'Did Fred Flintstone Really Live with Dinosaurs?': The Effect of Visual Media on the Public Perceptions of Human Evolution with a Specific Focus on Homo neanderthalensis

TAYLOR, CERI,LIANN

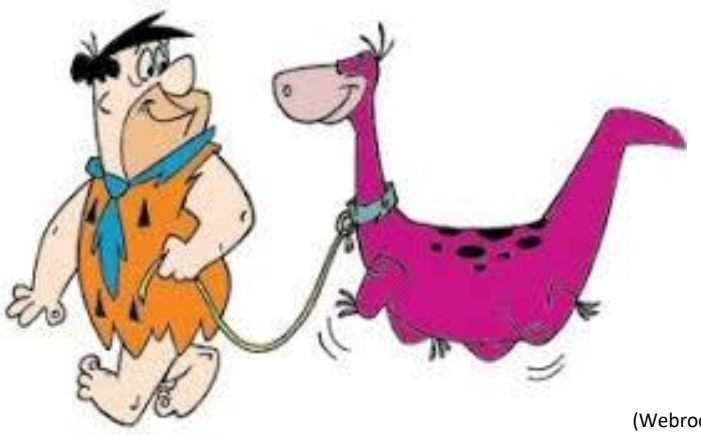
‘Did Fred Flintstone Really Live with Dinosaurs?’: The Effect of Visual Media on the Public Perceptions of Human Evolution with a Specific Focus on *Homo neanderthalensis*

Ceri Liann Taylor

Abstract

Academic perceptions of *Homo neanderthalensis* have changed dramatically since the beginnings of palaeoanthropology in the 19th century. Contemporary research advocates that Neanderthals were caring, artistic, capable of symbolic thought, and possessed the ability for articulated speech; with many academics asserting that they were merely a geographical variation of our own species. However, evidence has shown that public perceptions of Neanderthals, and human evolution more generally, are not congruent with recent academic research and instead echo the academic perceptions of Victorian science, where Neanderthals were hairy cavemen and evolution was progressive. This thesis explores and examines the extent to which the visual media of popular science has influenced these stereotypical perceptions of evolution in the public. In order to determine the extent to which visual media has influenced this, a two-fold method has been utilised which (1) involves a questionnaire to discern the sources with which the public interact and identify if there is a clear difference between academic and lay perceptions and (2) a dual-purpose interdisciplinary experiment that utilises psychological techniques to test whether visual media are more persuasive and memorable than verbal media. Results found that there was no conclusive evidence to support a difference between images and text in terms of persuasion and memorability, however, images were found to contain concealed tropes that elicit the production of additional stereotypes. It was found instead that the public are more likely than those within the field of anthropology to uncritically accept information they are presented concerning human evolution, irrespective of format, due to the trust they place in public science. Thus it was shown that the uncritical absorption of information from the public is a key factor in the perpetuation of negative Neanderthal stereotypes and is considered as such for both visual and verbal media.

‘Did Fred Flintstone Really Live with Dinosaurs?’: The Effect of Visual Media on the Public Perceptions of Human Evolution with a Specific Focus on *Homo neanderthalensis*



(Webrockonline, 2020)

Ceri Liann Taylor

Department of Anthropology

University of Durham

This thesis is submitted for the degree of

Master of Science by Research

2021

Contents

List of Figures

Literature Review

Results

Discussion

List of Tables

Methods

Results

List of Appendices

Statement of Copyright

Acknowledgements

I would like to express my deepest thanks to my amazing supervisors Dr. Trudi Buck and Dr. Sally Street who have guided and encouraged me throughout the whirlwind of this thesis from the initial plans to the final product. It is a credit to their continued support and supervision that this research was able to be completed in the midst of a global pandemic. Without their invaluable advice and expertise this thesis would not have been remotely possible; and without their continued passion and enthusiasm toward my research the experience would not have been half as enjoyable as it was.

I would also like to express my gratitude to my family and friends who provided a constant support network throughout this experience (as well as a plentiful amount of Dairy Milk to fuel many long writing days). I'm sure they are glad that they don't have to hear the word 'Neanderthal' for the foreseeable future, but I hope they know that their continued love, encouragement, and stress-support was greatly appreciated all the same.

Introduction

Looking at the title of this thesis you may be thinking that no one would actually believe that humans ever lived amongst dinosaurs and certainly would not have kept them as pets; however, you would be surprised. In 2007, biological anthropologist Monique Scott (Scott, 2007) conducted a questionnaire in four famous natural history museums around the world (the Natural History Museum and Horniman Museum in London, the American Museum of Natural History in New York, and the National Museums of Kenya in Nairobi), assessing the general public's knowledge of human evolution. Results from Scott's study found that between 47% and 22% of respondents across the four museums believed to some extent that 'humans and dinosaurs lived at the same time' (Scott, 2007; 16); an extremely unexpected result considering there are multiple geological epochs between the extinction of the dinosaurs and the appearance of the first hominins (Rothery, 2015). However, Scott's findings did not end there. She found that, amongst public understandings of human evolution, stereotypes were rife, misconceptions were common and much of the human evolutionary story was unexplored; Neanderthals were seen as the archetypal cavemen, humans were believed to have co-existed with dinosaurs, and human evolution in general was seen as a progressive process transitioning from apes to *Homo sapiens* (Scott, 2007).

What Scott uncovered through her study is not unique to the four institutions on which her work focused but is a reflection of a wide-spread public misunderstanding concerning the human evolutionary narrative. The human evolutionary narrative typically envisioned by the public is one laden with stereotypes and fallacies which were formed in the 19th century with the birth of human evolutionary ideology (Trinkaus & Shipman, 1993). For decades anthropologists and archaeologists have aimed to challenge and negate the stereotypes and

mistakes of 19th century academia, with scholarly opinions on hominin evolution changing dramatically over the course of the century; especially in the case of the Neanderthals. The Neanderthals, or *Homo neanderthalensis,* were a hominin species that occupied the majority of the Eurasian landmass from the Middle Palaeolithic to the beginning of the Upper Palaeolithic (Schrenk et al., 2009) before becoming extinct around 40,000 years ago; a few thousand years after the introduction of anatomically modern humans to Europe (Schrenk et al., 2009). The way in which this species was viewed academically changed dramatically over the 20th century, transforming the Neanderthals from pithecoid brutes (Boule, 1913) to geographically varied *Homo sapiens* with symbolic culture (Kimbel & Lawrence, 1993). Recent research on the species has highlighted evidence which promotes the Neanderthals as more like us than originally thought: they cared for the elderly and ailed (Trinkaus & Zimmerman, 1982), buried their dead (Pettitt, 2011), developed the skillset and tools necessary to hunt large game (Patou-Mathis, 2000), adorned their bodies (Zilhão et al., 2010) and cave walls (Marris, 2018) with art, and even interbred with our own species (Sankararaman et al., 2012). The reputation of Neanderthals and other hominins is continually changing within scientific research, however, despite this new academic perspective having been established and reinforced for decades, popular opinions seemingly remain trapped in the Victorian era.

In the Victorian era, human evolution was a compelling subject for science and public alike, evidenced through the continued use of contemporary scholarly debates as the focus of numerous Victorian plays produced by the likes of P. T. Barnum, and the popularisation of caveman cartoons and imagery in 19th century publications such as Punch magazine (Horrall, 2017). The study of human evolution has attracted the attention and interest of the public as well as academics since its inception due to the fundamental and universally intriguing questions it addresses concerning humanities' place in nature (Pobiner, 2016). The creation

of the field occurred at a time where Christian views of creationism were being questioned (Parsons, 1988), providing a scientific approach to an often considered solely religious argument that primarily focused on a single human species. Due to this, and the pre-existing Victorian fascination with extant apes (Horrall, 2017), the interest and popularisation of the human evolutionary narrative was immediate; a reaction that remains valid today as palaeoanthropology continues to pave a dialogue of the ever-relevant human condition.

Due to the high levels of interest the subject has received, scientific knowledge from within the human evolutionary disciplines is still being continuously disseminated to the public through a vast array of educational media today. The subject receives coverage in media such as the *National Geographic* magazine, natural history museum displays, newspaper coverage of breakthrough findings, best-selling books such as *Sapiens: A brief history of humankind* (Harari, 2011) and televised documentaries; namely the large production BBC series *The Incredible Human Journey* with biological anthropology expert and University of Birmingham professor Doctor Alice Roberts (The Incredible Human Journey, 2009). It is therefore surprising that, despite the quantity of educational material available, the public's knowledge of human evolution is generally tainted by outdated stereotypes and misconceptions; a problematic notion when considering how impactful the human origins narrative has been on the formation of fascist political agendas (Gasman, 1971), societal gender inequalities (Hager, 1997), and racial prejudices (Porr & Matthews, 2019).

It could be suggested that these educational media sources with which the public interact do not appropriately disseminate recent scientific findings and instead rely on displaying outdated stereotypes and misconceptions as modern facts to appeal to the interest of the public; however, previous research in this area has suggested that this is not the case. My

undergraduate dissertation preceding this thesis ('You're Such a Neanderthal: The persistence of an academically challenged stereotype in the Media', 2019) found that 21st century media articles and anthropological journal articles used stereotypical language to the same extent. There were no statistical differences between the source types in terms of negative stereotypical language nor positive stereotypical language use; with the sources seemingly providing the same information and not conveying an alternative outdated message to the public. However, an additional survey conducted for this dissertation illustrated that, despite this congruency between academic and lay article content, there is a statistically significant discrepancy between the perceptions of the hominin species *Homo neanderthalensis* amongst anthropology students and the general public. The survey found that students who had not engaged with anthropological literature generally had a more negative view of the species than those who did; therefore, indicating that source type has a substantial influence on public perceptions. As there was no significant difference between the written content of the source types it was subsequently concluded that popular media sources were influencing opinions via different means: visual imagery.

The notion of visual imagery having a significant impact on public opinions of human evolution is not novel with Moser (1998) and Scott (2010) both suggesting that images and visual representations have had a huge impact on the way in which the human evolutionary narrative is consumed and understood. The study of human evolution is a very visual discipline with the likes of dioramas and reconstructive images being used throughout its history to support arguments and convey key points of research (Moser, 1998); yet the visual imagery associated with the discipline expanded far beyond academic work even during the Victorian era. Images of human evolution have seeped into all areas of popular culture from children's films such as *Early Man* (2018) to the comical skits of the Flintstone clan (The

Flintstones, 1960) and even to the iconic advertisement for the auto insurance company GEICO (2004). The effect of visual media such as these on the public perceptions of human evolution has always been assumed and as such this thesis aims to test this assumption. The intention of this thesis is to analyse the effect of visual media on the human evolutionary narrative in general but also with a specific focus on the Neanderthals as research has shown that this is the iconography with which the public identify most (Scott, 2010), likely as they embody the most common representation of the quintessential 'caveman' (Moser, 1992).

The purpose of this project is to illuminate the extent to which misconceptions and stereotypical notions concerning human evolution have continued to persist despite being academically challenged for a number of decades; exploring the impact visual images have had on this phenomenon. The prediction this thesis puts forward is that the stereotypical notions of the human evolutionary narrative from the 19th century are still being perpetuated to the public through visual media such as film and quasi-educational material. In order to analyse this, the thesis takes an interdisciplinary approach utilising psychological techniques to understand an anthropological theory. Here psychological techniques are being utilised to understand the power of stereotypes and the subsequent effect of stereotypes in terms of their memorability and persuasion while in a visual format on the public. In order to do achieve this the thesis takes a two-fold approach through the use of an online questionnaire and online psychology-based experiment. The purpose of the questionnaire is to test whether the public express human evolutionary stereotypes when unprovoked in order to highlight and analyse the extent to which Victorian ideology is still being echoed. The purpose of the psychology-based experiment is to explore the extent to which images have had an impact on this echo. This will be achieved by using a set of visual and verbal primes to understand the influence images have on opinions and to test whether the stereotypes within the images

are more memorable, and thus more impactful, that those within the verbal text; as psychological imagery theory would suggest (Paivio, 1971). Thus, it is hypothesised in this thesis that human evolutionary stereotypes and misconceptions are still widely believed by the general public more than academics, that popular images have played a key role in the maintenance of stereotypes in perceptions of human evolution, and that these images are more prominent, memorable, and impactful in terms of conveying human evolution stereotypes than verbal sources are.

1. Literature Review

A literature review has been collated for this project that explores both the academic and visual presence of Neanderthals. For this project it is important to explore how and why the Neanderthal and human evolutionary stereotypes were formed as well as delving into the theory of imagery presentation both in terms of how they can encapsulate stereotypes and the psychological impact they have on human memory. This literature review first looks at the way in which academic perceptions of Neanderthals have changed over time since their discovery in 1856 (Trinkaus & Shipman, 1993). The second half of the review then looks at how Neanderthals and other hominins have been depicted by science and society overtime before ending on the psychology of imagery retention. These two overviews will explore the sexist, racist and progressist notions that are harboured within the Neanderthal stereotype and deduce how such notions came to be associated with the Neanderthals. For the purpose of this project the term 'race' will be used throughout to discuss ancestry however it is recognised that race is a social construct and as such the term is only used as a means to concisely convey information.

1.1 Changing Perceptions of Human Evolution

1.1.1 Darwin's Theory of Evolution and the Beginnings of Palaeoanthropology

For the past few decades, the nature of the paleoanthropological discipline has been under scholarly scrutiny, with issues surrounding its emergence being widely studied and debated, shedding light on the current state of the field (Goodrum, 2009). This research is part of a recent tradition to assess the origins of disciplinary thought as it has been suggested that many disciplines have complex and problem-ridden histories that must be understood,

interrogated, and rectified (Alberti et al., 2011). This case is true of palaeoanthropology where blatant notions of racism, sexism and progressionism have been identified; the origins of which have been traced back to the beginning of the discipline in the 19th Century when numerous sciences amalgamated to form the field (Goodrum, 2009). It has been suggested by Brace (1964) that the climate of opinion that was prevalent at this formation and during the discovery of major hominin finds has ultimately and enduringly influenced the way in which the fossil record has been interpreted ever since. The study of human origins was birthed during a time of wide-spread colonialism, scientific revolution and religious unease. The social ideologies from this period perforated the prevailing scientific theories such as Thomsen's Three Age System (Thomsen, 1836) and Darwin's theory of evolution (Darwin, 1859) which aided in the formation of modern and professionalised archaeology, palaeoanthropology and in turn the discovery and understanding of the Neanderthals.

Palaeoanthropology came to fruition when theories of human evolution were supported with the discovery of a hominin fossil record, an early addition to which was discovered in August 1856 with the excavation of the specimen, Feldhofer 1 (Trinkaus & Shipman, 1993). In the Kleine Feldhofer Grotte cave at Neander Valley in western Germany cave owners Wilhelm Beckershoff and Friedrich Wilhelm Pieper stumbled across a few fragmented remains and a skull cap, misinterpreting them as that of a cave bear (Weniger, 2006). However, these remains, particularly the Feldhofer 1 skull cap, became the focus of scientific attention when they were recognised to be human by fossil collector Johann Carl Fuhlrott (Fuhlrott, 1856) and anatomy professor Hermann Schaaffhausen (Schaaffhausen, 1958). This skull cap became the type specimen of the species which was later to be termed *Homo neanderthalensis* after the valley in which it was excavated (King, 1864). The discovery of *Homo neanderthalensis* provided some of the first evidence for human evolution, putting

pressure on the validity of the widely believed biblical view of creation (Parsons, 1988). The Christian view of creation was already under fire from the geological evidence that had been acquired which pushed for a greater antiquity of the world than strict creationism would allow (Lyell, 1863). The subsequent debates that engulfed the scientific community, as well as the Victorian public, put into question the antiquity of the earth, the antiquity of humanity, and above all the possibility of a 'missing link' which would suggest that we as a species were not as unique as we once believed (Cartmill, 1990).

The concept of human evolution theory has often been attributed to Charles Darwin through his formation of the theory of evolution by natural selection in '*On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*' (Darwin, 1859) and his later application of this theory to humankind with the three-volume publication '*The Descent of Man, and Selection in Relation to Sex*' (Darwin, 1871). However, Darwin was not the first to apply evolutionary thinking to a *Homo sapiens* framework with prominent evolutionists such as Charles Lyell (1863), John Lubbock (1865), and 'Darwin's bulldog' Thomas Henry Huxley (1863) already discussing human evolution in terms of geological time, cultural change, and morphological and mental similarities to extant apes. Darwin admitted in his work that such ideas had been previously explored (1871) even referencing and publishing the article '*Note on the Resemblances and Differences in the Structure and the Development of the Brain in Man and Apes*' by Huxley (1874) within the second edition of his 1871 works (Darwin, 1882). These evolutionary explorations by other scientists in the world of natural history and the discovery of ancient humanoid remains initiating the hominin fossil record formed the perfect platform in order for Darwin to present his theory of human evolution.

Darwin's theory for human evolution rested on the notion of anatomically modern humans and extant apes descending from the same progenitor (Darwin, 1871). A link which Darwin expressed was overtly apparent to see, both anatomically and behaviourally, when not blinded by prejudice and pride (Darwin, 1871). Although referred to as "lower forms" throughout his publication (Darwin, 1871), it is clear that Darwin believed that scientists refused to recognise the similarities humans shared with these "lower forms", i.e. apes and other mammalian species, as they had been blinded by unfounded self-importance; a notion iterated through the Victorian belief in the Great Chain of Being which, as will be later discussed, placed *Homo sapiens* on an untouchable pedestal above other lifeforms (Lovejoy, 1936). Darwin's work was therefore revolutionary as it animalised the human species and considered humans under the microscope of the naturalist and not as the naturalist.

In *'The Descent of Man, and Selection in Relation to Sex'*, more commonly termed '*The Descent of Man'*, Darwin compared the physical characteristics of the human body to those of other extant mammalian species, highlighting the anatomical similarities between them. Darwin noted that humans share the same basic anatomy as all other vertebrates in terms of bone structure, organs and blood vessels to the point where the human ovum is indistinguishable from that of other mammals until later developments of the embryo (Darwin, 1871). However, Darwin expressed that some mammals are more closely related than others as he explained is the case with anatomically modern humans and extant ape species such as orangutans and baboons (Darwin, 1871). Darwin cited many observations published by other naturalists which highlighted the physical parallels between humans and apes from their contraction of similar diseases, such as tuberculosis, cataracts and IBD (Rengger, 1830), to their comparable neural responses to substances such as coffee and tobacco (Brehm, 1864). However, Darwin delved further into these similarities by expressing

that they do not just exist on a physical level but a mental one also. Multiple chapters of '*The Descent of Man*' were dedicated to the comparison of the mental powers of humans and apes highlighting the importance of sociability, morality, reasoning, intuition, and communication in the world of all primate species, including humans.

Another area to which Darwin dedicated a chapter was the on the races of humankind. In this chapter Darwin explained that many anthropologists debate the origins of the human races which led to the emergence of two schools of evolutionary thought: monogenesis and polygenesis. Monogenesis is the theory that all anatomically modern humans descended from the same common ancestors (Trinkaus & Shipman, 1993) while polygenists believe that the different races were derived through different lineages (Swamidass, 2019). The theory of polygenesis was born from deep-rooted racial ideas that claimed peoples different to 'us' were not the same species as ourselves, with advocates such as James Hunt claiming that the Africans and the Europeans were different "types" of people (Hunt, 1864; 17). Hunt's paper entitled '*On the Negro's Place in Nature*' argued that African people were mentally and physically, due to their 'apish' features, inferior to whites and even refused to accept that mixed race children were fertile (Hunt, 1864). Darwin however was a firm believer of monogenism and explained that as a naturalist he acknowledges the perceived differences of the races from skin colour to body structure to climate but states that these differences do not remain when people of different races are mixed together in large numbers in the same place (Darwin, 1871). He suggests that there are high levels of variation within the distinctive characteristics of the races that ultimately lead to inconsistent characteristics, which cannot be used to classify a species (Darwin, 1871).

In his life time Darwin often argued that people used human origins and evolutionary theory to promote racial superiority and rationalise acts such as slave labour, to which Darwin was resolutely opposed (Moore & Desmond, 2009), which some may attribute to his monogenist beliefs. However, although monogenists advocate for a single lineage evolution, many scholars, including Darwin, reflected their societal and cultural notions of colonialism into their theories with monogenist Robert Knox claiming that the different races demonstrate varying stages of evolutionary progress, with the 'other' hierarchically frozen as lower evolutionary forms (Knox, 1857). The concept of 'othering' has been utilised since the 19th century as a means to separate and ostracize certain groups by identifying the differences between the 'other' and the 'self' (Honderich, 2005). A notion often used to endorse racial ideals and epitomised in the hierarchical order of the Great Chain of Being.

The Great Chain of Being is the linear hierarchical order that categories all the lifeforms and matter that exist in the universe from God in the heavens down to the inanimate rocks of the earth (Lovejoy, 1936). The chain is highly detailed and includes all animals and plant species as well as all of the human races in its ranks (Lovejoy, 1936). Although derived from the minds of Classical philosophers, the Great Chain of Being was a prominent belief system in Europe in the Middle Ages and remained a central part of Western thought for centuries following (Nee, 2005). Therefore, when the theory of evolution and the idea of a human lineage came to light in the 19th century, the Great Chain of Being played a leading role in the common presentation of evolutionary theory. For many, evolution mirrored the premise of the Great Chain of Being (Nee, 2005) as, aside from the removal of the supernatural elements, evolution was perceived as a linear progression from simple primitive lifeforms to complex civilised creatures, i.e. anatomically modern humans. However, in keeping with the contemporaneous belief in the Great Chain of Being, the progressive nature

of early evolutionary thought did not rank all human races the same (Nee, 2005). White Europeans were seen as the pinnacle of earthly existence with all other races perceived as evolutionarily un-progressed, primitive and subhuman (Ogunnaike, 2016). The prominence of this in 19th century evolutionary theory is exemplified in the works conducted by monogenist (Kenny, 2007) Thomas Henry Huxley on the Neanderthal Feldhofer remains excavated 1856.

The excavation of the Feldhofer remains exemplified the concept of the Great Chain of Being within human evolution as many within the scientific community refused to believe that a skull claimed to be obscenely apelike and primitive (Huxley, 1895) could be the remains of a European *Homo sapiens* ancestor. The find was explained away by the reputable German biologist Virchow (Virchow, 1871), known for being the founder of modern pathology, as well as other key figures such as German anatomist August Franz Mayer. Mayer's interpretation suggested that the Feldhofer specimen was the pathological remains of a Russian Cossack soldier who suffered from rickets and spent a life on horseback who, when wounded during the legion's travels through Germany on their way back from France in 1814, crawled into the Neander Valley cave to die (Mayer, 1864). However, the extent to which the Great Chain of Being infiltrated 19th century evolutionary beliefs is encapsulated by the below image, Figure 1.1, which is a sketch of the Feldhofer skull cap imposed on to an Aboriginal Australian skull taken from the works of Huxley (1863). The image was used as a means to 'other' and degrade extant Aborigines as well as exclude *Homo neanderthalensis* from the human lineage. The work of Huxley made apparent that although the concept of evolution was being increasingly more accepted across Europe (Trinkaus & Shipman, 1993), what humans were believed to have evolved from was as much a social debate as it was a scientific one.

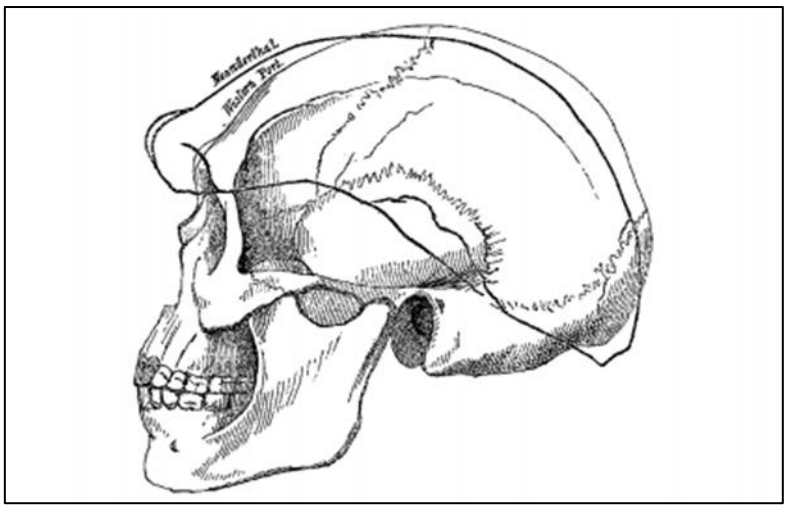


Figure 1.1, Huxley's sketch of the Feldhofer skull cap superimposed on an Aboriginal Australian skull (Huxley, 1863)

Although the concept of evolution was accepted, the Neanderthals as a possible human ancestor were not. The Feldhofer remains were seen as belonging to a savage being (Schaafhausen, 1861; 158) of little intelligence (Trinkaus & Shipman, 1993), which meant that, in the concurrent ethnocentric climate of Victorian Britain, the individual could not possibly be an ancestor to any aristocratic European. The first Neanderthal specimen was therefore explained as being evidence of a hierarchically lower *Homo sapiens* within the pre-existing hierarchical order of modern human populations (Malik, 1996). This view is perfectly analogised in Thomas Henry Huxley's infamous seen in Figure 1.1. Huxley claimed that there were multiple similarities between the Neanderthal skull cap and the Aboriginal skull (Huxley, 1863) and thus the specimen was seen as falling within the range of anatomical variation for modern human populations. By suggesting that the Feldhofer specimen was a *Homo sapiens* individual, the question of its potential ancestry to modern Europeans could be avoided, leaving the spot of 'the missing link' open to a more suitable species.

In 1889 a different type of specimen was discovered in Java, Indonesia, by Eugène Dubois (Dubois, 1891) who coined the name *Pithecanthropus erectus* for his find*,* which was later to be known as *Homo erectus* (Tattersall, 2015). Dubois concluded from studying his finds that the fossil was of a transitional species between modern humans and apes and thus declared that it was a modern human ancestor (Dubois, 1894), making *Homo erectus* a viable contender as the elusive 'missing link'. However, European scientists received Dubois claims with an immense amount of criticism (Theunissen, 1989); having the East Indies as the cradle of the human race was an even more unappealing notion than having Neanderthals as ancestors (Tattersall, 2015). As became apparent with the case of Piltdown Man which will be later explored, early evolutionists were opposed to envisioning the origins of White Europeans as anywhere home to peoples considered inferior to their status and racial rank (Dennell, 2018). This blatant racism was common within the general milieu of 19th Century European society and has greatly impacted the way in which human evolution has been considered since the beginnings of palaeoanthropology.

1.1.2 Victorian Science and Society

Many historians of palaeoanthropology have attributed the negative racial stereotypes seen within the discipline to the social and political climate of the 19th Century (Cartmill, 1990), with a particular focus on people's colonial mindset. History textbooks and documentaries concerning Victorian Britain cannot complete their summary of the era without mentioning the expansion of empires which occurred throughout the period and across Europe. The 19th Century was a time of colonial conquest for many major powers in Europe, branching their empires into various colonies of the recently explored 'other' continents (Athreya & Ackermann, 2019). This expansionism came with a long history of

interacting with native peoples which, with the abolition of slavery occurring only a few years prior to Victoria's coronation (Sherwood, 2004) and the colonizer superiority complex (Conlin, 2014) that often came with the domination of new lands, resulted in many ethnocentric accounts of indigenous groups. Darwin himself, on his Journeys aboard the HMS Beagle, documented his encounter with the Tierra del Fuegians with his perception of the group being surmised in the passage below:

> In another harbour not far distant, a woman, who was suckling a recently-born child, came one day alongside the vessel, and remained there out of mere curiosity, whilst the sleet fell and thawed on her naked bosom, and on the skin of her naked baby! These poor wretches were stunted in their growth, their hideous faces bedaubed with white paint, their skin filthy and greasy, their hair entangled, their voice discordant, and their gestures violent. Viewing such men, one can hardly make oneself believe that they are fellow-creatures, and inhabitants of the same world. (Darwin, 1939; 218)

Darwin's encounter was one of numerous accounts that formed a distinct divide between 'us', the aristocratic European white man, and 'them', anyone outside of this elite group, which summarises the mass thoughts of Victorian Europe concerning people within colonised groups. The people within these colonised groups were seen as so inferior that the taking of archaeological and ethnographic objects from them wasn't considered unethical, in fact many felt that the objects were theirs for the taking (Aldrich, 2009). These 'artefacts' objectified the cultures and practices of native groups and were displayed in early museums of curiosities, which portrayed the pieces in a 'freakshow' fashion and out of cultural context (Flynn & Barringer, 1998). Examples of these museums still exist today such as The Pitt Rivers

Museum in Oxford (Mills, 2019) and other museums, including The British Museum (Aldrich, 2009) still harbour relics acquired through 19th Century imperialism. These museums made a visual divide between 'us' and 'them'. This same segregation is clearly analogised in the 'othering' of the Feldhofer fossil by figures such as Huxley, objectifying the remains as an artefact and comparing them to a group they thought of as far distanced from themselves as they were seen as progressively inferior.

This notion of progress was a key feature of many aspects of 19th Century society to the point that it has been suggested that "no society has ever been more committed to progress than Victorian Britain at the height of colonial and industrial expansion" (Gould, 2001; 265). Progress was an integral part of many scientific as well as social theories of the era, with anthropologist Lewis H. Morgan's theory of the three stages of human progress being a key academic influence for years (Morgan, 1877). Morgan postulated that each society had to pass through three stages: Savagery, Barbarism and Civilisation, which he based off the material culture of modern societies (Morgan, 1877). This theory, along with many social and biological evolutionary perspectives of the time, placed white European man as the pinnacle of society making him the ultimate goal that every other society was to strive towards. These theories incorporated European women into hierarchical order also with Morgan arguing that primitive societies in the Savage stage existed in a state where women were equal to or dominant over men as their promiscuity put them in charge of sexual relations, however as a society becomes more civilised women lose this power (Morgan, 1877). Other models similar to this have even suggested that patriarchy was developed to provide protection for females and offspring, allowing women to retreat to their 'natural' socially respected domestic functions (Fedigan, 1986).

The notion of 'primitive' women as being promiscuous is characterised in many works that sexualise the morphology of females within these groups. During his expeditions in Africa, Raymond Dart collected morphological measurement data on the crania of various indigenous groups, yet also examined and conducted studies on the female genitalia of these people (Kuljian, 2016). Works such as this continued the sexualised stereotype of 'primitive' women, yet this stereotype was epitomised in the case of Sarah Baartman. Not only did European's claim rights over the artefacts of indigenous groups, they also claimed rights over their bodies (Athreya & Ackermann, 2019). Sarah Baartman was a prime example of how living people of colour were displayed in 'human zoos' like animals for the entertainment of white people (Athreya & Ackermann, 2019). Baartman was displayed as a 'living savage' and was overly sexualised for her curvaceous figure and large buttocks to the extent that after her death in 1916 her remains were still displayed to objectify her sexual organs for the masses (Gordon-Chipembere, 2011). The use of ethnographic and human evolutionary ideas for public entertainment was a phenomenon in Victorian Europe with masses crowding to see the unknown and the unusual (Horrall, 2017). The concept of 'the missing link' became a common feature in theatrical entertainment, taking centre stage in the comedy entitled '*Missing Link*' in London's Surrey Theatre in 1894 and becoming the answer to the question in P. T. Barnum's 'What is it?' sketch which he displayed alongside his '*Wild Man from Borneo*'; an indigenous man who he branded as a prehistoric relic (Horrall, 2017). The concept of human evolution had well and truly perforated Victorian society but had also allowed Victorian society to perforate it.

1.1.3 Early 20th Century: The Piltdown Scandal

The early 20th century saw the discovery of various new fossil hominins filling the paleoanthropological record with new species, such as *Homo heidelbergensis* (Schoetensack, 1908) and *Australopithecus africanus* (Dart, 1925), to consider within the human evolutionary narrative. Paleoanthropologists were in constant pursuit of the next find in order to lay claim to the discovery of a new hominin species and mark their contenders as the elusive 'missing link' between anatomically modern humans and apes. One contender for this title was uncovered in 1912 by amateur archaeologist Charles Dawson in gravel pits at Barkham Manor in Piltdown, East Sussex (Russell, 2003). Dawson uncovered what appeared to be the fragmented skull of an archaic human as well as worked stone tools and the remains of extinct animals (Russell, 2003). The skull in question was made up of fragmented cranial bones which indicated a cranial capacity akin to that of modern *Homo sapiens*, a small primitive mandible and various large ape-like teeth (Russell, 2003). These remains were claimed by Dawson, along with palaeontologist and fish fossil expert Sir Arthur Smith Woodward, to be evidence of an intermediary species ancestral to both anatomically modern humans and ape species due to its large human-like brain case paired with its primitive jaw (Dawson & Woodward, 1913). This specimen, named *Eoanthropus dawsoni* and known commonly as Piltdown Man (Russell, 2003), was to become the central evidence of one of the most notorious hoaxes in archaeological history not only for the longevity of its ruse but more importantly for the insight it provided into the institutionalised racism and patriotism of European paleoanthropological research.

Although there was speculation as to the authenticity of the Piltdown remains from the beginning (Thomson, 1991), it was not until 1953 that the truth of the hoax was unveiled

("Piltdown Man", 1953). Chemical analysis revealed that the 'hominin' remains were in fact a modern human skull accompanied by an array of fragmentary matter from various other primate species including a filed-down chimpanzee canine and an orangutan mandible (Tattersall, 2015). Despite some early speculations regarding the remains, many people believed the Piltdown hoax until its exposure in 1953 due to two major reasons: the first being that a hominin with the physical attributes of Piltdown Man was expected within the Plio-Pleistocene (Goodrum, 2009) and the second being that the discovery created a desired European human origins narrative. The large humanlike skull of the specimen placed Piltdown Man in line with the expected model of human evolution that scientists had been searching for since the beginnings of palaeoanthropology (Hammond, 1979). This physical attribute of Piltdown Man made the specimen a more apt candidate for a European ancestor than the likes of Dubois' *Homo erectus* (Goodrum, 2009), which donned a relatively small skull (Dubois, 1891), as the implied intelligence associated with a large brain was used to justify the superiority of humankind as the most progressed species. The antiquity of the Piltdown man was also used to justify the superiority of a particular race of humankind, the Europeans. Comparisons to the contemporaneous hominin fossil record revealed that the antiquity of Piltdown Man challenged that of the Java specimen, with Woodward deducing that the English fossil was the oldest known hominin and that Britain was therefore to be considered the cradle of humanity (Dawson & Woodward, 1913). This provided an acceptable answer for European ancestry as it distanced White Europeans away from an African or Asian origin and put Britain on the evolutionary map; a feat which had until this point not been achieved (Thomson, 1991).

The case of the Piltdown Man discovery remains the most noteworthy hoax in archaeological history (Russell, 2003), with the implications of its meaning and purpose

enduring as a message for researchers even today. The Piltdown Man case is a prime example of how European ethnocentrism, also termed Eurocentrism (Amin, 1989), slowed paleoanthropological progress. The willingness of the scientific community to wholly accept the claims made by Dawson and Woodward of a British human origin narrative, despite there having been vocalised doubts about the legitimacy of the remains by various academics claiming that a modern skull had been planted with an ape jaw (Gregory, 1914), highlights an enduring colonial mindset to strive for and prove Western superiority. Promoting Europe as the epicentre of humanity meant that it could be claimed that Europe was also the birthplace of modernity, depicting other nations, such as Asia and Africa, inferior, primitive and unmodern in the process (Athreya & Ackermann, 2019). Creating and maintaining a primitive and culturally infantile identity for these other nations through paleoanthropological research meant that early hominin finds from these regions were scrutinised and analysed in a context that maintained the validity of a European human origin story as other regions were made undesirable (Athreya & Ackermann, 2019). This method of analysis was implemented to the extent that when Dart identified the first *Australopithecus africanus* specimen, the Taung Child found in South Africa (Dart, 1925), the claims he made of its great antiquity were ignored by many with the specimen instead being labelled as an ape (Gregory, 1927). Dart's push for an African origin story was particularly undesirable to European science due to associations made between Africa and the primitive 'Other' (Athreya & Ackermann, 2019) and their refusal to be descended from such associations. Thus, Africa was excluded from the quest for the cradle of humanity until after the Second World War when the United States of America became the dominant influence in paleoanthropological research and replaced such European colonial ideology with a strive for human unity (Dennell, 2001).

Blatantly racist ideology from the 19th and early 20th century set back human evolutionary research as it greatly influenced the context in which major discoveries were initially analysed (Brace, 1964), colouring the opinions of Hominini for decades, and in some cases still arguably having a resounding effect on the way certain species and human evolution in general are perceived both academically and socially. It has been highlighted by scholars such as McBrearty and Brooks (2000) and Athreya and Ackermann (2019) that much of anthropological and archaeological research has been grounded in European ethnocentrism. For example, McBrearty and Brooks (2000) highlighted in their paper '*The Revolution That Wasn't*' how popular models, such as the research proposed by Binford (1985), concerning the abrupt emergence of behavioural modernity in Europe during the Upper Palaeolithic are flawed as they fail to utilise the wealth of the African archaeological record and instead bias evidence that places behavioural modernity on European shores. Anthropological works such as these, teamed with the persistent bias from the scientific community towards European research (Athreya & Ackermann, 2019), provides evidence of a lingering past ideology. The tendency of research conducted by Asian and African anthropologists to be overlooked or claimed to be irrelevant until similar theories are proposed by Western researchers (Athreya & Ackermann, 2019), illustrates the unrelenting power Eurocentric ideology has had since the 19th century on our understanding of the human evolutionary narrative.

Although there are remnants of this mindset that beset modern academia, it is clear that these no longer dominate paleoanthropological research as they did in the early 20th century at the time of the Piltdown discovery. Upon initial discovery the Piltdown Man was undoubtedly used as evidence to promote Western superiority through the theory of polygenesis. Advocates such as, anatomist and anthropologist, Arthur Keith suggested that

the sheer size of the Piltdown specimen's braincase was evidence that the other specimen from around the same period, the Java Man (Dubois, 1891), was a very primitive hominin (Keith, 1914) which evidently evolved later than *Eoanthropus dawsoni* had. For Keith and many others this provided proof that there were multiple genera of human and thus different human linages that evolved at different rates (Keith, 1914). This notion of a non-linear view of human evolution also gave rise to the opportunity to remove an unwanted group from European ancestry, claiming them as a dead branch of the ancestral tree (Dawson & Woodward, 1913): the Neanderthals. According to this view, the sloping foreheads and prominent brow ridges of the Neanderthals could not have evolved from the supposedly noble, modern-like skull of *Eoanthropus dawsoni* which meant they could not both be ancestral to modern Europeans (Hammond, 1982). Thus, Dawson and Woodward (1913) claimed that Piltdown man was a direct ancestor of *Homo Sapiens* and that the Neanderthals evolved as a separate lineage that deteriorated towards extinction, which translated into removing the Neanderthals from the human family tree (Trinkaus & Shipman, 1993).

1.1.4 Early 20th Century: The Fate of the Neanderthals

The fate of the Neanderthals determined by the Piltdown discovery was ultimately set-in stone by the words of the renowned palaeontologist Marcellin Boule. In 1908 Boule, the palaeontology professor at The French National Museum of Natural History in Paris, was presented with the almost complete skeleton of a Neanderthal discovered in a cave near the French village of La Chapelle-aux-Saints (Reybrouck, 2002). Boule studied the remains extensively leading to a host of comprehensive reports concerning the Neanderthal anatomy (Boule, 1911; 1912; 1913). Due to the reputation of Boule's work and the preservation of the Neanderthal specimen, his La Chapelle-aux-Saints reports became paleoanthropological

dogma; being translated in to both English and German (Reybrouck, 2002) so that his words were accessible to the wider European scientific community. These words shaped the way in which Neanderthals were perceived for over half a century (Goodrum, 2009). Boule explained that the La Chapelle-aux-Saints Neanderthal lacked the signature 'S' shaped spinal column of anatomically modern humans and as a result, with its 'C' shaped spine and accompanying bent knees, would have had a stooped posture and simian gait (Boule, 1913). When considered with its prognathic face, heavy brow ridges, sloped forehead, and low cranial vault, Boule could exclusively conclude that Neanderthals were more akin to the great apes than to *Homo sapiens* and thus were highly unlikely to be ancestral to anatomically modern humans (Boule, 1913). Although many points of Boule's analysis were later proven to be incorrect, as the La Chapelle-aux-Saints specimen was actually pathological (Haeusler et al., 2019), Boule's Neanderthal morphology remained the scientific standard on which all Neanderthal theories were based for decades (Murray, 2007). Boule's work even enhanced the arguments made within previous theories such as Gorjanović-Kramberger's evidence of Neanderthal cannibalism from Krapina, Croatia (Gorjanović-Kramberger, 1901).

