order to continue to reap the benefits of the online community. The ways in which narratives are used determine the transformation of the media practice and the content. Political implications will be associated with participation in the media practice, thus ensuring the user is part of an active audience base.

Determining what constitutes an active audience is a task that Facebook is continually trying to fine tune. Social scientists have been interested in this discussion, and within the field of psychology, research is continually being conducted to find out how personality and motivation influence the likelihood of an active audience member. Ross et al. (2009) examined how personality types influence the ways users interact with Facebook, becoming an active participant. This study sheds light on how people navigate Facebook differently depending on personal characteristics. They established that some personality types, like extroverts, were willing to use all aspects of Facebook, while people with higher levels of conscientiousness only use photos and walls.

The results of Ross et al. (2009) are supported and opposed by the results of Aimichai-Hamburger and Vinitzky (2010). These psychologists were also interested in examining the relationship between Facebook usage and the Big Five Personality test. The Big Five Personality test is a psychological scale that measures five aspects of one’s personality, based upon a scored test. The results showed that most behavior-personality types fell on a U-curve. People with high and low levels in each personality type navigated Facebook differently than those who were in the mean group. Ross et al. (2008) relied on self-reporting for their information, while Aimichai-Hamburger and Vinitzky (2010) used quantitative statistics and surveys to examine the relationships that exist. The methodologies highlight the complexities that exist in the observation of this media practice. The use of quantitative methods in supplement to interviews and self-reporting allowed for Aimichai-Hamburger and Vinitzky (2002) to uncover other dynamics between personality and Facebook usage not observed by their predecessors. They assessed that extroverts tend to not post as many pictures or actively seek out new networks, instead focusing on maintaining existing online and actual relationships.

Some psychologists, like Pempek et al. (2009), research the perspective of the consumer and consumption. According to them, Facebook allows students the opportunity to display their identities. The Facebook attributes of religion, politics, ideologies, and workplace helps facilitate this display of identities for each user. The psychological perspective highlighted by these authors will help anthropologists add to the corpus of literature that analyzes construction of self and other, using both quantitative and qualitative methods. This integrated use of methodologies help adds richness to the data and its interpretation.
The use of social scientists from various disciplines contributing to the body of literature concerning Facebook extends beyond psychology. Sociology helps position the discussion to the ways that particular groups of users navigate a shared space within structures of power. Also, the field may provide perspective of power imbalances that may exist within the system itself, especially in regards to race and identity. In her sociological examination of multiracial students, Gasser (2008) explores how students navigate Facebook and use it as a cohesive agent, creating a community within a heterogeneous structure. The lack of attention given to actual narratives is compensated by the authors uncovering specific issues multiracial students face, and best practices for student affairs and campus organizations to create a sense of community using virtual worlds. Gasser (2008:65) states that “online social network sites may offer opportunities for connection and community building when local student organizations or supportive communities do not exist on their campus”. Gasser (2008) positions the multiracial student as both a victim and controller of power in this online system. Her results helped support the idea that Facebook was often used as a way of sustaining relationships that were established before enrollment in the university. The study also showed that Facebook was used to share encouragement and acceptance of individuals, as they were newly navigating the university system.

This sociological perspective of examining relationships of power between institutions, such as community groups and universities, and the individual is an important piece to the study of social media. Sociological scholars and their examination of structure and agency should be paired with feminist methodologies to provide an analysis of structural imbalances that exist on Facebook. The influence Facebook has on the social world of users has been outlined above, but education and media scholars are also interested in the ways students navigate the site for educational reasons. Madge, Meek, Wellens, and Hooley’s (2009:152) results have shown that undergraduate students use Facebook to transition into university life. The educational technology scholars stated that Facebook was part of the “social glue” that helps students transition into university life. Baran (2010) also found similar results to Madge, Meek, Wellens, and Hooley (2009), but also established that students prefer to keep the experience social rather than educational. These findings helped situate the boundaries that possibly exist for users, particularly students.

The added benefit of anthropology in the media studies allows for multiple voices to be collected, synthesized, and shared. Anthropologists have the opportunity to use, collect, and interpret multiple voices. Ginsburg et al. (2002:22) discusses the advantage that anthropologists have in media studies. It is the ability to “access both sides,” from the point of view of the producer and receiver, that helps anthropologist situate the content and represent it in a critical nature. My work on Facebook will show representation of identity and add to the perspective of the user-producer. Most of the literature has been concerned with the consumption aspect of the media practice, but my research will highlight the complex spaces the user inhabits, as a place of consumption and production.

Domains of Facebook Usage: Establishing Collective Intelligence, Creating Social Networks, and Maintaining Social Ties

Participant observation and interviews allowed me to be engaged and present during production and consumption practices of Facebook users. I observed how two graduate students, two groups of professionals, and a focus group of twenty graduate and professional students choose the content they want to share, and why they chose to share certain content. I believe this process to be the best avenue for truly accessing and understanding the ways people navigate Facebook and online environments. The “deep-hanging out” sessions allowed me the opportunity to naturally observe the ways people use and talk about the media. Deep-hanging out also allowed me to flush out information of this complex media practice, such as group hierarchies, gaming strategies, and “check-in’s.”

Information and media practices can be misinterpreted or misunderstood in many situations. This is similar to the ways Geertz (1994) describes how a simple wink can be a secret between two people, simple tick, attraction, or just an automatic response. To not fall into the pitfall of Geertz’s famous wink interpretation conundrum, I felt multiple observations were needed in order to get a better grasp on Facebook usage. These extended opportunities allowed me to have discussions about Facebook and its impact on the respondents’ lives. Anthropologists may research how the discourse of the technology affects the culture. As discussed by Wilk (2002:286), one must observe "how people talk about television" in order to understand the effect it has on the consumer. I believe the same can be said about my ethnographic study of Facebook. While it was important for me to visually see how they used Facebook, I thought it was equally important to hear their views of the service, its influences, and its functions. Many times, the bulk of the interview was talking about social networking and what it means to
them, rather than me actually observing them using the application.

Facebook is a popular social networking site that boasts over 500 million users. It is safe to say that this collective voice has the power and influence to change the ways that media is produced, distributed, and received. In one setting on Facebook, I observed a major t-shirt company fan page promise consumers that when the page is “liked” one thousand times, they will start a t-shirt sale. This is the active audience, or voice, that further highlights the influence of convergence, as proposed by Jenkins (2006). Convergence is when old and new media interact and allow for content to be spread through multiple mediums and platforms to ideally coexist in a new integrated form. The medium transforms continuously across multiple platforms.

Facebook is one of the contemporary leaders of convergence. News, politics, movies, and gaming all happen on a single application allowing for content to be distributed through multiple avenues. News that is spread on Facebook as a status can easily be shared through email, in spoken form, webisodes, online videos, or even on the radio. The use of multiple mediums allows access to new consumers. There are countless books and print media that consecutively publishes content in print and then on their Facebook page, such as the New York Times and Le Monde. Facebook allows users to interact and allow for content to be spread through multiple mediums and platforms to ideally coexist in a new integrated form. The medium transforms continuously across multiple platforms.

While at a national conference for graduate and professional students, I was able to observe the ways people use Facebook for creating a collective intelligence. The conference was intended to share best practices of advocacy and representation for graduate and professional students. The conference took place at the prestigious M.I.T. and was aggressively scheduled, a session taking place on the hour every hour. Facebook messages and photo posts were the main method of communication and discussion. Many of the attendees that I asked stated that the ability to have the conference schedule online and the availability of Facebook to communicate with others allowed them to coordinate their location and decision-making process. Facebook as a source of collective intelligence was also present in my interviews. In my interview with Jamie, a graduate student, stated, “I use Facebook to keep track of what my friends are doing, and I can join them if I want. Also, we can comment on movies or music on each other’s wall.” This conversation that takes place between two users, and most likely other members of their network is the basis of collective intelligence. Many participants described Facebook as a safe place where one could contribute to movements and causes, from the location of their home, while still remaining anonymous. Social dialogue on important issues is clearly of interest to the participants. The next step in starting dialogue and establishing a collective intelligence is creating a social network of individuals.

For many users, creating a social network is not a tedious task. One can simply link their current email account to their Facebook account. At the conference, it was a common procedure to exchange business cards and school names. This practice was used as a method to send invites on Facebook to participants who attended the conference. Within a day of trading Facebook names, my network increased by twenty people, based solely on received invites. The process of using Facebook allowed me to participate in the social media practice I am researching. The experience also was evidence to me of how easy Facebook has made creating and maintaining social ties and networks. Sending and accepting invites allows new users to enter networks. Facebook also facilitates user’s ability to share and produce content with the members of their network.

Andre, a graduate student, stated that he uses Facebook to establish relationships based on gaming. He uses Facebook primarily for entertainment, while he does other things on the internet. He describes how he uses Facebook for creating and maintaining social ties:

I sort my Facebook friends by the games I play. Some games give you a bonus if you update your status and a friend clicks the link. I just update my status, and only make it visible to the friends who game with me. I know I’m only helping someone on my team. I only send to people I know, so it gives my group a competitive edge (interview October 15, 2010).

The maintenance of existing relationships varies among Facebook users. Andre’s infrequent usage of Facebook left his co-gamers to engage in tolerated scrounging from another alpha player. Jamie on the other hand was involved in many Greek Life Organizations and continually connected with others through Facebook. For all intents and purposes, one could also label my short term engagement of continual updates from the conference to my constituents at my home university were maintaining
existing networks. All these were facilitated by Facebook and its ability to connect people regardless of location.

The theme of relationship maintenance was presented in every aspect of my ethnographic research. All respondents stated that they mostly used Facebook to remain connected with social groups, although there was variety in the types of social groups dependent on the respondent. Jamie used Facebook to maintain relationships with her immediate and local family, while Andre used Facebook to connect with his extended family in Poland. The conference participants used Facebook to stay connected with each other. The act of being actively engaged in the media practice of using Facebook was the signifier of your inclusion in the social network. The level of engagement was not of importance in most cases.

The components of the photos and wall seemed to cement for most people the utility of the technology. The photos and wall were interesting aspects to study because the respondents of the interview and informal focus group felt a "need" to continue using this application in order to "stay connected" with people. There was an emotional and psychological effect to the participation of wall discussions and photo captions. The interviewees stated walls and photos allowed them to scan and search through networks in which they are distantly connected. The act of searching through people's pages to identify potential ties was a commonality in all cases. Many times, this act began with the user checking on the status of people they knew, then spreading out in relations from personal to impersonal pages. Further research should be applied to this area of Facebook, as it may uncover important complexities between users.

The Social Network or The Social Paradigm

As Ginsburg (2002) discussed in relation to the Great Divide, a term to describe the technology gap that exists between technology users and those without access to computers or technical knowledge, Facebook has the ability to create a value based system of haves and have-nots, becoming a system based on perceived value where the ones without access have lower value in social terms. This value system was manifested in terms of access to the application in the case of this study. The respondents of the study would state how other people "needed to be on Facebook so we can keep in touch." The facility alone was more than enough to convince most users to try Facebook. The thinking and motivation of the respondents imply, as Ginsburg (2002:130) illustrates, that the non-Facebook users "are simply waiting, endlessly to catch up". I think it is this mode of thinking that allows for developers to directly market to users. The need to be connected is motivation for some to become completely immersed in this technological environment.

Facebook has systematically grown from being within a closed community, to being available globally. The availability of using Facebook in sixty-nine languages gives some hint to the global scale of the site. Anthropologists critically observe and interpret information to provide better understanding of people’s lives, online and offline. The interconnectivity of Facebook can allow for cross-cultural research in one setting. Facebook allows individuals and groups to form a transnational community due to its availability. As a form of globalization, this interconnectivity through Facebook hints to the discussion led by the anthropologist Appadurai (1996; 55) about transnational anthropology. Anthropologists can conduct “globalized ethnography, allowing for divergent view and cross-cultural analysis on a large-scale”. How can the examination of Facebook help anthropologist conceptualize the way people inhabit the online space on a global scale?