The description Boule provided became a popular theme for artists outside of the scientific community, aiding in the birth of the classic 'caveman' representation with which Neanderthals are synonymised. This notion is epitomised in the infamous Neanderthal illustration by Czech painter František Kupka, who, as can be seen in Figure 1.2, captured the essence of Boule's work with his stooping, ape-like, primitive Neanderthal man. Kupka's painting aptly represents the way in which Neanderthals were perceived for the first half of the 20th Century due to the work of Boule on the La Chapelle-aux-Saints specimen and the discovery of the well-timed ancestral alternative of *Eoanthropus dawsoni*. Neanderthals had been 'othered' since their discovery, but the monograph provided by Boule fixed the position

of the *Homo neanderthalensis* for decades. Keith explained that Boule's work confirmed the assumption that there must have been two distinct species of humans in the Pleistocene (Keith, 1914) and as such human evolution was no longer considered linear.

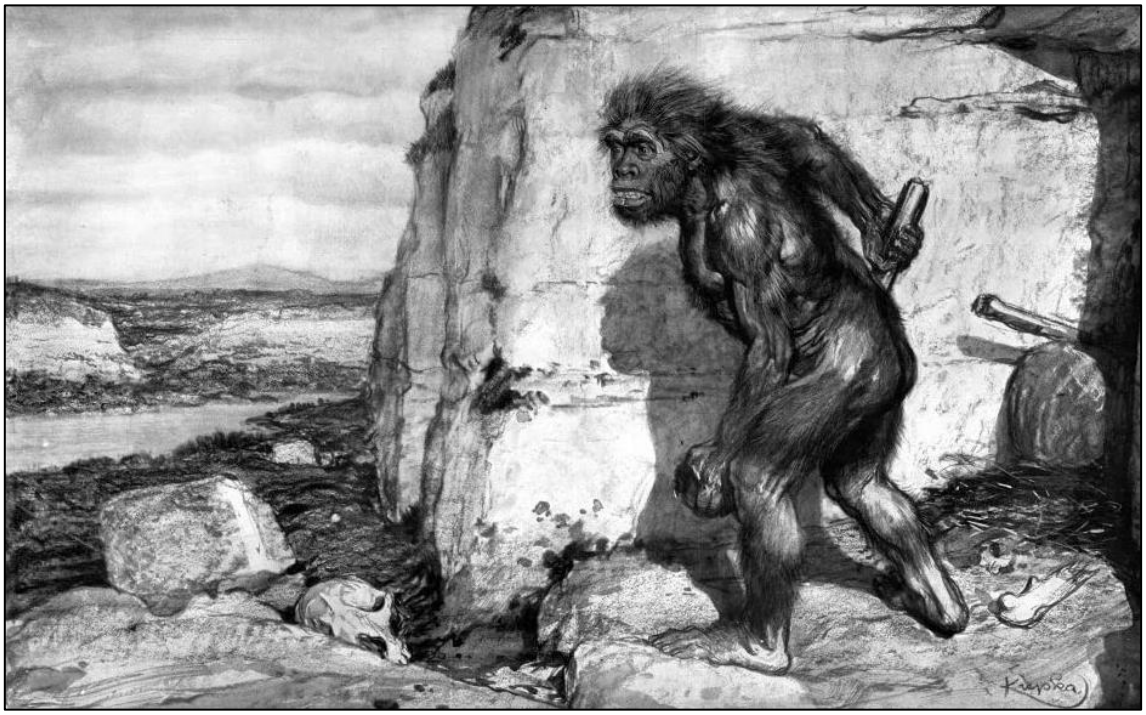


Figure 1.2, Kupka's illustration of the La Chapelle-aux-Saints Neanderthal reconstructed from Boule's description prior to the publication of Boule's pivotal papers, (Kupka, 1909)

1.1.4 Mid to Late 20th Century: Neanderthal Appearance and Behaviour

For the first half of the 20th Century Boule's monograph and the presence of Piltdown Man in the fossil record achieved exactly what was intended; to remove Neanderthals from the human evolutionary picture and encourage any future Neanderthal evidence to be used in a way which would further denounce their relevance to modern humans. The tone of Neanderthal studies during this period was one of unacceptance, dismissing them as

primitive, ape-like, unintelligent (Trinkaus & Shipman, 1993), and even as cannibals (Gorjanović-Kramberger, 1901). However, Neanderthals saw their redemption in the mid-20th Century. As previously stated, the remains of *Eoanthropus dawsoni* were proven to be fraudulent in 1953 ("Piltdown Man", 1953) which threatened the integrity of the established *Homo sapiens* lineage where Neanderthals had been cast aside, additionally, new analyses were also coming to light which painted Neanderthals in a way they had never been truly considered before; humane. After the first decade of the century, there was a relative lack of new Neanderthal discoveries (Drell, 2000) which led to the reconsideration of previous works, for example Gorjanović-Kramberger's assessment of the Krapina remains. Neanderthal cannibalism became a common consideration when analysing remains with other reports, namely the papers following the find at Monte Circeo in Italy (Sergei, 1939), receiving much attention and scientific approval. A review of the Monte Circeo remains suggested that the mutilations Sergei had identified were in fact part of a cannibalistic mortuary ritual performed prior to the burial of the dead (Blanc & Serge, 1953), that is to say Neanderthals were purposefully partaking in ritualistic acts and thus had a higher level of symbolistic thought and intellect than they had previously been attributed. This put into question and ultimately nullified the barbaric cannibalistic claims Gorjanović-Kramberger had constructed at the beginning of the century. Blanc and Serge's analysis entered the study of Neanderthals into a new intellectual climate which led to novel ways of considering *Homo neanderthalensis*, as well as other hominin species, and human evolutionary thinking in general.

It took almost 100 years from the time of their initial discovery in 1856 (Schaafhausen, 1858) for Neanderthals to be accepted by the majority of researchers into the human lineage, a feat which many early paleoanthropologists mustered to avoid. Neanderthals were beginning to be considered, both behaviourally and physically, more 'human' than ever

before, to the extent that towards the end of the 20th century, many in the field were speculating that Neanderthals should be renamed *Homo sapiens neanderthalensis* (Kimbel & Lawrence, 1993); that is to say, renamed as a member of our own species. Arguments for this newly realised human nature were being evidenced throughout the latter half of the 20th century, with key papers such as Movius (1953) and Soleki (1975) advocating that Neanderthals frequently participated in ritualistic and symbolic practices, namely the burial of the dead. The concept of burial is considered suggestive of strong emotional bonds and the notion of expressing the identity of an individual within a group even after their death (Chase & Dibble, 1987). Soleki (1975) explained how an individual was ceremonially buried with flowers at the Shanidar Cave in Iraq and Movius (1953) interpreted a site at Teshik-Tash in Uzbekistan to be indicative of a young Neanderthal burial due to the presence of an ibex horn 'ring' around the remains. These cases imply that Neanderthals expressed a compassionate level of care to the individuals within their group; a notion reinforced by other remains found at the Shanidar Cave in Iraq. An individual labelled as Shanidar 1 became an archaeological symbol for Neanderthal humanity as skeletal evidence showed this male suffered numerous injuries and chronic diseases, yet many of the bone fractures this individual had accumulated displayed signs of prolonged healing, indicating that he survived for a number of years with these conditions; the survival of which would have required a great amount of care and assistance from others (Trinkaus & Zimmerman, 1982). During the mid to late 20th century, Neanderthals were being gradually attributed with an abundance of 'human-like' qualities, such as these, which distanced them from the savage beasts they were once dismissed to be. This new acceptance of Neanderthals within the human lineage was encapsulated in the words of William Strauss and Alexander Cave who proposed that "if [Neanderthal man] could be reincarnated and placed in the New York subway – provided that he were bathed, shaved,

and dressed in modern clothing – it is doubtful that he would attract any more attention that some of its other denizens" (Strauss & Cave, 1957; 359).

The acceptance towards Neanderthals during the latter half of the century occurred at a time when the discipline of biological anthropology was broadening to encompass novel research areas that changed the context in which evolutionary studies were considered; particularly the now flourishing study of primatology. Primatology is a key area of consideration in human evolutionary research, aiding in the understanding of hominin behaviour and social systems as well as providing data for a more accurate method of deducing the time of divergence of the great apes and humans (Martin, 2002). This now prominent research field only began in the 1950s, developing independently in both Europe and Japan within the decade (Fedigan & Strum, 1999), and quickly led to alterations concerning the human-animal boundary and the taxonomic classification of various primate species, including our own. Prior to the emergence of primatology, the primary distinction between human and ape was considered to be the encephalisation of the brain (Smith, 1924). The emphasis on brain size being the distinctive human quality was used to promote the presence of *Eoanthropus dawsoni* in the Plio-Pleistocene (Dawson & Woodward, 1913) and dismiss other fossils, such as Dart's Taung Child (Dart, 1925) and other australopithecine species, as irrelevant to the human lineage as they lacked the essential human characteristic of a large brain and were thus excluded from the taxonomic family Hominidae (Hooton, 1949). However, with the uncovering of the Piltdown fraud came the realisation that all other evolutionary fossil evidence therefore indicated that encephalisation could not be the only defining human characteristic and thus the placement of the human-animal boundary needed to be reconsidered in order to encompass other species (Cartmill, 2001). Before the 1960s the concept of some ape species being more closely related to humans and possibly being

included within the Hominidae family had also not been considered, but works in primatology provided biochemical evidence to show close genetic ties with chimpanzees and gorillas (Goodman, 1962); which further promoted the acceptance of the australopiths into our taxonomic family, and in turn, of Neanderthals into our taxonomic genus.

These drastic changes to the way the human lineage was considered within the discipline were born out of a post-war understanding of the true nature of barbarism among humanity; enabling researchers to reflect on imperfections within our own species and lower the pedestal on which we'd placed ourselves. During the Second World War, the policies of the National Socialist German Worker's Party, also known as the Nazi's, put into question concurrent perspectives of human evolution as the two were closely entwined to the point where it has been stated that Nazism is nothing but applied biology (Lenz, 1931). The Nazi's policies were built upon the work of the, arguably, most influential polygenist Ernst Haeckel (Nordenskiöld, 1929), who was responsible for the adoption of Darwinian theory into German science (Wolpoff & Caspari, 1997). Haeckel was a strong believer in progressive evolution, advocating that apes were a failed attempt on the pathway to reach the ultimate goal of human beings; and was also of the opinion that the human races were the equivalent of different species and that these too could be arranged in hierarchical order of the evolutionary progression they had achieved (Haeckel, 1883). Haeckel himself turned his popular works into a nationalist social agenda suggesting that Darwin's natural selection happens on a group level and that competition for survival occurs between racial groups, thus making it socially acceptable to exterminate and exploit these groups for the good of the racially superior, i.e. the German Volk (Wolpoff & Caspari, 1997). This ideology was subsequently adopted by the Nazi Party, with the good of the racially superior becoming the basis to all of their major political agendas (Gasman, 1971). With the fall of the Nazi Party and

the end of World War II, came the end of polygenetic ideas and the scientific backing of racially different evolutionary trajectories (Wolpoff & Caspar, 1997). By the latter half of the century, the different human populations were believed by many to belong to one single species and have one single area of origin: Africa.

The concept of human origins beginning in Africa was not novel, even Charles Darwin suggested that life likely began there (Darwin, 1871), yet due to multiregional origins being the dominant stance throughout the 19th and early 20th centuries (Stanton, 1960), Africa was not considered a viable, or preferable, option for people of European descent. It was not until the 1970's that the Out of Africa theory (Cann et al., 1987; Stringer & Andrews, 1988) began to develop, and, for most, completely displace the notion of multiregional origins which had lost popularity after the war. One of the first major pieces of evidence put forth for this hypothesis was the carbon dating work of Reiner Protsch who deduced, after dating 20 fossils from south and east Africa, that these fossils of 'modern man' were of greater age than the Neanderthal fossils found in Eurasia and therefore indicated that *Homo sapiens* did not evolve from Neanderthals but likely an African hominin species (Protsch, 1975). Although many fossil dates Protsch had provided in his career were believed to be incorrect (Grant, 2007), he highlighted Africa as a key area for consideration. Almost a decade on, Günter Bräuer, using the phenology of African fossil hominins, became the first to argue for the complete evolution of *Homo sapiens* in Africa and the subsequent spread of this new species into Europe through his Afro-European sapiens model (Bräuer, 1984) which became the primary basis for the Out of Africa hypothesis. However, the hypothesis mainly owes its establishment to the mitochondrial DNA analysis conducted in 1987. In 1987, the revolutionary study by Rebecca Cann, Mark Stoneking and Allan Wilson was published in Nature, which revealed genetic evidence of a single woman, believed to have originated in Africa, whose mitochondrial DNA

was present in 147 people randomly selected from five geographical populations (Cann et al., 1987). This provided solid evidence for a single human origin, paving the way for more biological and anthropological racial acceptance. The success of the Out of Africa model owes as much to the work of Cann et al. (1987) as it does to the socio-political implications of the data (Athreya & Ackermann, 2019).

1.1.5 Mid to Late 20th Century: The Role of Women

The mid to late 20th century was an era of change and enlightenment for various paleoanthropological stereotypes developed early within the discipline but was very much a time of struggle for another: the role of women. Throughout the history of human origins research, the role of prehistoric women has tended to be minimised or ignored altogether (Hager, 1997); a notion which is not novel to palaeoanthropology alone as shown by the popular book 'Invisible Women' which focuses on gender bias in data collection (Criado-Perez, 2019). Since the development of the discipline the notion of gender has remained a core element of discussion with the likes of Darwin commenting on the comparatively passive role of females in sexual selection to the protagonist male who showed an active and seemingly committed role in evolutionary change (Darwin, 1871). That is to say, as many paleoanthropological works imply, that evolution is a male phenomenon with the evolutionary driving force being born out of male activities and behaviours. Men are often ascribed as the sole agents of evolutionary change responsible for the majority of human innovations from encephalisation and bipedalism to symbolic thought and tool use (Hager, 1997) to the extent that any evolutionary change which exclusively occurred to women, for example enlarged breasts, have for the most part been interpreted in terms of the male, suggesting they developed as a means for a woman to attract a mate (Low, 1979). The role of

women in prehistory is often diminished to their role in reproduction, they are seen as mates for males in a monogamous pair-bond and as mothers for the offspring of said males with their mention in any evolutionary narrative being akin to the westernised views of gender roles: women stay at home and care for the children whilst the man brings home the bacon (Hager, 1997). The casting of modern societal values and social norms on the human evolutionary narrative is not novel, as can be read above with the notion of race, and so prehistoric women are often considered as many 19th and 20th century women were, as mothers and housewives. The mention of women in prehistory as anything other than housewives and mothers is scarce with only a handful of females, such as the *Australopithecus afarensis* specimen 'Lucy' (Johanson & Taieb, 1976) and the genetic phenomenon known as 'Mitochondrial Eve' (Cann et al., 1987), being famed for providing evolutionary evidence that male specimens could not. However, in comparison to the emphasis placed on the evolutionary evidence of 'man'-kind within prehistory, the status of these few female individuals is negligible.

This trend of passive women was exacerbated in the mid-20th century by paleoanthropologist's newfound interest in behavioural studies which the introduction of primatology and the perception that ethnography was a useful tool in understanding past life ways allowed (Edgeworth, 2006). The study of past behaviours created a broader human evolutionary picture which the simple anatomical analysis of fossils alone could not ascertain; and it was this broader scope and novel research avenue that Zihlman (1997) argued sealed the glass ceiling over evolutionary studies forever. This new research avenue led to the development of one of the most famous anthropological theories, 'Man the Hunter' (Lee & DeVore, 1968), which, as the title suggests, used ethnographic field work conducted on the Kalahari Bushmen to promote the male activity of hunting as the primary driving force for

evolutionary change. The theory outlined that males evolved, developing tools, becoming bipedal etc., in order to better precure meat which they shared with females through an exchange for sexual receptivity and thus reproductive gains. In this theory females, though rarely mentioned, were wholly dependent upon males and took an extremely passive role in the human evolutionary narrative. The image of the heroic hominin man chasing prey through the savannah whilst his mate and offspring waited patiently for his return became iconic; the 'Man the Hunter' model was such a success it takes a prime mention in the majority of paleoanthropological textbooks and courses even today (Hawkes et al., 2018).

However, with the Women's Rights Movement of the 1970's, came the appropriate social climate to address gender issues within research disciplines, including palaeoanthropology. A key paper which highlighted the androcentric nature of the discipline was written by Sally Slocum in response to the popularity of the 'Man the Hunter' model, proposing an alternative reconstruction which was aptly titled 'Woman the Gatherer' (Slocum, 1975). Slocum put into question the role of male hunting as the primary subsistence strategy and instead suggested that the female gathering strategy, observed in many modern hunter gatherer groups, likely contributed the highest proportion of food, providing women with a more active evolutionary role. Slocum's work began a trend in the 1970's to counter the gender biased accounts which had been in place since the 19th century. Tanner and Zihlman (1976) utilised a wealth of ethnographic, fossil, and primatological data to develop a theory which suggested that there were no strict gender roles in the early stages of evolution with all individuals likely partaking in a wide variety of tasks related to gathering strategies as they proposed hunting was probably a much later development than Lee and DeVore (1968) had assumed. Although it was suggested that these models were only developed due to the feminist movement (Conkey & Williams, 1991) the wealth of information that was pooled in

order to develop these models told a different story. During the 1970's and early 1980s the role of women in prehistory seemed more hopeful than ever before, with increasing work on nonhuman primates and hunter gatherer groups correcting the neglect of prehistoric women (Zihlman, 1997), however, the work of Owen Lovejoy put an end to that.

Lovejoy's model (1981) was an overriding success and proposed that the gathering of plants, which by now was established as a major form of subsistence, was mainly conducted by males. He argued this point by suggesting that females needed to remain relatively sedentary at a home base in order to spend time and energy on increasing the population size, which for Lovejoy was the key factor of evolutionary success. In this model, women became re-dependant on males for provisions for themselves and their offspring and in return, through a monogamous bond, ensured the male's paternity. The models which had previously advocated for female liberation in prehistory were hypocritically labelled as flawed as they only concentrated on the roles of women (Tooby & DeVore, 1987). Therefore, the glass ceiling was reinstalled (Zihlman, 1997) and women in prehistory, Neanderthal females included, were perceived as an accessory for a male-driven evolution.

1.1.5 Current Perspectives

Palaeoanthropology is still considered a relatively young discipline (Gundling, 2010) having only been conceptualised in the mid to late 19th century yet has changed drastically since the discovery of the first fossil evidence of human evolution in 1856 (Schaafhausen, 1858). The discipline had a rough beginning of being accepted and established within the realm of science with many people refusing to accept that human evolution was even a possibility (Trinkaus & Shipman, 1993), yet despite which, it still remains a thriving sub-discipline of anthropology today. Palaeoanthropology aims to provide evidence for many of the huge theoretical questions about our species and although there are still many

unanswered questions, some that are likely never to be answered due to the time nature of the discipline (Henke 2007). Research in palaeoanthropology relies on other scientific disciplines to ascertain as much knowledge as possible (Henke, 2007) which has expanded the realm of possibilities beyond the boundaries of what the discipline once was 150 years ago. Novel methods of research in the 21st century have made the subject as interdisciplinary as it has ever been before, utilising methodologies and theories from areas such as psychology, zoology, geochemistry, and many more (Henke, 1999) including molecular biology which aided in the ground-breaking work of the Human Genome Project coding the Neanderthal genome (National Human Genome Research Institute, 2010).

Current research in biological anthropology often has a tendency to seek out evidence which humanises past hominins as opposed to bestialising them, which was common in 19th century palaeoanthropology in order to uphold the unique characteristics of *Homo sapiens* (Cartmill, 1990). Recent research conducted in Neanderthal studies has been a prime example of how researchers have strived to correct wrongfully attributed over-animalistic characteristics by increasingly uncovering and publishing evidence which negates this, such as the work of the Neanderthal Genome Project. The Neanderthal Genome Project aimed to sequence the entire Neanderthal genome from ancient DNA as had been achieved using living DNA for the human genome previously (National Human Genome Research Institute, 2003). By using the data from both of these projects, researchers were able to deduce that Neanderthals and anatomically modern humans mated. Remaining Neanderthal DNA was found to be present in the human genome of modern Europeans, varying in frequency between one and five percent (National Human Genome Research Institute, 2010), providing evidence that *Homo sapiens* and Neanderthal relationships were relatively common in order for a noticeable percentage of DNA to remain. This data was revolutionary for the status of

Neanderthals as it directly humanised them on a level equal to anatomically modern humans which had never truly been achieved before. However, a plethora of other studies have also contributed towards removing the heavily stereotyped stigma that has cursed the Neanderthals since the 19th century such as recent papers by Zilhão et al. (2010) and Peresani et al. (2013). These papers provide evidence of Neanderthal body adornment through modified shell pendants found at Fumane Cave in Italy (Peresani et al., 2013) and the cave sites of Cueva Antón and Cueva de los Aviones in Spain (Zilhão et al., 2010). In anthropology body adornment has often been linked to the notion of individual identity and symbolic thought (Zilhão et al., 2010), abilities which would previously have been considered marvels of human uniqueness and incomprehensible for other species, including Neanderthals. Many modern researchers strive to correct the damage caused by previous studies and cast hominins in a positive light with the emphasis being taken away from the search to prove human uniqueness and thus challenging the boundaries placed between ourselves and other members of the Hominidae family.

The recent changes which have occurred within the discipline over the last few decades have caused many researchers to, much like this literature review has done, retrospectively reflect on the history of palaeoanthropology in order to assess the current state of the field in terms of deep-rooted issues, areas for improvement, and unexplored avenues for research (Goodrum, 2009). It has been argued that by publishing work which delves deep into the history of the discipline, researchers are able to highlight areas where further interdisciplinary crossovers could be conducted that were not done previously and thus held back the potential of the project as researchers have often undervalued the impact other disciplines have on palaeoanthropology (Goodrum, 2009). This recent development has encouraged further dialogue between disciplines and has also been used to highlight

unresolved and problematic issues within research which often echo the colonial mindset in which the discipline was birthed. Researchers are able, with hindsight, to consider the effects of the social climate at the time of the major pieces of research and fossil evidence discovery. Examples of these evaluative discussions have been happening frequently in 2020 in the wake of the Black Lives Matter movement (Humphreys et al. 2020) with persistent colonial notions of the discipline being questioned and shamed in order to establish awareness and encourage ethical practice. The discipline of palaeoanthropology is far from perfect, but much work has been done, and is still being done, to dispel stereotypical, racial and sexist notions that have plagued the discipline since its establishment in the 19th century.

1.2 The Evolution of Evolutionary Imagery

In line with the recent tradition of exploring the histories of scientific disciplines, the exploration of human evolutionary reconstructions and imagery would be a worthy subject of attention (Adkins & Adkins, 1989). Since the introduction of art and science the two have been entwined, with art forming an integral part of communicative methods in science to aid in the understanding of theories and the promotion of hypotheses (Moser, 1998). Thus, science is often associated with the use of imagery from the branches of astronomy (Winkler & van Helden, 1992) to zoology (Acheson, 2010). However, human evolutionary reconstructions, and scientific images more generally, have seldom been studied as they are often divorced from the text which receives the majority of focus (Moser, 1998); yet, due to relatively recent traditions, a few social scientists have delved into the realm of archaeological imagery, namely Conkey (1991), Gamble (1992) and Moser (1992, 1998, 2012). These studies addressed the embedded meanings of archaeological imagery which often carry connotations

far beyond their claimed intention; a notion that human evolutionary studies are by no means exempt from.

Pictorial reconstructions have coincided with textual theories from the beginning of the paleoanthropological discipline in the 19th century. The importance and considered need of these images accompanying the text is highlighted by the fact that in the early 20th century, when the discipline had been firmly established, there were professional artists specialised in the area of scientific human origins art such as Zdeněk Burian, Maurice Wilson, and Jay Matternes (Moser, 1998). Each of these artists produced a numerous amount of famous reconstructions using their own artistic style to bring flesh to the fossilised remains; however, despite each image being stylised in an individual manner, there are many reoccurring themes within them that not only span through the collections of each artist but also across artists (Wiber, 1998). The images which have been produced by these artists, and many others, are constantly recycled within disciplinary research that deals with fossilised entities and deep time, with the works of Jay Matternes from the early 20th century still appearing in archaeological textbooks and museum displays, such as The Smithsonian Institute's National Museum of Natural History (Catlin, 2019), decades after its production. Reconstructive drawings are continuously reproduced and used to accompany texts even, in some cases, after the archaeological evidence they were created to support has been disproved (Adkins & Adkins, 1989; 132). This illustrates how little attention and appreciation is given to what kinds of images authors use despite the fact that some researchers have claimed these images can have hidden meanings which the author may not intend to present (Moser, 1998). Many of these reconstructions were produced during the beginnings of the paleoanthropological discipline at a time where, as explained previously within this literature review, colonial mindsets and westernised social notions greatly perforated scientific thought. Also, during

this time images were often stylised to create stories for the reader using the concurrent extremely popular genre of Victorian 'incident pictures' (Wiber, 1998); these being images that were designed to be read like a novel revealing information about the characters such as their morals, behaviour, intellect and physical strength (Wiber, 1998). As such it is not surprising that some of these human origins image 'narratives' reflect the social climate and expected norms of Victorian Europe, as will be explored in the following section.

1.2.1 The Primitive Other: An Established Tradition

It is apparent that many political and social notions of Victorian society greatly perforated scientific thought in the 19th century, yet due to this, Victorian ideology is also often mirrored in scientific and quasi-scientific imagery, even outside of the Victorian era. Elements of this ideology were repeated incessantly, with recurring themes so common to human evolutionary imagery that they spanned across different artists and art styles (Wiber, 1998). It has been argued that this repetitive nature of artistic representation is not surprising as specific features of these images began to contain meaning and inference in order to portray a particular idea effectively to an audience (Moser, 1992), hence why there are many elements which have been borrowed from classical, biblical and medieval art traditions as they already held certain implications (Wiber, 1998). This notion is common within scientific illustrations, for example, in Andreas Vesalius' 16th Century dissected diagrams of the human body, the bodies are positioned in a manner which can be likened to the classical hero poses seen in Roman and Grecian art (Wiber, 1998). Due to this notion, it has been argued by Wicktor Stoczkowski (1997) that the common human evolutionary imagery was developed long before the idea of evolution was even founded as the ideology and artistic tropes which

have been used to form the images were already in existence; with the foremost artistic tradition that these images are characterised by being the European notion of the 'Other'.

The Western convention of the Other has been an observed notion in societal thought since the late 18th century, becoming prominent when Georg Wilhelm Friedrich Hegel introduced it to philosophy as a counter to the concept of 'Self' as one cannot define Self with out there being the existence of the Other (Hegel, 1807). The Other is a concept used to dissociate things from Self or from 'Us' in order to better define ourselves in contrast and has thus been used in many racial and colonial connotations throughout history to dissociate the European from the people of Africa and Asia (Athreya & Ackermann, 2019). However, the thinking behind the concept of the Other existed long before the work of Hegel with evidence of 'othering' apparent in many classical and medieval artistic traditions. The ancient Greeks believed that the further away from Greece one travelled, the more uncivilised people became, with the people of Ethiopia and India being labelled as extremely primitive in comparison to Greek society (Moser, 1998). The notion of the Other is often associated with primitivity, particularly in contexts of racism and colonial acquisition, as primitivity is the direct contrast of the sophistication of civilisation which throughout history scholars have expressed is the desired state societies wish to achieve (e.g. Morgan, 1877). In order to express the notion of the primitive Other, images were produced in the classical period of people from other lands, such as the Gauls (Champion, 1997), as well as images of primeval life which used the same primitivity markers as those of classically concurrent individuals (Wiber, 1998). The notion of primitivity within these images and visualisations was repeatedly portrayed by markers such as nakedness, unruly hair, proximity to nature, and engaged combat with wild beasts and monsters (Moser, 1998).

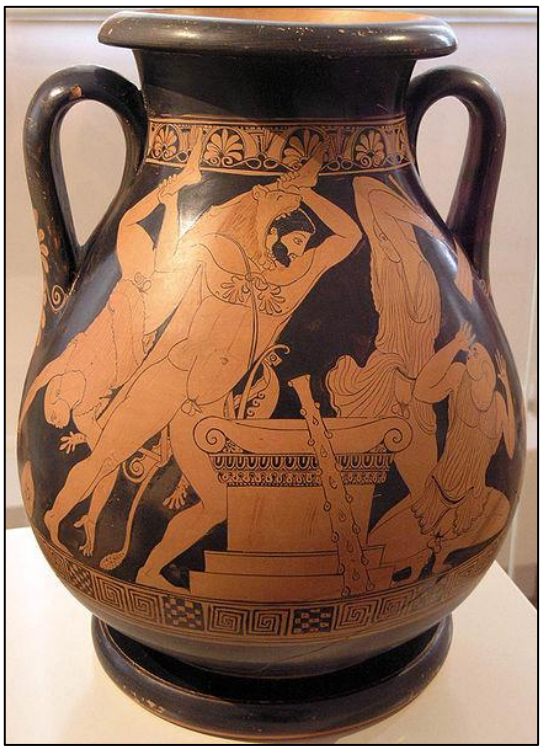


Figure 1.3, A vase depicting Heracles fighting the Egyptian King Busiris and his servants painted c. 470 BC from the Athens National Archaeological Museum, (Hellenciaworld, 2020)

Artistic representations of Heracles in Grecian art are a prime example of how primitivity has been portrayed since the classical period (see Figure 1.3). Heracles, or Hercules in Roman traditions, was a divine Greek hero who was famed in mythology for his strength in defeating various beasts that plagued the world from the nine-headed hydra to three-headed dog Cerberus (Stafford, 2012). Representations of Heracles' labours were depicted on vases and chiselled into stone but remain recognisable as he is always depicted in the same manner, embodying the qualities which have been attributed to primitive humans (Moser, 1998). As can be seen in Figure 1.3, Heracles is often depicted naked which highlights his defined muscular physique marking him a warrior, but more interestingly in hundreds of

representations he is also draped in animal skins, mid combat and possesses a wooden club. The presence of animal skins signifies Heracles' heroic defeat over various beasts, with the Nemean lion's skin specifically being depicted on the Figure 1.3 vase (Stafford, 2012); but more importantly also denotes his proximity to nature and the uncivilised elements of his life (Moser, 1998) highlighted further through the constant portrayal of combat. Combat is also implied through his weaponry, however the use of a wooden club still covered in tree knots is a prominent visual indicator for primitivity, especially as it is of frontal focus in Figure 1.3 and positioned in direct comparison to the more sophisticated axe of the Egyptian servant. A club is considered one of the most rudimentary forms of weaponry as it is completely natural, showing no evidence of purposeful alteration and so is a simplistic tool for defence that derives directly from nature (Cohen, 1994). The symbolic use of the club is a common trope within human evolutionary imagery and has often been depicted throughout history for its use against wild animals (Cohen, 1994), the presence of which has been marked as another visual indicator of primitivity (Moser, 1998). These elements have remained as visual markers for primitivity and uncivility throughout history; for example, in the medieval period the notion of nakedness, proximity to nature and unruly hair were used to depict giants from the East (Moser, 1998), as can be seen in Figure 1.4. These giants appear human but are shrouded by tropes of primitivity and are depicted cannibalising people making them a prime embodiment of the Other in early European traditions as they appear human but completely primitive, monstrous and unhuman at the same time. This notion of the Other was prominent during the 19th century at the time when human evolutionary imagery was beginning to be made, exacerbated by the concurrent colonial expansion of Europe.

Figure 1.4, Medieval giant cannibalising a person from *Marvels of the East* manuscript dated eleventh century, (British Library, 2020)

The notion of the Other was prominent in European colonial society as the colonisation of other lands during the period involved encounters with many of the peoples Europeans had imagined and visualised in the classical and medieval periods. These encounters have been well documented and, despite occurring in different locations across the globe and with different cultures and peoples, mostly came to the same conclusion, the people outside of Europe were primitive. For example, Darwin (1839) exclaimed that the South American Tierra del Fuegians were barbarians without culture, which doesn't differ greatly from William Dampier's account of the Australian Aborigines for whom he coined the term 'antipodean ignoble savage' (Russel, 1997) and who he explained at length were incapable of advancement (Dampier, 1697). Not only were accounts of these encounters beginning to be produced, images of different places, animals and peoples were also in

commission with many voyage ships employing an artist as a necessary crew member in order to generate data of new lands upon arrival (Bland, 1958). However, it is apparent the extent to which the imagery and visualisations of the primitive being in artistic traditions had on the artists depicting these initial encounters as the majority continued to use the same tropes of excessive body hair and exposed skin, despite the inaccuracies that doing so caused (Berman, 1999). For example, when Europeans first encountered Native Americans many verbal reports stated that Native Americans were not hairy at all and plucked hair from their bodies to be rid of it (Dickason, 1977), with the ironic twist that the Europeans were actually hairier in comparison (Berman, 1999). However, as Figure 1.5 shows, male Native Americans were still depicted with long beards in most early representations (Sturtevant, 1976) which remains in line with artistic clichés as opposed to scientific accuracy.

Figure 1.5, Early German woodcut scene of the New World with bearded Native Americans, (Berman, 1999)

The artistic concept of the primitive being was firmly established by the time of creation of the first human evolutionary images in the 19th century. Born out of classical and medieval art, he was naked, in the open environment, hairy, dressed in furs, and often labelled a savage; he was as 'Other' as artistic imagination would allow whilst still making him human enough to reflect our view of ourselves in comparison (Berman, 1999). Attempts were made in the modern mythology of the 18th century to rid this being of barbaric connotations and label them a nomadic 'Noble Savage' without sin and idyllically at peace with nature the way human life was believed to be intended (Rousseau, 1782), with many depictions of this coming to light. However, these images, despite the change in intentions behind them, carried the same artistic notion of nakedness equates to primitivity that had previously been seen. This concept soon fell out of fashion in spite of many attempts to resurrect it (Sahlins, 1968), and as such the primitive Other remained as he has been for centuries.

1.2.2 A March of Progress

The notion of the primitive Other was a key concept in human evolutionary imagery, used in the most sense to distinguish what was considered human and what was not. The role of the excessive haired primitive Other was cast as the modern ape and, unsurprisingly, the role of the more advanced and civilised Us to contrast this was taken by the white European man. These two characters were seen as situated at opposite ends of the evolutionary scale and could thus be used as indicators as to how advanced a species was considered; by depicting a hominin in a more human-like manner they were seen as more advanced and evolutionarily ancestral to *Homo sapiens*, but more ape-like features were used to push them further away from Us and excluded them from our lineage (Moser, 1996). The use of apes to understand and measure primitivity has been practiced within palaeoanthropology since the

birth of the discipline with early accounts of the Neanderthal Feldholfer skull cap highlighting its proximity to the great apes (Blake, 1862). Thus, the use of apes and ape-like features in human evolutionary imagery to denote primitivity is not surprising. An example of how apes were used as a contrast against more human-like features can be seen in Figure 1.6 which shows a depiction from a 1925 *Illustrated London News* article of Dart's *Australopithecus africanus* find (left) next to the Rhodesian Man (right), who was discovered four years earlier in 1921 (Woodward, 1921). Although discovered in Zambia, Rhodesian Man was thought by some to be a *Homo erectus* specimen, a species which had roots in Asia (Moser, 1996). The image immediately infers that Rhodesian Man is more human-like and closer to Us than the australopith who greatly resembles a chimpanzee, with a bipedal stance being the individual's one human-like characteristic. The australopith is naked, covered in body hair, has a simian gait, no tools and looks incredibly ape-like which contrasts greatly from Rhodesian Man who is clothed with a loin cloth, has only facial hair, is fully bipedal and is equipped with a walking staff. He looks very human-like in comparison. This image has been interpreted to represent the resistance of considering Africa as the region of human origins; the Rhodesian Man, thought to be an Asian *Homo erectus*, was a more preferable candidate for the missing link as Asia was favoured over Africa as the cradle of humanity (Moser, 1996), and was thus depicted to be so. However, Rhodesian Man was depicted more human-like in comparison to *Australopithecus africanus* yet when considered on his own, he still upholds many of the artistic tropes attributed to primitivity as he still has little clothing, a prognathic face and unruly hair; he is still being 'othered' within this image.

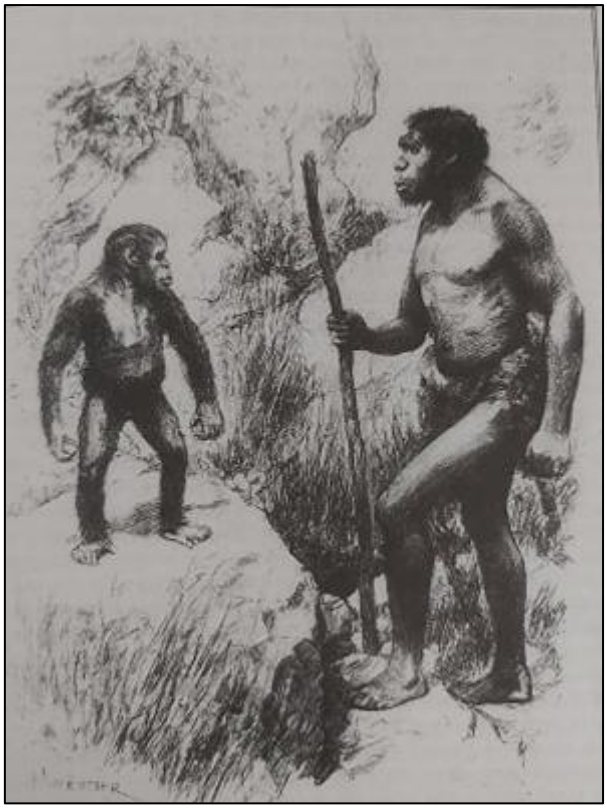


Figure 1.6, Illustration of *Australopithecus africanus* drawn using the Taung Child skull (left) next to Rhodesian Man (right) by Grafton Elliot Smith from the *Illustrated London News* in 1925, (Moser, 1996)

The comparative scale from apes to European white men was a key trope in early human evolutionary imagery, yet in order to be a scale there needed to be other increments between these two points; a role assigned to people of colour, specifically Africans (Wiber, 1998). This scale was seen as a line of progression from the least evolutionary advanced, the ape, to the most evolutionary advanced, the white European. The role of the African was often deemed as an intermediary between the two as they were seen as human but were usually ascribed simian features to denote the primitivity of Black people under the Western gaze in comparison to themselves (Wiber, 1998). Skin colour, which was often

interchangeable with hairiness in many depictions (Wiber, 1998), was a scale in itself with progressively lighter skin, and or less body hair, symbolising the evolutionary progress from primitive to civilised. Thus, Black people were considered a separate category of evolution to white *Homo sapiens* as suggested by Figure 1.7 which shows Alfred Schultz's (1931) comparisons of extant apes, a Black man and a white man. The necessity for two different coloured *Homo sapiens* to be in this image illustrates the notion that Black people were othered and seen as more primitive and ape-like in comparison to white people.

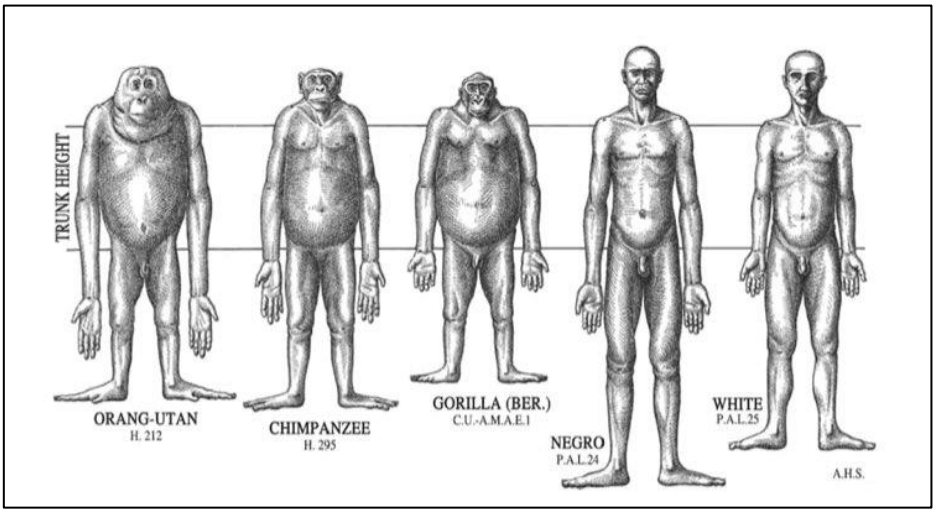


Figure 1.7, Adolph Schultz's illustration comparing the body proportions of an orangutan, chimpanzee, gorilla, Black man and white man, (Schultz, 1931)

The use of this notion in human origins research was used to maintain othering, with artists choosing to cross racial borders instead of species borders (Wiber, 1992). An example of this can be seen in the work of Jay Matternes from 1965 in Figure 1.8 which depicts a battle scene between *Australopithecus boisei* and other australopiths. It is clear from the depiction that *Australopithecus boisei* is not considered as primitive as the other australopiths since

they are not depicted as apes and are instead shown to be more modern and closer to *Homo* with no body hair, a less barbaric combat stance which is more indicative of self-defence and worked stone weapons. However, they are also depicted as Black men. Here race acts as a means of distinguishing *Australopithecus boisei* from the other australopiths but also establishes a barrier between *Australopithecus boisei* and *Homo sapiens* as they have retained un-European-like primitivity through their nakedness, facial hair, and most prominently through the colour of their skin.

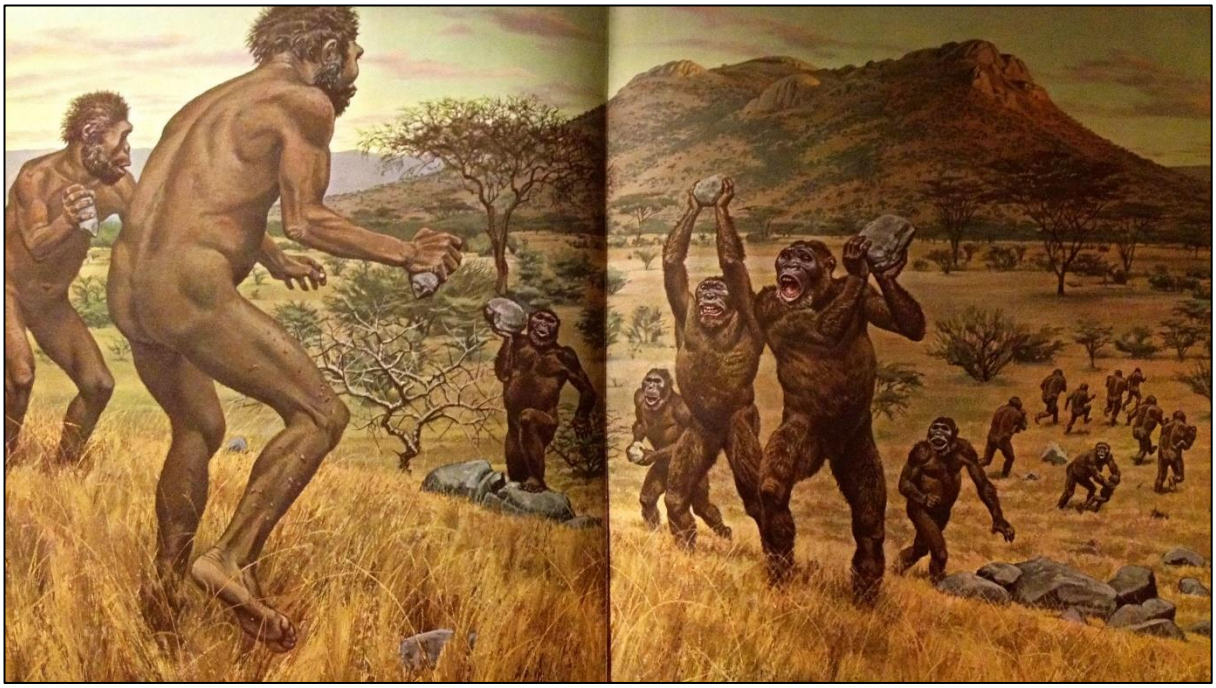


Figure 1.8, A battle scene between *Australopithecus boisei* and other australopiths by Jay Matternes (Howell, 1965)

The racialised traditions of Black people and other people of colour being considered phenotypically, and behaviourally (Trinkaus & Shipman, 1993), closer to apes was accepted as scientifically accurate in the 19th century due to works in phrenology (the study of cranial

morphology as an indicator of mental capacity and disposition), physiognomy (the study of facial features believed to be indicative of ethnic origin or character) and craniometrics. Craniometry is the measuring of the cranium and was used since the 18th century to infer ideas about different racial intellects, behaviours, and morals (Lipphardt & Sommer, 2015) becoming integral to support the belief of white superiority. As shown previously in Figure 1.1, Huxley famously used craniometrics to form a hierarchical placement for Neanderthals suggesting they were similar to Australian Aborigines whose primitivity had been perceived for centuries (Dampier, 1697). In line with contemporaneous thinking, African crania were also considered this way, with the primitivity of African skulls being upheld by craniometric diagrams that likened them to apes (Lipphardt & Sommer, 2015). The emphasis of these traits in Victorian art is apparent as many 'scientific' artists were trained in physiognomy in order to produce images that conformed to recognisable stereotypes of certain groups, which left Black people to be debased morally and physically by depicting them with ape-like features (Wiber, 1998). Therefore, it is not surprising that images such as that seen in Figure 1.9 existed prior to the development of evolutionary theory (Marks, 2006) as the racism seen in this image which likens the Black man to the non-human ape was born out of the idea of White superiority and Black primitivity and not evolutionary thought. Seemingly the artistic representations of human origins came from pre-existing imagery and ideology with few traditions and tropes being born from scientific accuracy (Stoczkowski, 1997).

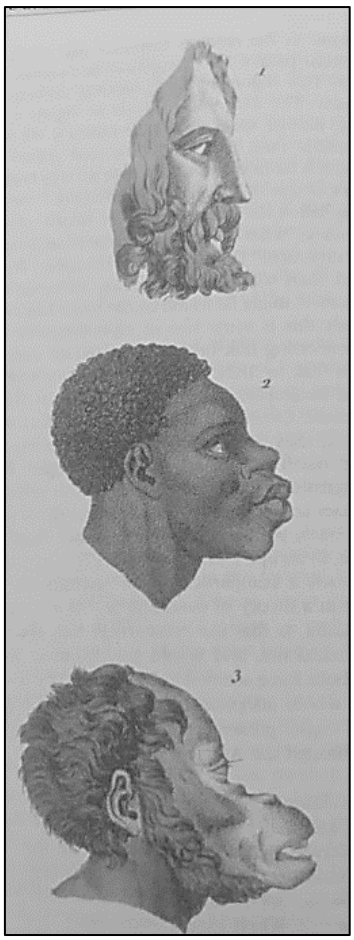


Figure 1.9, Illustration which shows the Black man as an intermediate between the ape and the white man from the work of Julien-Joseph Virey in 1824 decades before the theory of evolution, (Marks, 2006)

1.2.3 Birth of the Caveman

Another common human evolutionary artistic trope that is not necessarily congruent with archaeological evidence is the classic caricature of the caveman. The quintessential caveman, of which we are all familiar, has convincingly been suggested by many to be based on early Neanderthal imagery (Moser, 1992) which made its initial appearance in a *Harper's Weekly* article in 1873 (Trinkaus & Shipman, 1993). This first image, which can be seen in Figure 1.10, contains many of the characteristic tropes of the primitive Other which thus set

the tone for the characteristics of the classic caveman icon. Figure 1.10 depicts a Neanderthal male standing in the opening of a cave dwelling surrounded by scattered animal carcasses whilst donning animal furs, cascaded by his long hair and holding a weapon whilst on the lookout for danger; he is undeniably a caveman. The notion of the caveman has been argued to not have come from academic work but be born completely out of popular reconstructions; however, this cannot be claimed to be the case as arguably one of the most influential caveman depictions came from the works of Marcellin Boule and the evolutionary artist František Kupka (Moser, 1992). As such, even though the caveman became a popular media icon (Horrall, 2017), it cannot be divorced from the scientific traditions of representation in which it was formed.

Figure 1.10, The first illustration of a Neanderthal featured in *Harper's Weekly*, (Harper's Weekly, 1873)

The image Kupka created from the reports Boule published on the La Chapelle-aux-Saints Neanderthal was presented in 1909 as a scientific reconstruction, not as a mere illustration (Sommer, 2006). The work of someone as reputable as Boule (Trinkaus & Shipman, 1993) being used to create this reconstruction meant it was considered as a scientific document and was thus, in the eyes of the majority, an accurate interpretation of the prehistoric environment and physical appearance of the Neanderthals despite the many elements which had been borrowed from classical and medieval artistic traditions. Due to the scientific support of the image and the growing interest in human origins research at the time (Horrall, 2017) it was made widely available to the public and as such the journalists and newspapers were active participants in the construction of the popular caveman iconography (Sommer, 2006). The La Chapelle-aux-Saints Neanderthal, as can be seen in Figure 1.2, was depicted in an extremely savage and simian manner with incredibly large muscles that were completely covered in thick body hair. He also stood in a stooped manner whilst carrying a wooden club and peering out of a carcass-covered cave dwelling into the distance with a vague, unintelligent neutral facial expression which revealed his teeth. Many of the aspects seen within this image are akin to those captured within the first caveman depiction in *Harper's Weekly* (Figure 1.9) which was not connected to scientific documentation. This stresses how the caveman icon was founded in art history renditions of the primitive Other but was fossilised and further popularised by the paleoanthropological discipline under the renowned name of Marcellin Boule (Moser, 1992).

Many of the classic tropes of the caveman iconography can be easily likened the Grecian representations of Heracles (Figure 1.3) from his draped animal pelt clothing and gnarled wooden club to his flowing unruly locks. This notion of unkempt hair is a definitive caveman trait and will be used here to illustrate how elements of the caveman iconography

relate more to art history than to archaeological accuracy, even though the majority of reconstructive human evolutionary images within the discipline conform to these stereotypes. As previously explored, the notion of hair has long been attributed to the primitive Other as hair is shrouded in symbolic meaning (Eilberg-Schwartz & Doniger, 1995). The fact that hair is easily visible at a sociable distance (Wobst, 1997) makes it a recognisable point of identity which can be repeatedly altered at will in order to reflect the identity and meaning that individual wishes to portray, making it a very accessible form of individual decoration and modification (Berman, 1999). Therefore, the untamed hair of the caveman is symbolic of how he is incapable of mastering his own body and expressing his own identity despite having seemingly 'mastered' nature by creating tools and donning animal pelts, with the visualisation of the untamed hair maintaining his unhuman-like qualities and his proximity to nature (Berman, 1999). This imagery and symbolism are not novel to human evolutionary depictions, as Figure 1.11 shows.

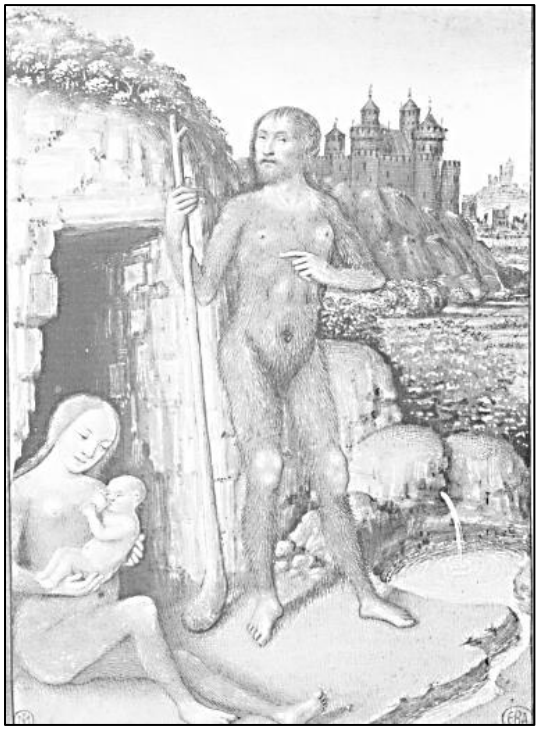


Figure 1.11, 'L'homme Savage' or 'The Wildman' c. 1505-1510 by French artist Jean Bourdichon, (Moser, 1998)

Figure 1.11 depicts a medieval wild family who live separately from civilised society and are depicted as completely naked and covered in body hair, with the man also having long head and facial hair. Although temporally distanced, this medieval family are represented as prehistoric cavemen have been since the 19th century. Archaeological evidence in the form of Venus figurines from the Upper Palaeolithic indicate that women may have styled their hair, as can be seen in Figure 1.12 of the most famous Willendorf figurine. Although it is not known if these were real depictions of women or idealised versions, they suggest that women did not have unkempt and dishevelled hair (Berman, 1999), Similarly they did not have excessive fur-like body hair as pubic hair was the only visible body hair on the figurines (Duhard, 1993). There is a distinct lack of male representation in this Upper

Palaeolithic figurine tradition but the few representations that do exist suggest that men also had little body hair and styled their hair (Duhard, 1993). Although researchers cannot be sure that these are accurate human representations (Berman, 1999), the understanding and portrayal of grooming practices in these figurines may be a true representation of their behaviour. Thus, the notion of unruly hair likely relates back to art history as there is no definitive scientific data to uphold it. This has been suggested to be the case for the majority of the caveman tropes which have instead been upheld for centuries through artistic traditions and used in various different contexts throughout history to infer the same imbedded meanings (Berman, 1999).

Figure 1.12, Hairstyle visible on the Willendorf Venus figurine from the Upper Palaeolithic, (Naturhistorisches Museum Vienne, 2020)

1.2.4 Evolution of Man?

Although there is little representation of men in the Upper Palaeolithic figurine tradition, the exact opposite could be said of the traditions within modern human evolutionary imagery; women rarely exist within human origins reconstructions and when they do feature, strict gender roles are conformed to (Wiber, 1998). Unger and Crawford (1992) suggested that the human origins reconstructions which have been produced within the discipline reflect the way in which paleoanthropologists and archaeologists have dealt with the concept of gender difference in hominin behaviour. As explained previously, the role of the woman in paleoanthropological research has been for the most part either ignored or written to embody the role of the mother and the lover (Zihlman, 1997). The 1970's saw a period of attempted academic upheaval with a number of scholars publishing women-inclusive accounts of hominin subsistence behaviour (e.g. Morgan, 1972 & Slocum, 1975), yet this enlightenment period was short lived. Androcentric models such as '*Man the Hunter*' (Lee & DeVore, 1968), the multi-republished '*Man the Tool-Maker*' (Oakley, 1949) and Lovejoy's (1981) male gathering model remained far more prominent within the paleoanthropological literature. Therefore, it would seem that human evolutionary imagery mirrors the women seen within hominin subsistence models as Unger and Crawford (1992) suggested. However, women have been oppressed within human evolutionary reconstructions long before the large-scale interest in hominin behaviour and subsequent development of subsistence models. The portrayal of women, or lack thereof, in evolutionary imagery, as in subsistence models, is a reflection of 19th century westernised notion of gender roles (Wiber, 1998).

Victorian gender roles often saw men as the breadwinners being the sole provider and protector of the family whilst women were seen as loyal housewives who spent their time

caring for and raising the children within a monogamous relationship (Zihlman, 1997). These concepts are reflected in human evolutionary imagery with the male often being at the forefront of the image engaging in what is considered a progress-inducing activity whether it be hunting, cave painting, tool making, or protecting the homestead (Wiber, 1998). He is the personification of Palaeolithic action and subsequently the protagonist of evolutionary change. Contrastingly, if a female is present within the image, she is depicted as a bystander to this dramatized depiction of male activity; she is often visually crouched or low to the ground, making the typical erect stance of the male more prominent (Wiber, 1998). If the female is engaging in any kind of activity it is understated and presented in a way which makes her either a housewife or a mother or both; she is nursing children, she is tending fires, she is skinning animals for clothing (Wiber, 1998), she is a 19th century woman living in a cave. This concept of female inactivity to male activity is encapsulated in the *Harper's Weekly* Neanderthal image seen in Figure 1.10. In this image the man is the focal point positioned upright at the cave mouth holding a weapon and looking out into the distance whilst the female present in the image is slumped on the cave floor on animal furs seemingly sleeping with the male as the watchful protector. The presence of the female in this image is used to reveal more about the male than to reveal about female life (Wiber, 1998), with her presence he is seen as the sole provider through the strewn animal carcasses in the cave and his weapon which she lacks, as well as the protector through his heroic stance and her slumped 'damsel in distress' demeanour. She is also the only woman present in all of the human origins reconstructive images thus far included in this project, this was not intentional but aptly portrays the insignificance that has been attributed to women in the human evolutionary narrative.

The most common way women have been portrayed in human evolutionary imagery is as mothers either holding a suckling baby or in association with infant offspring. This trope could be argued to be a means of distinguishing gender in images, but the stark conformity to gender roles and modern western notions of family life suggest that this would not be the only reason (Wiber, 1998). As can be seen in Figure 1.13, emphasis is placed on the monogamous nuclear family which is a classic human evolutionary imagery trope and reflects the modernised tradition of family life which the popular subsistence models also centre around (Moser, 1993). Figure 1.13 is an illustration which was produced in the 19th century depicting an early *Homo sapiens* family living in the open environment. This image epitomizes the classic prehistory narrative (Moser, 1993) of a monogamous nuclear family with the heroic male standing to protect his mate and offspring whilst she remains tied to the home base by having multiple infants to care for such as the young female in the image who is depicted learning to sew furs likely for her own destiny as a mother and prehistoric housewife. However, even though these images unquestioningly epitomise Victorian societal gender norms, they are also influenced by a long-standing artistic history of male-centred art work (Wiber, 1998). The presence of these same tropes conveyed in the exact same manner in Figure 1.11, a medieval art piece, signifies how artwork has been androcentric for centuries prior to the creation of human evolutionary imagery.

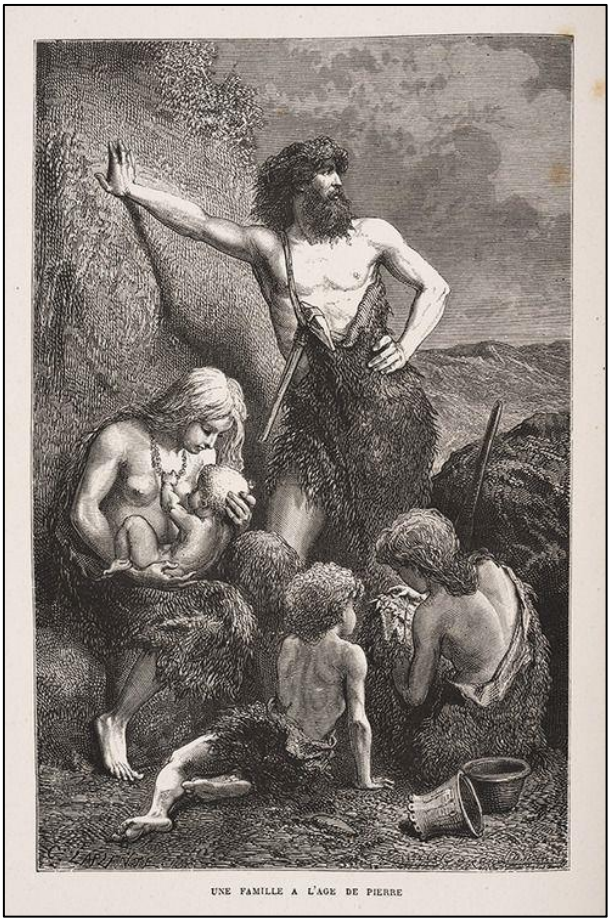


Figure 1.13, A classic reconstruction of a prehistoric family reflecting stereotypical notions of 19th century gender roles, (Figuier, 1870)

1.2.5 Evolutionary Imagery in Popular Culture

It has been argued that, over the last few decades, the classic characteristics of paleoanthropological imagery no longer dominate the reconstructions produced within the discipline (Rosser, 1990). However, it is clear to see when assessing contemporary popular culture illustrations of human evolution that these early disciplinary reconstruction tropes have seeped into popular non-professional depictions of prehistoric life. It is highly likely that we are all familiar with the classic image of the caveman epitomised by the likes of Fred Flintstone and Barney Rubble, as seen in Figure 1.14. '*The Flintstones'* has been a popular

animated cartoon series since its creation in the 1960s and has continued to be aired on television for decades after the last episode was released with an additional live action film of the series also being created in 1994 and a second in 2000 (IMDb, 2020). Thus '*The Flintstones'* is a widely recognised popularisation of prehistoric life. The depiction of the Flintstone characters in Figure 1.14 uses many of the classic caveman tropes seen in early Neanderthal images and classical depictions of Heracles from the rugged animal skins worn by Fred Flintstone to the iconic wooden club in the hands of the infant Bam-Bam. Through watching the series, it is also apparent that many other classical tropes have influenced the depictions of '*The Flintstones'* such as Barney Rubble playing the archetypical unintelligent Neanderthal, visualised in his mannerisms, inferior stature to Fred and vague eyes. Additionally, gender stereotypes are also perpetuated in the series with Fred Flintstone being the sole provider of his family working at the Slate Rock and Gravel Company whilst his wife Wilma raises their daughter Pebbles (IMDb, 2020). Thus, Fred Flintstone and his cast members are the embodiments of the caveman caricature, relating early paleoanthropological tropes to a lay audience in a comical manner.

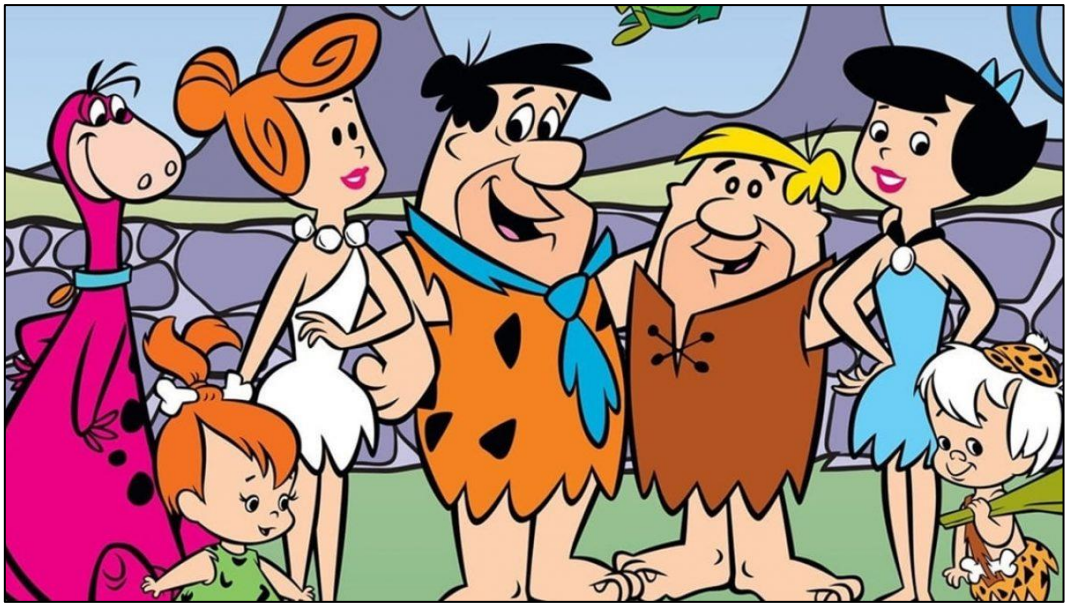


Figure 1.14, The Flintstone and Rubble families from the famous cartoon series 'The Flintstones', (Retroland, 2011)

Depictions of prehistoric life became popular in the eyes of the public during the Victorian era whilst evolutionary thinking was relatively new and news of fossil hominins was exciting the nation with wide-spread coverage of palaeoanthropology in various newspapers (Sommer, 2006). Human evolution research soon became part of the school curriculum (Moser, 1998) as well as inspiring works of literature, theatre shows and comedic sketches (Horrall, 2017). The notions of prehistory and human evolution were popular in 19th century society as they complimented the Victorians' existing fascination with apes, namely chimpanzees, gorillas, and orangutans (Horrall, 2017). Thus, works such as E.T. Reed's *Prehistoric Peeps*, which was a cartoon series featured in Punch magazine, which began in the 1890s and depicted short comical strips of life in the Palaeolithic (Reed, 1894), were enjoyed by the masses following the growing interest in human origins research by the public (Moser, 1998). This interest also led to the renowned comedy sketch by George Robey in 1902 entitled '*Prehistoric Man*' which saw Robey clad in furs acting as a clumsy, unintelligent caveman

(Horrall, 2017), an image of which can be seen in Figure 1.15. This image of Robey unsurprisingly embodies the classical tropes of the caveman from the 19th century artistic styles of human origins reconstruction as his work is contemporaneous with such depictions; however, his resemblance to characters of *The Flintstones* is noteworthy. Both Robey and the Flintstones were dressed in animal furs, owned tools that have long been a symbol of primitivity and were even depicted as living with dinosaurs (Horrall, 2017); a similarity that is startling because the Flintstone family were created over half a century after Robey's sketch. This illustrates how along with the coining of the term (Lubbock, 1865), the caveman was developed in the 19th century and fossilised in popular imagery (Moser, 1998).

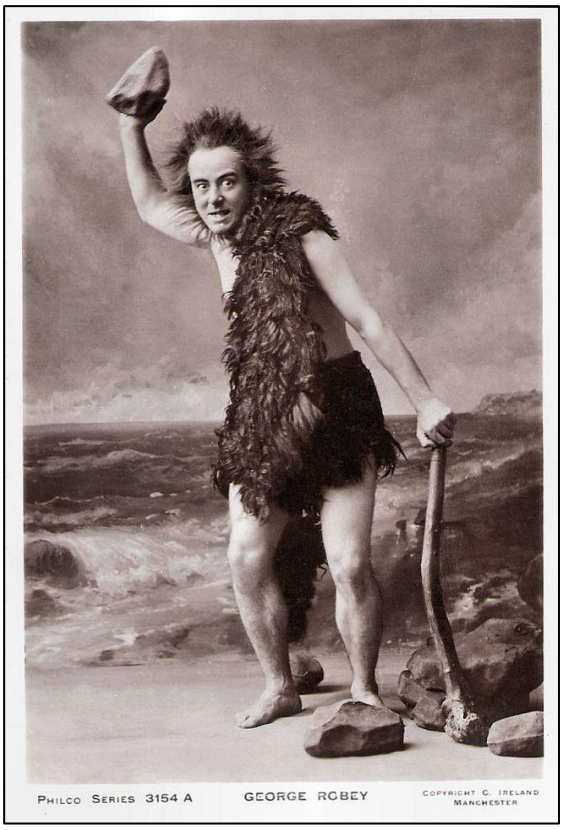


Figure 1.15, Image from George Robey's 'Prehistoric Man' sketch in 1902, (Horrall, 2017)

Other misconceptions derived from 19th century human origins depictions have been surprisingly fossilised for the public through museum displays. The museum is often considered to be a place which displays scientifically current information to the public but it has been argued that museums have moved away from being strictly scientific institutions (Bouquet, 1998). As such the displays seen at museums have been curated with the public in mind (Van der Weiden, 1993) by displaying things in a way that would entice them instead of sticking to a strict scientific trajectory. This can be seen, for example, in the 'Human Biology and Evolution' exhibit erected at the American Museum of Natural History in New York in 1993 (Zihlman, 1997). Many elements of this exhibit hark back to early tropes of evolutionary depiction with a diorama of two australopiths at Laetoli leaving footprints in volcanic ash whilst the volcano erupts in the distance (Moser, 2003) being akin to art history images of biblical creation, with Adam and Eve's expulsion from the Garden of Eden (Zihlman, 1997). However, a more striking diorama is that of the *Homo erectus* individuals from the same exhibit, pictured in Figure 1.16. This diorama encapsulates the racial and sexist tropes of Victorian imagery. Although the woman is unusually depicted in the open savannah environment, she is still an asset to the male's activity and her presence creates a narrative; her scared features attribute the male, who is shown to be a proficient hunter, as her protector seemingly killing the animal to save the 'damsel in distress'. It is also apparent that these individuals are depicted as dark-skinned, which is used here as the trope has been used before to temporally place *Homo erectus* closer to anatomically modern humans than more ape-like hominins but still othering them through the colour of their skin.

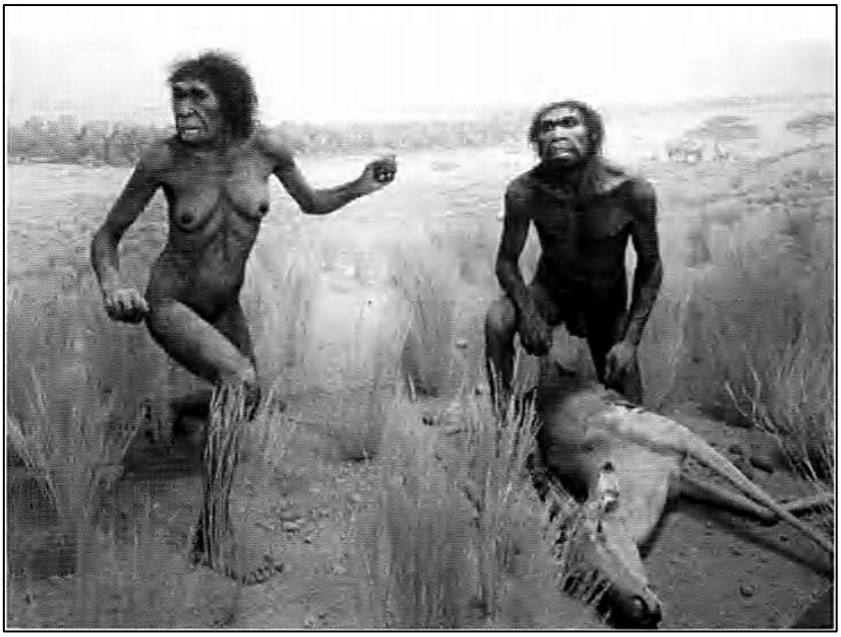


Figure 1.16, *Homo erectus* diorama from the 'Human Biology and Evolution' exhibit erected at the American Museum of Natural History in 1993, (Moser, 2003)

Representations such as these continue throughout popular culture. From films such as *The Croods* (2013) which depict a prehistoric Neanderthal caveman family, all named after unintelligible noises such as 'Eep' and 'Grug', who are reliant on a *Homo sapiens* to be saved; to depictions written in novels such as *The Grisly Folk* (Wells, 1921) which demonises Neanderthals as monsters without morals and reasoning who prey on Cro-Magnon. The examples of stereotyped depictions of human origins in popular culture are endless, being found in books, television programmes, documentaries, museums, magazines, films, comic books and many other forms of visual media (Scott, 2010). Thus, it is clear that classic tropes have perforated popular depictions of human origins and as such remain in popular reconstructions to this day.

1.3 A Picture Speaks a Thousand Words?

The notion that visual information is more memorable than verbal information has long been studied by psychologists through the well-documented 'picture superiority effect' phenomenon (Paivio, 1971; 1986). The picture superiority effect has a basis in Paivio's Dual Coding Theory (Paivio, 1971), which suggests that images and words are coded for differently in the human mind and are thus stored differently. Paivio explains that memory can be coded for as either verbal or visual but many pictorial stimuli can be dually encoded as both visual and verbal memory as we are mentally more sensitive to symbolic modality (Paivio, 1986); words on the other hand only generate a verbal code (Paivio, 1986). Paivio claims that imagery is more easily remembered and recalled than verbal material due to the fact it is dually coded for (Paivio, 1971), therefore, there is a bias towards the remembering of visual evidence as opposed to verbal material. This bias is known as the picture superiority effect. There have been many studies conducted on the picture superiority effect in the psychological field, a commonly cited example being the work by Gehring, Togilia, and Kimble (1976) who measured and compared the memorability of pictures and words at both short and long retention intervals. This study measured the memory of participants for both a long series of words and of pictures, concluding that visual memory was superior to verbal memory at both short and long retention intervals (Gehring et al., 1976). This is a prime example to illustrate how images can have an influential impact on the way in which humans retain information.

Psychologists have also suggested that when we encounter visual material it is being mentally measured, remembered and coded in the context of our own individual world view (Barry, 1997). The messages coded from imagery are mentally interpreted in the context of

both the individual's personal experiences and the societal perspectives with which they are integrated; we therefore gain much more from an image than merely a pictorial piece as images are stories which actively seek meaning and interpretation (Barry, 1997). Images are symbolic representations which must be interpreted to be understood, we tend to interpret images as narratives (Wiber, 1998) which we then relate to our own context and knowledge (Barry, 1997). A study which looked at how images relate to our own worldviews was conducted by Abraham and Appiah in 2006. This paper assessed the role played by the mass media priming of racial stereotypes through visual images on maintaining the stereotypical association of Black African American individuals with social problems and criminal activity (Abraham & Appiah, 2006). In order to test this, experimental conditions were set up which involved using various online news articles of criminal based activity, which did not mention the ethnicity of the suspects, and associating these articles with imagery of individuals of a specific ethnicity. There were four article conditions: an article with no images, an article with two images of Black individuals, an article with two images of White individuals, and an article with an image of a Black individual and an image of a White individual. White respondents were asked to judge the effect that the ethnicity of the individual has on the news story. The results of the study suggested that the respondents perceived the news stories that contained images of Black individuals more negatively than they perceived the same news stories that were accompanied by images of White individuals. Thus, Abraham and Appiah found that images of Black individuals aided in the priming of racial stereotypes with reference to social problems and criminal activity. This study illustrates the point made by Barry (1997) that every image is interpreted as a narrative in the context of an individual's worldview; the results highlighted the common societal stereotypical association of Black individuals with crime among White Americans which was made apparent as there was no significant correlation

made between the ethnicity of the White individual images and the content of the article. This concept is similar to how illustrations of human evolution are interpreted.

Human evolution illustrations are often presented and interpreted as narrative, charged with encoded messages relevant to the time in which the illustrations were created (Wiber, 1998). The initial study of palaeoanthropology was greatly shaped by the social and scientific milieu of the 19th century (Trinkaus & Shipman, 1993) which is evidenced in reconstructive illustrations and the literary work from this period, as this literature review has shown. The literature suggests that anthropological research has become more accepting of Neanderthals throughout the centuries, but many popular and academic images still harbour 19th century ideologies, inaccuracies and stereotypical iconography. Although anthropological work no longer blatantly states these notions in written text, there are still encoded messages for the passive observer within the illustrations used that, in many cases, remain unchallenged by anthropologists and the public (Wiber, 1998). In 1998, Wiber conducted a study on the stereotypical nature of human evolution illustrations. Using her anthropology students as participants, she asked participants to describe the images she had collated from anthropological textbooks which were stereotypically charged. Wiber's results showed that the majority of participants felt the illustrations were accurate representations of the past without challenging the messages presented by the iconography, in fact it was suggested by many that the representations of gender, race, and progress were scientific fact (Wiber, 1998).

The prediction this thesis puts forward is that these stereotypical notions of the human evolutionary narrative from the 19th century are still being perpetuated to the public through visual media. Such media has been suggested to contain hidden meanings derived

from art history and early Palaeolithic reconstructions which rely on the continued use and association of specific stereotypes to infer certain meanings (Moser, 1992), such as the artistic style to use hair to denote primitivity. It has long been assumed that psychological phenomena such as the picture superiority effect apply to human evolutionary studies with anthropological scholars claiming that "imagery often sticks with the reader longer than the text" (Wiber, 1998; 2) and as such it is believed that these images have had a resounding impact on the way human evolution is understood by the general public. However, this has always only been an assumption based on the presence of recurring tropes in human evolutionary imagery and on the work of psychologists testing such phenomena within other contextual perimeters than human evolutionary stereotypes. The effectiveness, and therefore the likelihood, of these harboured messages impacting the lay understanding of the topic has not been directly tested as the principal factor which has caused 19th century human origins ideology to prevail despite drastic academic changes occurring for over half a century; and as such this thesis aims to test this.

2. Methods

2.1 COVID-19 Impact

The initial intention of this thesis was to provide a threefold approach to analysing the impact of visual media on the public perceptions of human evolution; however, the current climate of the global COVID-19 pandemic limited the methods of data collection which could be conducted and as such this thesis stands as a twofold approach. This twofold approach involved a questionnaire to examine the presence of stereotypes in public perceptions of human evolution and an experiment to deduce whether visual narratives influence stereotypical thinking more than verbal ones. As the data collection occurred during the height of the pandemic, all methods had to be conducted virtually as opposed to physically and as such the decision was made to remove any elements of the method that would not be effective if conducted in this manner. Therefore, the third method of data collection, a focus group conducted with current Durham University anthropology students, was removed with the other two methods of data collection being altered accordingly.

2.2 Study Design

The first method of data collection was an online questionnaire which focused on examining the presence of stereotypes in the public perceptions of human evolution and Neanderthals as well as highlighting the sources with which people interacted. The second method of data collection was a dual-purpose experiment which encompassed a priming task focusing on the effectiveness of pictures as stereotyped primes, as well as a picture superiority test used to compare the longevity and memorability of visual versus textual stereotypes. These methods were used to investigate the hypotheses that human evolution

stereotypes and misconceptions are still widely believed by the general public, that popular images have played a key role in the maintenance of stereotypes in perceptions of human evolution, and that these images are more prominent, memorable, and impactful in terms of conveying human evolution stereotypes than verbal sources are.

In order to make analysis more concise, certain terms are used within this thesis to refer to particular groups of people. In both the questionnaire and experiment analysis is conducted which divides the group based on their anthropological education, for these instances the term 'anthropology group' is used as a reference to the participants who currently or have previously studied anthropology and/or archaeology at a degree level. The opposing group, which consists of the participants who have not had an anthropological education, is referred to as the 'media group'.

2.2.1 Questionnaire

In the absence of the focus group due to the Coronavirus pandemic, the questions and purpose of the questionnaire was altered prior to being released in order to encompass the data that was missed. The focus group was designed as a discussion with current Durham University anthropology students to deduce their opinions and insight into stereotypical human evolutionary narratives displayed in imagery. This data was to then be compared to the questionnaire data, which was aimed at any individual not practiced within the field of anthropology and/or archaeology, as representatives for 'professional' and 'lay' understandings of human evolutionary stereotypes. A pilot study involving nine anthropology students was conducted for the focus group prior to the pandemic on the 12th February 2020 which was utilised to alter the content of the questionnaire to be an appropriate method of comparison. Thus, the questionnaire was designed in a way which acquired the appropriate

data from the two groups and allowed them to be directly compared without the need for the anthropology focus group.

It consisted of 4 basic demographic questions and 11 human evolution questions. The questionnaire was short with completion taking approximately 2 to 3 minutes; this was intentional as experimental data has shown more people are inclined to partake in research that is not time consuming (Galesic & Bosnjak, 2009) and will thus likely spend more time per question as a result (Chudoba, 2019). The questionnaire contained both open-ended and closed questions, a copy of which can be found in Appendix 3. The main purpose of these questions was to test whether human evolution stereotypes and common misconceptions are still widely believed in popular understandings and to determine what media forms people interacted with and considered reliable sources of human evolutionary information and research. As such the questions used images from various sources and in a range of artistic styles to tests people's familiarity with certain stereotypical tropes.

Many of the hypotheses tested within this thesis rest on the notion that anthropology students interact with academic human evolution sources and non-academic sources and non-anthropologists only interact with non-academic sources, hence why they are referred to within this thesis as the 'media group'. This differentiation between source type enables analysis to be conducted with a 'professionally-informed' group and a 'lay-informed' group to understand differences in source communication. This was investigated through questionnaire question 1 which asked respondents to select which sources they had recently interacted with regarding human evolution from a list of ten sources with the ability to choose as many as were applicable. These sources ranged in type with both popular media and academic examples present as well as some popular media sources which could be claimed

to be quasi-educational; a notion which will be later explored. The list of source options available can be viewed in Appendix 3. There were two academic sources available to choose (academic journals and textbooks) and eight non-academic sources (National Geographic, film, newspaper articles, non-academic literature, museum displays, documentaries, television programmes, and social media). Respondents could also mention additional sources via selecting 'other' or alternatively could also select 'none of the above' to indicate they had not interacted with any of the sources.