The ways people navigate Facebook are diverse and they are hard to track. Users will utilize the part of the technology that is relevant to them. For some users, the wall and photos are most important, while others prefer instant messaging or groups. The scope of the project was too limited to get a complete picture of how people navigate Facebook. Ethnographers must be satisfied with a partial view because a lot of what we observe is only one moment in time. More ethnographic work would be needed in order to have a more complete picture of the ways groups of people navigate Facebook. It is certain that respondents interviewed primarily used Facebook for social ties and networks. Most respondents used Facebook to talk with friends and family, or plan an outing with friends. It was also apparent; they actively searched Facebook for new groups and friends to continue establishing, or rekindling, past relationships. The usage recorded was almost purely social.

Facebook is a site that empowers users to create change and infrastructure for the site. Future research may be interested in looking at the relationship between production and consumption on Facebook. Users are active consumers, but the content maintenance of the site is dependent on their production. Consumers are producers of content for Facebook, while at the same time forced to act as consumers. This gives users of Facebook the privilege of participating in the production and consumption side of the media practice. This may be the source of Facebook’s popularity and infamy.
Facebook could be blamed for the inadvertent empowerment of a consumer to produce content, eventually not needing the host company to produce its content. Or Facebook could be the producer of content for consumption, reinterpretation, and re-broadcasting. Researchers should look at the process of mediation of Facebook as Mazzarella (2004:357) discussed concerning globalization. He states it involves “a dual relationship: a relation of simultaneous self-distancing and self-recognition” The opportunity still exists for both the anthropologist and respondent alike to participate in the moment, while at the same time remaining detached and critical, and being aware of the difference.

References


How the West was One: Multivocality and the Interpretation of the American Social Narrative

Andrew D. Miller

The American West, as a symbol of the cultural heritage of the United States, is regarded with a special reverence. However, different perspectives toward the American West abound as is the case between archaeologists and laypersons. While the former involves a methodical, scholarly approach to understanding the past through material culture, the latter refers to the popular conception of the American West as a cultural symbol. The above statement seemingly presents a dichotomous relationship, with archaeologists attempting to uncover the “true” reality of the West and laypersons mythologizing it. The goal of this paper is to show how our present American identity is constructed both through the mythologizing of an era as well as through its objective, scientific examination. Indeed a mutual fascination exists in both camps that could be harnessed to the benefit of the West’s preservation and conservation. Therefore films, literature, and other artistic mediums will be analyzed as material culture that is used to construct the past just as artifacts are used by archaeologists.

Certainly examples of sensationalized depictions of history do exist that are contrary to the archaeological record. Instead of lambasting such fictive stories, the subsequent pages will entail how and why the West was sensationalized through early newspaper accounts and subsequent dramatic mediums. Additionally, incorporating archaeology can correct misinterpretations while adding truthful narratives of the past that can be more interesting than fiction. Specifically, the mythologizing of the past will be considered in regards to what Cassirer (1979) referred to as chosen glories and chosen traumas pertaining to the construction of group identity. The archaeology of frontier-towns will provide a standard to which the fictive West can be compared, as well as to illustrate the multi-ethnic heritage of the region; a heritage which only adds to the dramatic vision of the West already held by contemporary society. Ultimately, the seemingly disparate categories of popular and archaeological conceptions of the West do not necessarily have to be contradictive. Once again while historic fiction and archaeology do contradict each other in many cases, this paper will show that a need exists among both camps to understand and preserve past identities.

The vast area west beyond the Mississippi River is an environment of sweeping plains, burning desert, lush temperate rainforests, and formidable mountains. Interpreted through the lens of pop-culture art, the “Wild West” is depicted as an open, empty, almost a-cultural land lacking in the European accoutrements of civilization and inhabited by horse-backed, raiding Indians. The typical cowboy of the West, the lone gunman or rancher is an archetype for the American qualities of independence, perseverance in the face of environmental hardship, and self-reliance in the lonely wilderness (Indick 2008). Depictions and glorifications of the above archetype are rife within American art. Films such as Butch Cassidy and the Sundance Kid, novels by Larry McMurtry, television series such as HBO’s Deadwood, and the paintings of eminent Montana artist Charlie Russell both recapitulate and reinforce these American-essentialist notions of the Wild West. Indeed, many tall tales of the Wild West are based on factual events. However, the stories that first inundated the American public on the east coast about the Wild West involved courageous tales of daring-do that were frequently sensationalized (Dixon 2006). Cogent examples are the experiences of Samuel Clemens while he was the editor of Virginia City, Nevada’s Territorial Enterprise. Clemens admits to falsifying information on slow-news days as well as sensationalizing gunfights (Twain 1985). What was one bored writer’s attempt at selling a story soon metamorphosed through similar tales to become the cultural myth of the lawless West, one that was easily adaptable to the film and television mediums in the 20th century. These fanciful depictions have flown together into the genre of “Western” art, film, photography etc., which themselves are fragments of the American social narrative.

The western half of the United States, due to technological limitations of the time, was isolated from central authority and governmental institutions on the East coast. Such isolation did not result in the heavily violent, might makes right culture as presented on the silver screen, though. What Hollywood producers and writers did advance was a dramatic vision of the West in which complicated interactions between human characters and the landscape could be summarized with the cliché
shootout. It is interesting to note that the quintessential shootout may have never actually occurred as it was so often depicted. Realistically, the quick-draw in films was probably based on Southern U.S. gentlemen’s codes which involved the attainment of “satisfaction”, or revenge, on the part of a slighted party (Indick 2008). Colonists of the West included many ex-Confederates and Southern families who brought with them the aforementioned codes of honor. Ironically, it is the same Southerners who are often portrayed as villains, brought to justice by their own vigilante code.

The Lewis and Clark expedition, setting out from St. Louis in 1803, was responsible for the United States’ first penetration into the lands sold by the French in the Louisiana Purchase. Through the years 1803 to 1806 the gallant explorers and their hardy band of soldiers and irregulars paddled up the Missouri River to its headwaters in modern day Montana, crossed the Rocky Mountains at Lost Trail pass, and then floated down the tributaries of the Columbia River to the Pacific Ocean. Historian Robert Cox contends that though the Corps returned with a voluminous collection of biological, geological, and even ethnographic data, frequent delays resulted in much of their findings never being published (Cox 2004). Due to this failure the expedition throughout the 19th century was considered “little more than a comma in the national sentence” (Cox 2004:3). However, by the time of the expedition’s first centennial writers and historians started recasting the explorers as intrepid frontiersmen and Indian-fighters who pushed the boundaries of a small nation to the expanse of a continent. Such writing has continued into the contemporary age in the form of Stephen Ambrose’s Undaunted Courage, condensing America’s first glorious “victory” over the unknown West into the social narrative.

Alternatively, Custer’s Last Stand is a symbolic and mythic example of a chosen tragedy. Chosen tragedies bind individuals together socially through an experience of loss or disaster. The Battle of the Little Bighorn, as memorialized in Fedor Fuch’s Custer’s Last Stand, is depicted as the death of a brave American hero, whose company was slaughtered to the last man by a hostile Plains Indian confederation lead by the enigmatic Crazy Horse. A more subtle interpretation is that Custer’s death represents a failure on the part of the United States to subdue the wildness of the West, reinforcing the notion that the vast frontier was a place of peril and antagonism, only to be subdued through greater force and firearms.

How Custer’s Last Stand came to be an archetype of unilateral American stalwartness involves the transformation of Custer from a living person into a cultural artifact. The artfactation of Custer and his final battle was made possible through the development of silent film in the late 1800’s. As the frontier period of the American West came to an end, early filmmakers sought to capture the fading grandeur of that era. Hence early silent film depictions of events like Custer’s Last Stand or the shootout at the OK Corral set a precedent for formulaic interpretations of mythic qualities of the people therein (Indick 2008). The mythic interpretation of the Battle of the Little Bighorn epitomizes an American chosen tragedy through the escalation of George Armstrong Custer to epic status after his death. At the time of the battle, Custer’s death marked the passing of another famous Civil War hero. In this sense Custer and his army are extensions of the victorious side of the rift that engulfed a nation; therefore their motives in battling hostile Indians were pure. Custer’s mode of death, in a manly pursuit like warfare, easily fits the mold of Western men-of-action and is ripe for artistic exploitation. Furthermore, repetitions of the Custer myth in films and art solidify the Battle of the Little Bighorn as a tragic loss of an American hero, now greater in death than he was in life and forevermore containing the essence of Americanness.

The Lewis and Clark Expedition and the Battle of the Little Bighorn are examples from American history which have been engraved into the popular culture. Culturally these two punctuations in the American social narrative present “historic” evidence for the indomitable spirit of Anglo-America. The pieces of art, film, and literature themselves are artifacts which provide for contemporary America a continuity between our modern selves and the past (Csikszentmihalyi 1993). Historic art provides permanence to American identity that defies temporal contingency.

Realistically, though, the Western drama has done little to actually capture the everyday lives of the quite cosmopolitan West. What archaeologists and historians working in the region have presented is replete with ethnographic and other cultural data that defies the rather monochrome vision of Western...
art. Archaeologist Chip Colwell-Chanthaphonh, (2004) presents an article filled with examples of unorthodox identity creation and artifact collection. In the description of collecting behaviors in the San Pedro Valley, Colwell-Chanthaphonh illuminates the many, frequently personal, reasons for why individuals and groups attach a multitude of different meanings to objects. While some reasons involve the retention and conservation of ancient sites due to the ancient heritage of the Native American tribes in the area, many others come to the site with a desire to experience a mysterious and historically significant place. In the case of the latter individuals and groups are creating a continuity with the past via objects that they feel are imbued with metaphysical power, in this case crystals.

Many groups and individuals, archaeologists included, can tie important, deeply held beliefs to objects and locations. In one sense, Western genre films and art are expressing the beliefs of one take on American history. The films and art pieces are themselves artifacts of such beliefs. Archaeologists, too, may hold beliefs about objects and sites and are therefore just one group of voices speaking for the identity of objects. Both avid Western film buffs and archaeologists are fascinated with the past, though, and therefore that mutual fascination can be complimentary. Indeed, many accounts from the past can be just as interesting and dramatic as the standard tale of a righteous Anglo-on–horseback. The following case examples illustrate the complex and cosmopolitan cultural area of the 19th century American West.

When recalling a standard episodic scene from any film starring John Wayne or Randolph Scott, one imagines the weather worn, yet tireless visage of an emboled white man in the company of his loyal band (also white and male), dispute revolvers slung at their hips. The androcentric image of an ennobled white man in the company of his loyal band (also white and male), dispute revolvers slung at their hips. The androcentric image presented in western films is rather obvious and is an extension of white-male dominance in the American present. The following case examples illustrate the complex and cosmopolitan cultural area of the 19th century American West.

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Interactions certainly did occur between white and non-white settlers. However many of these interactions were not positive in the sense as commerce was the Chinese and Anglos. Highlighted in the Chinese-American experience out West is the role of Chinese immigrants in supporting the grand scheme of mineral extraction. Chinese families ran eateries, laundries and other shops, and also worked depleted or less wealthy gold claims. The ascription of the Chinese to these various vocations was the result of competitive exclusion, or a demand for a certain resource that resulted in some parties being prohibited from extracting said resource and were then forced to perform other jobs and services. In California during the days of the ‘49’ers valuable and productive gold claims were monopolized by Anglo settlers. The archaeological record supports competitive exclusion through the analysis of occupational artifacts. The remains of mineral extraction and food-production technologies differ markedly from Chinese to Anglo settlements, for example (Hardesty 1980).

The economic and occupational boundaries marked in the archaeological record carried significant weight socially in the Wild West. Accounts of African-American settlers, many leaving traditional Southern slave-culture to brave the way West, affirm how stringent many local laws were. Many local segregations laws dictated the location of African-American settlements and land purchases. In locations like 1860’s Utah, a bevy of civil and human rights, like suffrage, were outright denied to blacks even after the state reversed its laws on slavery in 1862 (de Graaf 1980). Just as Chinese immigrants came to incorporate Euro-American material culture and influence the general Western mélange, so too did African-American settlers persevere and add their influence the general Western mélange, so too came to incorporate Euro-A

Contemporary historians and social scientists have taken a more ecumenical examination of the past. The history and archaeology of women, Chinese, Native Americans, African-Americans and numerous European colonial populations are now being considered in the tapestry of the Wild West. If the contemporary conception of the west is fueled by pop cultural interpretations, then the “reality” constructed by archaeologists is one of scholarly interpretation. Both realities are constructs, and both interpretations seek to conserve aspects of the past deemed important with material culture. On one hand, modern culture preserves a timeless American ideal identity through mediums of art. On the other, archaeologists are trying to preserve materials that are representative of identities that are contextually contingent. However, this is not to say that archaeologists in the pursuit of an objective interpretation of the past are not without their own biases towards what kinds of identities should be promoted.

James Snead (2002) plainly states that the promotion of the American Southwest in the late 19th century as a suitable site for settlers involved both the exhortation of the landscape’s natural beauty, as well as the wealth of ruins and antiquities. Besides the US government singing the location’s praises, early southwest archaeologists such as Frank Springer and Charles Lummis spent much of the late 1800’s and early 1900’s establishing museums and scholarly societies in the Southwest. The men mentioned above as well as many others went about promoting the area’s ancient cultures as distinct aspects of American identity. Snead contends that the regional preference among the aforementioned archaeologists is evidence of the need for historical referents among a transplanted people in a new, strange land. In this case, settlers coming to New Mexico and Arizona at the end of the Wild West frontier period sought to link themselves with the land’s ancient cultural heritage via the artifacts and ruins of past Native American cultures.

Obviously, this argument counters the statement that popular American culture views the Wild West as empty and a-cultural. The first Anglo-American settlers readily linked themselves to cultures with which they had no contact. However, the remains of ancient Native American cities and the wealth of artifacts in the Southwest were transformed by the new settlers. The symbolic power of objects can be harnessed and directed to support the ideals of an unrelated people. In this way the agency of an object or artifact discovered is subtle. As Southwestern artifacts and architecture stood (or lay) unvoiced and undisturbed for untold years, settlers were understandably struck by their silent power.
Power, or agency, in this case refers to an artifact’s capability to elicit a response from the viewer in the form of imaginative interpretation (Lowenthal 1985).

In the case of the American Southwest, the overtly tangible nature of cliff cities and artifacts fired the imagination of the new Anglo-American settlers, as well as, the archaeologists who came after them. The ruins were reminiscent of ancient structures in the Near East and Egypt which were used to link European Christians to the era of the Old Testament (Snead 2002). Thus settlers constructed the area of the Southwest as one with a long and ancient history, similar to that of the Near East, to which they could attach themselves and assert their own distinct American identity. Snead’s argument also illustrates how archaeologists strive to preserve, via material culture, identities of the past that they consider part of their own heritage.

As stated before, the purpose of examining how laypeople and archaeologists interpret and preserve identities of the past is not to compare the inaccuracy of one group to the objectivity of the other, but to show how each constructs an historic heritage that contains quintessential qualities of America. Archaeologists and laypersons alike use material culture to construct historic heritages that can be included in the American social narrative. Neither is free from bias, as Snead has shown through the attempts of Southwest archaeologists to establish a regional link between their own culture and those of past Native American populations.

A fascination exists among both sides of the Wild West’s interpretation. Instead of reactionary arguments and disdain for the historically inaccurate, perhaps this shared fascination can be put to use protecting artifacts and historic sites, while educating people from around the world who are already excited about the Wild West. One must beware the pitfalls of educating people about such an absorbing and popular topic as Western history, though. Recall that Mark Twain, bored and hot in the Nevada summer, wrote fanciful stories to entertain and enlighten the folks back East while adding to the general misconceptions of an era. To illustrate this point, the following is an excerpt from a journal I kept during the summer of 2004 when I interned with an excavation crew in Nevada City, Montana:

Today I enjoyed coffee and a muffin during the afternoon break and saw a man come into the café wearing a huge fake cowboy hat, spurs, boots, and chaps. He was tall and very blonde. He looked over the café and smiled when he saw Tim, Daniel, and Mike who were also taking their afternoon break. The man smiled and sauntered over to the three and shook each of their hands. Another person came in and stood next to the cowboy. His accent was very thick and from what I overheard his friend had come all the way from Sweden because he loves the Wild West and has always wanted to meet a real cowboy. He asked to see their horses and Daniel said they drive trucks now. I left and I hope that nobody told the poor dude that those three are retirees who like to play dress up cowboys and indians on the weekend and harangue passersby with fake laconic drawels [sic] on the boardwalk.

The men above were volunteers who came to Nevada City during the tourist season to act out portrayals of popular denizens of the city. To the Swedish tourist the American social narrative of Wild West adventures and the stalwart heroic cowboy might as well be historic fact, and in this case a current reality. The acting skills of the volunteers did little to stymie such inaccuracies. Their job is precisely to recreate history in an exciting way that compels tourists to return to the fun, yet educational, historic ghost town and in doing so they are recapitulating the very inaccuracies they volunteer to prevent. Herein is where collaboration between archaeologists and laypersons can exist to mutual benefit. It is arguable that archaeologists have an ethical responsibility to inform the public of developments and discoveries in the field so as to curb politically zealous interpretations of the past (Dixon 2006). As individuals who are trained to methodically and objectively interpret past identities via material culture, archaeologists are in a foremost position to educate the public about our shared past. The purpose of archaeologists and laypersons alike in educating the public is unto “furnishing people with figurative spoonfuls of sugar with lessons in the complexities of American western history and that history’s influence on our modern world” (Dixon 2006:582).

To return to the question of who owns, and who interprets the past, one contends that the interpretations are numerous, and ownership is theoretically non-existent as the ethereal past cannot be possessed in entirety. What is left over to be owned or dispossessed are, metaphorically and literally, fragments of the past that require intense analysis to piece together. To some groups, one piece may be more emphasized than another. In the case of Anglo-dominated films it is obvious which pieces are being emphasized; independence, perseverance in the face of environmental hardship, and self-reliance in the lonely wilderness. Through the creation of the American social narrative chosen glories and tragedies are emphasized and reinforced through art which certainly speaks to a particular segment of the American people. Western films inundate audiences with entertainment interpreted as history. However, through collaboration between archaeologists and the
individuals fascinated with Western history a monopoly on the past does not have to exist. Indeed, the battle over archaeological vocality may not be one between objectivism and a malevolent need to recast the past to curry the powers-that-be, but rather one of simple ignorance.

The archaeological process provides an objective lens through which multiculturalism can be revealed. Popular mediums of art, paintings, and film provide a celebration of the past. Throughout this paper examples have been given to shed light on the multiple cultural groups which were involved in, and shaped by the Wild West. Within each of these groups is a strand of the American social narrative that resonates. Cooperation between archaeologists and artists progresses the American social narrative toward inclusiveness through depicting shared triumphs amidst diversity.

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Sexual Violence Against Native American Women and the Effect Alcohol Has on It

Jessica M. Hughes

“He wanted to go out. He said to me ‘You stay home’ I said ‘I wanted to go out’ He said ‘You have a baby’… I looked up and he slapped me, my husband. Not a blast that knocks your eyes blue. That came later, it was a smack, a hard domestic smack…He took me to dinner, made me go out with his boss. I didn’t want to go. He kicked me under the table, told me to look happy, told me to smile. I smiled. He kicked me again…Outside the restaurant he grabbed my hair and pulled me down to the curb. It had been snowing, he buried me in snow, he pounded me in the gutter…He was drinking. I was too. I must have blacked out. I woke up in the hospital after five brain surgeries…I didn’t want to have sex with him. He was drunk. I was just a piece of meat to him, a big hole. I tried to pretend I was asleep. He elbowed me, jerked me, pulled me up. I remember thinking just get it over with…Now he calls me in the middle of the night weeping, he didn’t mean to beat his wife. He didn’t mean to batter her. He's suicidal. He knows what his mother went through. But he can’t stop, my son. They took our land. They took our ways. They took our men. We want them back”.

This excerpt is from a monologue written by Eve Ensler from the Vagina Monologues. Ensler wrote this monologue after going to the Pine Ridge Reservation in South Dakota. She interviewed the women on the reserve about how life is for them. With their responses, she wrote this monologue. Domestic violence and sexual assault are a huge issue on the reservation as well as off. And a huge influence of this is the use of alcohol. It is possible to determine a positive correlation between domestic violence and alcohol abuse.

Domestic Violence and Sexual Assault

According to the Domestic Violence Sourcebook, domestic violence is when a spouse, intimate partner, or a date use threats, physical violence, harassment, stalking, and/or emotional abuse to control their behavior (3: 2004). It also includes biting, hitting, pushing, punching, tripping, beating, kicking, twisting arms, throwing or pushing people out of cars, shoving, throwing or causing people to fall down stairs, pulling hair, choking, and using or threatening to use a weapon such as a knife, baseball bat, gun, or lit cigarette (Danis et al. 2010:31). Sexual assault is seen as any sort of unwanted sexual activity between two or more individuals where one of the individuals is involved against their will. This includes any sort of unwanted touching, grabbing, oral sex, anal sex, sexual penetration with any object, and/or sexual intercourse. Danis and Bhandari (2010) describe domestic violence

As a pattern of coercive behaviors to control one’s partner through physical abuse, the threat of physical abuse, repeated psychological abuse, sexual assault, progressive social isolation, deprivation, intimidation, or economic coercion. Domestic violence is perpetrated by adults or adolescents against their intimate partners in current or former dating, married, or cohabiting relationships of heterosexuals, gay men, lesbians, bisexuals, and transgendered persons (30).

“Domestic violence”, “domestic abuse”, and “intimate partner violence” can be used interchangeably (Danis et al. 2010: 30).

Battering is another form of domestic violence. This is used to establish power and control over another person through fear and intimidation, using the threat or the use of violence. Battering includes emotional abuse, use of children against the victim, threats, sexual abuse, using male privilege when batterer is male, economic abuse, intimidation, isolation, and a variety of other behaviors used to maintain fear, intimidation, and power (Domestic 2004:15).

There are three different kinds of battering: physical, sexual, and psychological. Physical battering is when the abuser’s physical attacks or aggressive behavior range from bruising to murder. Generally, physical battering begins with trivial contact which then escalates into more frequent and serious attacks. Sexual abuse is when physical attack by the abuser is often accompanied by, or culminates in, sexual violence, such as the victim is forced to have sexual intercourse with the abuser or takes part in unwanted sexual activity. Psychological battering is when the abuser uses psychological or mental violence against the victim, including constant verbal
abuse, harassment, excessive possessiveness, isolating the woman from friends and family, deprivation of physical and economic resources, and destruction of personal property (Matthews 2004:15-16). Batterers often use the victim’s children as weapons. They do this by threatening to take them away from the victim or reporting them as unfit parents to the child welfare authorities. Also, batterers will isolate the victims from family and friends by sabotaging their social support networks, sometimes by making them feel unwanted or unwelcomed by them. Male abusers will often consider themselves as masters or lords over women and warrant being waited on (Danis et al. 2010:31).

Feminism has contributed significantly to the understanding of domestic violence. One of the biggest contributions made is determining the primary cause of domestic violence as a gendered nature of power and control in intimate relationships. Historically in Western culture, domestic violence occurred against wives because of rigid patriarchal structure that offered almost no legal or social redress to battered wives. It has been shown that battering of wives is not an anger issue but rather to maintain male dominance. Class also is a factor in domestic violence. Economic stresses increase the likelihood of violence happening and severely limits victims’ abilities to effectively respond to violence once it has happened (Hamby 2000:650-651).

**The Relationship Between Alcohol and Domestic Violence**

There is a strong correlation between domestic violence and alcohol abuse. There is an association with alcohol use and the increased likelihood of male-to-female physical abuse. Alcohol dependence and domestic violence are both major public health threats, and when combined, form a huge problem. These problems are being encountered more and more in the criminal justice system and substance abuse treatment facilities (Kahler et al. 2010: 115).

Now, it must be said that given the different degrees and nature of stress and substance abuse may or may not have the same association with domestic violence across all social classes, races, and environments. The stress anxiety of a domestic relationship may be so stressful that alcohol abuse is used as a coping mechanism with the situation. Researchers have found that during partner conflict there is a great deal of talk about finances and how it is spent for alcohol use (Kahler et al. 2010: 121-122). This means that finances is generally the cause of violence and have the possibility of being caused by money spent on alcohol.

There are commonalities between domestic violence and alcohol abuse. Both can be passed down from generation to generation, both involve denying and minimizing the problem, both may cause the abuser and the victim to feel isolated, and both stem from a need for power and control (Domestic 2004:106). Approximately, half of all violent crimes, including domestic violence, involve alcohol. The estimate of alcohol use in sexual assaults have been collected from a variety of sources including police reports, national random samples of crime victims, and interviews with victims who sought hospitalization. Therefore, researchers have shown that approximately one half of all sexual assaults, which includes domestic violence, are committed by men who have been drinking. Sexual violence commonly occurs when both the perpetrators and victims were drinking alcohol. It is very rare that only the victim is drinking alcohol (Domestic 2004: 224).