The seven images used within the questionnaire, referred to here as they are displayed in Questions 4 and 6 in Appendix 3, have a range of origins with images from both anthropological sources and popular media sources included within the mix. Image A is a human origins illustration taken from the Smithsonian Institution website's *Hall of Human Origins* page (Smithsonian, 2020), an American museum donning the title of the world's largest museum (Smithsonian, 2020). Image B is a reconstruction image by American anthropologist F. Clark Howell of a battle scene between *Australopithecus bosei* and other australopiths (Howell, 1965). The third image, Image C, is of a life-size reconstruction of a Neanderthal and *Homo sapiens* created by sculpture artists the Kennis brothers to be displayed in the Natural History Museum in London (Natural History Museum, 2020). Image D is a depiction of five hominins which is the first image that appears when searching for the term 'human evolution' on Google images. It is sourced from the online encyclopaedia Britannica (Tuttle, 2020). Image E is a still from the stop-motion film *Early Man* animated by the creators of Wallace and Gromit (Early Man, 2018). The sixth image is labelled as Image F and is a *Homo naledi* illustration created by the artist Jon Foster featured in an issue of the National Geographic magazine (Shreeve, 2015). The final image, Image G, is an illustration of *Homo heidelbergensis* taken from the lecture slides of a first-year Durham University

anthropology module called ‘Human Evolution and Diversity’ originally sourced from Raul Martin’s artwork (Science Photo Library, 2020). The various sources chosen reflect different areas where individuals, lay and professional, are likely to attain their human evolutionary information from, ranging from anthropology books and educational resources to museum displays and cartoon films.

2.2.2 Experiment

The experiment consisted of 4 basic demographics questions, a priming task, a mathematical distraction task and a picture superiority memory retention test. The experiment took approximately 8 to 10 minutes to complete. A copy of the entire experiment in its original formatting can be found in Appendix 4. To ensure that the experiment was appealing to both individuals that may or may not have a keen interest in the topic, a five-person pilot study was conducted prior to the publication of the experiment. This pilot study was used to determine whether multiple experiments within one link was effective and efficient, as such the maintenance of participant interest was assessed throughout. This pilot study was also used to test the effectiveness of the distraction task and the appropriate use of timers within the experiment.

The purpose of the priming task was to deduce whether visual human evolutionary narratives influence stereotypical thinking more than verbal human evolutionary narratives, and are thus more likely to have a greater influence on the spread of stereotypical ideology. In order to test this, a between-subjects design was used which presented each participant with one of four potential conditions; the distribution of these were randomly and evenly selected by the Qualtrics software. The four conditions were primed media in textual or image format. The first prime was a ‘stereotyped’ image, the second a ‘non-stereotyped’ image, the

third was a ‘stereotyped’ textual passage (referred to for the rest of this thesis as the stereotyped text), and the fourth prime was a ‘non-stereotyped’ textual passage (referred to for the rest of this thesis as the non-stereotyped text). Each participant had 40 seconds of exposure to their given prime, after which they were automatically moved on to the next slide and could not return to the prime. This ensured that the exposure to the prime was controlled as those who had a visual prime viewed it for the same amount of time as those who had a verbal prime as not to bias one form over another.

The images chosen for the experiment were the 1909 Kupka Neanderthal illustration of the La Chapelle-aux-Saints Neanderthal displayed in Figure 1.2 and the counter image produced by Arthur Keith in 1911 (can be viewed in Appendix 4 under Prime number 4) which were both taken from an article by Moser (1992). The images were chosen as they were both produced by, or on the behalf of, anthropologists as scientific reconstructions for a mass non-specialised audience, were both old enough to likely be unknown to the participants and were both illustrations of the La Chapelle-aux-Saints Neanderthal. In fact, the 1911 Keith image was produced as a direct counter argument to the 1909 Kupka reconstruction and thus they presented opposing arguments about the same physical material (Moser, 1992). These images were the best choice for the priming task as participants likely had not been exposed to them before yet they contained the same stereotypical tropes seen in modern visual imagery and both focus on one male individual in a cave environment.

In order to not bias attention to one image over the other, they were both cropped and resized to the same dimensions (200 x 114 mm) as to focus purely on the present individual with background distractions removed so that different narratives weren’t displayed that could influence respondents’ opinions. The images were also both black and

white with the sharpness of the 1911 Keith image being increased by 25% using the Microsoft Word photo editor so that the clarity of each image was similar. Although both images are heavily stereotyped, for the purpose of reference during analysis the 1909 Kupka image was used to represent the 'stereotyped' image as it portrayed Neanderthals negatively and the 1911 Keith image was used to represent the 'non-stereotyped' image as it portrayed Neanderthals in a much more positive light, more akin to how they are seen today.

The verbal passages used as the two other primes were descriptions of these images as to ensure that the four primes could be fairly compared as the content and context was uniform throughout. The 'stereotyped' passage was a description of the Kupka image and the 'non-stereotyped' passage was a description of the Keith image. These descriptions referred to the same aspects of their respective images and described the images in detail so that they could be compared to each other and the images fairly. Both passages referred to each aspect in the same order with the phrasing and structure remaining the same except for on key words; these were used to differentiate between the stereotypes displayed in the images with antonyms being used (e.g. "his mouth is **open** and **showing** teeth" from the 'stereotyped' passage and "his mouth is **closed** and **not showing** teeth" from the 'non-stereotyped' passage) as to make them opposing primes. Following on from the exposure to the prime, each participant was then presented with the same questions that asked their opinions about Neanderthals from their morality to their ability to produce tools.

After answering the questions for the priming task, participants were presented with a three-minute distraction task that consisted of 30 simple mental arithmetic questions. The purpose of the distraction task was to set a controlled amount of time before the memory retention test in the picture superiority effect experiment and to focus the attention of the

reader away from the topic of human evolution. The picture superiority test requested that participants describe or recall the original prime they saw at the beginning of the experiment. As the purpose of the picture superiority test was to analyse the memorability of visual primes versus verbal primes, distraction tasks involving visual imagery or textual descriptions were avoided. These types of distraction tasks were avoided as research has shown they may have had an impact on the way in which the primes were retained (Craik, 2014; Rae & Perfect, 2014); i.e. if individuals who were allocated visual primes were given an image matching task the exposure to other stimuli of the same nature may alter the way in which the prime is remembered or contain a related, unconsidered bias. Thus, mathematical questions were used to avoid bias or confusion.

2.3 Ethical Considerations

The methods of data collection used within this thesis relied on the responses of living participants and as such adhered to a number of anthropological ethical guidelines and considerations in order to ensure that research was being conducted in a morally justified and non-harmful manner. In order to ensure this was the case, this research was considered under ethical review prior to execution and following this received ethical approval from the Durham University Anthropology Departmental Research Ethics Committee. Both the experiment and questionnaire were conducted using software programs that this committee deemed ethical as the privacy policies of the software adhered to the General Data Protection Regulations outlined by the EU and any additional clauses adopted by the University. The information and questions contained within these methods have also been approved as measures were made to ensure that all data collection fell in-line with the official Durham

University Privacy Policy; a full outline of which is available on the Durham University website. A link to the Durham University Privacy Policy can be found in Appendices 1 and 2.

The experiment and questionnaire were both distributed via appropriate social media pages on Facebook (Overheard at Durham Uni; Durham University Archaeology Society; Durham Anthropology Society) and through the Durham University emailing system. Permission to do this was given by the respective admins of each social media page and by my supervisors who emailed various anthropology classes and groups on my behalf. Each of these posts and emails contained a link to either the experiment or questionnaire where, upon clicking the link, participants were presented with an information and consent sheet before being permitted access to the questions. The exact wording and presentation of these information and consent sheets can be viewed in Appendix 1 (sheet for questionnaire) and Appendix 2 (sheet for experiment).

The information sheets provided participants with a brief description of the research without revealing the exact purpose of the data collection i.e. the participants were not directly informed that the understanding of stereotypes from imagery was the main purpose of the research as not to influence the way in which they answered. The sheets also made it clear to the participants that partaking in the research was voluntary, as such they were made aware that they could leave the questionnaire or experiment at any time and if they chose to do so their data would not be included within this research project; they were also made aware that they could decline answering any question should not they not wish to do so. The sheets also explained that all responses would be kept anonymous with no identifying information being included within the project data. In order to ensure responses remained anonymous, the two forms of software used were distributed via an anonymous link that did

not require any personal details in order to participate. Some email addresses were acquired for the experiment prize draw but were deleted from the raw data set following the announcement of the draw. Participants were also made aware that the research project will be published open access on the Durham University online depository for Higher Degree Theses. Participants provided consent by clicking 'Next' (questionnaire) or 'I Consent' (experiment) and were informed that this action meant they were confirming that they were 18 years or over and consenting to the inclusion of their responses within the research project as well as the potential further use of the data in future publications. An email address was also provided if participants had any questions concerning the data collection or their partaking of the research. Participants were additionally made aware that this email address could be used to request a summary of the findings upon completion of this research project.

2.4 Data Collection

2.4.1 Questionnaire

The questionnaire was conducted using the Jisc Survey software and was first released on the 5th March 2020. The questionnaire remained open for 15 weeks and was closed on the 2nd July 2020. The questionnaire received 220 complete responses to be used within the analysis. The respondents consisted of 76 anthropology and/or archaeology students from Durham University who currently study or have previously studied the disciplines to act as a proxy for a 'professionally-informed' audience (this is the 'anthropology group' for the questionnaire) and 144 non-anthropology and/or archaeology individuals to act as a proxy for a 'lay-informed' audience (this is the 'media group' for the questionnaire). 163 (74.1%) of the respondents were female with 52 (23.6%) males and 5 (2.3%) people identifying as other. 8

(3.6%) of the respondents were of Asian descent, 9 (4.1%) were of a mixed decent of multiple ethnicities, 9 (4.1%) identified as other, and 194 (88.2%) were White. Additionally, 131 (59.5%) of the respondents were between the ages of 18 and 24, 29 (13.2%) were between the ages of 25 and 34, 9 (4.1%) were between the ages of 35 and 44, 31 (14.1%) were between the ages of 45 and 54 and 20 (9.1%) were 55 or above.

2.4.2 Experiment

The experiment was conducted using the Qualtrics survey software due to the wider range of question manipulation options the program offered than Jisc. The experiment was first released on the 7th May 2020. The experiment remained open for 8 weeks and was also closed on the 2nd July 2020. A monetary incentive of an Amazon voucher prize draw was used to attract and encourage people to complete the experiment. The experiment as a whole received 164 complete responses. The respondents consisted of 46 (28%) anthropology and/or archaeology students who currently study or have previously studied the disciplines (this is the 'anthropology group' for the experiment) and 118 (72%) individuals who had never studied anthropology and/or archaeology at degree level (this is the 'media group' for the experiment). 116 (70.7%) of the respondents were female with 47 (28.7%) males and 1 (0.6%) person identifying as other. 10 (6.1%) of the respondents were of Asian descent, 8 (4.9%) were of a mixed decent of multiple ethnicities, 2 (1.2%) identified as other, and 142 (86.6%) were White; as well as 2 (1.2%) individuals who chose not to say. Additionally, 116 (70.7%) of the respondents were between the ages of 18 and 24, 17 (10.4%) were between the ages of 25 and 34, 4 (2.4%) were between the ages of 35 and 44, 11 (6.7%) were between the ages of 45 and 54 and 16 (9.8%) were 55 or above.

2.5 Statistical Analysis

2.5.1 Questionnaire

All statistical analyses within this thesis were conducted using the IBM SPSS 27 software. The closed-ended questions of the questionnaire were analysed using chi-square tests of independence as the variables were nominal. However, the first question of the questionnaire, which requested people to select which sources they had interacted with from a given list (Appendix 3, Question 1), was analysed slightly differently to the basic format of the other chi-square tests used to analyse all of the closed-ended responses. As respondents for this question were invited to "tick all that apply", the number of answers provided for the question differed between respondents making the same analysis methods used with the other questions difficult to perform as one respondent did not align with just one source. The range of answers per respondent also nullified this method as the same respondent was able to choose sources that were academic in type as well as sources that were non-academic in type, complicating the desired purpose of the question to test which type of source members of the different groups chose. In order to overcome this, each source was treated as a different variable. As with all of the questions within the questionnaire, the data was split by anthropological engagement. The anthropology group and media group were the independent variables for the analyses of both the closed and open-ended questions. Chi-square tests of independence were also conducted for the open-ended questions.

The free-text responses of the open-ended questions also required additional coding prior to analysis which was conducted using content analysis theory. The content analysis theory has been highlighted as a key method of qualitative analysis in anthropological research by cultural anthropology professor H. Russell Bernard (2006). The content analysis

theory is similar to the popularly-used grounded theory (Glaser & Strauss, 1967) as it relies on the premise that data can be thematically categorised, meaning that a formula of codes can be systematically applied to a set of texts in order to search for recurring themes (Bernard, 2006). However, content analysis differs from grounded theory in the fact that it is used to test pre-existing hypotheses, not create them (Bernard, 2006).

This method was utilised in questionnaire question 3 to explore the correlation between the extent of the individual's anthropological knowledge and their language use in the context of Neanderthal descriptions. 205 responses were collected to be analysed for this question. 131 responses were collected for the media group and 74 responses were collected for the anthropology group. The content analysis method was considered appropriate as the responses were short with the majority of respondents providing one to two sentences of text meaning a standardised set of codes was more effective and efficient than considering each response individually. The coding was used to categorise the responses into 'positive', 'neutral' or 'negative' descriptions depending on word use in order to test the hypothesis that respondents from the media group would describe Neanderthals more negatively than members of the anthropology group. The codes put into place were categories of words which were considered positive or negative. The coding was conducted in a binary manner which considered the type of word or words present to categorise a description and did not analyse the number of charged words present per description. The presence of one of these words, or a synonym of one of these words, was considered enough to categorise the overall description as either positive or negative. If none of these words were present, the description was categorised as neutral. This categorisation method can be observed in Appendix 5 (the anthropology group's responses) and Appendix 6 (the media groups responses) where each

description has been moved into the appropriate category, positive, neutral or negative, to which it was coded.

In Appendices 5 and 6 the word or words present which were used to code a description into its respective category have been highlighted in green for positive terms and red for negative terms. If a description included both positive and negative terms it was excluded from the analysis. This was done to avoid inflating the sample size which would occur if the description was included in both the positive and negative categories. This also avoided misconceptions that the description was neutral as the use of positive with negative terms does not 'balance' the description as neutral. 7 the of responses, 1 from the anthropology group and 6 from the media group, were excluded from the final results for this reason. These excluded responses can be identified in Appendices 5 and 6 as they have been converted to blue text and capitalised with a single line struck through them ~~LIKE SO~~.

The words used to categorise the descriptions into positive, neutral and negative were based off of the selection of terms provided for question 11 where respondents had 12 Neanderthal descriptive words to choose from (the categorisation of which can be seen below in Table 2.1) as well as from an initial scan of recurring terms within the question 3 responses. As the responses were short, synonyms and variant phrasing were included in the coding so long as the context of the alternate word(s) used was congruent. These alternatives were only considered for terms that fit within the predesigned thematic codes. The positive terms which were coded for were those which stated that Neanderthals were human, wore clothes, were advanced, had technology, and had the ability of speech. The negative terms which were coded for were those which stated that Neanderthals were ape-like, naked, unintelligent, hairy, unhygienic and unadvanced. Terms and phrases outside of these parameters were not

considered in order to ensure accurate and consistent analysis. Variations of the positive and negative terms were accepted with phrases such as “walked like gorillas” and “long-arms” recognised in the code to mean ‘ape-like’. If a respondent included an antonym of a term within the code set it was also accepted; for example, if the respondent said that Neanderthals were ‘not hairy’ it would have been coded as a positive term.

Although seemingly lenient by allowing the consideration of context and synonyms, strict rules were applied to the coding to ensure that the consideration of stereotypes remained consistent within the coding of the descriptions and within the overall format of the questionnaire. For example, the term ‘human-like’ can be considered to be the antonym of ‘ape-like’ and thus a positive term, however, as ‘human-like’ was considered a neutral term in question 11 and the term ‘human’ was found to be used by some respondents in question 3, the term ‘human-like’ remained neutral. Phrases that fit within the coded parameters but were confusing in their context were also excluded from analysis; for example, the phrase “mix of man and gorilla” was excluded as it was unclear where on the scale between ‘ape-like’, ‘human-like’ and ‘human’ the respondent was referring to. Notably, the term ‘muscular’ was also excluded from the coding set despite the fact that 17% of responses included the term. Although this term is often linked to a common stereotype of a brawny caveman the term itself is not necessarily positive or negative and as such was classed under ‘neutral’. It could be argued that responses that used the phrase “very muscular” could have been coded as being negatively charged, but to do so could have caused discrepancies within the accuracy of the coding set and undermined the strict rules of the code.

POSITIVE	NEUTRAL	NEGATIVE
Human	Human-like	Ape-like
Intelligent	Average intelligence	Unintelligent
Sophisticated	Basic	Primitive
Civilised	Non-aggressive	Barbaric

Table 2.1, List of terms categorised into positive, neutral and negative used in the questionnaire for question 11 and used as a guidance for the analysis of the questionnaire question 3 responses

Content analysis was also used to code the responses to questionnaire question 9 which asked respondents what they felt about the portrayal of human diversity shown in the images from questionnaire questions 4 and 6. The full responses to this question can be viewed in Appendix 12. Four codes were used in order to conduct analysis on these responses, the first being a mark allocated if a respondent expressed that they found issue with the presentation of human diversity in the images. The other three codes focused on any mention by the respondents concerning the portrayal of gender, race and progressionism. Once coded, this data was statistically analysed used chi-square tests of independence.

2.5.2 Experiment

How participants responded to these questions was analysed in relation to the specific prime they had seen to deduce whether the type of prime had an effect on the way Neanderthals were viewed. This analysis was used to test if images were effective methods of retaining, communicating and transferring stereotypes to the reader. For statistical

analysis, respondents were split into groups dependent on the prime they were shown; creating four groups in total. The number of respondents for each prime condition can be seen in Table 2.2. Further analysis was also conducted which split respondents by the same anthropology/media demographic seen in the questionnaire data. This was possible as the same demographic questions were asked to participants in both the questionnaire and the experiment. The majority of analysis for the experiment was conducted using chi-square tests of independence as the data was formatted to be nominal or ordinal data. Due to this, questions 2, 3, 5, and 7 were analysed similarly to the questionnaire data with question 1 and the recall task requiring further reformatting and alternative tests in order to be analysed.

PRIME	NUMBER OF RESPONDENTS
Stereotyped Image	43
Non-stereotyped Image	38
Stereotyped Text	36
Non-stereotyped Text	35

Table 2.2, Number of respondents from the experiment data that were exposed to each of the four experimental conditions (primes)

For question 1 (Appendix 4), which involved a list of statements to which respondents had to express their agreement, the data was considered as ranked ordinal data. The data was coded 1 to 5 with 1 indicating 'strongly agree', 2 indicating 'somewhat agree', 3 indicating 'neither agree/disagree', 4 indicating 'somewhat disagree' and 5 indicating 'strongly

disagree'. Although there was no measurable distance between these variables (i.e. there is no measure of how much more agreeable 'strongly agree' is than 'somewhat agree' and how much more disagreeable 'strongly disagree' is than 'somewhat disagree'), they were considered in this manner in order to easily conduct statistical tests as the tests used required ranked data. As analysis was needed to be conducted on more than two independent groups, the Kruskal Wallis test was utilised for this question. The Kruskal Wallis test is designed to assess the hypothesis that multiple independent groups come from different populations (Field. 2009); the independent groups here being the four primed conditions of the experiment. Following a significant Kruskal Wallis test result, Dunn Bonferroni's post hoc test was conducted in order to determine the direction of effects and to deduce between which groups the significance lay.

The data from the picture superiority recall task also required additional reformatting before analysis; this was done by considering each statement individually in the context of its corresponding prime as well as using content analysis techniques. Two types of analysis were conducted on the data in order to first test whether pictures were more memorable than words and then to analyse the ability of pictures to memorably convey stereotypes in comparison to words. Therefore, the first test was measuring for correctness and the other for the presence of stereotypes. The first analysis was conducted by counting the number of correct statements made in each response as a measure of recall. The second analysis was more detailed and used a set of codes to scan the responses for the number of stereotypical traits correctly remembered ('correct' stereotypes) as well as the number of stereotypical traits that were not included within the prime and had been introduced by the respondent ('incorrect' stereotypes). This was to deduce which primes were an effective vessel for

stereotypes as well as analysing what absent stereotypes respondents had inferred from their own context and understanding.

For test one, each statement was considered individually within its own prime context. The number of correct statements was tallied for each respondent and can be found in the fourth column of Appendix 7. Each respondent was given one tally for every correct statement made with incorrect and repeated statements being ignored. Close synonyms were accepted such as strong instead of muscular. This method of text analysis without fixed coding enabled leniencies within the analysis such as allowing for subjectivity and inference to be considered correct that the second test did not. For example, with the stereotyped image one respondent suggested that the figure was “romantically posed” and many inferred that the figure looked “ape like”, these statements were accepted as correct statements despite being subjective as such notions are suggested by the historical context of the primes. This analysis was therefore used as a measure of overall memorability as it considered factors outside of the stricter coded framework of test two which focused on the stereotypical traits of the primes.

The second test followed a stricter code and utilised methods of content analysis to find themes within the recalled passages. The set of codes used to scan the responses were taken from the stereotypes mentioned in the textual primes and can be seen in Table 2.3. For each respondent, the number of stereotypes mentioned that correlated to the prime they received was tallied, with a maximum of ten points available for remembering each stereotype mentioned or displayed in the prime; this can be seen in the fifth column of Appendix 7.

Codes for non-stereotyped image/text	Codes for stereotyped image/text
Male/he	Male/he
Making stone tool	Holding club/stone
Animal skins/clothes	No clothes
Tooth necklace	No accessories
Facial hair/no other hair	Hairy/all over
Muscular build/not very defined	Extremely muscular/well defined
Mouth closed/not showing teeth	Mouth open/teeth showing
Smooth brow ridges	Prominent brow ridges
Medium nose	Wide nose
Bare feet/short toes	Bare feet/long toes

Table 2.3, List of codes used to analyse picture superiority recall task data for both stereotyped and non-stereotyped primes

Stereotypical traits that were mentioned that were not in Table 2.3 were considered 'incorrect' and were tallied for each respondent in the sixth column on Appendix 7. These incorrect stereotypes can also be seen in Appendix 8 where they have been highlighted, green for positive stereotypes and red for negative stereotypes; these have been placed under the subheadings of their corresponding primes. The incorrect stereotypes were highlighted as such in order to be statistically analysed using chi-square tests of independence to deduce whether images induced more negative stereotypes than words. Chi-square tests of independence were appropriate for this analysis as both variables were categorical, however, for the other recall test analysis this was not the case. The tallied responses for the correct

statements, the 'correct' stereotypes and the 'incorrect' stereotypes were analysed using Mann-Whitney U tests. Mann-Whitney U tests are used to compare the means of two independent groups in order to determine statistical significance (Field, 2009). Here the dependent variables are the number of correct or incorrect stereotypes and the independent variables are the prime groups split by text vs image and stereotyped vs non-stereotyped, as well as the respondents' engagement with anthropology (anthropology vs media). These tests were used as the data contained categorical and non-parametric interval data. A Shapiro Wilks test showed that the data did not follow a normal distribution, the results of which can be seen below in Table 2.4.

STEREOTYPE TYPE	SHAPIRO WILKS RESULTS
Correct Stereotypes	$W(152) = 0.959$, $p < .001$
Incorrect Stereotypes	$W(152) = 0.771$, $p < .001$

Table 2.4, The results of the Shapiro Wilks tests showing that the 'correct' stereotypes and 'incorrect' stereotypes data are non-parametric

3. Results and Preliminary Discussion

For every hypothesis tested within this thesis the significance threshold was 0.05 and the null hypothesis was always no correlation between the tested variables. The results for the questionnaire and the experiment have been displayed separately. The majority of the results have been presented in the question order they were originally shown to participants during data collection and how they were replicated in Appendix 3 (questionnaire) and Appendix 4 (experiment). There are some instances where this is not the case in order to appropriately thematise the data, however, questions have been clearly labelled as they appear in the appendices for reference purposes. Figures and tables have also been labelled with the question code that they correspondent to e.g., QQ1 (questionnaire question 1), EQ1 (experiment question 1) and ER1 (experiment recall task). It must also be noted that numerous statistical tests are included within this thesis and thus it must be acknowledged that there is therefore chance of familywise error within these results.

3.1 Questionnaire

3.1.1 Interaction with Human Evolution Sources

Many of the analyses within this thesis rest on the notion that anthropologists interact with academic sources and non-anthropologists only interact with non-academic sources; questionnaire question 1 tested this. The list of source options available in questionnaire question 1 can be viewed in Figure 3.1 and Appendix 3. There were two academic sources available to choose (academic journals and textbooks) and eight non-academic sources (National Geographic, film, newspaper articles, non-academic literature, museum displays, documentaries, television programmes, and social media). The percentage of respondents

within both groups who expressed their engagement with each source can be seen in Figure 3.1. As can be seen from the data, the anthropology group expressed higher levels of engagement with nine of the sources than the media group, but the media group engaged with one source more than the anthropology group; films. The data also shows that 20.1% of the media group claimed to have no interaction with any of the human evolution sources compared to only 5.3% of the anthropology group; a difference which was statistically shown to be significant through a chi-square test of independence (X^2 (1) = 8.634[a], p = .003). This difference between the two groups is made more apparent as a comparatively high percentage of respondents in the anthropology group (3.9% compared to 0.7%) also expressed that they had engaged with other human evolution sources that were not included within the question options. These additional options were all of an academic nature with respondents mentioning academic conferences, course lectures and discussions with researchers.

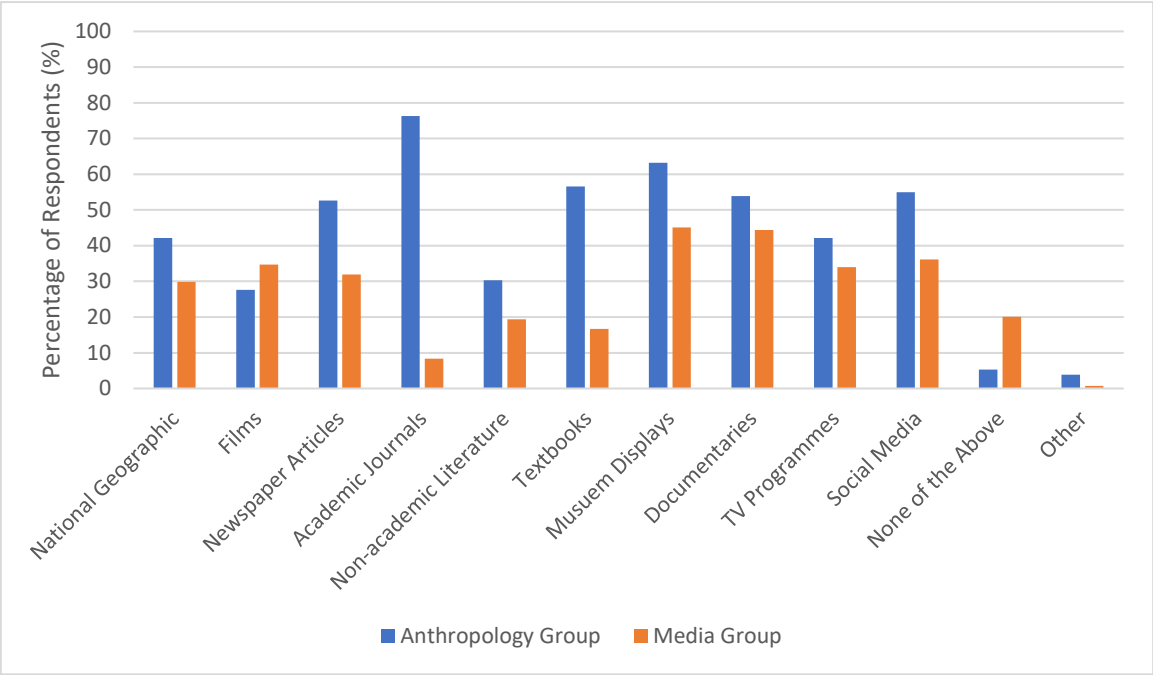


Figure 3.1, A graph to show the percentage of engagement both groups had for each source [QQ1]

The Figure 3.1 data suggests that the anthropology group engage with human evolution media more than the media group and for the one source where this is not the case, the margin between the groups is smaller than with any other source (7.1% difference in comparison to 8.1 – 68% difference). The biggest margin between the groups is their engagement with academic journals with 68% more anthropology students engaging with this source than media respondents. Academic journals are the highest medium of engagement for the anthropology group at 76.3% of respondents with the other academic source, textbooks, being their third highest medium of engagement (56.6%) after museum displays (63.2%). The highest medium of engagement for the anthropology group was the lowest medium of engagement for the media group with only 8.3% of media respondents reading

academic journals. The highest source of engagement for this group was instead museum displays (45.1%).

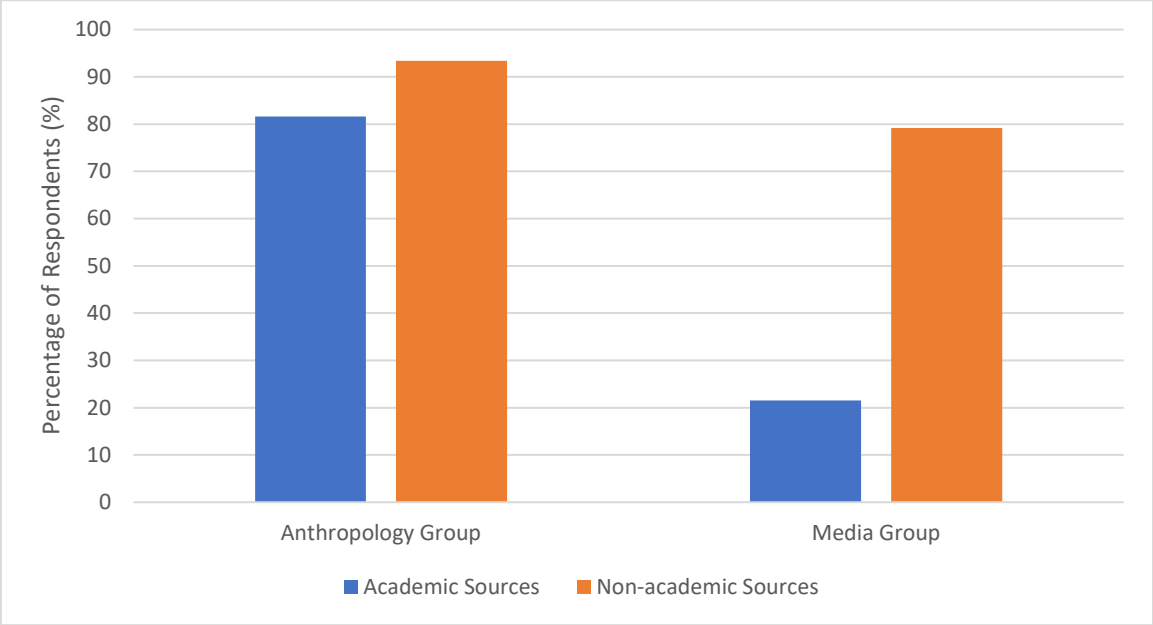


Figure 3.2, A graph to show the engagement of the anthropology group and the media group with academic sources (academic journals and text books) and non-academic sources (National Geographic, film, newspaper articles, non-academic literature, museum displays, documentaries, television programmes, and social media) [QQ1]

As can be seen in Figure 3.1, the anthropology group engages more with both academic and non-academic sources than the media group does in most cases. Due to the uneven representation of academic versus non-academic source options in the question, i.e. there are four times more non-academic sources to choose than academic ones, the expected result would be that both groups show a bias towards non-academic sources in their

selection. This bias can be seen in Figure 3.2 with 79.2% of the media group engaging with non-academic sources of human evolution information and portrayal and 93.4% of the anthropology group engaging with the same sources. However, to support the hypothesis that anthropologists engage with academic resources and non-academics do not, it would be expected that the anthropology group would be less biased towards the non-academic sources than the media group as they chose academic options. As the data suggests, the anthropology group did not show this diminished bias and in fact engaged more with non-academic sources than the media group. However, this is because each respondent was able to pick as many sources as were applicable and thus the results for both source types were mutually exclusive with the outcome of one not impacting the potential outcome of the other. The high level of engagement from the anthropology group with non-academic sources did not diminish their high level of engagement with academic sources with 81.6% of the anthropology group engaging with this source type. This differed greatly from the media group who expressed a 21.5% engagement with this source type. These results suggest that the hypotheses within this thesis are valid as the sample reflects the expected trend of the anthropologically educated group engaging with academic anthropological sources and the media group not engaging with these sources to the same extent; so much so that there is a statistically significant difference. This statistical difference can be seen through a chi-square test of independence: X^2 (1) = 21.400[a], $p < .001$. For this test, the null hypothesis that there is no correlation between group and source type can be rejected.

It must also be noted that whilst the anthropology group is engaging with academic sources as expected, they are engaging with non-academic sources to a greater extent. This high level of engagement and exposure to non-academic sources cannot be ignored. Further analysis of this data found that this high level of engagement was actually with quasi-

educational media as opposed to strictly entertainment-based portrayals of human evolution. Quasi-educational media is referred to here as the sources which translate science for the lay understandings of the general public for the purpose of education. The quasi-educational sources within this question were: The National Geographic, newspaper articles, museum displays and documentaries. These quasi-educational sources made up half of the non-academic source options. As the charts in Figure 3.3 suggests, these quasi-educational sources contributed the highest level of engagement within non-academic sources for both the anthropology and the media group. Within the anthropology group 57.7% of non-academic engagement was with quasi-educational sources and 54.9% of the media groups non-academic engagement was with quasi-educational sources. These figures highlight the popularity of human evolution education within anthropology but more importantly within the non-professional interests of the media group; there was no statistically significant difference in use of such sources between the two groups (X^2 (1) = 0.183[a], p = .669).

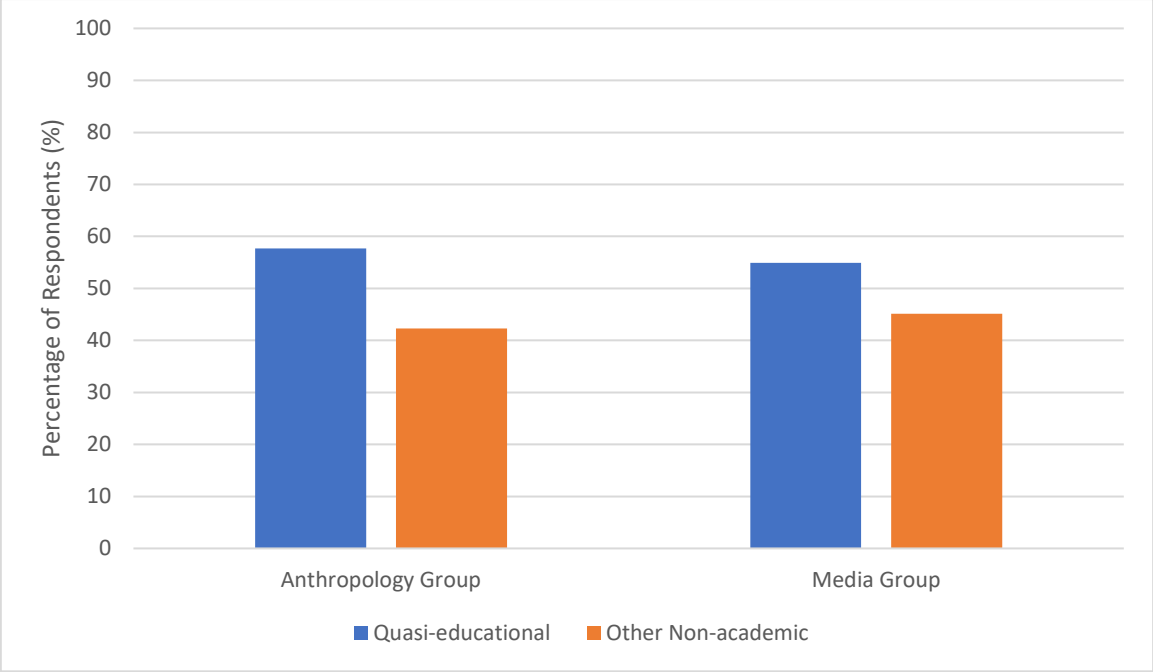


Figure 3.3, Graph to show the percentage of engagement with non-academic sources which are quasi-educational and non-academic sources which are not quasi-educational, comparing this between the two groups [QQ1]

3.1.2 Perceived Accuracy of Human Evolution Sources

Question 2 asked respondents to select which source they perceived to be the most trustworthy from a given list. The list included both academic (textbook and lecture slides) and non-academic (museum website, museum display, Google Images, film and National Geographic) sources. The sources chosen were important as they correlated directly with the source origins of the images presented to respondents in questions 4 and 6 of the questionnaire. For all three of these questions, there is an expected bias for both groups towards the non-academic sources as there are more of these available to choose to from. Unlike with question 1, the respondents were only allowed to choose one answer per question for these three questions and as such the disproportionate number of options per

source type would have had more of an effect on the overall outcome of these questions. Therefore, a bias towards the non-academic would be expected for both groups, but it is hypothesised that the anthropology group will show less of a bias due to their interaction with academic sources.

Figure 3.4 shows the percentage of respondents from both groups which chose each source. The data does not seem to show the expected bias towards non-academic sources for the anthropology group as the two most trustworthy sources for this group were the academic sources with 36.8% of anthropology respondents choosing lecture slides as the most trustworthy and 35.5% opting for textbooks. The least trustworthy source according to this group was films as no anthropology respondents chose this, correlating with the data from Figure 3.1 which showed that film was the least engaged medium of the anthropology group. Film was also considered one of the least trustworthy sources by the media group alongside Google Images with only 0.7% of respondents choosing these sources respectively. The most trusted source according to the media group was unexpectedly textbooks, with 32.6% of respondents selecting this. Textbooks was followed closely by The National Geographic with 29.9% of media respondents opting for this.

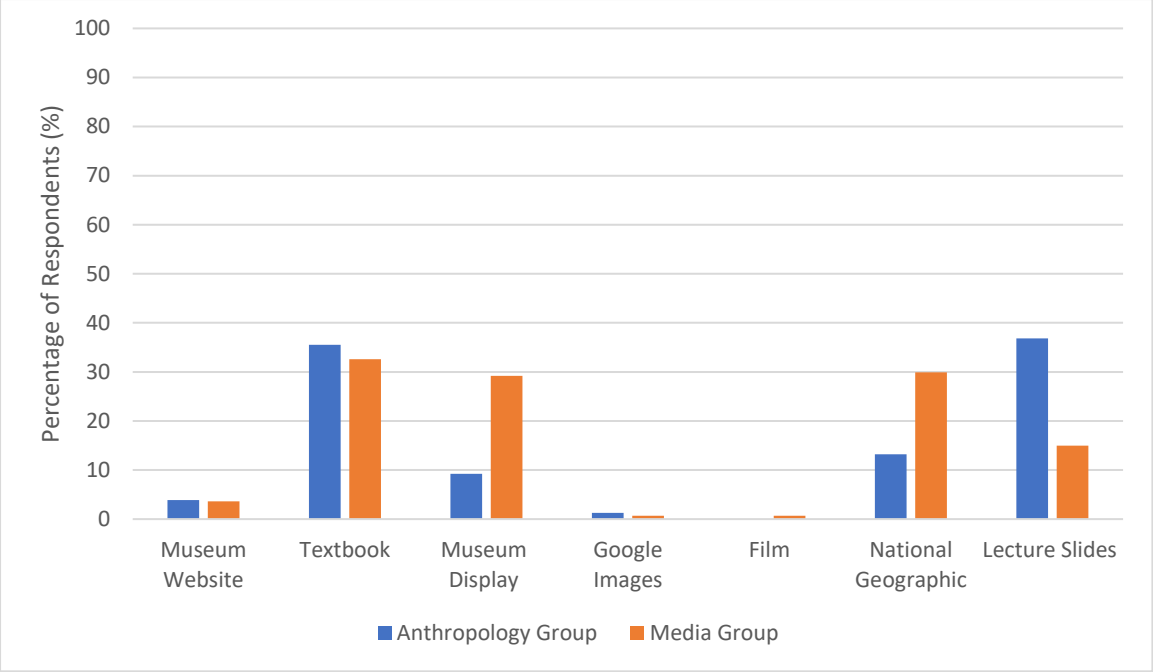


Figure 3.4, A graph to show the sources respondents from both groups found to be most trustworthy [QQ2]

This data was also condensed into source type i.e. anthropology sources and media sources in order to compare the extent to which respondents trusted the sources types that they interact with. Figure 3.5 illustrates the collation of the data from question 2, categorising the groups' selections under which sources were academic (anthropology sources) and which were non-academic (media sources). As can be seen from the graph, the anthropology group trusted academic sources (72.4%) more than non-academic sources (27.6%) and the media group trusted non-academic sources (63.9%) more than they did academic sources (36.1%). When statistically tested through a chi-square test of independence these results proved to be very significant (X^2 (1) = 26.177[a], p < .001) and the null hypothesis that there is no correlation between extent of anthropological background and perceived accuracy of academia was rejected.