**Historical Background**

Many researchers have linked the problem of both sexual violence and alcohol abuse to the historical persecution of Native Americans by the European settlers and the United States government. Prior to European colonization, the life of the Native Americans was filled with less violence and more respect for women. It is estimated 4.4 to 12.25 million Native American people lived in the Americas. After colonization, in 1900, the estimation of Native Americans living in the United States was only approximately 250,000 (Szlemko et al. 2006: 439). The introduction of alcohol and Christianity developed a new ideal that women were lower than men and should be subservient to the will of God. This caused both Native and non-Native men to treat women as property leading to the abuse of both women and children. When Columbus came to the Americas, he along with other Europeans brought both diseases and a new way of life. Prior to this, women were valued, respected and honored, holding equal status as men. In many tribes, when women did not agree with a certain course of action, they would intervene and their word was law. But when colonization came, the ways of the tribes were broken up, giving way to sexual assault and violence (Witko et al. 2006:102-103).

Alcohol was a huge problem even at its introduction to Native Americans. Benjamin Franklin said, “If it be the design of Providence to extirpate these savages in order to make room for the cultivators of the earth, it seems not improbable that rum may be the appointed means. It has already annihilated all the tribes who formerly inhabited the seacoast” (Szlemko et al. 2006:439). Drinking was pervasive among European colonists and alcohol
served practical purposes in their everyday lives, often being used as a substitute for drinking water and for medical purposes such as to fight fatigue, ease indigestion, fend off fever, and relieve aches and pains. But when hard liquor and increased local brewing and distillation became more popular, people began to drink more and in less controlled situation (Frank et al. 2000:348). Not only did these traumas, along with others caused death, and destroyed the elements of Native American culture. Colonization yanked people from their ancestral homelands and forced socialization and values of the majority culture. Some of the most traumatic events were the forced removals and relocations such as to the boarding schools, the Trail of Tears, the Allotment Act of 1887, and the Termination and Relocation Act of 1954 (Sælomko et al. 2006:440).

Boarding schools were introduced in order to assimilate the Native Americans into the new European culture that was taking over the United States. The US government established boarding schools for Native American children (Sælomko et al. 2006:440). Native American children were taken from their families and put into these schools. They were taught that being a Native American was bad and they were punished severely for using their native language or practicing their native traditions. This caused a loss of cultural history because the children were not allowed to learn their culture’s stories and practices. Children were taught that physical punishment was the only way to correct behavior and abuses in all forms were used (Withko et al. 2006:103).

Native Americans were relocated into urban areas away from their family and community when the relocation movement took place. Many times they did not have advanced warning of the moves and did not have enough time to prepare for the changes leading to many difficulties. This caused them not to be able to fall back on their old traditional ways of handling conflict and instead encouraged violence. The separation from the tribal land and their community caused isolation and loss of identity which led to more internalized oppression that encouraged resulted in violence (Withko et al. 2006:104). The Trail of Tears took place in 1838 and was the journey of the Cherokees from their ancestral home in the North Carolina region to Oklahoma. Disease, exposure to the elements, and inadequate medical care or food supplies caused the death of 8,000 to 17,000 Cherokees. Approximately, 50% of the Creek and Seminole nations died during their relocations (Sælomko et al. 2006: 440).

Congress passed the Allotment Act in 1887 which eliminated the traditional system of communal land holdings and placed individual parcels of land to a select group of Native Americans. This caused an extreme disruption in the traditional way of dividing land in Native American culture. But Native Americans who wished to keep their land were required to become American citizens. When they refused, which many did, they were then relocated and left with no land (Sælomko et al. 2006: 440).

The Termination and Relocation Act of 1954 worked to assimilate Native Americans into the European American mainstream culture. The first phase of the act, the termination phase, worked to eliminate the recognition of several Native American groups. This meant the unilateral dissolution of these groups, that reservation land would no longer be recognized, and the tribal members were viewed as individual citizens of the United States. The second part of the relocation phase of the act subsidized immigration of Native Americans from reservations to metropolitan areas, requiring them to agree to never return to reservations. The act completely separated these Native Americans from their original culture, assimilated them into a new one, and caused large amounts of stress and trauma (Sælomko et al. 2006:440-441).

In 1832, Congress passed a law that prohibited the sale of liquor to all Native Americans. In 1953, Public Law 83-377 gave legislative control over tribal alcohol policymaking to tribal officials. This allowed tribes to either keep their reservation dry or to introduce liquor control ordinance that allowed for legal alcohol consumption and commercial sale on tribal lands (Kovas et al. 2007:184).

Alcohol Use Among Native Americans

There are relationships between alcohol use among Native Americans and other ethnicities, but there is distinctiveness in terms of the history, culture, and societal position that has caused a distinct set of circumstances that are not like any other group (Sælomko et al. 2006:435). There are four main differences between Native American drinkers and non-Native drinkers. Native Americans consume larger quantities of alcohol, as well as, drink more frequently. They show a greater tendency to drink in large groups and express less guilt about alcohol abuse (AFP 1985:247). There are a lot of alcohol-related arrests, morbidity, and mortality is incredibly high among Native Americans. All of these factors take a large toll in the Native American communities. The Native Americans have a higher rate of alcohol dependence than the United States population on average (Kovas et al. 2008:183).

There are notable differences among tribes when it comes to alcohol abuse. In many tribes, the proportion of Native Americans who drink or drink
frequently is smaller than that of the general population of the United States (Kovas et al. 2008:184). These numbers are derived from the number of patients discharged from Indian Health Service hospitals with an alcohol-related diagnosis, and research from geographic disparity. The rate of alcohol-related diagnosis is higher among Northern reservations than Southern reservations, as well as happening twice as often among males than females. It has been found that Native American men are 26.5% more likely to die from alcohol-related accidents and 13.2% of Native American women. This includes alcohol-related accidents, alcohol-related diseases, and many other factors. Also, the range of Native American adults who said they were current drinkers was from 30% to 84% interviewed whereas the other populations were rated at 67% (Szlemko et al. 2006:435-437). A study by Dr. James Whittake (Szlemko et al. 2006), a social psychologist, concluded that approximately 62% of Native American drinkers have experienced blackouts, 70% say they cannot stop drinking once they start, 17% say they are preoccupied by drinking, and 52% say they have been arrested while intoxicated. The study also shows that confinement on a reservation with little release for anger or aggression contributes, if not causes, alcoholism among the Native Americans living on the reservations.

Since 1975, there has been one of the largest ongoing studies of alcohol use among Native American adolescents in an annual school-based survey of tribal schools. This survey anonymously surveys 7th-12th graders on reservation schools. It has shown that Native American adolescents have a higher lifetime prevalence of alcohol use than among non-Native American adolescents. Seventy one percent of Native American adolescents reported never drinking alcohol in 1993. In 1996, another survey reported that 55% of Native American adolescents reported being drunk and 34% reported being drunk in the last month prior to the survey. The lifetime prevalence rates for alcohol use are about 5 to 15% higher among the Native American adolescents than non-Native and they appear to begin using alcohol at an earlier age. Other studies found that Native American adolescents drink in larger amounts and experience more negative consequences of drinking than other adolescents. Additionally, Native American adolescents who live on reservations, attend boarding schools, or drop out of school have been found to have higher levels of alcohol use (Szlemko et al. 2006: 437-438).

These statistics do not necessarily apply to all tribes. A recent study compared the Northern Plains tribes and members of Southwest tribes and their members from ages 15 to 54 that lived on or within 20 miles of the reservation. The results showed that less than 20% of the Northern Plains were lifetime abstainers from alcohol whereas over 50% of Southwest abstained. This showed that the Southwest members were more likely to have lifetime abstainers than either the United States or the Northern Plains populations. Former drinkers consisted of less than 10% of Northern Plains and about 36% of Southwest population. The rate of current drinkers was only 12% in the Southwest and 60% of the Northern Plains (Beals et al. 2003: 1683-1684). This study shows that alcohol use is not static across all Native American populations. Each tribe has different laws and social stipulations when it comes to alcohol use and one statement cannot be made to include all tribes. The style of drinking that some Native Americans partake in produce very high blood alcohol levels and therefore cause the high rate of morbidity, mortality, and arrest.

**Domestic Violence Against Native American Women**

Family violence, including domestic violence, is a serious problem in Native American communities. Jones (2007) has shown that Native American women are the most likely demographic group to report physical or sexual abuse from a family member or an intimate partner. A sample of 347 Navajo women showed that 52% of them reported at least one domestic violence episode in their life. Sixteen percent of the women reported being victimized in the last 12 months. A study of Southwestern Indians found that 91% of women reported being victimized by an intimate partner and a third of this percentage occurred in the last 12 months (Jones 2007:113).

It is hard to determine the extent and prevalence of domestic violence among Native Americans, but there are indications that the rate of domestic violence is higher than in other races and ethnicities in the United States. But unfortunately, these studies have flaws, such that the consequential data must be viewed with extreme caution. Most of the time these studies are limited to individual site studies because all of the studies have negative validity issues associated with them. This includes a low number of participants, multiple recounting of incidents, and data taken only from domestic violence shelters and their clients, which causes a problem because it is well known that most victims do not use the shelter system (Abril 2010:41-42).

Much of the reason for the disproportional occurrences of domestic violence are varying histories, such as the legacy of colonialism, subjugation, oppression, and subsequent trauma, as well as current events such as high poverty rates,
encounters with racism, high rates of drug and alcohol abuse, and isolation of those living in rural areas. The trauma transmits across generations because of the historical mistreatment and oppression by the dominant culture, in this case the European culture at time of United States colonization. This includes the genocide, racism, forcible expulsion from ancestral lands, and removal of children. These factors caused most Native Americans to be placed in the economically marginal rural areas of the United States. Additionally, the failure of the United States government, or the dominant and ruling culture, to keep spoken promises made to the Native Americans causes the distrust of the government (Jones 2007: 114).

In 2007, Amnesty International published Maze of Injustice: The Failure to Protect Indigenous Women from Sexual Violence. This review took an inside look into the issue of sexual violence against Native Americans. Amnesty International interviewed survivors, activists, and support workers across the United States. It suggested that the available statistics are greatly underestimated compared to the severity of the problem. A lot of the reason that the statistics are wrong is because of the magnitude of barriers to reporting. These include a fear of breaches in privacy, fear of retribution from attackers, and a lack of confidence that reports will be taken seriously and result in perpetrators being brought to justice (Maze 2007:2-3).

Native Americans are increasingly at risk of sexual violence. According to the US Department of Justice, about 86% of reported cases of rape or sexual assault against Native American are committed by non-Native men. Native American women are 2.5 times more likely to be raped or sexually assaulted than any other women in the United States. This makes it look like Native American women are targeted increasingly more because of their gender and the factor of them being Native American. Even though rape and sexual assault is about violence, there is evidence to suggest that sexual assault against Native American women involves a higher level of additional physical violence. Fifty percent of Native American women report that they suffered physical injuries as well as rape. In the general women population in the United States rape occurs to is only 30% (Maze 2007: 4-5). Additionally, violent crimes, including sexual assault, are higher among urban Native Americans than those in rural areas. Those Native Americans who have an annual income of less than $10,000 report the highest rate of being victims of violent crimes. In more than half of these assaults, the offender is someone the victim already knew as well as one in six offenders or were intimate partners or family members (Maze 2007:4-5).

Even though Native American women report many sexual assaults against them as being done by non-Native men, there is a large amount that are also experience sexual assault at the hands of their male acquaintances, boyfriends, or husbands in the Native American community. About 25% of reported sexual assaults against Native American women are attacked by their intimate partner. Intimate partners who commit sexual assaults do so in part to a lack of recognition by themselves as well as the women themselves, responding authorities, and by society in general that violence is wrong (Maze 2007:6).

A study conducted by Halinka and Malcoe (2004) was done of Native American women who attended a tribe operated WIC (Women, infant, child) clinic in southwest Oklahoma. The WIC program provides specified foods to low-income pregnant, lactating, or up to six month postpartum women and children younger than five. Therefore all of the participants are low-income. A series of questions were asked based on the Conflict Tactics Scales, Form R used in the 1985 National Family Resurvey. The survey included questions about the women’s victimization experiences of verbal and psychological aggression, physical and sexual assault, if sex was ever forced on them, and verbal abuse. The survey also separated the questions into lifetime abuse and past year abuse. The age of the women participating range from 14 to 48. Seventy four percent had a spouse or a steady male partner and the majority of that group (69.8%) had been in that relationship for over two years. All of the women were enrolled members but 59% of their partners were not. 58.7% of the women reported that they have experienced physical or sexual abuse in their lifetime. Thirty nine percent of them experienced severe acts of physical partner perpetrated violence. Some of the most common forms of severe physical abuse included being kicked, bit, or hit with a fist, being choked, or beaten up. There was a 12.2% response for women who were forced to have sexual activity by a partner, or in other words, raped. Only one woman reported sexual abuse but not physical abuse. Eighty four percent were sexually assaulted by their partner and reported multiple forms of severe physical abuse. 88% of women had an intimate partner during the last 12 months and 30% of them reported experiencing some form of physical or sexual abuse in the past year. Nearly 60% of the women reported experiencing physical and/or sexual abuse, 39% had been harshly assaulted by a partner, one in five had been beaten up, 40% had resulting injuries, and 12% had been raped by an intimate partner. These rates are almost double of those of the general United States population (Halinka and Malcoe 2004:2-9).
The data for the problem of domestic violence is incredibly flawed and it is difficult to determine the extent of the problem. Obviously, it is known that domestic violence and sexual assault is a huge issue among Native Americans, but the cause is unknown. There are many additional criminological issues, such as gang violence, that the issue of domestic violence is often embellished with subjective data (Abril 2010: 50).

Risk Factors

There are some risk factors that increase the likelihood of domestic violence. This includes the use of alcohol, the perpetrator and victim being under the age of 40, other perpetrator and victim receiving public assistance meaning they are from a low income area, and witnessing of domestic violence between the parents of either the perpetrator or the victim. None of these factors are solely unique to Native Americans, but research on Native Americans has stressed the importance of alcohol in the development of problems among Native Americans. According to one report, 62% ofNative American men and 74% of Native American women said that alcohol was being used during intimate violence episodes. Thirty percent of Native American women said that being victimized led to substance abuse and alcohol abuse was associated with the most severe abuse (Jones 2007:113-114).

Studies have shown that Native American adolescents have a more significant social, psychological, and substance use risk factors. Among Native American adolescents, there is a considerable co-morbidity of psychiatric and substance abuse disorders. Within the community and clinical populations, it is shown that early intervention and treatment programs are needed. There are residential substance abuse treatment programs around in the area, but unfortunately, most Native Americans live miles away and this distance presents a major barrier to extended involvement in treatment. Family focused treatments are necessary for Native American alcohol treatment because the caretaker’s substance use can influence adolescent drinking (Willmon-Haque et al. 2008:57).

Prosecution Issues

There is a broken system of handling sexual violence against Native Americans. A lot of this is because of the confounding criminal jurisdiction and a lack of resources. The Department of Justice reported that Native Americans have the highest rates of sexual assault in the United States and is more than double that of non-Native women in the United States (Cooper 2009: 5).

When it comes to prosecution of individuals on tribal land, a problematic situation occurs. There are details that must be determined prior to any sort of court proceedings, can occur. Even though most, if not all, reservations have their own law enforcement agency. But that causes a problem when determining jurisdiction. If an individual is not a registered member of the tribe or if the assault did not take place on the reservation, then the tribal law enforcement cannot prosecute the case. This causes a different response depending on these issues, resulting in uneven and inconsistent accountability. Also, in order for the victim to seek prosecution, they have to navigate a labyrinth of tribal, state, and federal laws. There is a complex interrelationship between these three jurisdictions that undermine equality before the law and often allows perpetrators to evade justice (Maze 2007:7-8).

Many times the US government has interfered with the tribal justice system in responding to crimes of sexual violence by underfunding the tribal system, prohibiting tribal courts from trying non-Native individuals, and limiting the custodial sentences that tribal courts can impose. According to the US government, the maximum sentence that the tribal courts can impose for crimes, including rape, assault, and murder, is one year. When prosecution takes place in the federal or state court system, it has been found that Native American women are often denied access to justice. According to Maze of Injustice (2007), many Native American victims of sexual assault find it hard, if not impossible, to find legal aid, adequate medical attention, and adequate reparations.

Native American tribes have retained the power to establish tribal courts. There are a total of about 350 tribal courts and many include appellate systems. In 1883, Congress placed authority for most felonies on Native American land in federal courts in the Major Crimes Act, giving tribes the right to prosecute offenders. But then in 1953, the public Law 280 assigned jurisdiction for certain reservations to select states. These included California, Minnesota, Nebraska, Oregon, Wisconsin, and Alaska. Between 1953 and 1968, all states had the opportunity to take over jurisdiction of the land, which a number of them did. In 1968, the Indian Civil Rights Act limited the sentencing authority of tribal courts to one year or a $5,000 fine. In 1978, the US Supreme Court ruled in Oliphant vs. Suquamish Indian Tribe that the tribal court did not have jurisdiction over non-Natives. (Cooper 2009: 5-6).

There are additional issues that run into prosecution. Federal prosecutors have researched the heritage of the victim and defendant and determine if the crime was committed on Native American land.
This causes delays because of both the time needed as well as the resources such as money. And with delays, it means that justice is not met fully. Between 2004 and 2007, the Senate Committee on Indian Affairs reported that federal prosecutors declined to prosecute 72% of child sexual crimes and 75% of adult rape cases referred from American reservation. Also, with limited resources and living on remote lands cause difficulties. One tribe located in Wyoming with a reservation about the size of Connecticut but only had two full-time police officers on 24 hour duty. There are also issues with collecting and testing rape kits (Cooper 2009: 6).

**Intervention**

There are many reasons that women do not leave an abusive relationship. Many of the women need medical help, they lack financial resources to support themselves and their family, and the abuser often lives within their community, creating a constant threat of violent retribution. But there are more and more institutions being created to help women leave an abusive relationship and find support within their communities. One of the best ways to get women to leave an abuser is by making her feel safe, most of the time helping them to obtain a restraining order against her abuser or by getting them to prosecute the abuser. But many governmental and non-profit resources to stop domestic violence are geared towards white women, neglecting the other women from other ethnic and socioeconomic backgrounds. This is even more difficult for Native American women because they are often overlooked and unreported (Hart et al. 2008:185-186).

In 2002, a program called Domestic Violence Project was started with funding from the Indian Health Service and U.S. Administration for Children and Families. It works to get Native American women to use IHS health facilities to screen for domestic violence problems. The project has caused women to use the IHS facilities, and has increased the number of Native American women who use the IHS facilities from only 4% to 48%. The program Native Americans to go to an IHS to identify and prevent abuse, visit trained health care providers and community advocates, as well as establish sustainable domestic violence response programs in hospitals and clinics (Bloom 2010: 7).

Women from the Oneida developed a project called Kanuhkwene to address critical social issues like domestic violence. They came together in the fall of 1990 to address critical issues facing their community including domestic violence, substance abuse, and health care. It is based on the traditional concept of community and connecting the social world, the natural world, and everything surrounding it. The Oneida reservation is located in northern Wisconsin. and The program works to get women to take charge of the most basic aspects of their lives and has worked to restore a balance in traditional gender roles of the Oneida culture. Originally, the Oneida people were a matrarchal society and part of the Iroquois nation. The women nurture the extended family and preserve the essence of the culture. Even though the brutal practices of the Bureau of Indian Affairs were abandoned years ago, Oneida women had to deal with a service delivery system, which was patterned after the mainstream medical model. This conflicted with traditional customs and values which left women vulnerable to domestic violence and the effects of substance abuse. The program was founded by Toni House, a student who decided to develop it as part of a university course. Women from the Oneida Nation raised issues with the current system and when women were aware of the service, they tried to take advantage of them. Unfortunately, they were met with terms that seemed patronizing and ultimately humiliating. House realized this and connected to the issue of low self-esteem in women who have suffered from domestic violence and substance abuse. So, she developed a flexible format consisting of meetings held on Monday mornings. At the meetings, they talk about traditions and ways of taking care of their tribe, like midwife practices, preparing traditional food, and health issues. The program continues giving support and leadership roles to the women of the Oneida tribe and work to end domestic violence in the community (Hagen 1995: 95-100).

**Conclusion**

There is a positive correlation between domestic violence and alcohol abuse. A very important thing to remember when studying domestic violence is that all types of violence and abuse are part of domestic violence, including emotional, physical, and sexual abuse, including rape. Most of the researchers came to the same conclusion, that alcohol was a contributing factor in domestic violence. It is not to be said that eliminating alcohol will put an end to domestic violence but more control over situations and an increased awareness of the issue will facilitate the decrease and possibly bring an end to domestic violence. Increased education of domestic violence and increased awareness in areas of increased risk will aid the prevention of domestic violence and alcohol abuse.
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The Human Cranium: An Evolutionary Perspective of Basicranial Organization

Jessica “Jesse” Hughes

Introduction

The cranium is important to the study of human evolution for several reasons. Evidence of the cranium comprises the largest part of the fossil record of the hominid clade. For many species of early hominid, the only specimens that are currently available are those of the cranium. For some species, one cranial fossil specimen has been the basis for all analysis of the species (Smithsonian Institution “Fossils”, 2010). This is possible because the cranium can yield a great deal of information, including cranial capacity, the specimen’s locomotive strategy, dietary information, body size, and changing facial structure.

There are several cranial features that make the Homo sapiens species unique among primates. Our head sits directly on top of our spine, we have an orthognathous face that is almost completely flat, and we have a very large brain that is protected by a globular shaped cranial dome. Changes in locomotion, the biomechanics necessary for food consumption and the special needs of our brains have brought on changes in our cranial structure relative to other primates.

The basicranium has undergone a continuous series of changes that can be tracked through the fossil record. In the following pages, I present an overview of cranial anatomy, a comparison between modern human cranial anatomy and that of other hominids and hominoids, a discussion of how change in the configuration of the basicranium has greatly affected the structural and functional anatomy of the rest of the cranium, and in conclusion, what inferences can be made about selective pressures for change in cranial structure.

Anatomy

There are four functional regions of the human cranium (Langdon 2005). They are the facial skeleton, the braincase, the basicranium, and the jaws (see Figure 1).

The facial skeleton is made up of portions of the frontal bone, the zygomatic bone, the sphenoid bone, the maxilla, and the bones that complete the interior of the orbits (the ethmoid, the palatine, and the lacrimal bones). The facial skeleton supports the muscles for mastication and the special senses of vision and smell. It also helps define the respiratory tract. The braincase consists of elements of the frontal bone, the parietal bones, the sphenoid bone, and the temporal bone. The braincase houses and protects the brain. The basicranium is comprised of the occipital bone, sections of the temporal bone, and the zygomatic bone. The occipital bone is the location of the foramen magnum, which is where the brain attaches to the spinal cord (see Figure 3). The basicranium is the support platform for the brain and the ear. The structure of both the braincase and basicranium reflect the shape of the brain and the connection of the brain to the rest of the body and its supporting tissues. The jaws include part of the maxilla and the mandible bone. They support the dentition and reflect the mechanical demands of chewing (Langdon 2005). As depicted in Figure 1 and Figure 2 the functional areas of the skull are overlapping and continuous.
Comparing Chimpanzee and Modern Human Cranial Anatomy

Chimpanzees and bonobos are the species with which Homo sapiens share a most recent common ancestor (Langdon 2005). Because they are more closely related to humans than any other living primate or other mammal, it is helpful to compare the cranial morphologies of the chimpanzee to modern humans. In Figure 4 there is a comparison of the human and the chimpanzee cranium and brain shape. The human braincase is more rounded and globular. The frontal bone in the chimpanzee is behind the orbits. In the human the frontal bone slopes up from the orbits to form the forehead. The chimpanzee face is prognathic and the jaws are robust in comparison to the human orthognathous face. The gap between the zygomatic arch is larger in the chimpanzee than in the human skull. This gap accommodates larger masticator muscles present in chimpanzees in comparison to their human counterparts. The larger masticatory muscles and more robust jaws indicate a diet that is rather poor; made up of mostly plant material like grasses with low nutritional value that is difficult to digest in comparison to foods such as fruits and meat. In humans, the lessening of the masticator muscles and the smaller jaws indicate a better diet. These changes are reflected in the brain size of the animals and will be discussed in terms of cranial capacity.