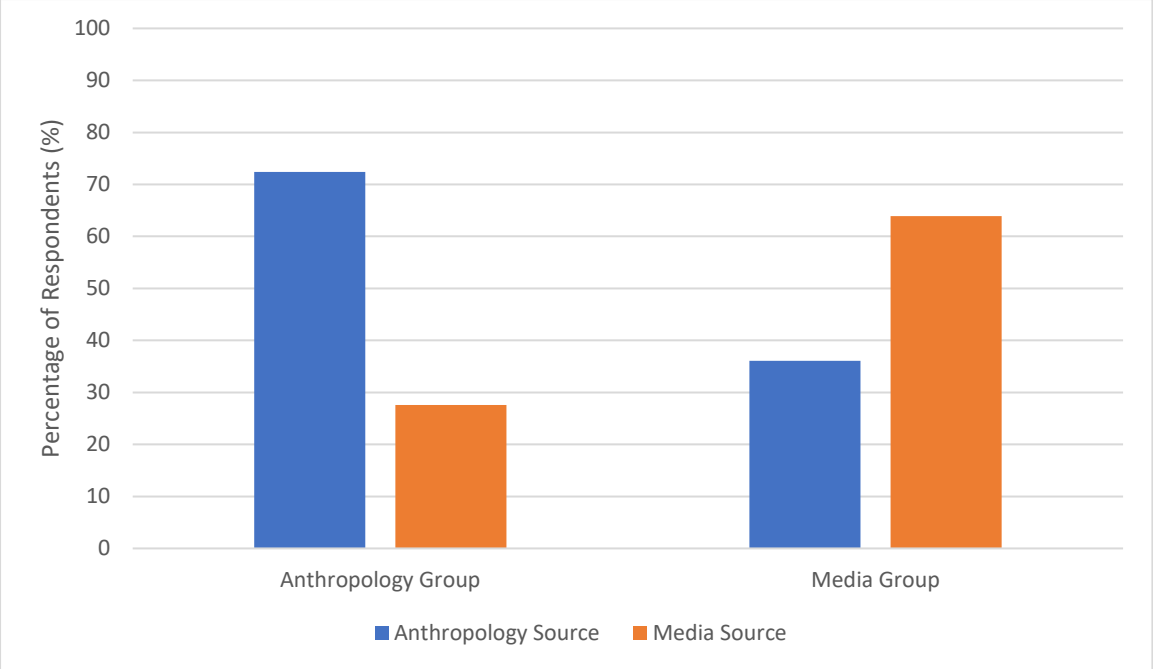


Figure 3.5, A graph to show which source types both groups believed to be the most trustworthy [QQ2]

The sources used in question 2 were again presented to respondents in question 4 but under a different format. Respondents were asked to select which visual image they felt was the most accurate portrayal of human evolution, with each image coming from one of the seven sources seen in Figure 3.3. As above evidence has shown that respondents engage with and trust their expected source types, it was hypothesised that, when presented with visual images from these sources, respondents would likely recognise and select images from sources they used. However, as Figure 3.6 suggests this was not the case. Figure 3.6 shows the percentage of respondents from each group that chose each image as the most accurate portrayal of human evolution. The images here have been labelled as their source origin but can be seen in Appendix 3 as alphabetically listed; the reference of the images in Figure 3.6 are alphabetically ordered in the same manner as Appendix 3 but instead labelled with their

source origin. As can be seen in Figure 3.6, both groups selected Image D, the Google Images visual that is displayed here in Figure 3.7, as the most accurate portrayal of human evolution; a source which both groups expressed as being one of their least trusted (Figure 3.3). 66% of the media group felt that this was the most accurate portrayal, along with 50% of the anthropology group. When understood in the grander scale of academic vs non-academic sources, non-academic sources were the most selected type for both groups. The anthropology group did select academic sources (10.5%) more than the media group did (4.9%) but the difference between the groups was not statistically significant with a chi-square test of independence (X^2 (1) = 2.513[a], p = .113). This result could be partially attributed to the representation bias of non-academic sources, but academia still doesn't equate, for either group, to the expected percentage of 28.6% of respondents if all sources were selected for equally.

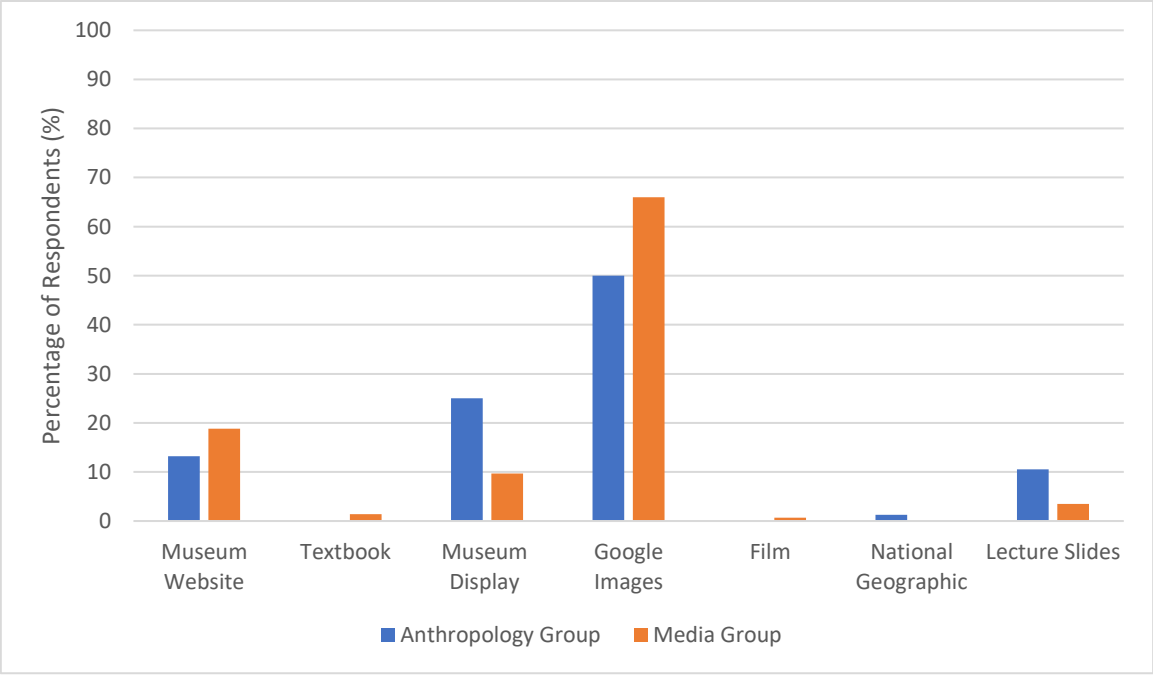


Figure 3.6, A graph to show which image the different groups found to be the most accurate portrayal of human evolution [QQ4]

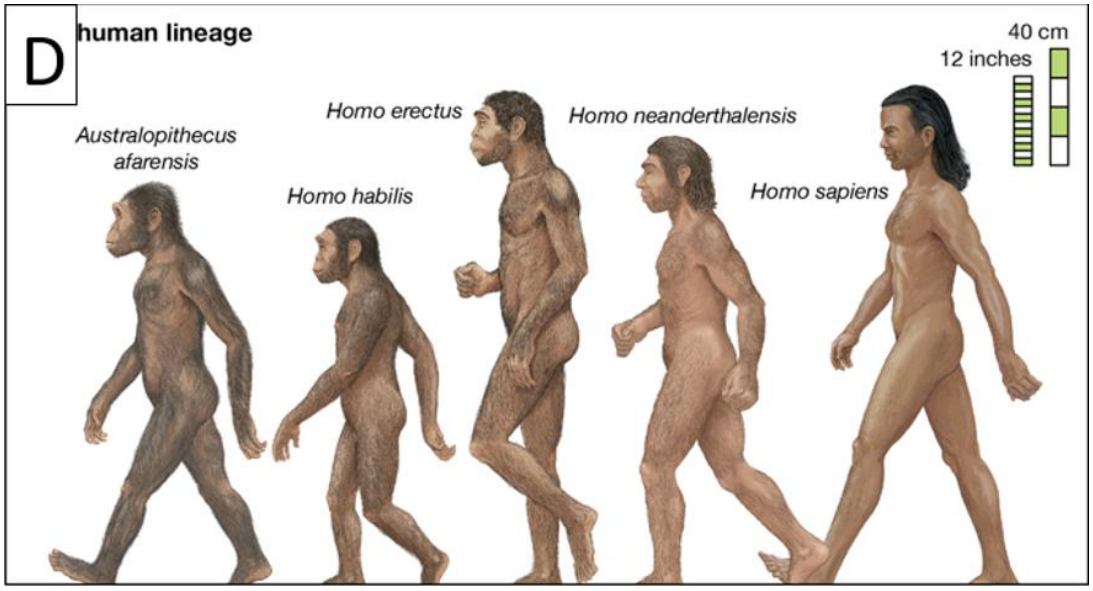


Figure 3.7, Google Images picture selected by the majority of respondents to be the most accurate portrayal of human evolution (Tuttle, 2020) [QQ4]

Although there was not a significant difference found between the groups there was a significant similarity. Both groups' selection of the Google Image picture seen in Figure 3.7 was statistically significant with a chi square test of independence: X^2 (6) = 18.432[a], p = .005. As the p value was below .05 the null hypothesis that this selection for Figure 3.7 was random could be rejected. The image in Figure 3.7 is the first image seen when 'human evolution' is typed into the Google Image search bar and comes from the Encyclopaedia Britannica website (Tuttle, 2020). The image is of five physically athletic male hominins walking in a human lineage descent line, interestingly facing the opposite direction of the more classical versions of this image. The hominins all seem to be of similar complexion but the amount of body hair and ape-like features visible on the individuals increases from right to left. A height scale can be seen in the corner of the image and the scientific names of the hominins are positioned above or next to each individual. There were a variety of reasons which respondents gave as

to why they felt that Figure 3.7 was the most accurate portrayal of human evolution. The reasons given by respondents for their selection of the Google Image picture can be seen in Appendix 9. The majority suggested that the image was "more scientific" and "seem[ed] to be based on scientific research" with others offering how the image was more scientific by explaining that "it isn't a painting or drawing of a dramatic scene" but instead "it shows the progression (evolution) of humanity". Other respondents simply offered that the image was "similar to [images seen] on trusted sites" or presented information comparable to "what [they] have been taught". These reasons were apparent for both the anthropology and the media group.

There was also a congruency between the two groups as to which image of the seven they deemed to be the least accurate portrayal; the data for which is taken from question 6. As can be seen in Figure 3.8, both groups felt that Image E, the one taken from a film, was the least accurate with 79.2% of the media group selecting this image as well as 53.9% of the anthropology group. This image can be seen in Figure 3.9. Both groups selecting this image was deemed statistically significant by a chi-square test of independence as the *p* value was below .005 (X^2 (1) = 23.020[a], $p < .001$). However, as a large proportion of both groups selected the film image, the difference between the groups in terms of non-academic and academic source selection is minimal. Yet, even though it is minimal Figure 3.10 illustrates that the reverse of the expected result occurred with more anthropology students (26.3%) selecting anthropology sources as being inaccurate than members of the media group (12.5%) did. This difference between the groups was not statistically significant (X^2 (1) = 6.645[a], $p = .010$) but it remains interesting that 25% (Figure 3.8) of the anthropology group selected the textbook image as being the least accurate portrayal of human evolution. This may seem opposing of their previous views of the source however the image presented as the textbook source dates

back to the 1960s (Howell, 1965) and thus this result may not be as surprising due to the age of the image and theories it would have been used to support.

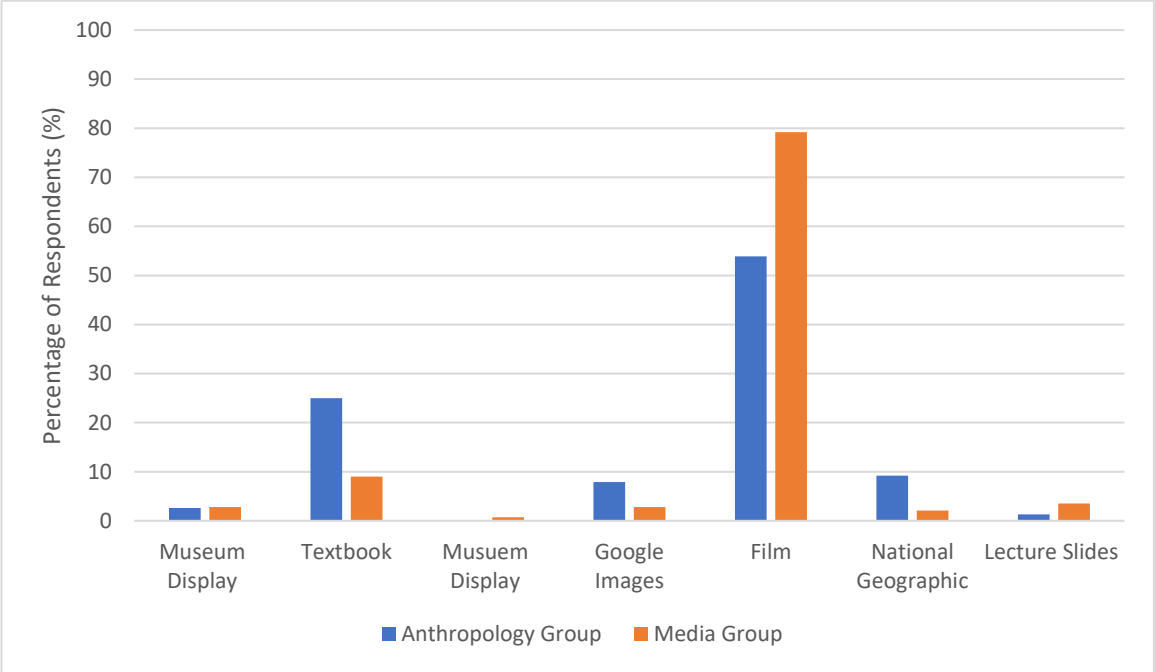


Figure 3.8, A graph to show which image the different groups found to be the least accurate portrayal of human evolution [QQ6]

Figure 3.9, Film still selected by the majority of respondents to be the least accurate portrayal of human evolution (Early Man, 2018) [QQ6]

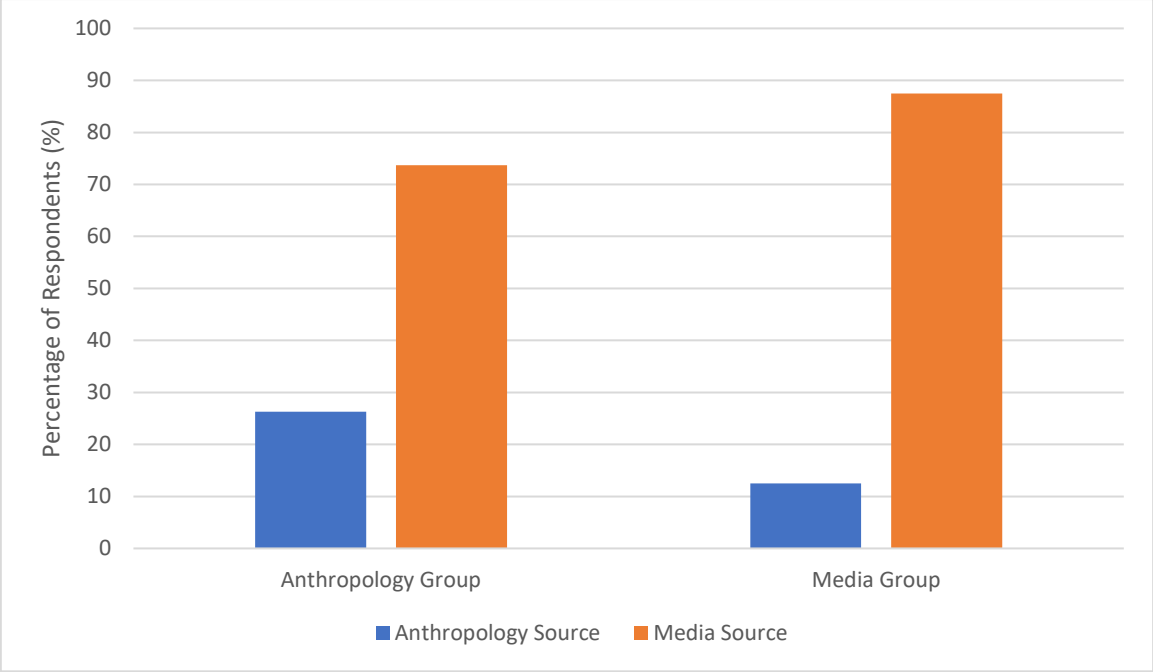


Figure 3.10, A graph to show the source type of the images the different groups chose as the least accurate portrayal of human evolution [QQ6]

The image in Figure 3.9 that the majority of questionnaire participants selected as the least accurate portrayal of human evolution is a still taken from the Claymation stop motion film *Early Man* (2018). The image depicts an animal fur clad male with his warthog companion using a spear to hunt a rabbit through a forest clearing. There are seven other individuals present within the image who are cheering him on in the background with clubs and weapons raised. These individuals are both male and female. The reasons given by respondents for the selection of this image, which can be found in Appendix 10, did not differ between the anthropology and media group with both expressing that the artistic stylisation of the image made it seem "a joke". The simple statement by many that the depiction was a cartoon seemed enough to justify it as inaccurate as the purpose of the image is "for entertainment".

The stylisation as opposed to the content of the image was the reason why so many of the respondents selected it as being inaccurate.

Respondents were further requested to express their opinions on all of the images through question 8 which asked them to identify any common themes between the images; the responses for which can be found in Appendix 11. Here respondents suggested that the images portrayed certain hominins "as lesser" than *Homo sapiens* through their depictions as "hunchback[ed], savage like, dark skinned, bearded", "hairy, aggressive, scarcely dressed, [and] largely male" beings. Whilst also highlighting how skin colour was used to project this notion with "the final person [being] white" for the evolutionary scale illustrations. They expressed that these factors are used to indicate "a clear scale from worst to best, showing the current state of humanity as our pinnacle". Many also highlighted the figures "all seem to be quite male" which one respondent expressed "implicitly says that evolution was driven by men and that somehow women just went along with it". The extent to which respondents addressed the issues of sexism, racism and progressionism were statistically tested in question 9 but despite many highlighting these notions not all saw problematic theming within the images. Many respondents chose only to comment on the "portray[al] of the hunter/gatherer lifestyle", that hominins "evolved in groups" and how they were seemingly under "competition for survival". Some even suggested that as "they're as [they] have seen previously", there wasn't much to comment on except their relatedness to other human evolutionary images available to the public.

The respondents' analysis of these images was also examined through question 9 which asked respondents to express their opinions concerning the portrayal of human diversity within the images. Statistical analysis was conducted on these responses with

particular focus given to the portrayal of race, gender diversity and the notion of progressionism within the human evolutionary images. This was split by group to investigate whether there was a statistical difference between the way in which respondents who interact with anthropology sources perceive the images than respondents who interact with purely non-academic sources. The full list of responses split by their interaction with anthropology can be seen in Appendix 12. It was hypothesised that the anthropology group would be more attuned to the issues present within the imagery than the media group due to their supposed familiarity with the human evolutionary narrative and the current discussion of issues such as these within the field (Goodrum, 2009). However, analysis showed that there were only a few statistical differences between the groups in some aspects of their diversity awareness.

The first analysis which can be seen in Figure 3.11 tested the percentage of respondents who found an issue with the portrayal of human diversity in the images from question 4 and 6. As can be seen from Figure 3.11, the majority of participants in both groups found issue yet, as hypothesised, a larger percentage of the anthropology group (79.1%) expressed this than the media group (53.1%). This difference was deemed statistically significant by a chi-square test of independence (X^2 (1) = 7.506[a], p = .006). However, although the anthropology group was found to be more aware of the presence of stereotypes with the imagery, further analysis suggested the groups were relatively equal in their observation of racial (Figure 3.13) and gender injustices (Figure 3.14) but not in their correction of linear depictions of evolution (Figure 3.12). As Figure 3.12 illustrates, the anthropology group (16.4%) was more receptive to the inaccuracies of a linear evolution and notions of progression than were the media group (4.2%). This difference was shown to be significant through a chi-square test of independence (X^2 (1) = 8.025[a], p = .005). The difference between

the groups was not significant with their reflection on the portrayal of ethnic inequality (X^2 (1) = 0.244[a], p= .622) and gender inequality (Not significant: X^2 (1) = 0.063[a], p = .802), as shown by chi-square tests of independence. This can also be observed in Figure 3.13, where there was only a 3.2% difference between the groups, and Figure 3.14, where there was only a 1.7% difference between the groups. However, when the observation of gender inequalities was split by participant gender a not by source groups (Figure 3.15), a significant difference was observed with more females than males noticing the androcentric nature of the images. This was shown to be significant through a chi-square test of independence: X^2 (1) = 3.921[a], p = .048. For this test respondents who identified as other were removed from the data set as their minimal numbers in comparison to the other two groups skewed the results of the chi-square test with the introduction of a third group.

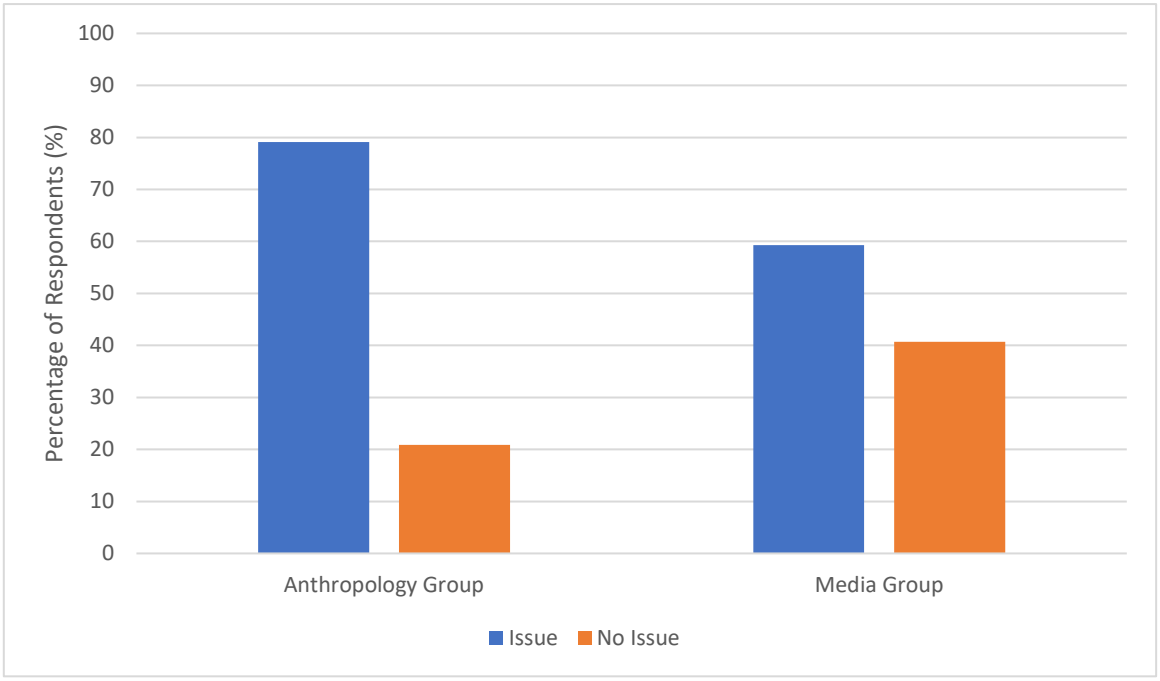


Figure 3.11, A graph to show the percentage of respondents from each group who found issue with the portrayal of human diversity in the question 4 and 6 images [QQ9]

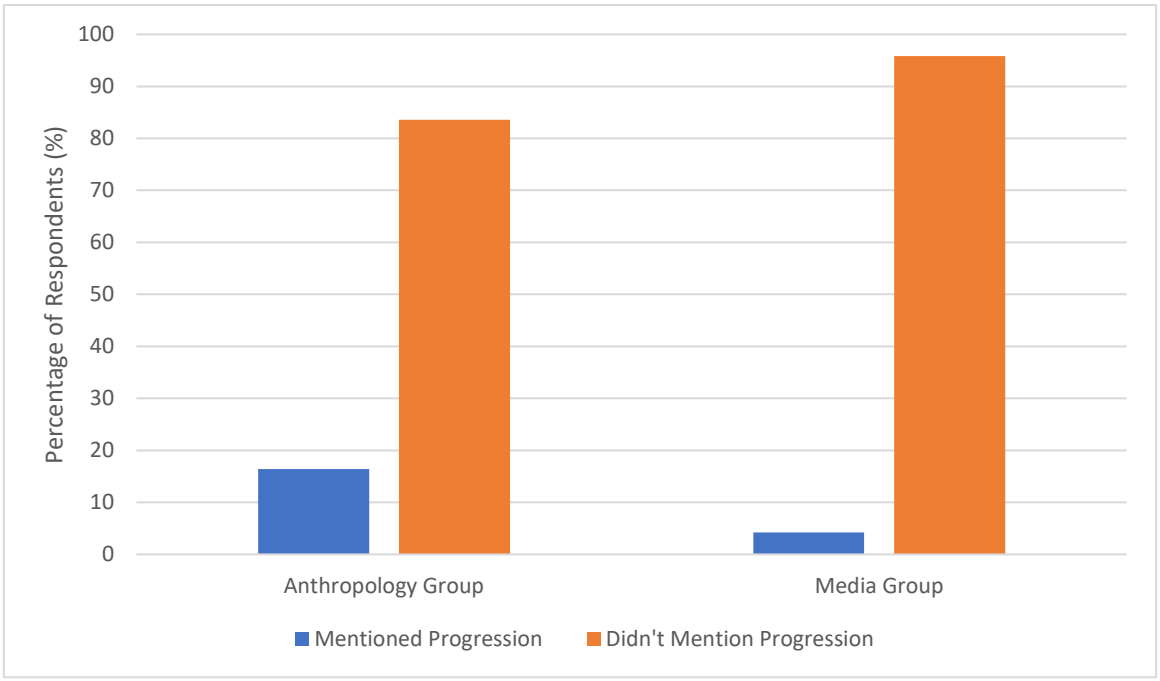


Figure 3.12, A graph to show the percentage of respondents from each group who found issue with the presentation of evolutionary progression in the question 4 and 6 images [QQ9]

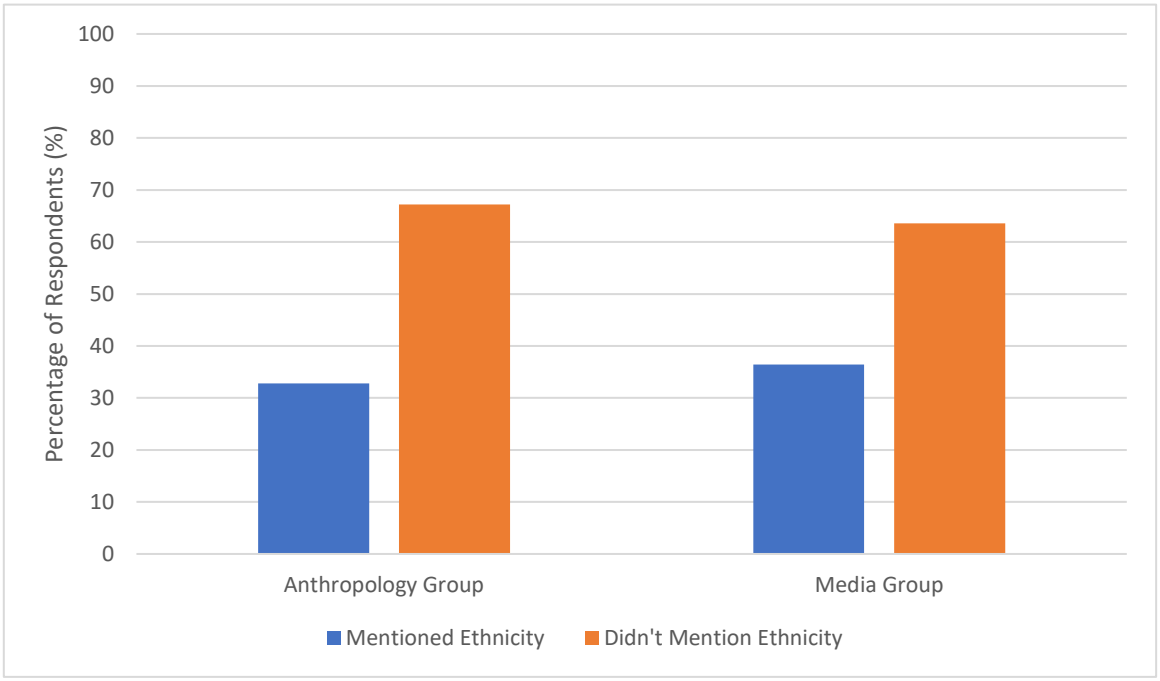


Figure 3.13, A graph to show the percentage of respondents from each group who found issue with the portrayal of race in the question 4 and 6 images [QQ9]

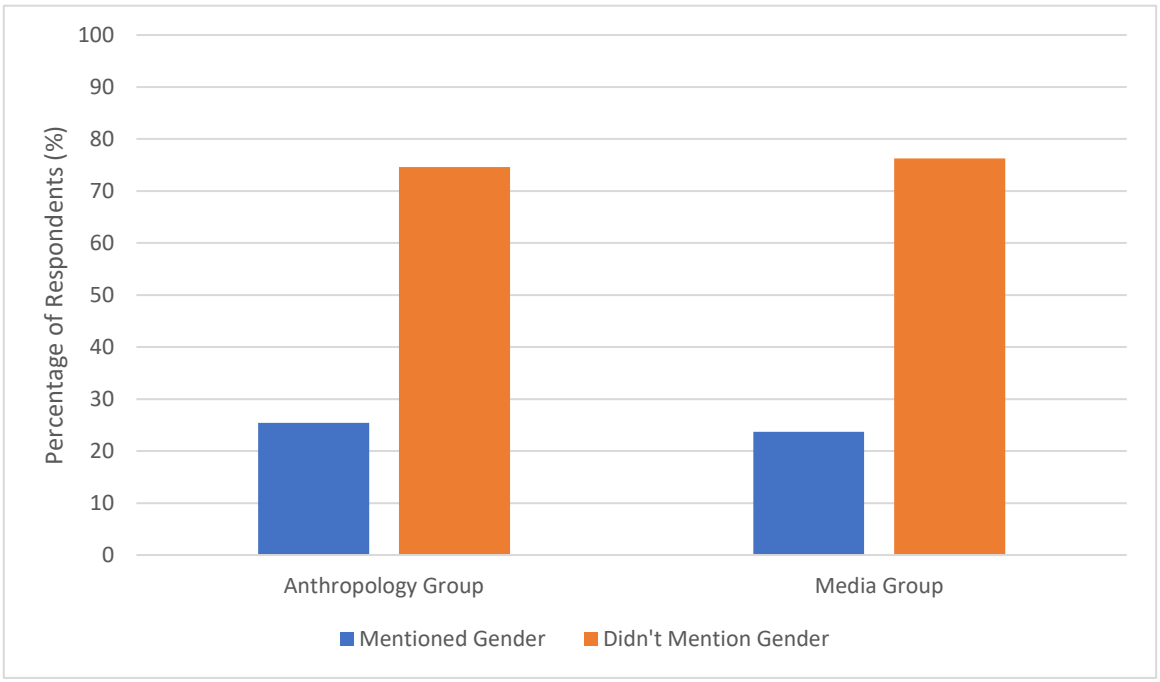


Figure 3.14, A graph to show the percentage of respondents from each group who found issue with the portrayal of gender diversity in the question 4 and 6 images [QQ9]

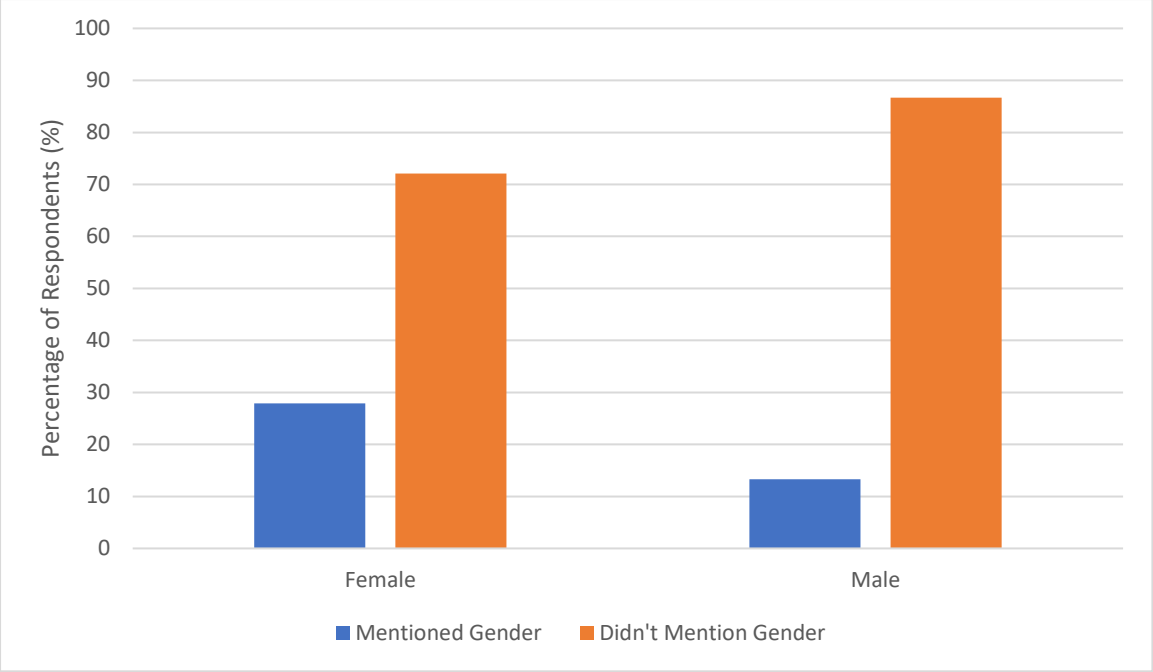


Figure 3.15, A graph to show the percentage of male and female respondents who found issue with the portrayal of gender diversity in the question 4 and 6 images [QQ9]

3.1.3 Portrayal of Neanderthals

Three of the questions within this questionnaire compared participants' personal perceptions of Neanderthals, between the anthropology group and the media group. It is hypothesised that those with a background in anthropological learning will be more likely to avoid common negative stereotypes and instead paint Neanderthals in a positive light. This trend was shown in the responses of question 10 which asked respondents to select which image looked 'more Neanderthal' to them between the two Neanderthal illustrations displayed in Figure 3.16. These images are the reconstructions created as part of an early 20th century theoretical argument between Boule and Keith on the interpretation of the La Chapelle-aux-Saints Neanderthal remains. Picture A, in Figure 3.16, is the reconstruction of Boule's work by Kupka and was used here as the negative image as to the image was created

to dissociate Neanderthals from anatomically modern humans and Picture B is the counter-image created by Keith that was used to express the similarities between Neanderthals and anatomically modern humans; this represents the positive image. Therefore, the expected trend would be for a greater percentage of the anthropology group to select the Keith image than the media group and a greater percentage of the media group to select the Kupka image than the anthropology; which Figure 3.17 shows was the case. 94.7% of anthropology respondents selected Picture B as looking the 'most Neanderthal' in comparison to 70.1% of the media group, with the other 29.9% of the media group selecting Picture A and only 5.3% of the anthropology group choosing this option. This difference was shown to be statistically significant through a chi-square test of independence (X^2 (1) = 17.916[a], p < .001) and thus the null hypothesis was rejected.

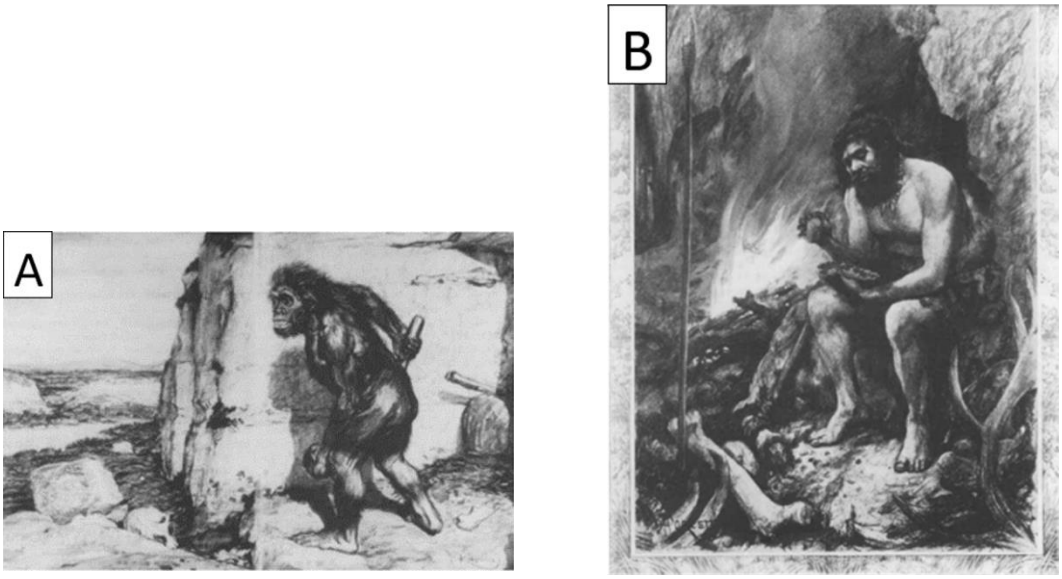


Figure 3.16, Images presented to participants in question 10 with Picture A representing the negative Neanderthal image (Kupka, 1909) and Picture B representing the positive Neanderthal image (Keith, 1911) [QQ10]

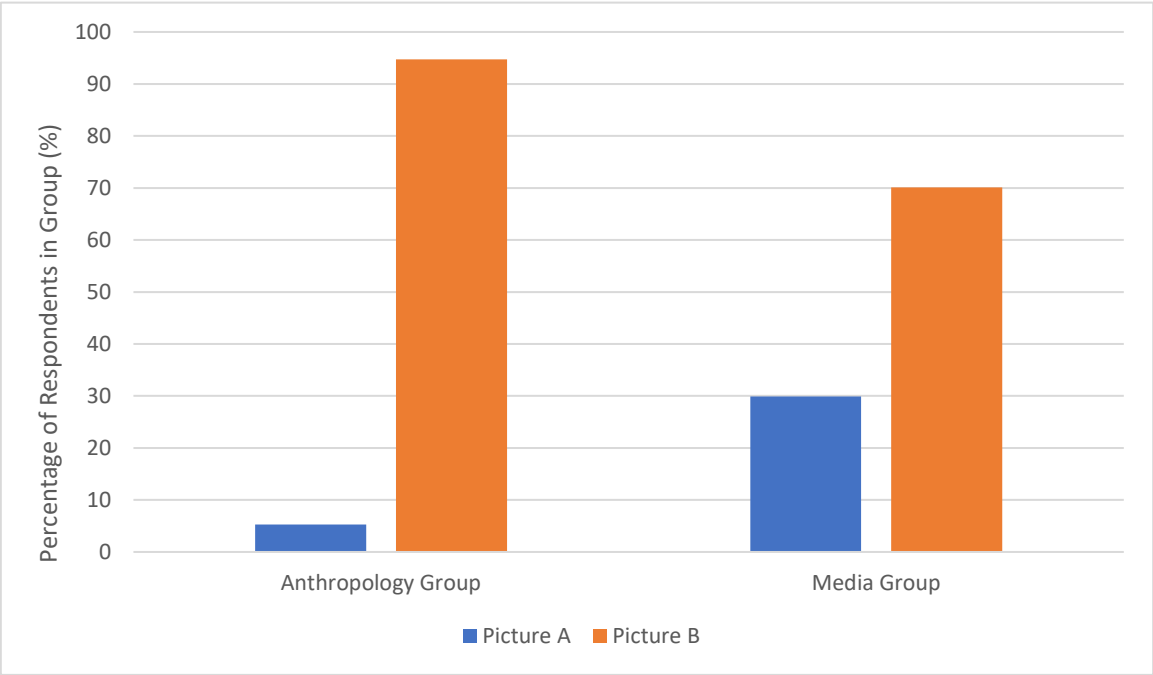


Figure 3.17, A graph to show the Neanderthal image chosen by each group [QQ10]

In line with the findings of question 10, it would be expected that the same trend would occur when respondents were presented with textual means to portray Neanderthals. Question 11 presented respondents with a list of twelve words, which can be seen in Table 2.1, that could be used to describe Neanderthals. There was an equal number of positive, neutral and negative terms available to choose from. In order for the same trend to be seen it would be expected that a greater percentage of anthropology students opt for the positive terms and a greater percentage of the media group opt for the negative terms. As can be seen in Figure 3.18, the anthropology group and the media group were similar in their selection of neutral terms (40.1% of anthropology group and 37.9% of media group) but diverged greatly in their selection of positive and negative terms. 45.4% of the anthropology group selected a positive term and only 12.8% of the media group selected a positive term. The remaining 49.3% of the media group selected a negative term, with only 14.5% of the anthropology

group selecting a negative word. This difference was deemed to statistically significant through a chi-square test of independence: X^2 (1) = 17.916[a], $p < .001$.