Comparing Cranial Anatomy within the Hominid Clade

Figure 5 represents a selection of hominid cranium specimens as well as a representative from Pan. There are many other species of hominid
corresponding to crania in the fossil record, but the five chosen for representation in the figure give a linear demonstration of the evolution of the modern cranial morphology over roughly the last 2.5 million years. *Australopithecus africanus* is dated at around 3.3 to 2.1 million years ago (Smithsonian Institution “Human Family Tree” 2010). The foramen magnum is situated so the head sits directly on top of the spine. This is common between all hominids as it is indicative of habitual bipedalism (Langdon 2005).
Though habitually bipedal the *Australopithecus africanus* cranium is very different from modern humans. The face is considerably more prognathic, and the braincase is long ventral-dorsally and short cranial-caudally. There is some evidence of large masticator muscles, a large zygomatic arch, suggesting a more robust jaw as well. There is little if any flexion in the basicranium. The emergence of *Homo habilis* at about 2.4 to 1.4 million years ago marked the appearance of some major changes in cranial structure. The most significant change at this juncture is a little bit of basicranial flexion. The face is slightly less prognathic than the face of *Australopithecus africanaus*. The braincase is still long ventral-dorsally and short cranial-caudally. Homo erectus dates back to between 1.89 million and 70,000 years ago (Smithsonian Institution “Human Family Tree” 2010).

Homo erectus shows considerably more basicranial flexion than any previous hominin. The face is much more flat, and only slightly prognathic because of the still robust jaws. The ratios for the dimensions of the braincase cranial-caudally and ventral-dorsally are decreasing. The orbits are still fairly robust, but a forehead is starting to become apparent as opposed to an immediate slope down from the orbits. *Homo sapiens neanderthalensis* became prevalent at about 200 thousand years ago. The basicranium has a greater angle and the face is very flat. The braincase is becoming more globular in shape. The mandible is still fairly robust, but has decreased in size. There is also evidence that the masticator muscles have decreased in size as well.

Homo sapiens appear in the fossil record about 250,000 years ago (Smithsonian Institution “Human Family Tree” 2010). They significantly overlap in time with Homo sapiens neanderthalensis.

However, modern humans have different cranium morphologies. The Homo sapiens face is very orthognathous. We have the flattest face of all primates living or otherwise. The jaws are not very robust and the masticator muscles are less prominent. There is a significant amount of basicranial flexion. This significantly changes the cranial shape. The braincase is considerably shorter ventral-dorsally than any of the previous hominin species. The cranial vault is also very tall cranial-caudally. This results in the globular configuration seen in the modern human species. There is also an interesting change in the Homo sapiens parietal bones. They flare out giving the cranial vault more volume. This makes the widest point on a modern human skull higher up on the head near the middle of the parietal region as opposed to lower on the head near the occipital region as was seen in earlier hominin species.

**Comparing Cranial Capacity Over Time**

All of the changes expressed in the fossil record significantly altered the cranial capacity of the hominin lineages over time. Figure 6 shows the changes in cranial capacity over time for each species represented in Figure 5 as well as a few earlier species. Using cranial capacity as a proxy for brain size, it can be deduced that the encephalization occurred gradually over time. However, there seems to have been a drastic increase in the brain size with

![Figure 6: A comparison between hominoid cranial capacity.](Photo: Schoenemann 2006)
the emergence of the Homo species. Though great detail about brain structure is not directly important, it is important to note that there is a significant change in brain shape. Referring back to Figure 4, the chimpanzee brain is more flat and long. It has less of a pronounced frontal cortex. As seen in Figures 5 and 6, the human brain is huge in comparison and is very round with a large frontal cortex. This may have had some influence on evolutionary patterns in cranial structure.

**Evolutionary Pressures and Basicranial Change**

Evolutionary pressures and adaptation to those pressures has had significant effects on cranial structure. Cranial anatomy is the result of a functional and structural network formed by genetically determined growth fields, developmental and biomechanical interactions, and physical constraints, both in terms of morphogenesis and evolution (Brüner 2007). It therefore should be investigated as a system. Each single feature has its own function, but in terms of structure, it is associated with the neighbor parts of the anatomical network. Therefore, the evolution of the whole system is constrained, characterized by adaptive pressures but also by structural and functional secondary consequences (Brüner 2007). All adult hominoids fit a model of total integration (Figure 7), with the primary contributions to this coming from the oral and zygomatic regions, and to a lesser extent the nasal region, indicating a strong connectivity among those skeletal elements that associates most closely with mastication (Ackermann 2005).

![Diagram of the relatedness between cranial structures.](Image)

**Figure 7: Diagram of the relatedness between cranial structures.**  
*Photo: Brüner 2007*

In primates there are differences in rates and degree of change due to functional adaptation differences (McCarthy 2001). The braincase, the cranial base, and the facial district, represent a structural network in which integration and modularity must be carefully considered when analyzing the evolutionary variation of single traits. Each single feature has its proper function, but in terms of structure, it is associated with the neighbor parts of the anatomical network (Brüner 2007). This means that the function and structure of each part is intrinsically related to that of the connecting parts.

The base of the cranium is of particular interest because it undergoes significant morphological change within the hominid clade, and because basicranial morphology features in several hominid species diagnoses (Nevell and Wood 2008). Because these changes are significant, they are fairly easily tracked in the fossil record and seem to be important to the overall function of the cranium as they affect so many other parts.

The basicranium morphology is also important in a comparative analysis because it is one of the first parts of the skull to reach maturity, and therefore, has an impact on the rest of the cranial morphology (Bastir, Rosas, et al. 2006). In 1863, Thomas Henry Huxley, discussing the relationship between humans and nature, suggested that cranial base morphology could represent the principal source of structural information when dealing with the functional aspects of cranial morphogenesis and evolution. His statement followed a basic principle of ontogenetic hierarchy, in which the structures maturing earlier influence the structures maturing later (Brüner and Ripani 2008).

Bastir, Rosas, et al., (2006), preformed a study that supports the idea that the basicranium matures in size before the face and may have an effect on the facial morphology. Prior to 12-13 years of age there are bidirectional interactions between the facial structure and basicranial structure that cannot be ruled out because in these early ontogenetic periods, neither structures are at maturation. It appears that after this stage, the basicranial structure affects the facial structure.

The question then becomes, why did the hominid cranium go through these types of changes in the first place? There are several selective pressures driving the increase in the size of the hominid brain since Homo habilis. Three selective pressures are climatic conditions, ecological demands, and social competition. Using latitude, prevalence of harmful parasites, mean annual temperature, and variation in annual temperature for the location of 175 hominin crania dating from 1.9 million to 10 thousand years ago, Bailey and Geary (2009) were able to deduce that these pressures definitely had an effect on cranial morphology.

In a study done by Lieberman, Pearson, et al. (2000), cranial measurements were analyzed and
the results indicated that while variations in the breadth, length and flexion of the cranial base are mutually independent, only the maximum breadth of the cranial base has significant effects on overall cranial proportions, largely through its interactions with brain volume, which influence neurobasicranial complex breadth. These interactions also have a slight influence on facial shape because neurobasicranial complex width constrains facial width, and because narrow-faced individuals tend to have antero-posteriorly longer faces relative to facial breadth than wide-faced individuals. This implies that the flexion and narrowing of the cranial base and the expansion of the braincase cranial-caudally could have had an impact on the narrowing and lessening prognathism of the lower face (Figure 8).

Anatomically, modern humans differ from archaic forms in possessing a globular neurocranium and a retracted face and in cognitive functions, many of which are associated with the temporal lobes. Though not directly related to brain size, the changes reflect alterations in brain shape and is shown to have happened at least 130 thousand years ago (Bastir, Rosas, et al. 2008). This correlates with the out of Africa migration of early Homo.

Lieberman, Hallgrímsson, et al. (2008) used mice to test three alternative models of spatial packing to address how and to what extent the cranial base angle is influenced by variation in brain and facial size. The models are tested using mouse strains with different mutations affecting craniofacial growth. Although mice have distinctive crania with small brains, long faces, and retroflexed cranial bases, the results of the study indicate that the mouse cranial base flexes to accommodate larger brain size relative to cranial base length. In addition, the mouse cranial base also extends, but to a lesser degree, to accommodate larger face size relative to cranial base length. In addition, interactions between brain size, face size, and the widths and lengths of the components of the cranial base account for a large percentage of variation in cranial base angle. The results illustrate the degree to which the cranial base is centrally embedded within the co-variation structure of the craniofacial complex as a whole (Lieberman, Hallgrimsson, et al. 2008). Though more study is needed to see if the effects seen in mice would be similar in primate species, these results seem to indicate that increasing brain size and the need for better spatial packing correlate with cranial base changes. That, along with the evidence presented in previous studies, suggests that the spatial packing needs (Figure 9) and the dietary changes correlating with a growing brain allowed for decreased prognathism and helped change the facial structures.

There are some evolutionary changes that affect the cranial structure of all hominid primates. The organization of the cranial base is influenced by locomotion and posture, as well as diet and biomechanics of the mandibular structures. The skull

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**Figure 8:** Enlow’s (1990) model of differences in facial form between dolichocephalic and brachycephalic individuals. Individuals with narrower neurobasicranial complexes will have proportionately narrower and antero-posteriorly longer faces than individuals with broader neurobasicranial complexes.
architecture largely depends upon the regulation of the cranial base morphogenesis. In primates, the more a species is encephalised, the more the cranial base is flexed to accommodate brain development. Currently, whether or not the cranial base in humans is flexed as or more than expected based upon the pattern presented by nonhuman primates is debated (Bruner 2007). Cranial anatomy is the result of a functional and structural network formed by genetically determined growth fields, developmental and biomechanical interactions, and physical constraints, both in terms of morphogenesis and evolution. It therefore should be investigated as a system.

Although the role of the skull in locomotion is not often considered, one hypothesis to explore is that decreases in facial size played a unique role in humans to improve head stabilization capabilities during running (Lieberman 2008).

**Conclusion**

The hypothesis on the outset of this exploration was that the basicranial shape has a great influence over cranial shape in the hominoid lineage through time. This hypothesis can neither be accepted nor rejected. The basicranial shape does have a large impact on the shape of the face and the rest of the braincase in hominoid crania. However, because of the extreme interdependence of the functional areas of the cranium, it is difficult to tell if the basicranium is driving the changes, or if some other evolutionary change such as decreased need for robust jaws is driving the changes. One idea to test to gain more clarity would be the effect of bipedalism on the basicranium. Bipedalism seems to be the driving force for the dietary and locomotor strategy changes that bring about changes in encephelization rates and in turn cranial morphology changes. If the basicranium changes come before the significant changes in the facial structure, there may be a causal effect.

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Persistence Hunting and the Evolution of Human Endurance Running

Paula L. Grubb

Introduction

Background

What is it that distinguishes humans from other animals? There are many different answers to this question, but one is likely to receive responses related to humans having a much larger brain size relative to overall body size. A list of uniquely human traits based on this might include linguistic ability, tool-making, thinking, reasoning, strategizing, representational ability, abstracting, and experiencing emotions. The other common response involves humans walking upright on two legs, or bipedally.

Evolutionarily, an upright, bipedal gait is one characteristic that sets humans apart from other primates, and is also a feature that can be examined readily in the fossil record (Carrier, 1984; Bramble & Lieberman, 2004; Steudel-Numbers, Weaver, and Wall-Schleffler, 2009). Consequently, most researchers in this arena have grounded their assumptions regarding the shape and form of the modern human body on the notion that adaptations, particularly those of the post-cranial skeleton, were brought about by selection pressures acting on early hominids engaged in walking (Steudel-Numbers & Wall-Schleffler, 2009). The hominid fossil record is replete with evidence suggesting that some of our earliest australopithecine ancestors were habitually walking bipedally roughly 6 to 8 million years (mya) ago (Bramble & Lieberman, 2004; Lieberman, et al., 2009).