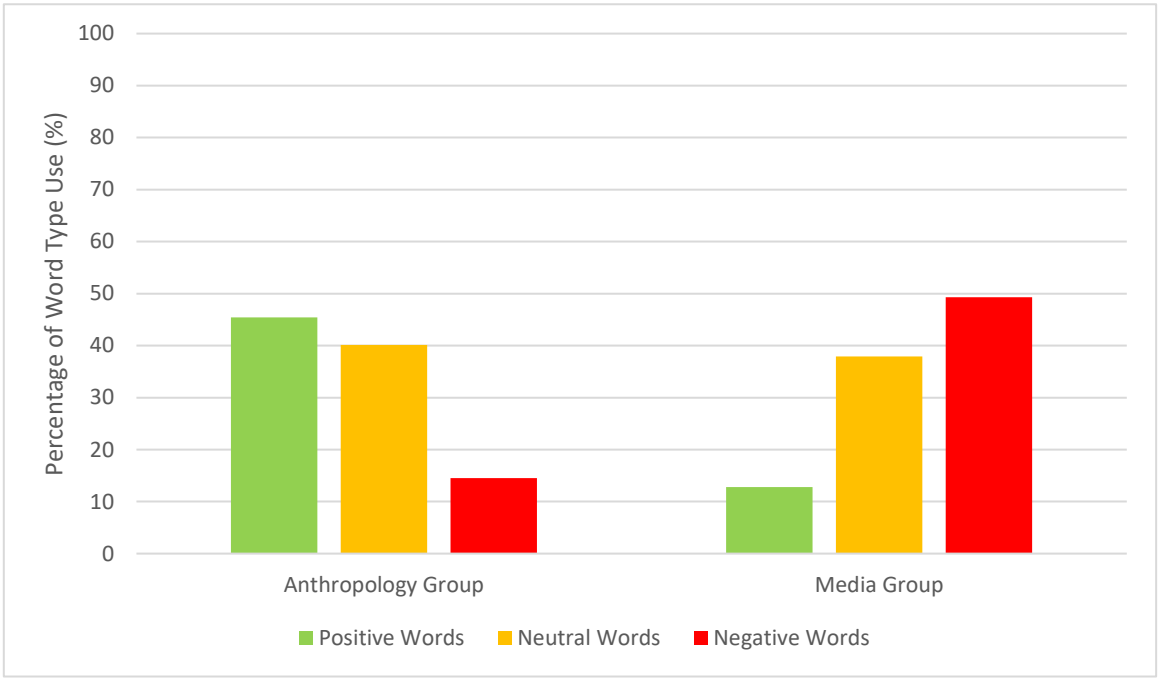


Figure 3.18, A graph to show the percentage of respondents from each group who selected positive, neutral and negative terms [QQ11]

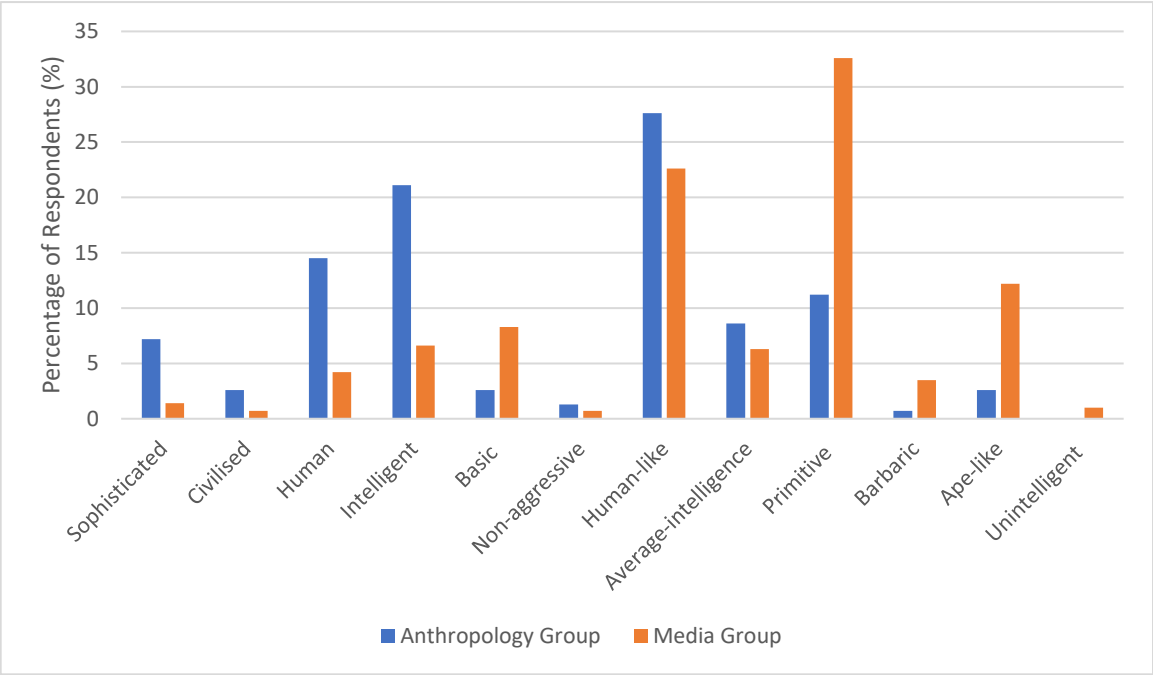


Figure 3.19, A graph to show the percentage of respondents from each group who selected each term [QQ11]

The specific terms each group selected can be seen in Figure 3.19. Figure 3.19 includes the 4 positive terms (sophisticated, civilised, human, intelligent), the 4 neutral terms (basic, non-aggressive, human-like, average-intelligence), and the 4 negative (primitive, barbaric, ape-like, unintelligent) terms in the order written here. For the anthropology group the most selected term was a neutral word, 'human-like' with 27.6% of respondents selecting this term. The two next highest selected terms for the anthropology group were both positive terms: 'human' and 'intelligent'. The least selected term for this group was 'unintelligent' with no anthropology students selecting this negative word. The most selected term for the media group was 'primitive' with 32.6% of the group selecting it; this word was also the most selected negative term of the anthropology group. The second most selected term for this group was 'human-like', which was the most selected neutral term for both groups. The least

selected for words of the media group were the neutral term 'non-aggressive' and the positive term 'civilised' with only 0.7% of the media respondents selecting these terms respectively.

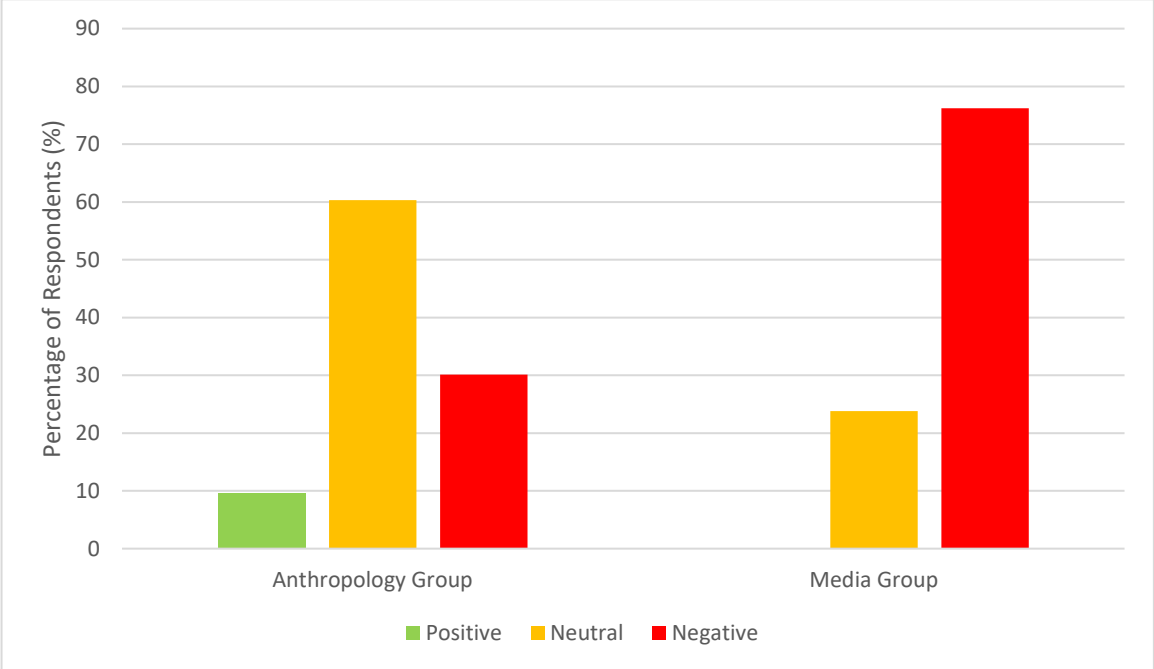


Figure 3.20, A graph to show the difference in word use between the anthropology and the media group when describing Neanderthals [QQ3]

The way in which the two groups describe Neanderthals without word prompts was also analysed through question 3 which asked respondents to describe what they felt a Neanderthal looked like in as much detail as possible. This question was positioned earlier within the questionnaire in order to maximise the amount of time respondents would take to answer the question and also to avoid being influenced from any of the source content included within the questionnaire. The descriptions given by respondents were categorised as positive, neutral or negative. The expected trend was for the anthropology group to make more positive descriptions than the media group who were expected to make more negative

descriptions. The results of the data can be viewed in Figure 3.20. As can be seen from the graph the anthropology group did provide more positive descriptions (9.6%) than the media group who gave no positive descriptions. Instead, as hypothesised, the media group provided more negative descriptions (76.2%) than the anthropology group did (30.1%). This difference was deemed to be statistically significant through a chi-square test of independence: X^2 (2) = 45.142[a], $p < .001$. This result complements the data seen in Figure 3.17 and Figure 3.18 as the anthropology group provided more positive descriptions, selected more positive terms and chose a more positive image with the media group contrastingly selecting options that express more negative stereotypes. However, the anthropology group did make more negative statements than they did positive statements. The majority of the anthropology group also remained neutral with 60.3% utilising neither positive or negative descriptive terms. As can be seen in Appendix 5, the majority of the anthropology statements were factual rather than opinionated, focusing on the skeletal structure of the species as opposed to behaviours and more ambiguous physical attributes.

3.2 Experiment

3.2.1 Priming Task

The stereotyped and non-stereotyped groups differed in their agreement of four out of the fifteen statements; the first being for the statement 'Neanderthals were intelligent'. As can be seen in Figure 3.21, participants with a non-stereotyped prime expressed more agreement with the statement than respondents who were given a stereotyped prime, however, there was not a momentous difference between visual and textual sources. This statement was shown to be statistically significant when split by primes through a Kruskal-

Wallis test (H (3) = 12.469, p = .006), with a Dunn Bonferroni post hoc test showing particular significance between the non-stereotyped image and the stereotyped text. Although the format of the significant primes is different, Figure 3.21 illustrates the overarching contributing factor in this case seems to be the nature of the stereotypes.

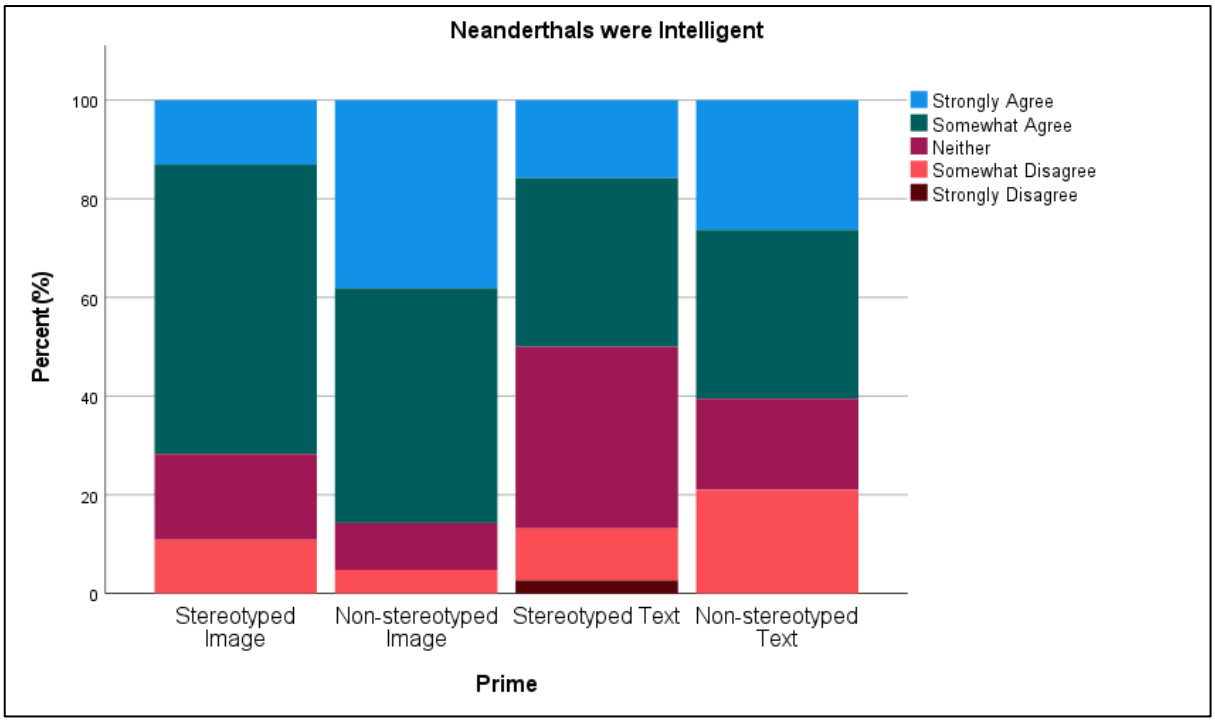


Figure 3.21, A graph to show the opinions of respondents from different prime groups in regard to the statement 'Neanderthals were intelligent' [EQ1]

The second statement to create a significant divide between the prime groups was 'Neanderthals were hairy'. This statement, unlike 'Neanderthals were intelligent', relates directly to the given primes as whilst certain traits can be inferred or interpreted the extend of Neanderthal hairiness was explicitly included within the primes. The non-stereotyped primes suggested that Neanderthals were not very hairy, and the stereotyped primes suggested that they were covered in body hair. As Figure 3.22 shows, there is a difference

between the primes in terms of the extent of agreement with the statement. However, the majority of respondents for all of the primes seemed to either agree with the statement or express no opinion ('neither') yet Figure 3.22 shows that respondents who were given the stereotyped image prime and the stereotyped text prime expressed a stronger level of agreement. Those with the stereotyped text showed the greatest level of agreement with the statement. This data was deemed statistically significant through a Kruskal-Wallis test: H (3) = 22.023, $p < .001$. A post hoc test showed that there was particular significance between the stereotyped text and the non-stereotyped image as well as between the stereotyped image and the non-stereotyped text.

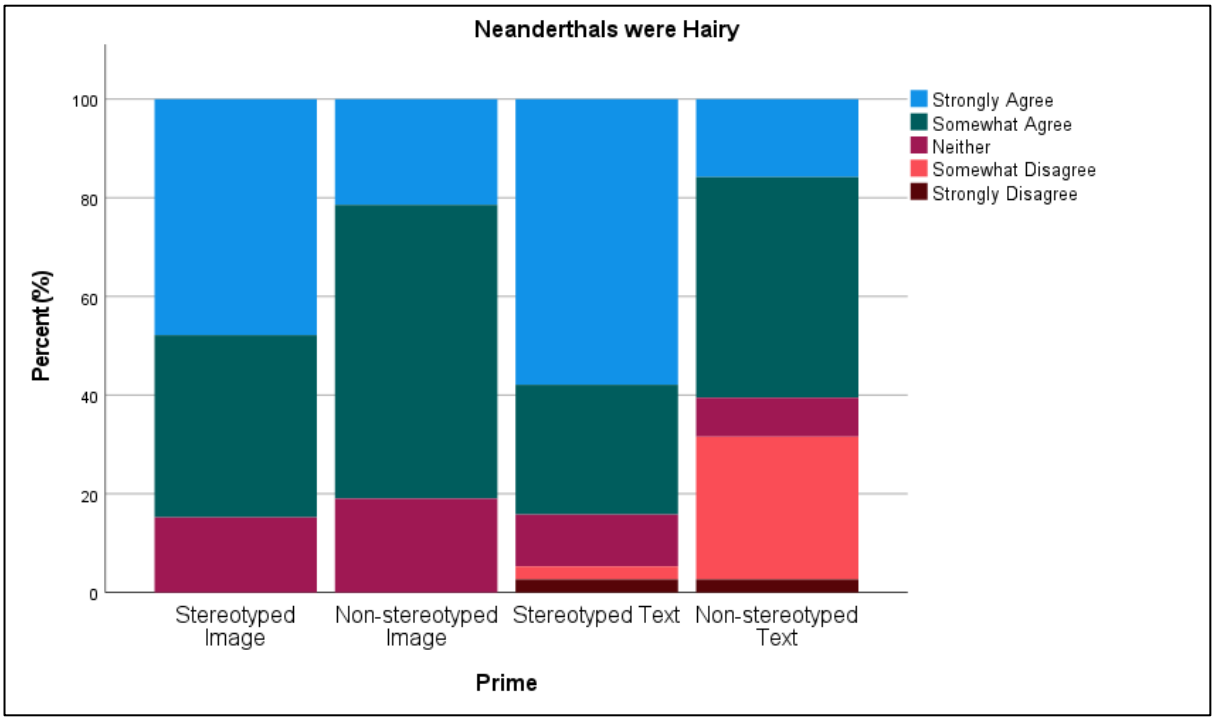


Figure 3.22, A graph to show the opinions of respondents from different prime groups in regard to the statement 'Neanderthals were hairy' [EQ1]

The third statement to show a statistical significance between the primes was 'Neanderthals wore clothing'. Similar to the level of Neanderthal hairiness, the presence of clothing was also explicitly mentioned within the primes. The stereotyped primes showed a naked Neanderthal and the non-stereotyped primes featured a Neanderthal dressed in animal furs. The results of this data can be seen in Figure 3.23. As the graph suggests there was a higher level of agreement with the statement from respondents who received a non-stereotyped prime than respondents who received a stereotyped prime. Within the respondents who received a non-stereotyped prime, those who had their prime presented in a textual format expressed stronger levels of agreement than those who had their prime in an image format. Additionally, respondents who received image primes expressed more ambiguity in their selection; particularly those with the stereotyped image who expressed much higher levels of uncertainty by selecting the option 'neither' than those who had the adjacent stereotyped text. This data was shown to be significant (H (3) = 3.949, $p < .001$) with a Dunn Bonferroni test highlighting particular significance between the non- stereotyped text and the stereotyped text, the non-stereotyped text and the stereotyped image, the non-stereotyped image and the stereotyped text, and the non-stereotyped image and the stereotyped image.

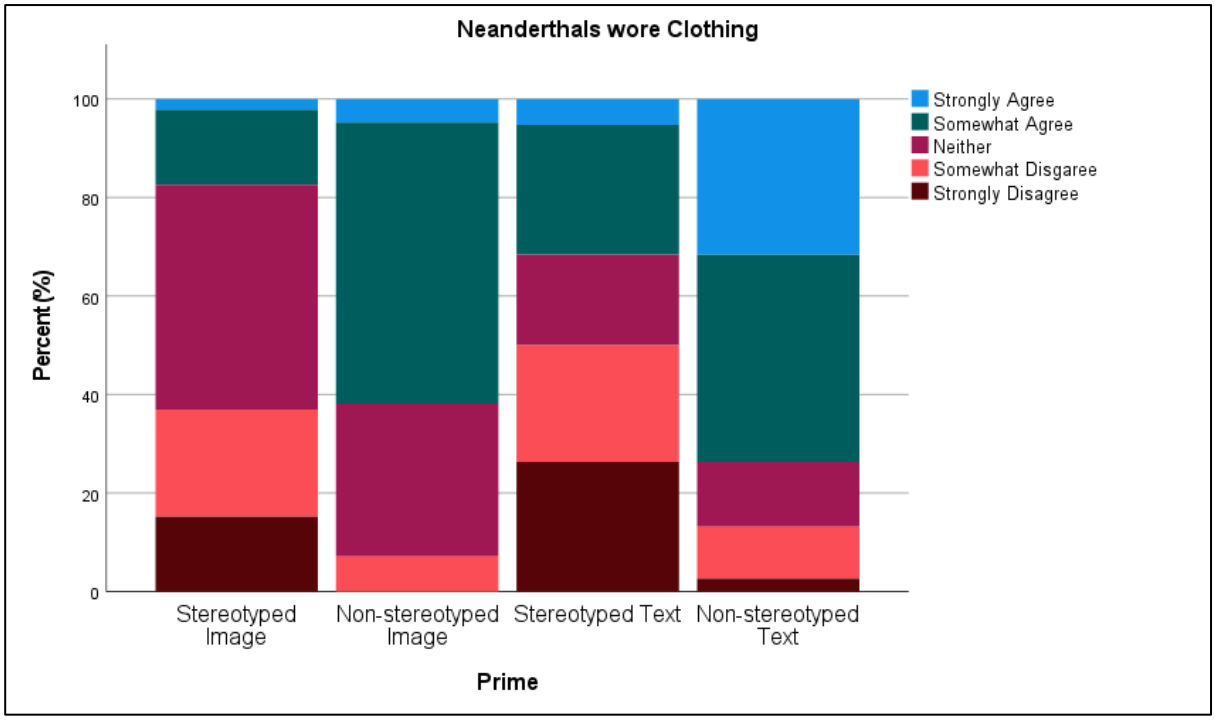


Figure 3.23, A graph to show the opinions of respondents from different prime groups in regard to the statement 'Neanderthals wore clothing' [EQ1]

The final statement to show a statistical difference between the primes was 'Neanderthals were ape-like'. As Figure 3.24 shows there was a higher degree of agreement for the statement from participants who had received a stereotyped prime than from participants who had received a non-stereotyped prime. The respondents with the stereotyped image in particular showed a great degree of agreement with the statement with more participants selecting both 'agree' and 'strongly agree' from this primed condition. This data was shown to be significant (H (3) = 13.691, p = .003) with a particular significance found between the stereotyped image and the non-stereotyped text as well as a significance between the stereotyped image and the non-stereotyped image. The statistical results of the

statements within the experiment that did not show a significant difference between the prime conditions when analysed through a Kruskal-Wallis test can be viewed in Table 3.1.

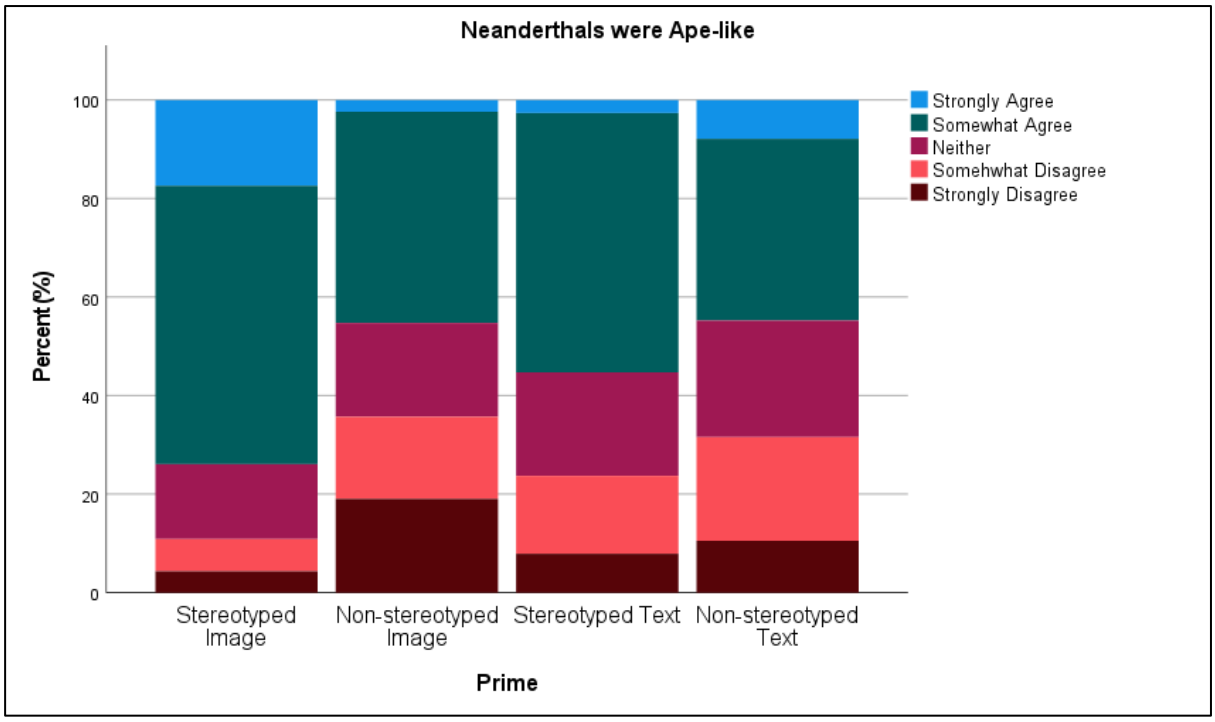


Figure 3.24, A graph to show the opinions of respondents from different prime groups in regard to the statement 'Neanderthals were ape-like' [EQ1]

STATEMENT	KRUSKAL-WALLIS TEST RESULT
Neanderthals has culture	*H* (3) = 6.791, *p* = .079
Neanderthals were sophisticated	*H* (3) = 0.999, *p* = .801
Neanderthals were primitive	*H* (3) = 2.964, *p* = .397
Neanderthals were vicious	*H* (3) = 0.039, *p* = .998
Neanderthals were human-like	*H* (3) = 3.151, *p* = .369
Neanderthals were cannibals	*H* (3) = 2.623, *p* = 0.453
Neanderthals were savage	*H* (3) = 0.656, *p* = .884
Neanderthals were barbaric	*H* (3) = 1.464, *p* = .691
Neanderthals were moral	*H* (3) = 1.576, *p* = .665
Neanderthals made tools	*H* (3) = 6.207, *p* = .102

Table 3.1, A table to show the Kruskal-Wallis test results that were not significant from the experiment statements when split by primed conditions [EQ1]

As the priming task only proved impactful on four statements, the data was also split by participant engagement with anthropology in order to assess whether this was hindering the effectiveness of the primes. When split in this manner there was a greater level of statistical significance shown, with people's preconceptions and prior knowledge seemingly having a bigger impact on the outcome of the data than the priming task. There was a statistical significance found with six of the statements; the first being 'Neanderthals were hairy'. This data for this statement can be seen in Figure 3.25. In this graph, as in the others of this nature, 'yes' signifies the anthropology group and 'no', signifies the media group. The data from Figure 3.25 is comparable to that of 3.20 which assesses the same statement. Both of these graphs illustrate that the majority of research participants agreed with the statement

that Neanderthals were hairy; however, there was a greater proportion and stronger agreement for the statement amongst the media group than the anthropology group. This difference was deemed significant by a chi-square test of independence (X^2 (4) = 13.291[a], p = .01).

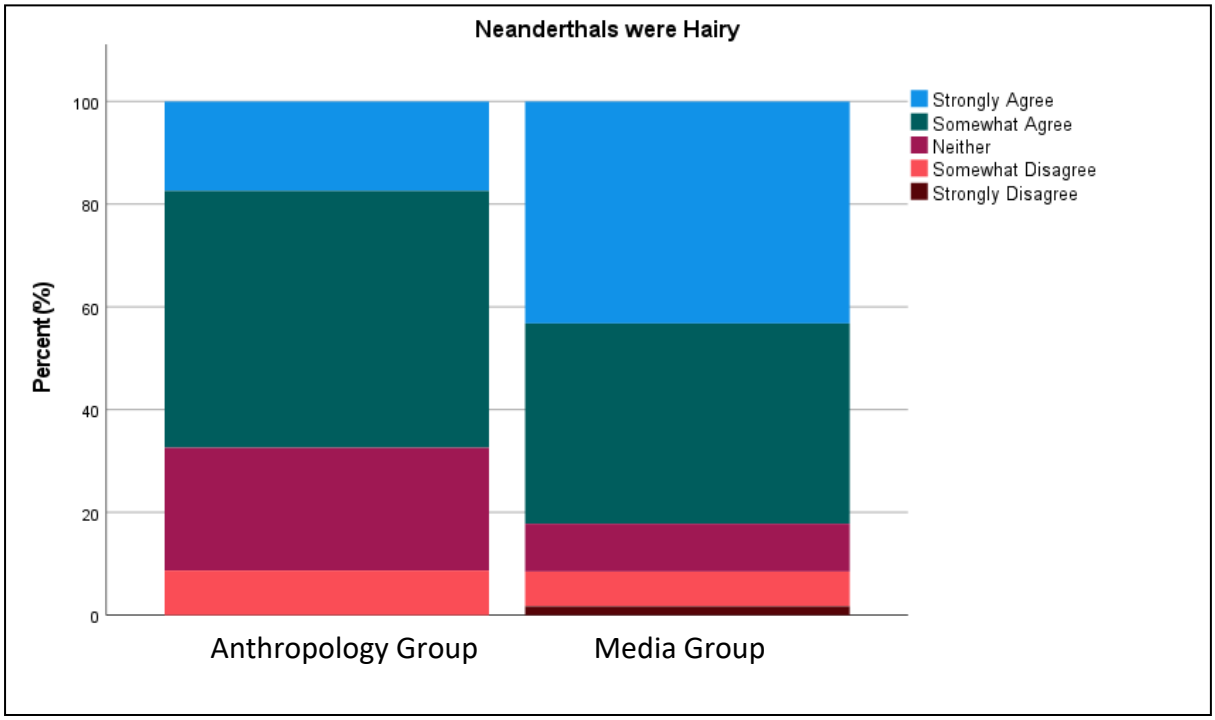


Figure 3.25, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals were hairy' [EQ1]

The next statement that was statistically significant when split by anthropological engagement was 'Neanderthal had culture'. As can be seen from Figure 3.26, the expected result occurred with more of the anthropology group agreeing with the statement than the media group. This was deemed significant through a chi-square test of independence: X^2 (3) = 20.942[a], p < .001. The statement 'Neanderthals were primitive' also showed a statistically difference between the two groups, which may be expected from the likes of the

questionnaire data seen in Figure 3.19 where the media group selected 'primitive' as there most used Neanderthal description. As can be seen in Figure 3.27, a greater percentage of the media group agreed with this statement with majority of the anthropology group expressing no opinion or disagreement. This was deemed to be statistically significant through a chi-square test of independence: X^2 (4) = 17.165[a], p = .002. It is not surprising therefore that a synonym of this statement, 'Neanderthals were savage', was also deemed statistically significant through a chi-square test of independence: X^2 (4) = 12.643[a], p = .013. However, although this still followed the trend that the media group showed more agreement with the negative statement than the anthropology group there is a divergence in the extent to which participants agreed with the term 'primitive' and the term 'savage'. This can be seen when comparing Figure 3.27 with Figure 3.28. There was a far greater level of disagreement and uncertainty for the 'savage' statement than the 'primitive' statement despite the words having similar meanings. It is additionally interesting to note that this was also the case for other synonyms of primitive such as barbaric that were tested (Figure 3.34).

The 'Neanderthals were ape-like' was deemed to be statistically significant when split by anthropological engagement with a chi-square test of independence (X^2 (4) = 15.321[a], p = .004). It is interesting to note that this as deemed significant when there was no statistical difference found between the groups for the statement 'Neanderthals were human-like' (see Figure 3.30). As can be seen in Figure 3.29, a greater percentage of the media group expressed their agreement with the statement that Neanderthals were ape-like than did the anthropology group. The final statement to be deemed statistically significant when split by anthropological engagement was 'Neanderthals wore clothing', however, not in the expected direction. As Figure 3.31 illustrates, there was a greater level of agreement for the statement amongst the media group with almost half of the anthropology group selecting the option

'neither'. This result was shown to be statistically significant through a chi-square test of independence: X^2 (4) = 13.228[a], p = .010. The statistical results of the statements within the experiment that did not show a significant difference between the anthropology group and the media group when analysed through a chi-square test of independence can be viewed in Table 3.2.

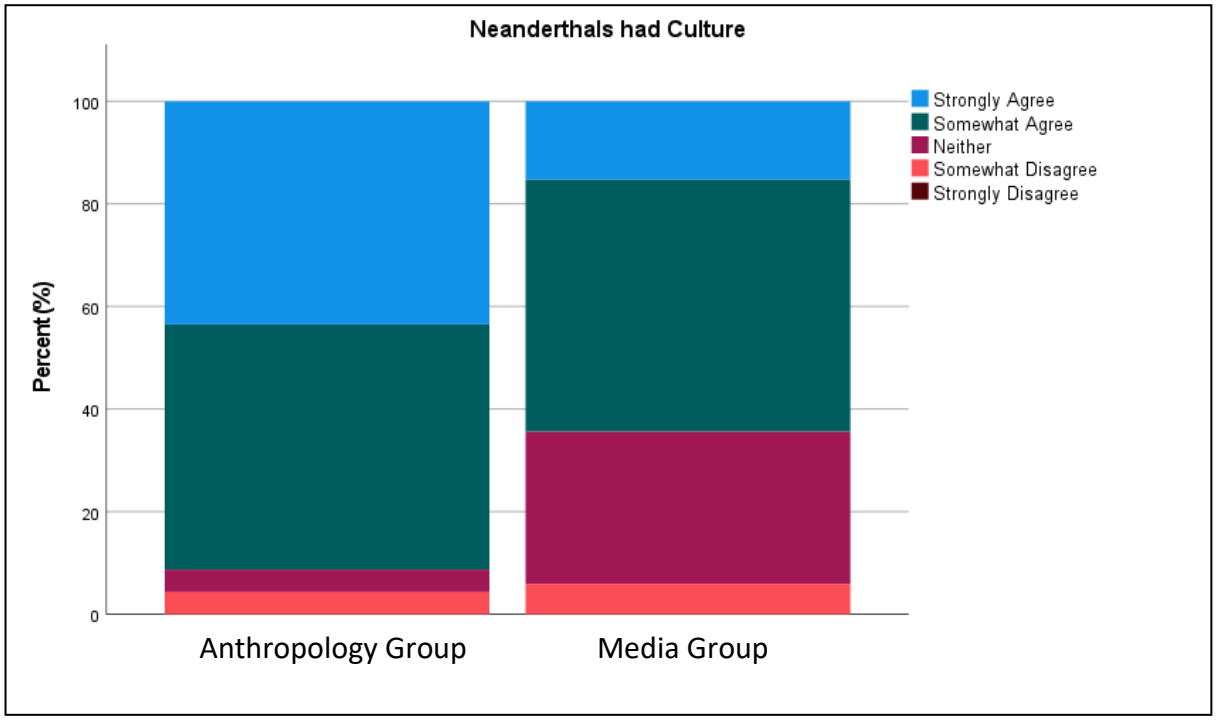


Figure 3.26, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals had culture' [EQ1]

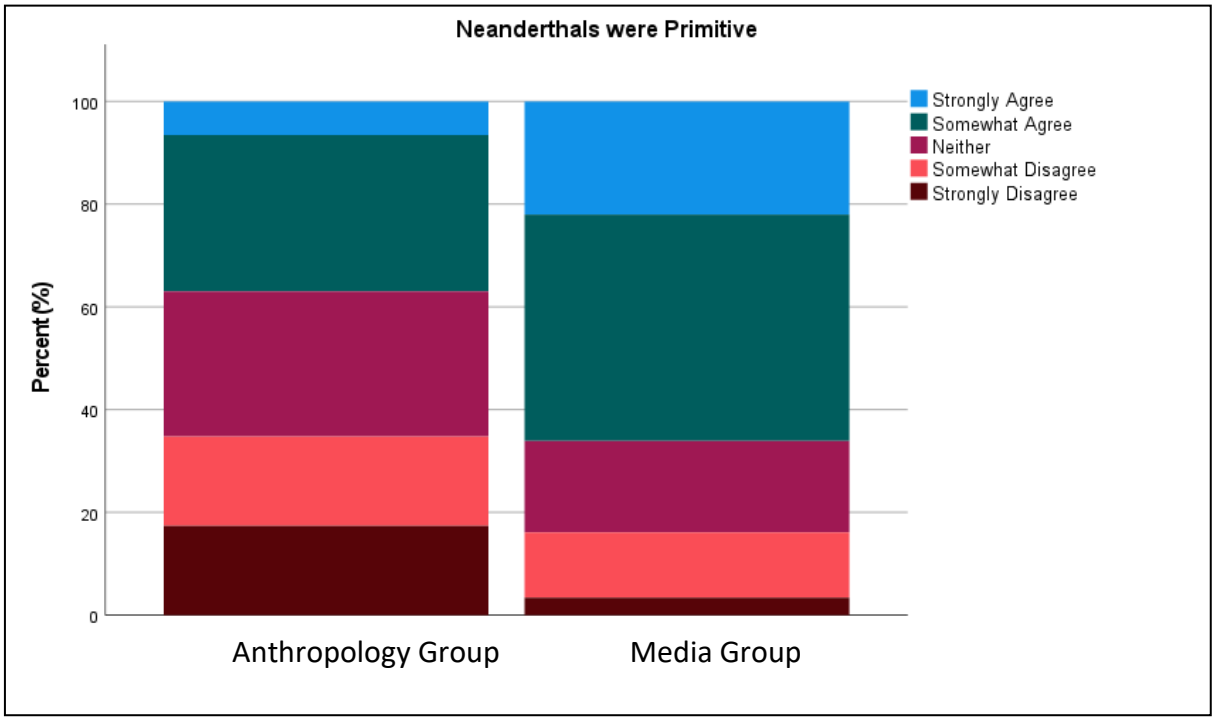


Figure 3.27, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals were primitive' [EQ1]

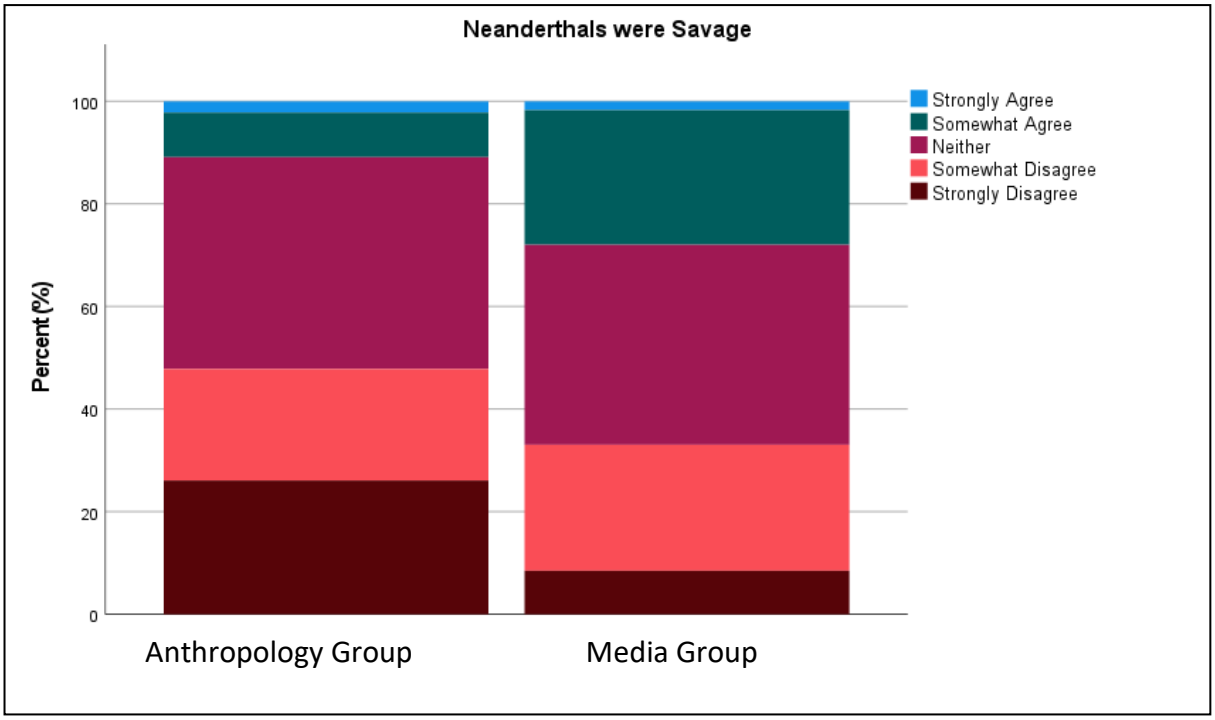


Figure 3.28, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals were savage' [EQ1]

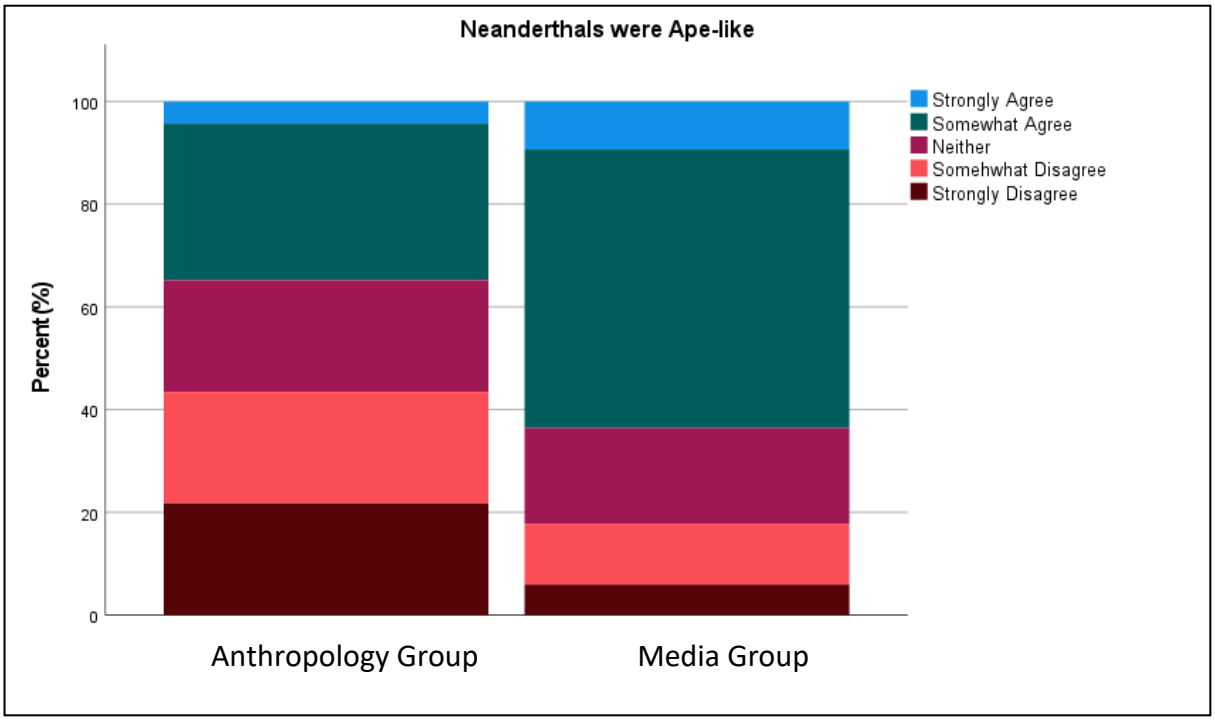


Figure 3.29, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals were ape-like' [EQ1]

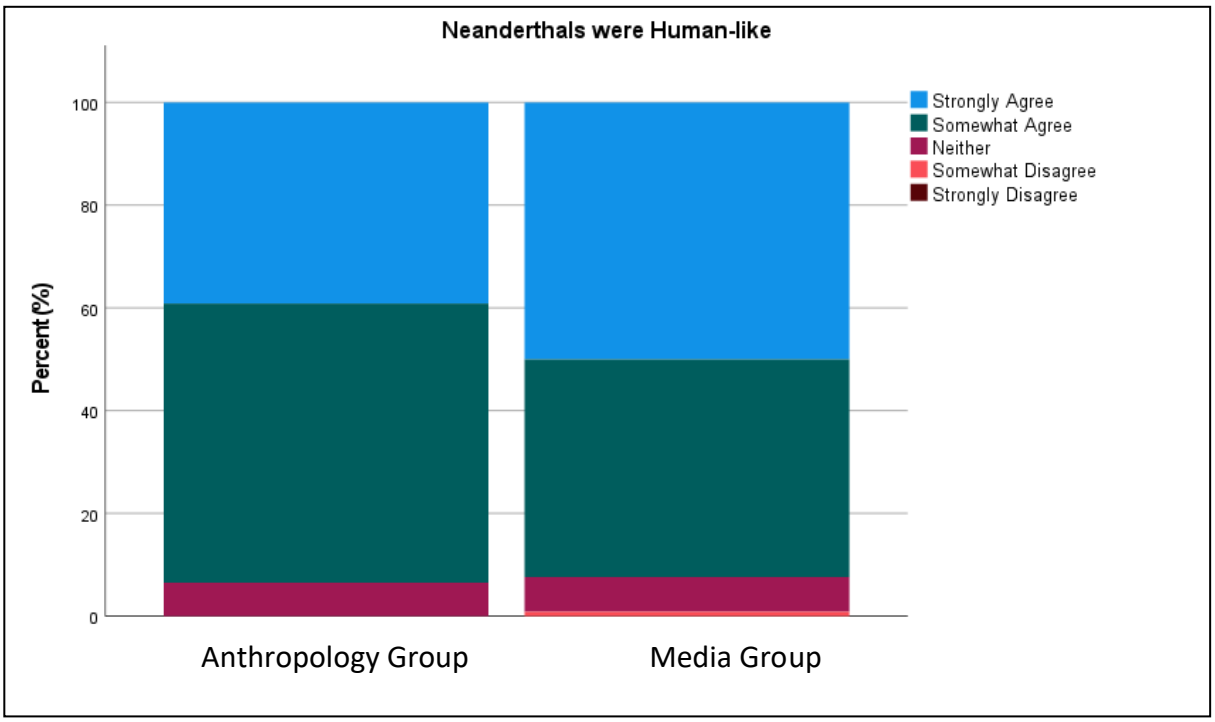


Figure 3.30, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals were human-like' [EQ1]

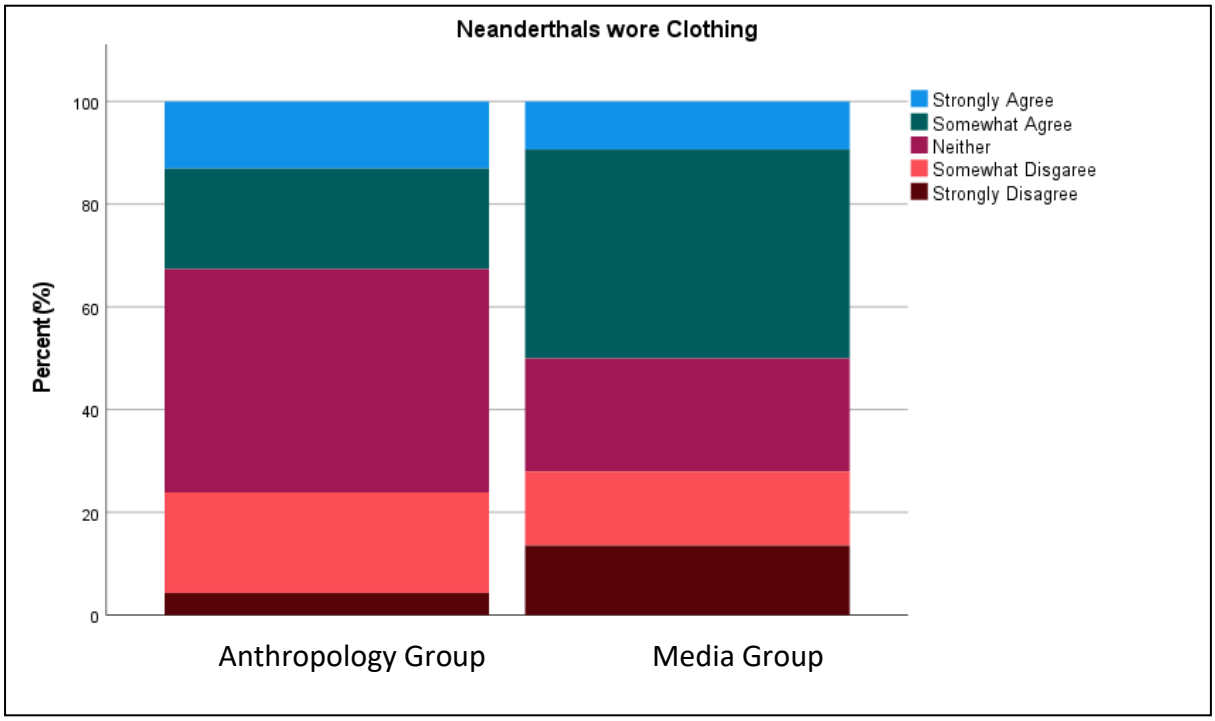


Figure 3.31, A graph to show the opinions of respondents from the anthropology group and the media group in regard to the statement 'Neanderthals wore clothing' [EQ1]

STATEMENT	CHI-SQUARE TEST OF INDEPENDENCE RESULT
Neanderthals were intelligent	X^2 (4) = 8.530[a], p = .074
Neanderthals were sophisticated	X^2 (4) = 7.641[a], p = .106
Neanderthals were vicious	X^2 (4) = 9.404[a], p = .052
Neanderthals were humanlike	X^2 (3) = 2.264[a], p = .519
Neanderthals were cannibals	X^2 (4) = 7.132[a], p = .129
Neanderthals were civilised	X^2 (4) = 8.689[a], p = .069
Neanderthals were barbaric	X^2 (3) = 4.936[a], p = .177
Neanderthals were moral	X^2 (4) = 5.972[a], p = .201
Neanderthals made tools	X^2 (3) = 1.557[a], p = .669

Table 3.2, A table to show the chi-square test results that were not significant from the experiment statements when split by anthropological engagement [EQ1]

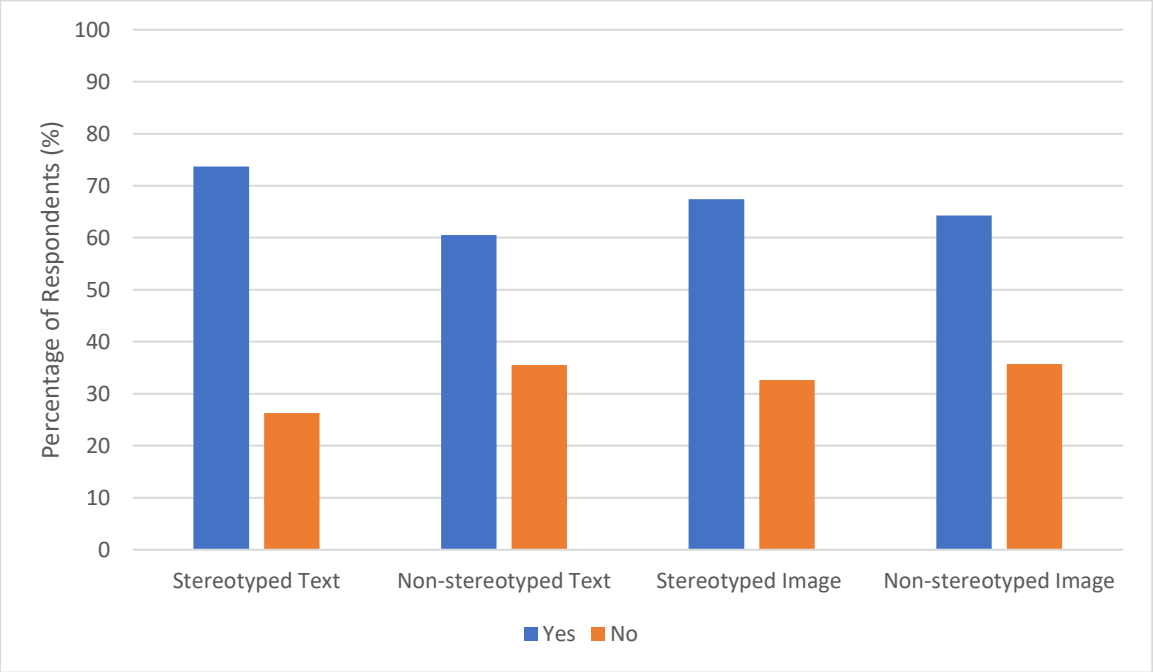


Figure 3.32, A graph to show whether the priming task had an effect on participants' beliefs that *Homo sapiens* directly descended from Neanderthals [EQ2]

Following on from the statements, question 2 of the priming task asked participants if they believed *Homo sapiens* descended from Neanderthals. Figure 3.32 is a graph of the question data when split by the prime respondents interacted with. As can be seen from the graph, the responses given by each prime group were very similar. The majority of participants expressed that they though that Neanderthals were ancestral to anatomically modern humans with 73.7% of the stereotyped text group saying 'yes' to the question along with 60.5% of the non-stereotyped text group, 67.4% of the stereotyped image group, and 64.3% of the non-stereotyped image group. As there was no drastic difference between the prime groups, a chi-square test of independence deemed the effectiveness of the primes to be statistically nonsignificant (X^2 (3) = 1.597[a], p = .660) in this case. However, when this data was alternatively split by anthropological engagement the results suggested that this had more of an influence than the priming task. As can be seen in Figure 3.33, the groups were not homogenous in their expression with a high percentage (63%) of the anthropology group stating that *Homo sapiens* did not descend from Neanderthals. Contrastingly the majority of the media group (78%) believed that there was a linear line of descent between the species.

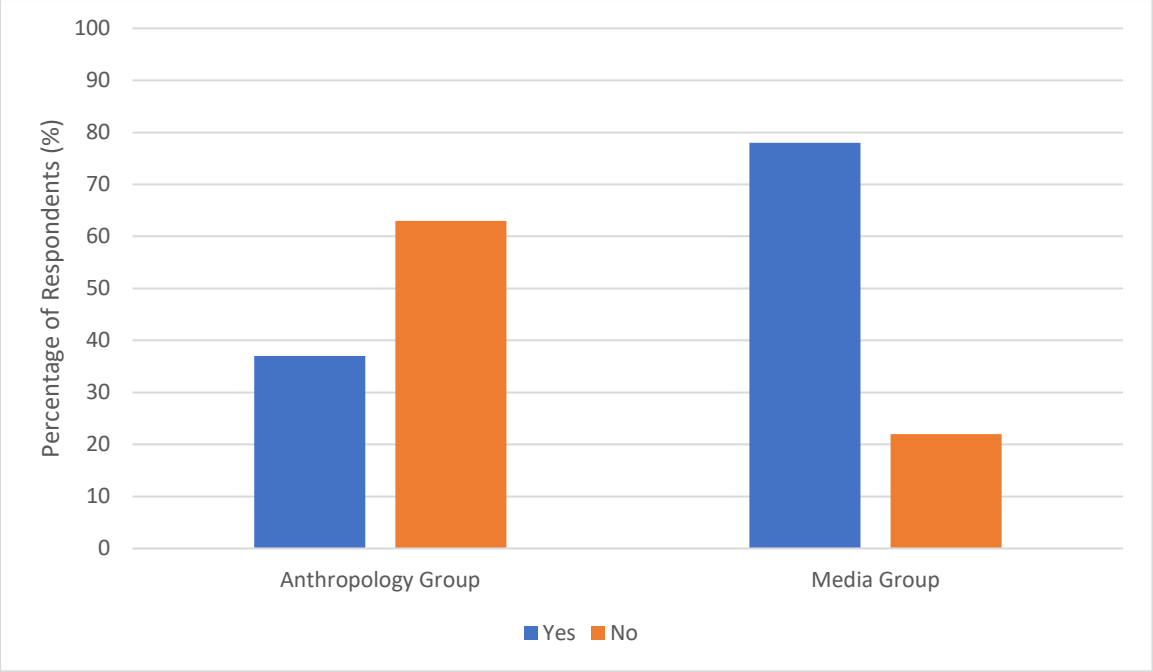


Figure 3.33, A graph to show whether the anthropological engagement of participants had an effect on their beliefs that *Homo sapiens* directly descended from Neanderthals [EQ2]

This trend was not discovered within the question 3 data which proved statistically nonsignificant when split by the primes and anthropological engagement. The split of the data by the primes can be seen in Figure 3.34. As the graph illustrates, the majority of participants in each group expressed a neutral reaction to having 5% Neanderthal DNA (68.4% of stereotyped text, 63.2% of non-stereotyped text, 54.3% of stereotyped image, and 59.5% of non-stereotyped image). Only a small percentage of each group expressed a negative reaction with only 2.6% of stereotyped text respondents, 7.9% of non-stereotyped text respondents, 4.3% of stereotyped image respondents and 2.4% of non-stereotyped image respondents suggesting that this would be undesirable. There was a greater percentage of respondents in both image groups who expressed a positive reaction in comparison to the textual prime groups, yet this was not deemed statistically significant through a chi-square test of

independence (X^2 (6) = 3.922[a], p = .687). A chi-square of independence also showed that this data was not significant when split by anthropological engagement (X^2 (2) = 2.213[a], p = .331), as Figure 3.35 shows. Although the anthropology group did express a more positive reaction (43.5%) than the media group (31.4%) as expected. Participants expressed in question 4 (see Appendix 13 for full responses) that this positive reaction was due to the notion being both "fascinating" and "interesting" yet other participants contrastingly felt it would be undesirable to be related as such due to the "primitive and negative connotations surrounding Neanderthals". One participant demonstrated that much of this negativity is due to a lack of education on the subject as they posed that as "it's a different species, it would be like coming back 5% chimpanzee. Not a positive thing". The majority of respondents however were unphased by the outcome and felt that having 5% Neanderthal DNA wasn't positive or negative as "doesn't really affect the way [they] live today".

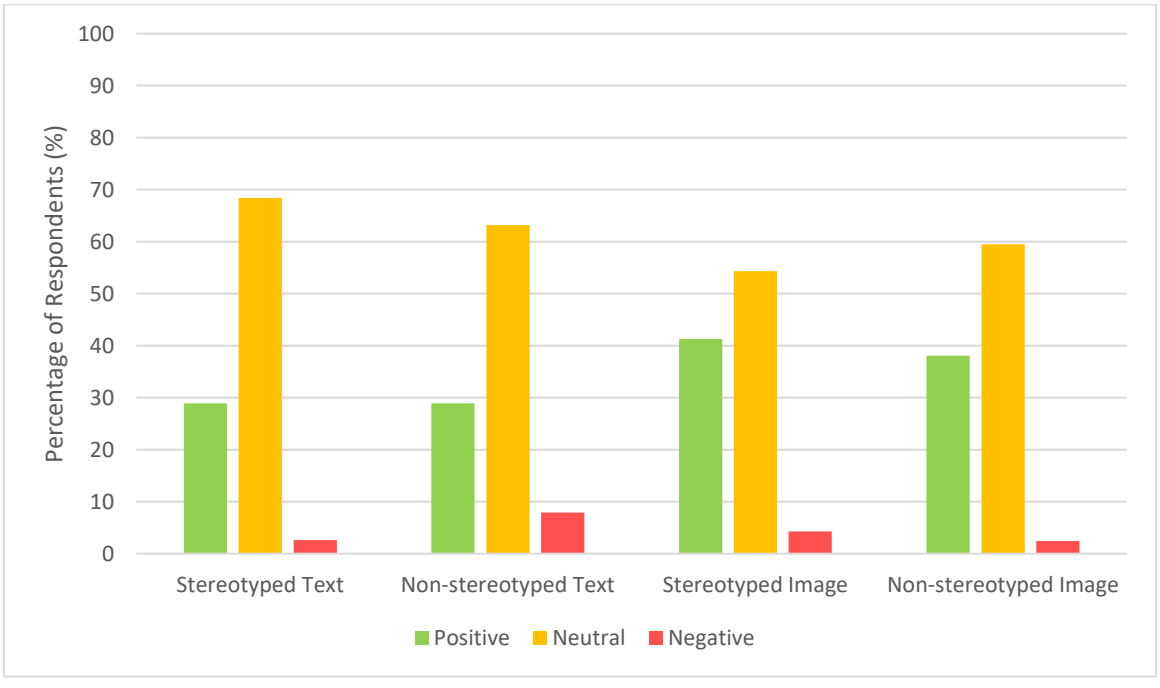


Figure 3.34, A graph to show whether the priming task had an effect on the participants' reactions to having 5% Neanderthal DNA [EQ3]

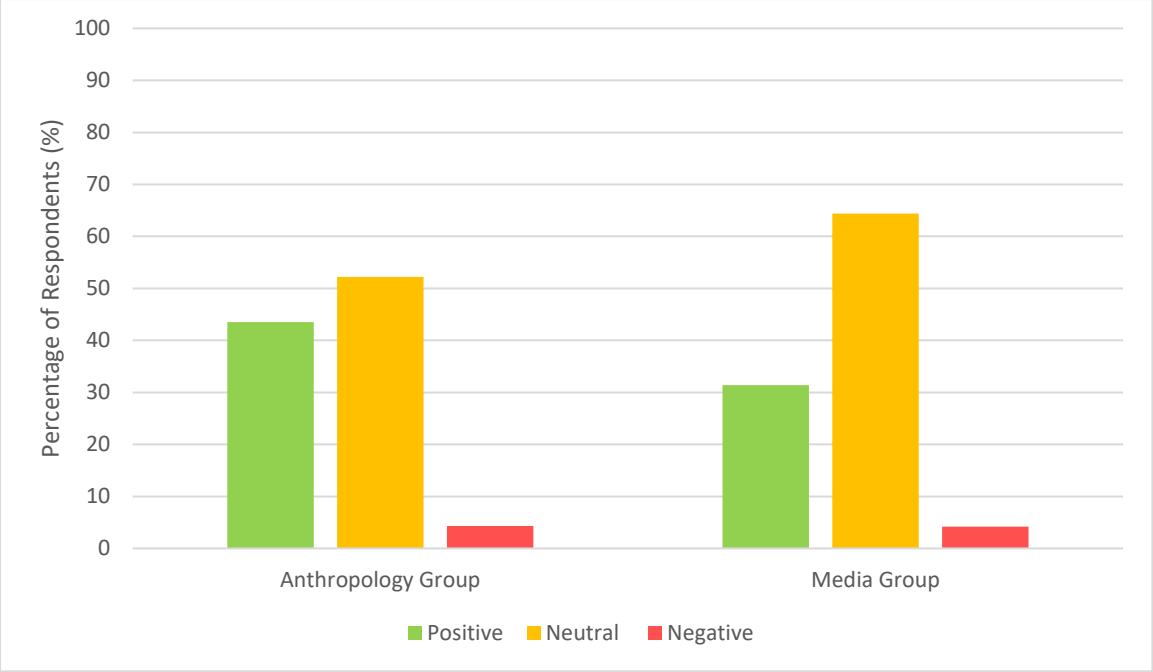


Figure 3.35, A graph to show whether the anthropological engagement of participants had an effect on their reaction to having 5% Neanderthal DNA [EQ3]

Question 5 asked participants what their reaction would be to the phrase 'you're such a Neanderthal'. When split by the prime groups, the data was found to be nonsignificant through a chi-square test of independence (X^2 (6) = 6.055[a], p = .417). This data can be seen in Figure 3.36. As Figure 3.36 shows, the majority of participants reacted negatively to the statement with 76.3% of the stereotyped text group, 50% of the non-stereotyped text group, 65.2% of the stereotyped image group and 61.9% of the non-stereotyped image group finding the statement to be negatively charged. The number of respondents in each group who reacted positively to the phrase was minimal. Those who had received a non-stereotyped prime reacted marginally more positively overall to the phrase than those who received a stereotyped prime, but the difference was nonsignificant. The data was also nonsignificant when split by anthropological engagement as Figure 3.37 illustrates. The reactions between

the anthropology group and the media group were extremely similar with only a 2.5% difference between the percentage of negative responses and a 0.3% between the percentage of positive responses. This was deemed very nonsignificant by a chi-square test of independence: X^2 (2) = 0.095[a], p = .953. When asked in question 6 (see Appendix 14 for full responses) why they felt this way about the phrase 'you're such a Neanderthal' many participants expressed that the phrase was insulting and used to indicate that the receiver was "stupid", "primitive", "unintelligent", "uncultured", "barbaric", "unsophisticated", "ugly", "uncouth", "aggressive" or "old". Others who suggested that the statement was positive however said that they "do not believe Neanderthals were primitive and would not be insulted".

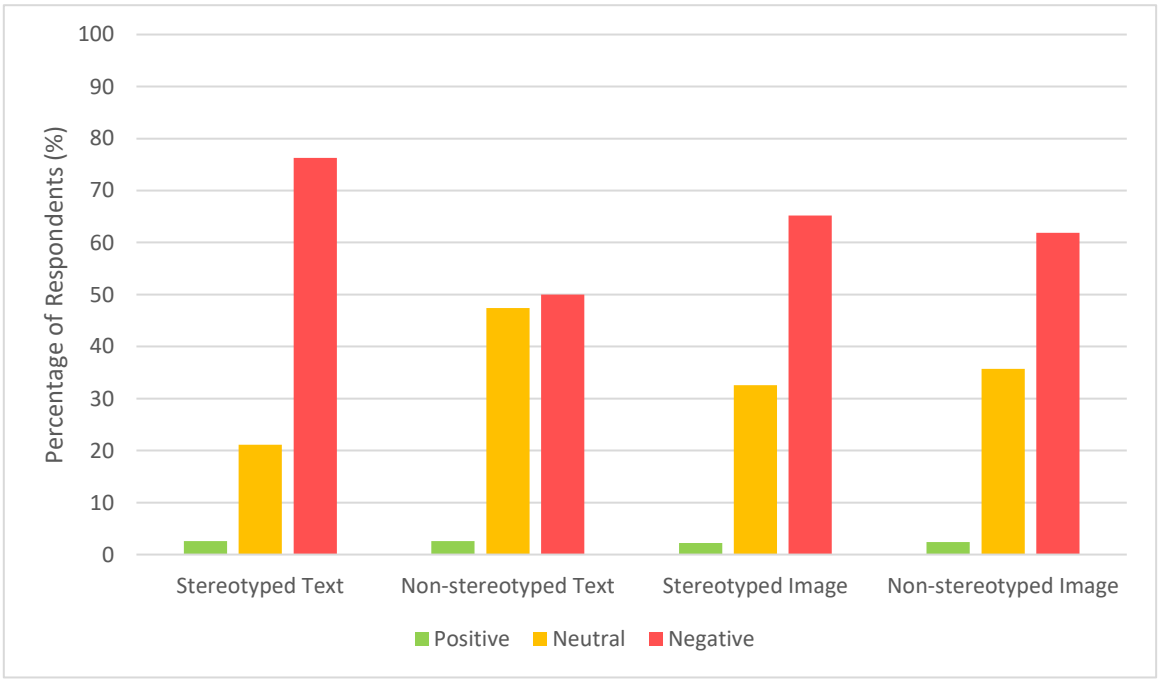


Figure 3.36, A graph to show whether the priming task had an effect on the participants' reactions to the phrase 'you're such a Neanderthal' [EQ5]

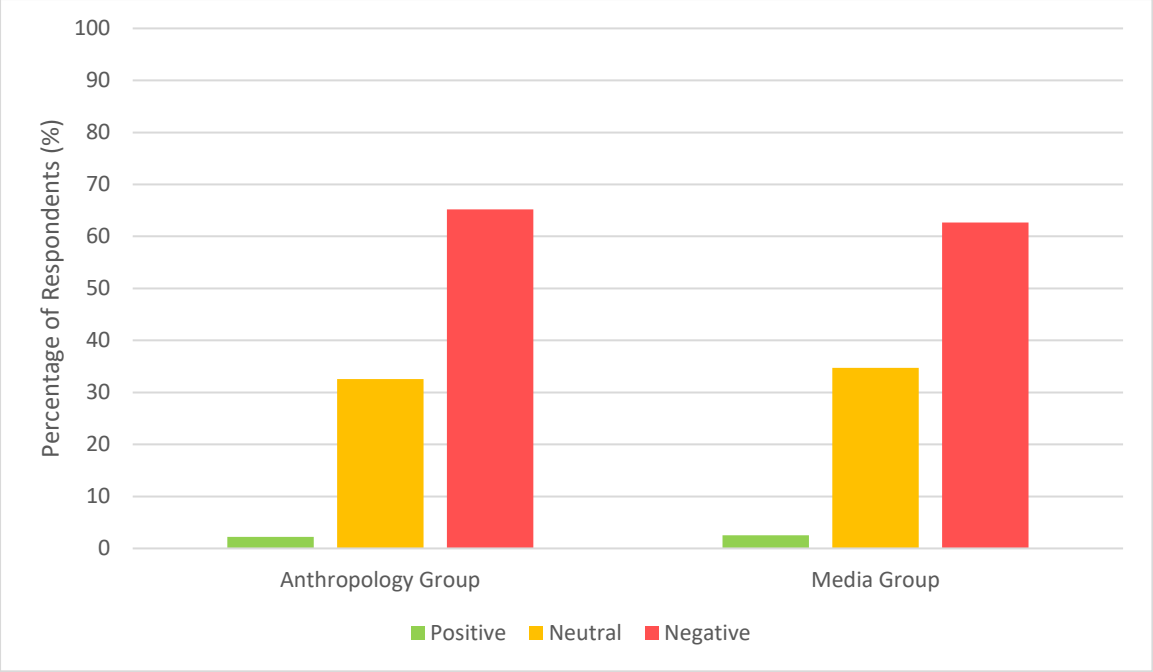


Figure 3.37, A graph to show whether the anthropological engagement of participants had an effect on their reaction to the phrase 'you're such a Neanderthal' [EQ5]

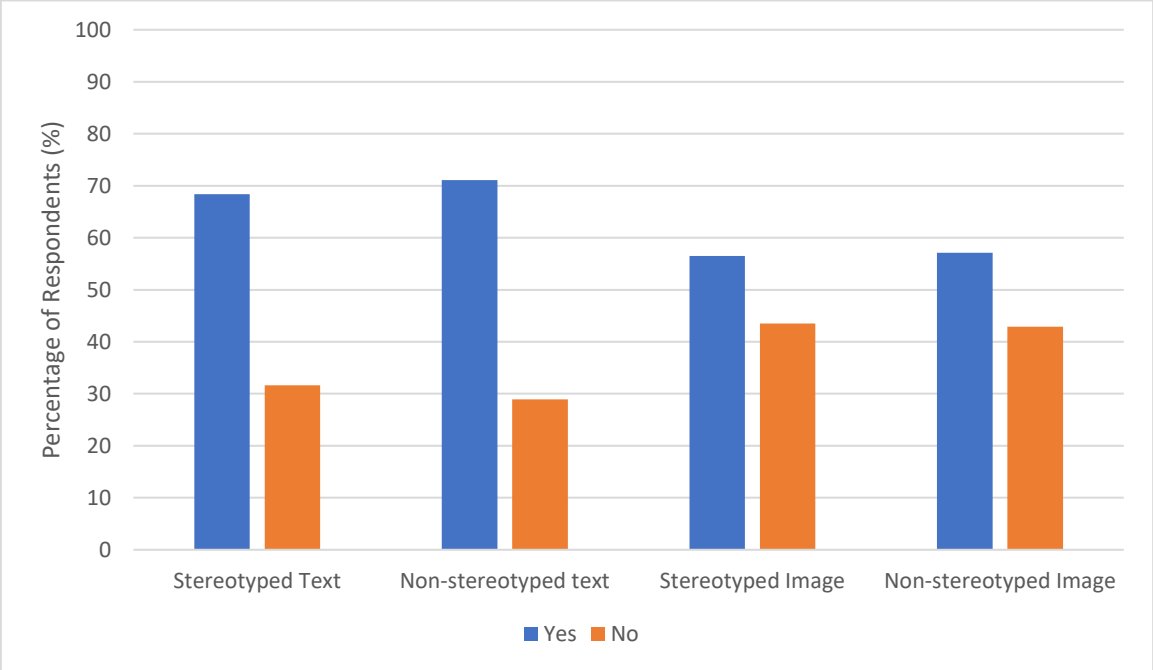


Figure 3.38, A graph to which primes respondents felt were an accurate depiction of a Neanderthal individual [EQ7]

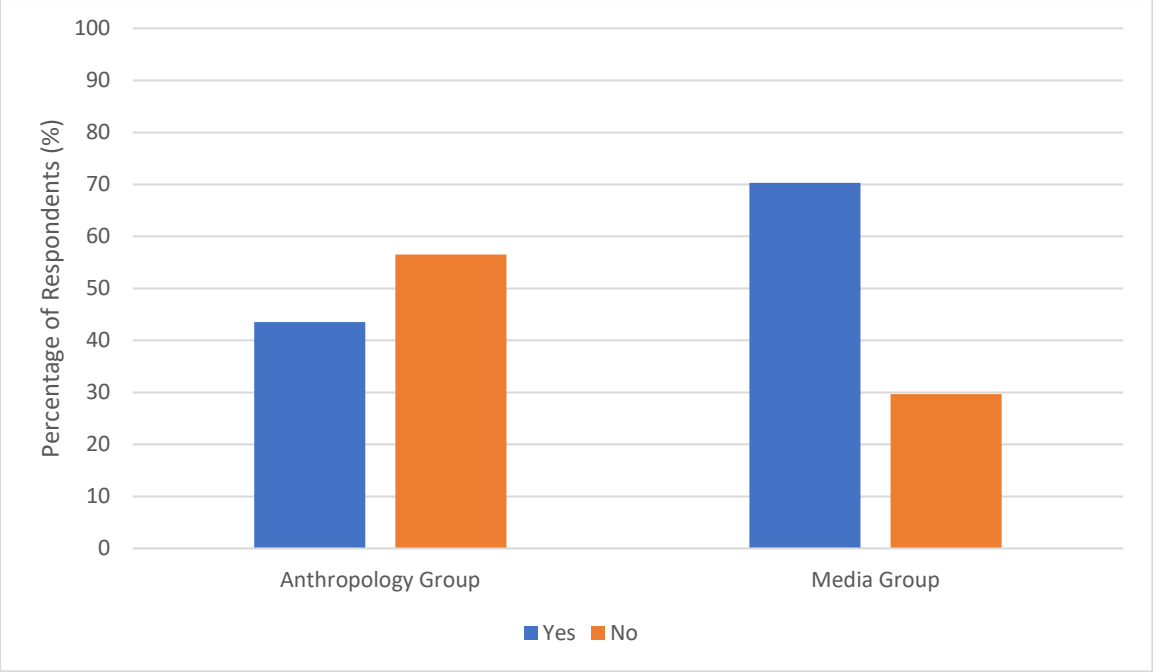


Figure 3.39, A graph to show whether the anthropology group and the media group felt their primes were accurate depictions of a Neanderthal individual [EQ7]

To conclude the priming task respondents were asked in question 7 if they felt the prime that they were presented with at the start of the experiment was an accurate depiction of a Neanderthal individual. The responses individuals gave for each prime can be seen in Figure 3.38. As the graph shows respondents slightly favoured the textual primes in terms of accuracy with 68.4% suggesting the stereotyped text was accurate and 71.1% suggesting the non-stereotyped text was accurate. However, a chi-square test suggested that this difference between peoples' perceived accuracy of words over images was not significant (X^2 (1) = 2.913[a], p = .088). Additionally when the test grouping was split by the primes and not by format (images vs words), results showed that the majority of respondents from all primed conditions felt that the prime which they received was accurate. This nonsignificance was

shown by a chi-square test of independence: X^2 (3) = 2.973[a], p = .396. There was a significance however when the data was split by anthropological engagement.

Figure 3.39 shows the question 7 data split by anthropological engagement with the graph showing that more of the anthropology group answered 'no' (56.5%) that 'yes' (43.5%) and more of the media group answered 'yes' (70.3%) than 'no' (29.7%). A chi-square test of independence found this result to be significant: X^2 (1) = 10.222[a], p < .001. The responses given to why participants answered this way in question 8 (see Appendix 15 for full responses) exemplified why this significant result is important in understanding the difference between anthropological and media information as the responses given were reflective of the content within these sources. Many of the media students expressed that the primes were accurate because they "fit the descriptions [the respondents] have seen before and what [they] have read" as "all history books show them like this" and thus it also "tallies with the museum and exhibition presentations of them". For these respondents the primes mimicked "what [they]'ve seen on TV" and "seem[ed] to reflect tv and books"; the primes were therefore similar the media-based image they have been presented. The anthropology group was more critical of the primes however, with many expressing in question 8 that they were merely "classical depictions that show big muscular hairy men" in order to "fit in with the stereotypes we are usually shown".

3.2.2 Recall Task

The purpose of the recall task was to test the memorability of pictures versus words, as well as to test which format is the most effective at harbouring and conveying stereotypes. Initially the recalled statements were analysed as a picture superiority test to assess the memorability of the images by counting how many correct statements were made for each

information format. As Table 3.3 shows, the mean rank of remembered statements was marginally higher for the textual primes (78.95) than the visual primes (74.35). This result does not adhere to the expected outcome of the picture superiority test which suggests that images should be significantly more memorable than words after short, and long, time intervals (Gehring et al., 1976). This result was found not to be statistically significant through a Mann-Whitney U test: $U = 2701$, $p = .517$. However, even though the visual primes were not deemed to be more memorable that the textual primes in terms of general information retained, there was significance found in the format in which stereotypes are conveyed. Table 3.3 shows the mean rank for the number of stereotypes remembered correctly is greater for the textual primes than the visual primes; a difference that was deemed significant by a Mann-Whitney U test: $U = 1654$, $P < .001$. This suggests that a textual format is more effective than a visual format at transmitting stereotypes. Yet a visual format was found to be significantly more effective at eliciting the creation of stereotypes that are not present within the image. This can be seen in the difference in mean rank between textual and visual primes in terms of incorrect stereotypes reported in Table 3.3. This was deemed significant by a Mann-Whitney U test: $U = 2247$, $p = .011$.

TEST	TEXT MEAN RANK	IMAGE MEAN RANK
Correct statements	78.95	74.35
Correct stereotypes	93.70	61.42
Incorrect stereotypes	67.65	84.25

Table 3.3, A table to show the mean rank of correct statements, correct stereotypes and incorrect stereotypes given by respondents with text primes and image primes [ER1]

Further tests were conducted to see if any other aspects of the experiment affected the way in which the primes were remembered than merely their presentation format. As the primes were also presented in a 'stereotyped' and 'non-stereotyped' way, i.e. negative versus positive descriptions, the data was also split in this manner as can be seen in Table 3.4. Analysis tested whether this had an effect on the memorability of stereotypes and the creation of new ones. However, two Mann-Whitney U tests found this not to be the case. There was no mean rank difference between the stereotyped and non-stereotyped primes in terms of correct stereotypes remembered and thus did not have a statistically significant effect: U = 2785, p = .713. The mean rank difference between the number of incorrect stereotypes formed between the stereotyped and non-stereotyped primes was minimal and also found to be statistically nonsignificant: U = 2616, p = .279. The data was also split by participant engagement with anthropological sources which can be seen in Table 3.5. As the mean ranks in the table show, the anthropology group was better at remembering present stereotypes correctly which was shown to statistically significant through a Mann-Whitney U test: U = 1689, p = .006. However, neither the anthropology group nor media group were more likely to form alternative stereotypes as the result was nonsignificant (U = 2311, p = .886).