More recently, investigators have suggested that many modern human postcranial features are not necessarily adaptations related to walking, but are the result of running (Carrier, 1984; Bramble & Lieberman, 2004; Lieberman, et al., 2009). More specifically, these investigators argue that endurance running was crucial for early Homo in order to obtain the nutrient-dense meat and organs necessary to support a large, costly, nutrient-hungry brain.

The Research Problem

The current paper reviews the evidence for the claim that endurance running in humans is an attribute governed by selective pressures, that humans are actually accomplished runners, and the idea that endurance running and persistence hunting are intimately linked. This paper considers several converging lines of evidence including skeletal morphology, biomechanics, respiration, thermoregulation, neuroanatomical structures, neurochemical rewards, and ethnographic studies of persistence hunting in contemporary hunter-gatherer groups.

The Evidence

Walk Don’t Run?

In comparison to other animals, humans would not seem to be very well-suited to running. Quite frankly, humans would appear to be too slow to even be categorized as “runners” in comparison to other animals that rely on speed (e.g., cheetahs). Running places higher metabolic and mechanical demands on the body than walking, it is more intensive in terms of thermoregulation, and it is not as stable of a configuration for balance (Carrier, 1984; Wheeler, 1993; Lieberman, et al., 2009).

The Energetic Paradox of Running

Carrier (1984) was one of the first investigators to suggest that humans were not poor runners, and that they could hold their own against other cursorial (“running”) mammals with respect to endurance running, and could in fact out-perform them over longer distances. Endurance running (ER) is defined as running for long distances (>5km) using aerobic rather than anaerobic metabolism (Lieberman, et al., 2009). Carrier (1984) offered evidence that endurance running in humans was not necessarily an inefficient strategy.

Gait Differences

Walking consists of a cycle of a single leg movement from a support to non-support period, with a stance phase (heel strike to toe-off) and a swing phase (toe-off to heel strike). Kinetic energy (KE) is the energy in an object due to motion, and potential energy (PE) is the energy due to position. The amount of potential energy is equal to the amount of kinetic energy that was required to lift a mass against gravity [PE = mass x gravity x height; KE = ½ (mass x velocity)]. The gait used in walking follows an “inverted pendulum” model, whereby the center of mass (COM) travels over an extended leg in the
stance phase. In this model, potential energy (PE) and kinetic energy (KE) are exchanged in an out-of-phase manner.

Running differs in that it is a “bouncy” movement with an aerial phase where the body is not in contact with the ground, the center of mass (COM) moves to in front of the hip, and the contact of the body with the ground is midfoot rather than at heel strike. Also during running, the knee flexes at the foot strike and also during the swing, and the arm opposite the bent knee swings as well. Running uses a “mass-spring” model in which the limb flexes and extends more at the knee and ankle, and PE and KE are exchanged in phase. This relationship is shown in Figure 1 below (from Bramble & Lieberman, 2004).

Figure 1. Comparisons of walking and running. a) Kinematics of walking (left) and running (right). During walking, the head and center of gravity are lowest near toe-off (TO) and highest at midstance (MS) where the leg is relatively straight. During running, the head and center of gravity are highest during the aerial phase and lowest at MS, when the hip, knee, and ankle are flexed; the trunk is also more inclined and the elbow more flexed. b) Biomechanical contrasts between human gaits. During walking, an inverted pendulum mechanism exchanges forward kinetic energy ($E_{ki}$) for gravitational potential energy ($E_p$) between heelstrike (HS) and MS; the exchange is reversed between MS and TO. During running, a mass-spring mechanism causes $E_p$ and $E_{ki}$ to be in phase, with both energies declining rapidly to minima between foot strike (FS) and MS. Leg tendons and ligaments partially convert decreases in $E_p$ and $E_{ki}$ to elastic strain energy ($E_{es}$) during the first half of the stance, which is subsequently released through recoil between MS and TO. [taken from Bramble & Lieberman, 2004, p. 346]

Cost of Transport (COT)

Cost of transport (COT) can be assessed as the amount of oxygen consumed in milliliters (ml O2) moving a particular mass (kg) a particular unit distance (km); Carrier, 1984). Metabolically, running requires more energy consumption than walking to cover the same distance (Alexander, 1991). Humans use roughly twice as much energy as quadrupedal cursors of similar sizes when running (Carrier, 1984; Bramble & Lieberman, 2009). Based on this, it would seem that the cost of transport (COT) associated with running outweigh the potential benefits. Researchers noted that quadrupedal cursors such as greyhound dogs or horses use different gait (walking vs. trotting vs. galloping) and these gaits are associated with speeds that minimize their energy expenditures (Carrier, 1984; Bramble & Lieberman, 2004). Refer to panel “a” of Figure 2 below (from Bramble and Lieberman, 2004).
Figure 2. ER performance in humans and in quadrupeds. a) Range of speed for human ER and sprinting, and minimum trot (Tm), preferred trot (Tp), trot-gallop transition (T→G), preferred gallop (Gp), and maximum sustained gallop (Gms) for ponies, and predicted for quadrupeds of 65 and 500 kg. Also indicated is Gld, the optimal long distance (20 km), daytime galloping speed for horses. Note that quadrupeds sprint at speeds above Gms. b) Comparison of the metabolic cost of transport (COT) in humans and ponies. Both species have U-shaped COT curves for walking, and trotting has a similar-shaped curve in the horse, but human COT is essentially flat at ER speeds. Preferred speeds (dotted rectangles) correspond to the most energy-efficient speeds in horses and walking humans, but speed selection is unrestricted in human ER. Not also that human running, like quadrupedal trotting, involves synchronized movements of diagonally opposed appendages (dots). [taken from Bramble and Lieberman, 2004, p. 347].

In panel “a” of the figure, human endurance running speeds range from approximately 2.3 to 6.5 meters per second (m s⁻¹), and sprinting speeds range from 6.5 to 9.9 m s⁻¹. Quadrupedal cursorial mammals can easily out-sprint humans for short periods of time. Panel “b” of Figure 2 depicts COT as a function of speed. In panel “b” of Figure 2, human walking speed is generally considered to be up to approximately 2.3 ms⁻¹, and most people will transition to a running gait around that speed (Bramble & Lieberman, 2004; Lieberman, et al., 2009). Walking humans have a U-shaped COT curve whereby the cost associated with walking is optimal around a speed of 1.3 m s⁻¹ (the trough of the “U”). Likewise, the COT curve for quadrupeds walking or trotting also is a U-shaped function, albeit the curve for trotting is not as steep and the range of optimal speeds is somewhat broader. In quadrupeds the COT curve for galloping maintains a vestige of the U-shape. Interestingly, the curve for humans engaged in endurance running (speeds ranging from around 2 to 6 m s⁻¹) is flat rather than U-shaped across the entire range of endurance running speeds, indicating that humans do not have an optimal running speed like other cursorial animals, and do not incur differential COT based on their running speed (Carrier, 1984; Bramble & Lieberman, 2004). The COT will be just about the same for a jogging human as for one running at a higher speed in the ER range. Human ER speeds are comparable to galloping speeds in other cursors, with humans averaging around 3.2 to 4.2 m s⁻¹ and quadrupeds averaging 2.8 to 3.8 m s⁻¹. The major difference between humans and quadrupeds is that that quadruped cannot sustain such speeds for more than 15 minutes (Carrier, 1984; Lieberman, et al., 2009). Even amateur or poorly-trained human endurance runners can easily maintain such a pace and cover much longer distances including marathons (26.2 miles continuously) and ultra-marathons (100 miles or more continuously). Based upon these data, it is clear that a human running at an average endurance speed will eventually catch and outrun quadrupedal cursors, such as horses. Moreover, humans are able to accomplish this at ages well beyond middle-age, into their 60’s and even older (McDougall, 2009).
Energetics

Stride length and stride rate are both salient factors in endurance running success (Bramble & Lieberman, 2004; Steudel-Numbers, Weaver, and Wall-Schleffler, 2007). Stride length is a function of limb length—longer legs mean a larger stride when locomoting. Stride rate is the turnover rate of your limb movement, or how many steps you take to cover a given distance. Speed (m/s) can be expressed by multiplying stride length by stride rate. Humans typically increase their ER speed by increasing their stride length, with the stride length being more than 2 meters during ER and over 3.5 meters in elite runners (see Figure 3 below from Bramble & Lieberman, 2004).

![Figure 3. Comparison of stride length (a) and stride rate (b) contributions to running speeds in humans and quadrupedal mammals for various gaits. A stride is a complete locomotor cycle. Compared to similar-sized quadrupeds, humans have relatively long stride lengths and relatively low stride rates in the ER range. Humans increase speed within the ER range primarily by increasing stride length not rate. [taken from Bramble & Lieberman, 2004, p. 350]](image)

Stride lengths are longer than those for quadrupeds of similar weights or for chimpanzees’ locomoting at the same speed (Bramble & Lieberman, 2004).

The mass-spring quality of running also makes it energy-efficient. The muscles and tendons of the legs store and release energy during the running cycle, and the limb during running is compliant. The Achilles tendon returns about 32% of energy, and the longitudinal arch in humans returns about 17% of energy. When the foot contacts the ground during running the energy is absorbed and then released to propel the person (Bramble & Lieberman, 2004).

Thermoregulation

Maintaining a stable body temperature is critical to survival (Wheeler, 1999). Metabolism and other internal functions generate heat, and body temperature varies throughout the body. The temperature of the external environment fluctuates as well, and impacts the body’s ability to maintain a constant, optimal core temperature. Heat can be increased by radiation from the sun, and can be gained or lost through conduction (transferred across one barrier or surface to another through convection (air flowing over a surface). Heat can be dissipated through evaporation. Animals regulate their core body temperature homeostatically to keep it within certain optimal boundary conditions. The
homeostatic tolerances for heat gain or loss (i.e., hyperthermia and hypothermia respectively) are very tight, and core body temperature, as well as the temperatures of certain organs (e.g., the brain), must be kept within these strictures or the animal can be permanently damaged or actually die. Any type of physical activity will generate heat, and running is particularly demanding (Wheeler, 1993; Bramble & Lieberman, 2004).

Sweating: Unlike other animals, humans sweat profusely and are cooled by this liquid evaporating off of their skin (Carrier, 1984). Human eccrine sweat glands are extensive along the surface area of the skin and mostly secrete water. Humans do not have fur, but have a smooth skin surface with some body hair, so moisture is not trapped as it would be with fur. As a consequence, humans are extremely efficient at sweating. While other animals do sweat, it typically involves apocrine glands which secrete a more viscous, oily, substance with a high protein content that tends to lather and does not evaporate very well.

Panting: Other animals must use respiration in the form of panting in order dissipate their body heat (Carrier, 1984; Lieberman, et al., 2009). Panting involves taking many shallow breaths at a very high rate through the open mouth, which increases the evaporation of water from the tongue and pharyngeal surfaces. Based on these factors, Carrier (1984) concluded that human thermoregulation is more efficient (or less costly) than that of other cursorial mammals when engaged in running.

Other Thermoregulatory Factors: In addition to being quite proficient at sweating, humans also have other adaptations geared toward cooling the body. While humans do not pant per se, they do engage in mouth breathing during strenuous respiratory activities such as running. This type of breathing increases airflow with less effort and dissipates heat during expiration (Bramble & Lieberman, 1984). The intricate vascular system of the brain functions specifically to provide constant blood flow to the brain through a series of redundant features. This system uses venous blood to cool hotter arterial blood through heat exchange prior to the arterial blood reaching the brain, thereby ensuring that the brain does not overheat (Bramble & Lieberman, 2004).

Decoupling of Respiration and Locomotion

In other animals, the breathing cycle during running is controlled by the body motions of the animal (Carrier, 1984). For example, in a running quadruped such as a cheetah, the movement of the limbs during running creates something like a “bellows” that forces air into and out of the animal’s lungs based on the positioning of the limbs during locomotion (Carrier, 1984; McDougall, 2009). This close coupling of the respiratory system with the locomotor apparatus makes it impossible for the animal to vary the airflow necessary for evaporation and cooling while running. The animal must stop running in order to pant and dissipate body heat effectively. The respiratory system of upright bipedal humans does not have this particular constraint. Humans can run effectively and maintain adequate respiration at the same time, since their primary cooling mechanism is sweating (Carrier, 1984; Wheeler, 1993).

Skeletal Morphology and Running

Several anatomical features contribute to the human ability to engage in ER, and it is not clear in terms of human evolution whether some of these features were selected for running, walking, or both (Lieberman, et al., 2009). Around 2 mya, early Homo exhibited long legs, large joint articulations, and a modern hip joint. These changes are coupled with the loss of upper limb features of their australopithecine ancestors that were relevant for climbing. In modern humans, features such as the bicondylar angle, short femoral neck, reinforced knee, hip abductors, lumbar curvature, plantar arch, adducted hallux (“big toe”), short toes, large attachment area for gluteus maximus, etc. are all relevant to running. Table 1 (from Bramble & Lieberman, 2004) below presents a listing of such features, their functional role, and an indicator of the earliest evidence for these adaptations in the fossil record.
Limb Length: Leg length in humans is much longer than that of other primates (Lieberman, et al., 2009). Evolutionarily, the trend has been toward longer lower limbs in Homo, but without any increase in overall limb mass (Lieberman, et al., 2009; Steudel-Numbers, Weaver, and Wall-Schleffler, 2007). In fact, leg mass decreases while leg length increases as one progresses from more “primitive” chimps, to australopithecines, to Homo lineages, and finally modern humans. Shorter lower limbs were characteristic of Australopithecus relative to later Homo lines, and the Neanderthal branch had shorter lower limbs than modern humans (Steudel-Numbers, Weaver, and Wall-Schleffler, 2007). This reduction in mass coupled with increased limb length has been implicated as an important determinant of ER through increased stride length (Steudel-Numbers, Weaver, and Wall-Schleffler, 2007). Steudel-Numbers, et al. (2007), using contemporary human participants, demonstrated that there were lower locomotor costs associated with longer lower limbs in relation to overall body mass.

Calcaneus: The modern human heel bone is also significantly different than that of chimpanzees, Australopithecus, and later Homo lines (Bramble & Lieberman, 2004). The area on the calcaneus for the Achilles tendon insertion (the longest tendon and the one with the most energy storage and return capability) has much more surface area in Homo and modern humans. This insertion is negligible in early australopithecines and nearly absent in chimpanzees (Lieberman, et al., 2009).

Gluteus Maximus: In humans, the gluteus maximus is a very large muscle; however, it is not engaged at all when walking. The gluteus maximus functions when humans are running. It provides stability to the trunk and also helps the trunk bend forward (Bramble & Lieberman, 2004). The fossil record indicates that the larger surface area for attachment of larger gluteal muscles on the ilium seen in modern humans was not present in Australopithecus, but appeared in Homo erectus (Lieberman, et al., 2009).

Long Necks and the Nuchal Ligament: Modern humans have long necks that are detached from their shoulders, which means that the head and shoulders can move independently. In apes, the neck is short and the musculature surrounding the shoulders is quite bulky, effectively anchoring the head and shoulder area together in a way that does not promote independent movement (Bramble & Lieberman, 2004).
A key feature evolutionarily is the notch or groove at the back of the skull for the attachment of the nuchal ligament (Lieberman, et al., 2009; McDougall, 2009). The nuchal ligament functions in stabilizing the head when an animal is moving fast. Modern humans have a nuchal line, as do other runners such as dogs and horses (McDougall, 2009). Chimpanzees do not have a nuchal ligament. In the fossil record, Australopithecus (4 mya) did not have evidence of a groove for the nuchal ligament, but the more recent ancestor Homo erectus did have an attachment site for the nuchal ligament (Bramble & Lieberman, 2004).

**Large Semicircular Canals:** The morphology of the temporal bone can provide an indication of the vestibular system in early hominids (Spoor, et al., 1994; Spoor, et al., 2003; Spoor, 2003). The semicircular canals of the inner ear are part of the visuo-vestibular system that is used to maintain balance. The semicircular canals respond to angular rotations of the head (Spoor, 2003). Using high-resolution imaging methods (e.g., CT scan), Spoor (1994) provided evidence that the human semicircular labyrinth has become larger over the course of human evolution in the anterior-posterior (A-P) dimension, and smaller in the lateral canals. While the exact function is not clear, it is thought that the A-P portion is vertically oriented and may involve monitoring movements in the vertical plane as when walking bipedally or running. As with other morphological features discussed herein, the first fossil hominid to evidence this feature was Homo erectus (Spoor, 1994). This suggests that these adaptations in the semicircular canals coincide with the advent of running as a habitual form of locomotion.

**Why Endurance Running?**

There is a great deal of evidence supporting the notion that humans are skilled, efficient endurance runners, and that some of the changes that favor ER seem to have occurred in the evolutionary history independently of walking upright. Australopithecines were equipped for bipedal walking and for climbing, but it would seem that running became a trait for selection much more recently in taller, less massive Homo erectus (Spoor, 1994; Bramble & Lieberman, 2004; Steudel-Numbers, Weaver, and Wall-Schleffler, 2007; Lieberman, et al., 2009; McDougall, 2009). It is well-established at this point that humans evolved to be adept at running long distances, and that this was independent from the ability to walk bipedally. The question now is why?

Since running poses more extreme thermoregulatory and mechanical stresses on the body than does walking long distances, what could possibly have been the selective pressure that provided the necessary features for running, but at the expense of other adaptations that favored walking and climbing?

Some researchers have theorized that ER evolved as a means of exploiting more far-reaching environments for the protein-rich foods needed to support larger, costly brains (Bramble & Lieberman, 2004; Lieberman, et al., 2009). If one engages in endurance running, more ground could be potentially covered in pursuit of resources that were perhaps more spread out from climatic or other environmental changes. Running for long periods of time over longer distances could also increase the likelihood of competing successfully with other animals for limited resources. In order for running to be a viable option, the output or yield from these foraging or hunting activities would have to be substantial in order to overcome the costs associated with running.

Another hypothesis is that ER provided our human ancestors with an edge in terms of being able to scavenge and compete with more skilled predators for food before the development of complex weapons (Bramble & Lieberman, 2004). Moreover, the ability to dissipate heat effectively while endurance running would enable early ancestors to scavenge or hunt during the hottest parts of the day, unlike other scavengers who might be diurnal or nocturnal in their foraging practices. Archaeological evidence suggests that bones and bone marrow from other animals were associated with human ancestors around 2.6 mya (Bramble & Lieberman, 2004). ER would enable early Homo to get to carcasses killed by other predators ahead of other scavenging animals such as wild dogs or hyenas (Lieberman, et al., 2009), which is strategic rather than opportunistic. Ethnographic accounts from modern hunter-gatherers such as the Hadza and !Kung provide some limited support or the idea of running long distances to get to the place where there was a kill by a predator or where a carcass was opportunistically discovered (Lieberman, et al., 2009; McDougall, 2009).

**Persistence Hunting and ER**

Some archaeological evidence such as cut marks on bone suggest that early Homo engaged in active hunting, while other researchers do not believe that stone tools were actually for hunting (Lieberman, et al., 2009). The archaeological record indicates that spear throwing devices and the bow and arrow are more recent technological advances (Liebenberg, 2006; Lieberman, et al., 2007; Pickering & Bunn, 2007).
Persistence hunting (PH) involves tracking and running prey to exhaustion as a means of disabling them for an attack, and it has been observed historically as well as in more recent hunter-gatherer groups (Liebenberg, 2006; Lieberman, et al., 2007; Pickering & Bunn, 2007; Liebenberg, 2008). Liebenberg (2006; 2008), in observing and living among modern hunter-gatherers, suggests that walking, not ER, is the hunting strategy of choice. Further, they suggest that, based on the author’s ethnographic experiences with the Kua San, walking, not ER, is the hunting strategy of choice.

Conclusions

The evidence presented for the humans being very skilled runners when one looks at endurance capabilities rather than sheer sprinting speed is quite compelling. Modern day accounts of running races where a person defeats a horse may not be all that unusual given the history of our ancestors. The physiological data from modern humans and primates, along with careful examination of the fossil record all seem to dovetail nicely. Converging lines of evidence from paleontology, archaeology, and paleo-ecology provide strong support for the evolution of ER, and the different methodologies also seem to pinpoint the timeline for the evolution of ER occurring recently in Homo erectus.

As Lieberman and his co-investigators (Bramble and Lieberman, 2004; Lieberman, et al., 2009) have noted numerous times, integrating ER into explanatory models of why this particular behavior was favored in terms of selection is the difficult part. Very clearly, some of the archaeological evidence, early Homo quite simply lacked the tracking skills necessary for PH.

Lieberman, et al. (2007) provided a response to the assertions put forth by Pickering and Bunn (2007). These authors suggest that the modern ethnographic record does not necessarily give an accurate or even adequate account of what past behaviors or cognitions of our early ancestors might have been like. They refer to this conundrum as “the tyranny of ethnography,” a term coined by anthropologist Wobst for this problematic method of testing hypotheses about past inhabitants. Lieberman, et al. (2007) point out that there is very little evidence to support the claim that tracking was too complex of a cognitive ability for early Homo, and that many less-encephalized mammals somehow manage to successfully engage in the activity. The rather sophisticated tool-making ability of early Homo is an indication of their cognitive ability, and that any sort of hunting would necessitate some form of tracking. Given that there is no evidence suggesting that early Homo made projectile points or spear-throwing devices (atlatl) that could kill or wound animals at a distance, using modern hunter-gatherer analogs that possess such technology is not particularly useful. Lieberman, et al. (2007) also assert that walking alone for pursuit hunting does not align with the physiological data in favor of ER, and that the PH forays described by Liebenberg (2006) were indeed successful 50% of the time, which leads to a much larger amount of meat per day (70%) than the use of a bow and arrow. Finally, Lieberman et al. (2007) maintain that PH is rare in modern groups because it is no longer a necessary strategy.
morphological adaptations present in the fossil record seem to favor the idea that ER was so important that early Homo essentially moved forward and completely left behind physical traits that favored merely walking, climbing, or living in a more arboreal situation. The reason for this shift in behavior, and the physical changes that went along with it, are a little murkier.

Fossil material from some of the early Homo lineages is limited, and there are notable gaps in the fossil record, so our knowledge is incomplete. As new information becomes available, it might be possible to refine hypotheses regarding the role of ER in human evolution.

The use of ethnographies of modern hunter-gatherer groups is also somewhat contentious. While useful in a global sense, modern hunter-gatherers are not subject to the same pressures or environment as those that may have been present several million years ago. These groups are influenced by modern society even if they maintain some of their traditional ways of life. Lieberman, et al. (2007) make a very important point that the “tyranny” of ethnography can be a very real problem in explanatory models.

The evidence that ER evolved as a means of persistence hunting is only one possible explanation for why ER may have been favored in the selection process. Some physiological adaptations do indeed seem to make humans well-suited for hot climates and for engaging in strenuous endurance activities under extreme heat conditions. It may very well be the case that other adaptations that seem to have no good explanation, other than they are necessary for running, does not necessarily imply that hunting was the reason for running. As suggested, scavenging efficiently could also provide the impetus for ER. It is also noteworthy that some of these adaptations also seem to coincide with the movement out of Africa, and into other regions such as Europe and Asia. It could be that ER, when combined with walking, was favored in order to effectively reach new environments that were more favorably exploited by early Homo.

What’s Next?

Newer methodologies such as the use of scanning imagery may be helpful in elucidating other adaptations to support the ER hypothesis, and the link between PH and ER is still tenuous at best. It is not clear if these issues can be elucidated by experiments involving contemporary humans or not. If modern humans do not need to engage in ER in order survive, why do so many choose to participate in such an activity recreationally? While it is true that ER is perceived as a means of maintaining fitness, even when it has more recently been suggested that it actually damages the body when carried to the extreme on a repeated basis (actually damaging the organ that it supposed to be keeping healthy—the heart), not everyone is purely motivated by interests in their health. Does ER fill some other purpose, and did it do so for our ancestors as well?

Recent psychopharmacological research indicates that running may effect changes in the mental status of the participant via a system of neuro-chemical reward (Dietrich & McDaniel, 2004; Keeney, et al., 2008; Fuss & Gass, 2010). In these animal models, it is suggested that running for long periods of time stimulates the release of endocannabinoids (eCBs) that provide an internal reward system in the form of a “runner’s high.” The role that endocannabinoids or related neuro-chemical reward systems may play in terms of ER and human evolution will be an interesting and challenging undertaking for future research. For now, Lieberman and his colleagues provide some compelling, evidence-based arguments for the role of ER in persistence hunting and scavenging.

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