TEST	STEREOTYPED MEAN RANK	NON-STEREOTYPED MEAN RANK
Correct stereotypes	77.74	75.16
Incorrect stereotypes	79.89	72.84

Table 3.4, A table to show the mean rank of correct stereotypes and incorrect stereotypes given by respondents with stereotyped primes and non-stereotyped primes [ER1]

TEST	ANTHROPOLOGY MEDIAN	MEDIA MEDIAN
Correct stereotypes	91.71	70.50
Incorrect stereotypes	75.76	76.79

Table 3.5, A table to show the mean rank of correct stereotypes and incorrect stereotypes given by anthropology and media respondents [ER1]

The formation of these alternative stereotypes was analysed to test whether the formatting of the prime had any effect on the types of stereotypes that were created, i.e. whether negative or positive descriptions were added to the recall statement. The below data only includes the responses where additional stereotypes were present. As can be seen in Figure 3.40, respondents who were given a visual prime created more negative incorrect stereotypes than respondents who were given a textual prime. 87.9% of image respondents created an additional negative description in the recall task with only 55.3% of textual respondents creating a negative prime. The remaining 44.7% of the textual respondents who included an incorrect description created a positive one with only 12.1% of the visual respondents doing the same. This result was deemed to be significant through a chi-square test of independence: X^2 (1) = 14.049[a], p < .001. This result was made more poignant when the same data was split by anthropological engagement as the difference between the media group and the anthropology group was statistically nonsignificant through a chi-square test of independence: X^2 (1) = 0.158[a], p = .691. As much of the questionnaire data suggests, it would have been expected for the media group to create more negative stereotypes as they did within the question 3 Neanderthal descriptions data seen in Figure 3.20.

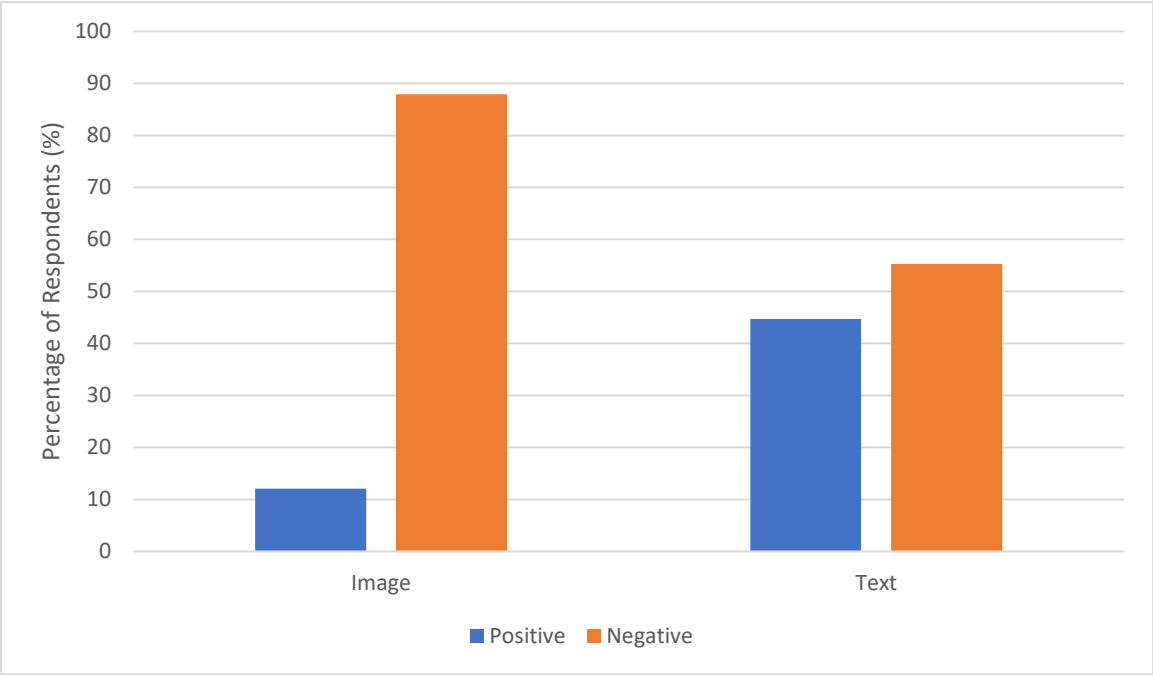


Figure 3.40, A graph to show the effect of prime format on the creation of incorrect stereotypes [ER1]

4. Discussion

The main findings of this discussion chapter suggest that there was no conclusive evidence to support a difference between images and text in terms of persuasion and memorability, however, images were found to contain concealed tropes that elicit the production of additional stereotypes. It was found instead that the public are more likely than those within the field of anthropology to uncritically accept information they are presented concerning human evolution, irrespective of format, due to the trust they place in public science. Thus it was shown that the uncritical absorption of information from the public is a key factor in the perpetuation of negative Neanderthal stereotypes and is considered as such for both visual and verbal media.

4.1 Limitations of Methods and Results

4.1.1 Questionnaire

The main limitation of the questionnaire data is that the entire analysis rests on the assumption that the respondents who claimed to have an academic background in anthropology have engaged with anthropological research sources and respondents who do not claim to have this background have not interacted with these sources. Although the results shown in Figure 3.2 and a significant chi-square test conducted on the questionnaire question 1 data suggest that this is the case, there are other contributing factors that could potentially affect the accuracy of this result and impact the assumption on which the questionnaire analysis is based. The demographics question on anthropological engagement only requested that respondents disclose if they have ever studied anthropology and/or archaeology. However, the data from this question does not disclose the capacity to which

the respondent studied the subject; that is to say the extent to which they may have engaged with the academic literature. Within the anthropological discipline there are many fields of research, one of which is biological anthropology that encompasses human evolution studies; although most full-time anthropology students will have encountered biological anthropology teaching and literature, their specialisation in the field, and thus their engagement with copious amounts of recent human evolution research, is not guaranteed. On the other end of the spectrum, human evolution research is very interdisciplinary and is often studied within other disciplines such as psychology and biology. The demographics question also does not measure specialisations in human evolution outside of anthropology, with archaeology only being considered as in certain practices, such as in America, archaeology is classified as a subdiscipline of anthropology (Hodder, 2012). Therefore, there may be students in the media group who have engaged with a wealth of recent human evolution research but who have not studied anthropology to a degree level. This is apparent as 8.3% of the media group (see Figure 3.1) claimed to have interacted with academic journals concerning human evolution and a further 16.7% claimed to have interacted with textbooks of the same nature.

However, this data is potentially problematic as the nature of the textbooks which respondents claimed to have interacted with was not divulged. Within this thesis textbooks were considered as academic research focused around human evolutionary studies yet many textbooks exist which include human evolutionary research but do not specialise in the subject area and are not necessarily written by academic experts of the field. Examples of these types of publications are encyclopaedias which typically provide broad overviews of a variety of subject matters. For the purpose of this research the understanding that textbooks are academic resources stands, however, consideration must be given to the potential that

respondents may not be referring to research conducted by a palaeoanthropology academic for this selection.

Another limitation of the questionnaire data lies with the seven images selected to represent the different sources in questions 4 and 6. In these questions each image represented a different source that was listed in question 2, this is limiting as a single image cannot be a holistic reflection of all types of imagery found within the source. As each source mentioned was very broad, selecting one image to epitomise the entire source could be considered an over-generalisation and as such analyses conducted on these questions have taken into consideration that the images cannot be a wholly accurate portrayal of the source. However, the images selected for the questions were chosen for being easily accessible human evolution depictions and as such are exemplar images that the respondents are likely to come into contact with. For example, Image D (see Appendix 3) was the first human evolution depiction found on Google Images, Image E was taken from a high grossing and recent film surrounding human evolution that featured popular voice actors and was released in cinemas (IMDb, 2018), and Image A was taken directly from the Smithsonian Museum website and is the leading image used for their human evolution page. As the images selected are relevant examples and are some of the most accessible human evolution depictions from the sources, the analysis conducted on them remains valid when considered as examples of their source. These images have additionally been analysed as forms of visual media in their own context that does not use them as a proxy for their source but merely as a component of it.

4.1.2 Experiment

A similar limitation to that of the questionnaire also applies to the primed conditions in the experiment. The primes used for the experiment were the images created in the early 1900s by František Kupka and Arthur Keith as well as two textual passages that were descriptions based off of the two images. As with the questionnaire, it is impossible for these two images to encompass all of the stereotypes and pictorial tropes associated with Neanderthals. Additionally, neither of these images wholly avoids all of the classical image tropes either despite being labelled as the 'stereotyped' image and the 'non-stereotyped' image throughout this thesis as, for example, the 'non-stereotyped' image only depicts a single male as the proactive protagonist in its evolutionary narrative with no female Neanderthals included. These images were chosen as one was created as a response to the other and thus, they are directly comparable, yet the 'non-stereotyped' image is not entirely free from problematic tropes and stereotyping. The Keith image is referred to as the 'non-stereotyped' image as it is less negatively charged than the Kupka image and the term provides a simplified means for clear discussion.

Another limitation of the priming task is that it was not a timed segment of the experiment. The length of time that respondents had to see the prime and the distraction task was controlled between respondents yet in between these two periods a respondent could take any length of time they chose to complete the priming task. Although beneficial for the thorough answering of the primed questions, this ambiguous time period had potential to hinder the subsequent recall task as the time between a respondent being introduced to the prime and recalling it was not fully controlled. That is to say inter-participant consistency is jeopardised as one respondent may have had a significantly shorter time frame

between the prime and the recall task than another which could have affected their ability to remember the prime.

The recollection of the primes in the recall task was also problematic due to the way in which the responses were coded for the memorability of stereotypes. In order to ensure that the four primed conditions could be statistically analysed and compared, a standardised code was applied to the data. This code utilised the content analysis method to identify themes within the recalled passages; the themes included within the code, such as clothing and body hair, can be found in Table 2.3. These themes were used to calculate the number of correctly remembered stereotypes from each primed condition, however, the list of themes used was derived directly from the textual passages and not from the images. Although the textual passages were originally based off of the two images, the formatting of the code biased the textual primes as text respondents were provided with a clear outline of the ten stereotypes they were expected to recall. Image respondents on the other hand were not indirectly informed how many and which stereotypes were included within the code. This provided a potential advantage for text respondents over image respondents. Another advantage of this was that textual respondents were aware of the expected detail and length of their recall responses as it was visually informed by the prime. This however was shown not to be a key advantage as the calculated means of recall response length showed that image respondents (30.9 words) on average wrote longer responses than text respondents (24.5 words).

It must also be noted that various aspects of the experiment were statistically analysed in different ways and as such the group sizes do not remain the same in every statistical test. In the experiment analysis responses are split either into their primed groups

(which are each a quarter of the respondent pool) or via the respondent's interaction with anthropology (which splits the respondent pool in two). This means that for some analyses, such as that seen in Figure 3.38, group sizes become relatively small as the analysis splits the pool into several groups. In Figure 3.38 for example the pool is divided into primed groups which are then further divided into 'yes' or 'no' responses to the question 'do you think the description/image you saw at the beginning of this experiment was an accurate depiction of a Neanderthal individual?'. Making each group in this question a small fraction of the original response pool size which could be problematic as small sample sizes increase the margin of statistical error (Field, 2009).

4.2 Public Engagement with Science

4.2.1 Quasi-Educational Media

For this thesis the perceptions of the public are analysed through the use of the media group. As the results from Figure 3.2 suggested, engagement of the media group with academic sources such as anthropological journals and textbooks was minimal. Results found instead that this group absorbed much of their knowledge from non-academic material, which was dissimilar to the anthropology group who engaged with both types of sources to a high degree. However, further analysis found that both the anthropology group and the media group engage more with quasi-educational material as opposed to less science-based forms of non-academia (see Figure 3.3). The term quasi-educational media is used here to describe forms of media that are partially educational but are simplified for a lay audience and are often produced by journalists, general science writers and non-experts. The types of sources included under the quasi-educational umbrella include public science books, popular

science magazines such as the National Geographic, newspaper articles, museum displays, and documentaries; the last four of which were included within the questionnaire source engagement data. This data also found that media participants put more trust into media sources, which were primarily quasi-educational, than academic sources. This is apparent from the data as the media group believed media sources to be the most trustworthy (see Figure 3.5) which, when considered alongside which types of media sources they engaged with (see Figure 3.3), translates to more quasi-educational sources than other non-academic sources.

The belief in and engagement with purposefully educational material from the media group illustrates a genuine interest from the public in human evolutionary science. This is further supported by the work of Unsworth and Silverstone (1992) who found that coverage of evolutionary material from well-known celebrity scientists such as David Attenborough, Richard Dawkins, and Brian Cox increased people's acceptance of evolutionary theory in highly religious communities. However, as this section will explore, the nature of quasi-educational media being curated specifically for non-expert individuals and often by non-expert individuals can be problematic in terms of stereotyping and over-simplification.

A prime example of quasi-educational material that is oversimplified and shrouded in negative stereotyping is Terry Deary's '*The Savage Stone Age'* (Deary & Brown, 2008) from the popular children's book series, and comical educational television series (IMDb, 2009), *Horrible Histories*. As captured below in Figure 4.1, Neanderthals in this publication are shown throughout as being "savage", unintelligent, clothed in animal skins and holding weaponry; here they are portrayed as the archetypal cavemen. The intended audience of this publication is children who, as research has shown, are very impressionable to stereotypes and use

stereotypes they encounter through education, parental figures and public media to shape their understandings of the world (Farland-Smith, 2019). It is additionally noteworthy that the time of Deary's publication aligns with the majority (59.5% of respondents were aged between 18 and 24) of the questionnaire respondents being of prime initial audience age for the publication. Publications with similar issues are also widely available for adults with Yuval Noah Harari's '*Sapiens: A brief history of humankind*' (Harari, 2011) selling over 12 million copies worldwide (Parker, 2020). This publication accounts the progressive course of human history from "insignificant apes" (Harari, 2011; 1) to the current pinnacle, before the creation of bionic life, that is anatomically modern humans; with the title of the publication itself also excluding other hominin species from the term 'human'. It is important to note the popularity of these publications as well as the unprofessional background of the authors in the field of palaeoanthropology, with Terry Deary spending his career as a theatre actor and high school drama teacher (Terry Deary, 2021) and Harari as a professor of medieval and military history at the Hebrew University of Jerusalem (Yuval Noah Harari, 2021).

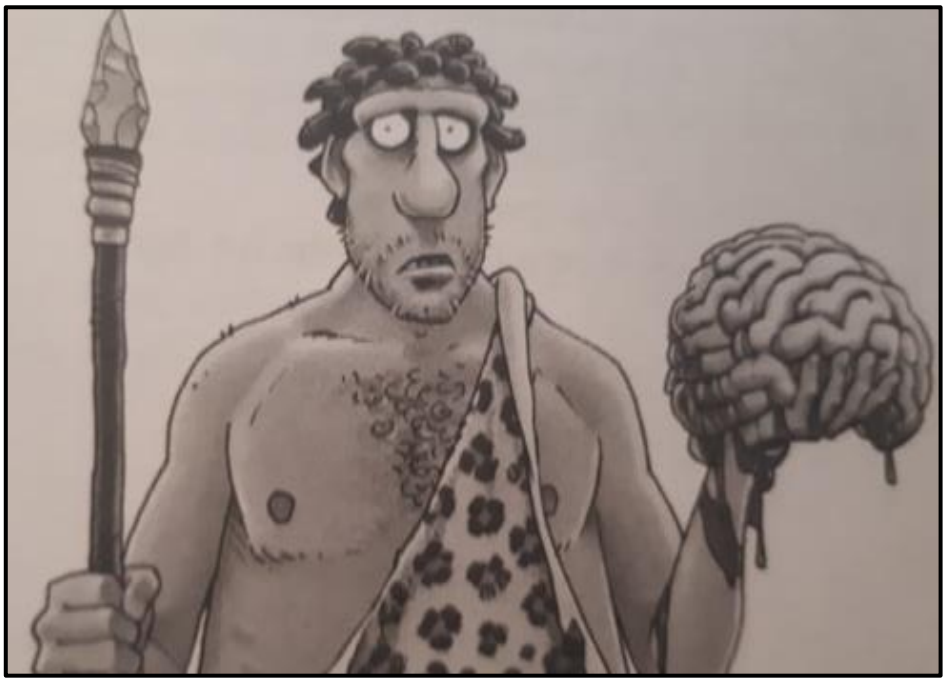


Figure 4.1, An illustration of a Neanderthal from the '*Savage Stone Age'* book in the *Horrible Histories* series (Deary & Brown, 2008)

The source of human evolution media with which the media group claimed to engage with the most was quasi-educational as 45.1% of respondents engaged recently with museum displays (see Figure 3.1). The nature of museums, and consequently museum displays, has changed over the centuries from houses of curiosities to scientific institutions (Simmons, 2016). However, Bouquet (1998) has argued that museums have since seen a shift in power from strictly scientific institutions to institutions with a greater focus on viewer's interests and engagement where there is a battle between the scientific staff and those in charge of curating and designing the displays. This shift is apparent in the way in which human evolutionary displays have been curated, the 'Human Biology and Evolution' exhibit at the American Museum of Natural History in New York being a prime example. In her survey of

four natural history museums across the globe, Scott (2007) explained that the positioning of the dioramas in the 'Human Biology and Evolution' exhibition is problematic as it forms a linear and progressive narrative of evolution with viewers beginning the story with *Australopithecus africanus*, before moving onto *Homo erectus* (pictured in Figure 1.16), then *Homo neanderthalensis*, until early *Homo sapiens* is reached. Exhibitions such as these provide an insight into the results of experiment question 2 where 78% of media respondents (see Figure 3.33) expressed their belief that *Homo sapiens* descended directly from *Homo neanderthalensis*. Scott also explained that the end of the human evolution exhibit at the Horniman Museum in London, a display called 'Varieties of Mankind' shows humans from four discrete regional categories (Africa, Indo-Europe, North East Asia and Americas, and Australia), which follows a theory based in the multiregional hypothesis (Scott, 2007); a hypothesis which has historically been justified by explicitly racist reasoning (Cheng, 2017). Additionally, scholars have complained about the representation of gender at such institutions with Machin (2008) highlighting the androcentric bias of the displays at the natural history galleries at Manchester Museum; an issue also clear with the two male reconstructions of *Homo neanderthalensis* and *Homo sapiens* which have been displayed at the Natural History Museum in London since 2014 (Hendry, 2021). All of these exhibits illustrate a disparity between current science and curation which engages viewer interest, with all engaging a large proportion of the public. This illustrates how quasi-educational material can be misleading as it is based in science and branded as educational but is often distributed by non-professionals or oversimplified and altered to appeal to a wide public audience.

4.2.2 Engagement with Scientific Imagery

As the media groups' engagement with quasi-educational media has shown, human evolutionary education is popular; a fact also evidenced by the increased use of at-home DNA tests which provide customers with the opportunity to explore their own ancestral origins. The popularity of tests such as *23andMe*, which has been valuated at approximately US$2.5 billion (Clark, 2018), is further evidenced through the experiment responses to question 3. Experiment question 3 asked respondents to express their opinion on discovering that they had 5% Neanderthal DNA after taking a home test kit such as *23andMe*. Results found that 37% of experiment respondents (see Figure 3.35) reacted positively to the news and found the ability to test for this "fascinating". Only 4.3% of experiment respondents saw this news as negative and instead many respondents expressed that they had already taken similar tests before or would be "interested in discovering more" (see Appendix 13). It is clear that the keen interest from the public in human evolutionary research has remained since the emergence of palaeoanthropology in the Victorian era when recent finds and theories would make headline news for the masses (Horrall, 2017).

The interest of the Victorian public in human evolutionary research aligned with the dawning of a 'mass culture' centred around visual imagery as opposed to text, with heavily illustrated magazines and newspapers becoming the norm (Horrall, 2017). Such publications were continuously reprinted to spread knowledge across Britain (Horrall, 2017), and included many articles on scientific subjects that were often written by generalists who simplified and expurgated scientific research in order to make it accessible to the public (Horrall, 2017). This notion of public science being simplified and made heavily visual remains apparent in modern quasi-educational material also, as is evidenced in the examples mentioned above. These

examples were either highly visual, e.g. museum displays which rely heavily on visual learning (Barnard & Loomis, 1994), or contain important visual components, e.g. newspaper articles and National Geographic articles which are often tied to associated images. Even quasi-educational books, which are mostly written sources, often include multiple illustrations. '*Sapiens: A brief history of humankind*', for example, includes over 70 visuals (Harari, 2011) and has recently been published as a graphic novel entitled '*Sapiens: A graphic history: The birth of humankind*' (Harari, 2020). Popular human evolution sources outside the realm of quasi-educational media, such as film and television programmes, also rely heavily on visual imagery, however, the media group expressed a very low level of trust in other non-academic sources outside of quasi-educational media (see Figure 3.4).

It has been argued by Moser (1998) that the visual imagery used in quasi-educational sources, particularly illustrated magazines and books, aids in capturing and maintaining the public's interest in human origins and prehistory. Thus, she claims that these images act as educational devices in order to transfer knowledge to non-professional consumers of human evolutionary research (Moser, 1998). Such images have been highlighted as key educational devices as they are presented in a language understandable to the reader (Myers, 1988), which many anthropological journal articles are not; hence why there is limited engagement from the media group with this information source (see Figure 3.1). Myers (1988) suggests that the iconography of a science is more likely to have an impact on a non-professional audience than the text, as the latter is likely incomprehensible and requires additional knowledge and further reading to grasp. This iconography is easily accessible to the public as the images used in the likes of newspapers and popular science magazines when reporting on scientific research are often taken directly from the journal publication with only the text being simplified (Wiber, 1998). Many of these images continue to be reprinted and circulated

in popular science for years after, even when they are considered outdated and problematic by the anthropological discipline (Wiber, 1998).

For example, in a Google Images search of the term 'Neanderthal' conducted on the 2nd of February 2021, four of the images on the first row of results (which consisted of five images) were of the same reconstructed Neanderthal model taken from different angles. The Neanderthal reconstruction, shown below in Figure 4.2, was part of the Kennis brothers' creations for the Natural History Museum in London that was completed in 2014 (Hendry, 2021). The four sources on the first Google Images search row that this image was included in (Gorvett, 2021; Jochem, 2017; Sample, 2019; Stringer, 2019) were quasi-educational sources, one being a museum webpage and the others online news articles reporting recent findings. Instead of using images derived directly from the journal articles and findings that these sources are reporting on they utilised imagery that would be more relevant to the public than statistical charts, infographics, and diagrams. For example, the 2017 piece written by Greta Jochem for *National Public Radio* on the work of Dannemann & Kelso (Jochem, 2017) used an image of the Neanderthal model pictured in Figure 4.2 instead of the infographics pictured in Figure 4.3 that were used in Dannemann and Kelso's (2017) journal article on the phenotypic contributions of Neanderthals to *Homo sapiens* genetics. The infographics from Figure 4.3 would likely require further reading and contextual understanding to comprehend than the *National Public Radio* article provides and as such a more understandable visual aid was substituted. This demonstrates how human evolutionary imagery is disseminated in media sources by the constant recycling of certain images that have been shown to catch the eye of the reader and maintain their interest in the article as well as human evolution more generally.

Figure 4.2, A reconstructed model of a Neanderthal displayed at the Natural History Museum in London and as the first image for the search 'Neanderthal' in Google Images (Gorvett, 2021)

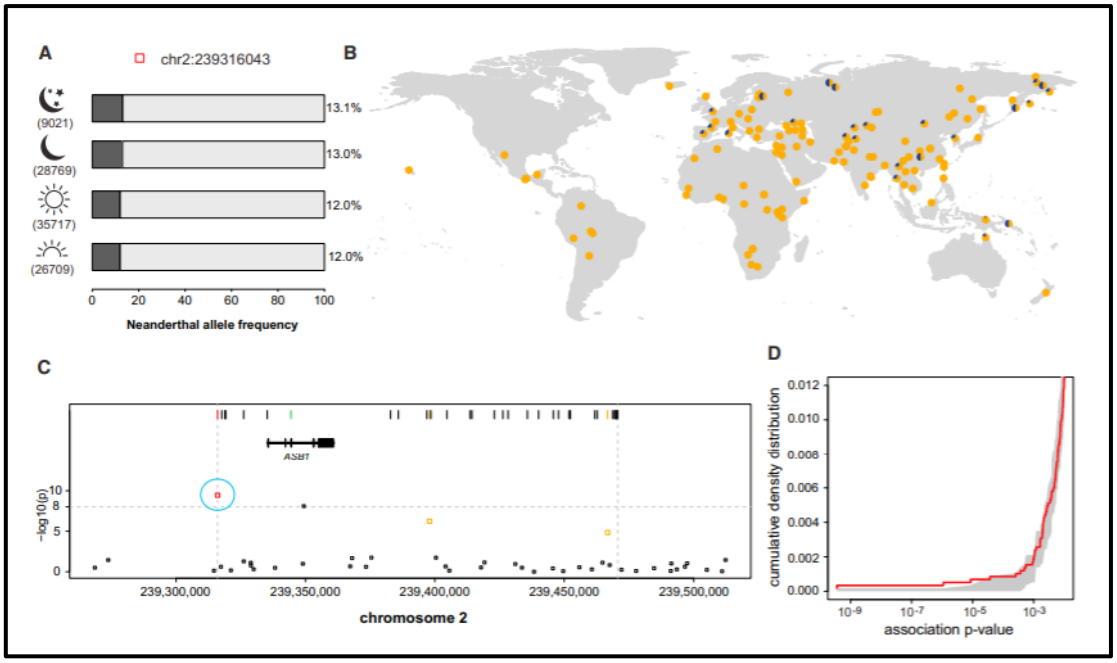


Figure 4.3, An example of an infographic taken from a scientific journal article on the Neanderthal contributions to *Homo sapiens* genetics (Dannemann & Kelso, 2017)

4.2.3 The CSI Effect

It is clear from the results that the media group placed their trust in quasi-educational material and engaged with such sources in a recent time frame. The trust that the media group placed in the sources they had encountered was further evidenced by many respondent's justifications for their image selection in questionnaire question 4. Questionnaire question 4 asked respondents to select which image of the seven presented they felt was the most accurate representation of evolutionary history; a choice which they were requested to justify in questionnaire question 5. The majority of media respondents, 66% (see Figure 3.6), selected Image D as the most accurate portrayal. Image D, displayed in Figure 3.7, depicted a version of the classic evolutionary progression line from early hominin to *Homo sapiens*. Many respondents justified this selection by stating that the image seemed "scientific" and "look[ed] like something [they've] seen in the Natural History Museum" as

well as “what [they’ve] seen on National Geographic” (see Appendix 9). The notion of trusting quasi-educational, as well as other non-academic, sources due to their display of scientific research and method is not novel, with research surrounding the ‘CSI effect’ addressing the relationship between science and the public perceptions of science for decades (Ley at al., 2012).

The CSI effect is usually defined as the influence that crime dramas have on jurors in legal proceedings (Cole & Dioso-Villa, 2007) but the definition has been expanded to encompass public perceptions of the forensic profession and evidence in general (Ley et al., 2012). Research into the effect has shown that public engagement with popular crime dramas such as *CSI* and *Bones* has altered the way in which forensic evidence is presented in court to jurors (Cole & Dioso-Villa, 2007) and increased the use of forensic methods such as DNA analysis (Pratt et al., 2006). Such shows have created an unrealistic expectation of what forensic methods can achieve, especially DNA analysis, as the public have learnt to accept such practices as being able to provide absolute evidence as this is how it is often portrayed to them (Ley et al., 2012). The trust that jurors place in forensic evidence is analogous to the trust that many people place in scientific research more generally. The notion of the CSI effect could be considered a case study example of the way in which the public view science as a whole. Scientific interpretations, which paleoanthropological research mainly consists of due to the minimal amount of physical evidence, often translate as hard facts in the eyes of the public because they are within a scientific discipline (Hager, 1997) and are often presented in this manner. Thus, many people assume that paleoanthropological theories and interpretations, as well as those within other scientific disciplines, are objective, bias free, and trustworthy (Hager, 1997). The media group justifying their image selection because it

appeared scientific and relates to what they have previously encountered is therefore not surprising.

4.3 The Presence and Detection of Stereotypes

4.3.1 General Neanderthal Stereotypes

Questionnaire question 3 asked respondents to describe what they believed a Neanderthal individual looked like. As can be seen from Figure 3.20, 76.2% of the media group used negatively charged language in their descriptions which contrasted significantly to the anthropology group. Additionally, unlike the anthropology group, there were also no positively charged Neanderthal descriptions produced by the media group. The negative descriptions produced by the media group (see Appendix 6) suggested that Neanderthals "[wore] animal skin clothes", had "big muscles, were "wild, feral", "primitive" and "hirsute", looked "messy", had "monkey-like features" such as "long arms" that they would use "as an aid to get around by dragging their fists on the ground", and they even lacked the ability to speak "except for grunting sounds" because of their "less sophisticated brains". In short, the respondents saw a Neanderthal individual as "a caveman with a lot of hair" and thus an "inferior copy of us". It is important to note that these selected quotations do not only represent the opinions of one respondent as the majority of negative media responses reiterated the same points. The same stereotypes were repeated to the extent that 79 out of the 100 negative media responses claimed that Neanderthals were "hairy" or "hirsute". This repetition is evidence of the recurring stereotypes surrounding Neanderthals that the public encounter.

The descriptions provided portray Neanderthals as the archetypal caveman, an iconography with which they have been associated since the 19th century (Horrall, 2017). Many of these descriptions match the imagery seen in popular culture of cavemen such as Terry Deary's vacant-eyed Neanderthal in Figure 4.1, the hairy caveman from the famous GEICO insurance advertisements in Figure 4.4, or the confused caveman from internet meme culture in Figure 4.5. All of these depictions are similar to the Neanderthal descriptions provided by the media group as, for example, they emphasise prognathic facial features creating a more 'ape-like' appearance, are depicted as having long unkept hair, and are portrayed as muscular with animal skin clothing (visible in Figure 4.1). The text in Figure 4.5 is also comparable to the media groups' description of Neanderthals as lacking articulated speech, utilising humour to portray them in an intellectually inferior manner.

Figure 4.4, A still of the caveman character featured in the GEICO insurance advertisements (GEICO, 2004)

Figure 4.5, A depiction of a confused caveman used in internet meme culture (Know Your Meme, 2010)

The descriptions produced by the media group provided evidence of the negative stereotypes that persist in popular culture surrounding Neanderthals. These negative connotations are also exacerbated by the continued use of the term 'Neanderthal' as an insult in books such as '*Ready Player One*' (Cline, 2011), in television programmes such as '*The Big Bang Theory*' (IMDb, 2007), and even in politics amongst high profile individuals such as when USA President Joe Biden used the term to criticise decisions made by the governors of Texas (Greve, 2021). The use of the word 'Neanderthal' as an insult was tested in experiment question 5 with results showing that the majority of experiment respondents would feel offended if the term was said to them (see Figure 3.36 and 3.37). Respondents felt this way as they suggested the term was indicative of a "lack of intelligence", as well as a "lack [of] sophistication, culture and manners", a "brutish" and "animalistic" nature, "primitive

behaviour", and "immoral[ity]" (see Appendix 14). Such responses correlate to the negative Neanderthal descriptions produced by the media group by portraying Neanderthals as unintelligent and primitive. However, unlike the questionnaire question 3 descriptions, these responses suggest that the use of the term as an insult is more revealing of the receiver's behaviour and character than their appearance. This emphasis on Neanderthal behaviour could be suggestive of inferred knowledge from imagery such as Figures 4.1, 4.4, and 4,5 which Moser (1998) would argue utilise classic visual tropes to code hidden meanings and interpretations such as "primitive behaviour" and "immoral[ity]"; a notion that will be further explored later in the discussion. These results also support the notion that the public perceptions of Neanderthal appearance and behaviour remain shrouded in negative stereotyping and misconceptions.

4.3.2 Representations of Gender

An issue which has been raised in anthropology since the revolutionary publication of Elaine Morgan's '*The Descent of Woman*' in the 1970's (Morgan, 1972) is the representation of women in paleoanthropological and archaeological research. Throughout the history of human origins research, the role of prehistoric women has tended to be minimised or ignored altogether (Hager; 1997). Instead, evolution has often been considered a male phenomenon with evolutionary changes such as bipedalism, encephalisation, tool use and symbolic thought being considered a direct result of male activities and behaviours (Hager, 1997). In contrast, prehistoric women are often diminished to their role in reproduction: they are mates for males and mothers for the offspring of said males (Zihlman, 1997). Due to their minimised roles, women rarely exist within visual reconstructions of prehistory (Wiber, 1998). In the imagery where females are included, they are portrayed in a submissive manner used to make

the active role of the male more prominent (Wiber, 1998). The underrepresentation of females in recent human evolutionary imagery was explored by Machin (2008) who analysed the representation of females in the natural history galleries at the Manchester Museum. Machin found that only 13% of images and displays in the gallery contained females and those that were present were portrayed at a visually lower level within the imagery than males and in less dominant positions than males. Machin also found that there was a bias towards the representation of males with other animals in the gallery also as 71% of mammals in the gallery were male. This male bias was also visible in the images presented to the questionnaire participants in questionnaire questions 4 and 6 in order to analyse the respondents' apprehension of gender representation in human evolutionary imagery.

As Figure 3.8 illustrates, both the anthropology group and the media group selected Image E as the least accurate portrayal of human evolution. Image E, which can be seen in Figure 3.9, was a still taken from the Claymation film '*Early Man*' (2018) which featured the main character, Dug, hunting a rabbit whilst other characters watched with their weapons raised in the background. The respondents who claimed this to be the least accurate representation suggested that the "cartoon" and "childish looking" style made it seem like "a joke" and "not a historical depiction", respondents believed that the image could not be accurate as it was "created for entertainment and basic comprehension as opposed to accuracy" and thus "it is not intended to be educational" (see Appendix 10). The majority of respondents did not give consideration to the content of the image and focused instead on the artistic style. A few respondents did highlight that the content of the image "perpetuates the 'primitive caveman' stereotype" however, there was no mention by any respondent about the positive diversity shown within the image that the other images lacked. Image E was the only image out of the seven to depict explicitly female characters. Not only were

female characters present in Image E, but they were also involved in the same activities and in the same manner as males within the image. The women in Image E were holding weaponry and were participating in the 'evolutionary-focused' activity that was at play in the depiction, a rare phenomenon within human origins reconstructions.

When asked in questionnaire question 9 about their thoughts concerning the portrayal of human diversity in Image E and the other six images, the majority of respondents (75.5%) did not mention that the lack of gender diversity within the images was an issue (see Figure 3.14). This data supports the findings of researchers such as Hager (1997) and Zihlman (1997) who have stressed that evolution is considered a male-driven phenomenon as it suggests that androcentric human origins imagery is the unquestioned norm. The notion that evolution is male-centred may not be an active understanding by respondents but by failing to acknowledge the gender inequality within the imagery, it is suggestive that they have a passive acceptance of this. This subconscious expectation for gender inequality within imagery may be influenced by popular visual media as a whole. Studies have found that within such media as fine art (O'Kelly, 1980), television advertisements (Coltrane & Messineo, 2000) and magazines (Hovland et al., 2005) males are visually portrayed in a more prominent manner and as commanding more authority than females. The portrayal of gender within human evolutionary imagery is a clear reflection of the societal depiction of gender roles that are in place in many visual media forms covering various subject matters. However, results did show that significantly more females than males highlighted the gender imbalance within the seven images as an issue (see Figure 3.15). This result is significant as it supports the position of feminism within academia. A notion that has been made apparent through previous research by Dancy et al. (2020) which found that men were unaware of the impact

gender inequality had on the pursuit of a STEM degree whereas women, in contrast, were largely aware of the underrepresentation of females in science.

4.3.3 Perceptions of Race

The relationship between the perceptions of race and human origins research has long been controversial with evolutionary theory being used in the 19th century as a means to justify the superiority of White Europeans over other ethnic groups (Ogunnaike, 2016). Human origins research during this period considered Black people to be inferior to White people both physically and behaviourally and as such they were shown to be an evolutionarily lower form in paleoanthropological imagery and in general society. In order to portray them as evolutionarily inferior, Black people were often associated with and portrayed as apes to the extent that the New York Zoological Park had a feature in 1906 that exhibited a Black man living in a cage with a chimpanzee (Plous & Williams, 1995). This association between Black people and apes has been shown to remain an issue in today's society with Google Photos' facial recognition algorithm categorizing Black people as gorillas (Zhang, 2015) and the auto-tagging system of the online image and video sharing platform Flickr labelling a portrait of a Black man with the words 'animal' and 'ape' (Hern, 2015). These reports received much controversy in the media and as such human evolutionary images that contained the same stereotypes were included within the seven images from questionnaire questions 4 and 6 to analyse people's awareness and perceptions of racism in imagery concerning scientific content.

The images in the seven options that included the most explicit racial tropes were Image A, which can be seen below in Figure 4.6, and Image B, which can be seen previously in Figure 1.8. Image A, taken from the Smithsonian Museum website, depicts the faces of

three hominin species in a line with the most recent hominin on the right shown to be White and the earlier hominin species depicted as Black. This image is problematic as it is an artistic twist on the classic 'evolutionary ladder' image which sees a linear depiction of human evolution; however, this issue is further exacerbated by the use of skin colour as an indication of evolutionary progression. The skin colour of the hominins within this image lightens from the earliest hominin through to the most recent hominin, echoing the 19th century association between race and evolutionary progress. This issue can also be seen in Image B which was taken from a 1960's anthropology textbook (Howell, 1965) and depicted a battle scene between *Australopithecus boisei* and other australopiths. This image depicts *Australopithecus boisei* as Black men in order to distinguish them from the other australopiths in the scene, who are depicted as bipedal apes, but also to establish a barrier between the hominins of Africa and the hominins of Europe, who are stereotypically portrayed as White.

Figure 4.6, 'Image A' in questionnaire questions 4 and 6 which was taken from the Smithsonian Museum website (Smithsonian, 2020)

When asked in questionnaire question 9 about their perceptions of human diversity within these images, 34.6% of respondents found issue with the portrayal of race (see Figure 3.13). Although the majority of respondents did not mention issues with the portrayal of race, more respondents mentioned issues with the portrayal of race than mentioned issues with the portrayal of gender (see Figures 3.13 and 3.14). Considering the results of Dancy et al. (2020) which found that the majority of people considering the injustices of women were women and the majority of people considering the injustices of people of colour were people of colour, it was expected that fewer respondents would mention issues concerning the portrayal of race than gender. This assumption was made due to the comparable results of Figure 3.15 which showed that significantly more females found issue with the portrayal of gender within the images than males, as well as the demographics information which showed that the majority of respondents were White (88.2%). However, it could be suggested that the perceived awareness of racial stereotypes over gender stereotypes was influenced by the concurrent social climate. The questionnaire was open for respondents to complete from the 5th of March 2020 to the 2nd of July 2020, a time at which the Black Lives Matter movement was receiving world-wide media coverage due to the killings of Breonna Taylor and George Floyd by US police officers (Gottbrath, 2020). The Black Lives Matter movement led to discussions which addressed the stereotypes and injustices which have been associated with people of colour, and as such results from this thesis would suggest that these discussions subsequently led to an increased awareness of racism within popular science also.

4.3.4 Evolutionary Progression

Progressionism, also termed evolutionary progress and orthogenesis, is the idea that the fossil record can be used to show the successive and linear evolution of organisms

towards a particular ideal (Bowler, 1976). Progressionism was widely advocated in 19th century science as it complimented the Victorian notion of the Great Chain of Being (Trinkaus & Shipman, 1993). As such, arguably one of the most famous evolutionary iconography tropes was born from the theory of progressionism, picturing human evolution in an ordered line of species ending with anatomically modern humans. This imagery has been termed 'The March of Progress' after the colloquial name for Rudolph Zallinger's illustration, '*The Road to Homo sapiens*', which featured in anthropologist F. Clark Howell's volume of the *Life Nature Library* (Howell, 1965) and can be viewed in Figure 4.7. The March of Progress trope has been mimicked in countless images of human evolution, including Image A and Image D from questionnaire questions 4 and 6.

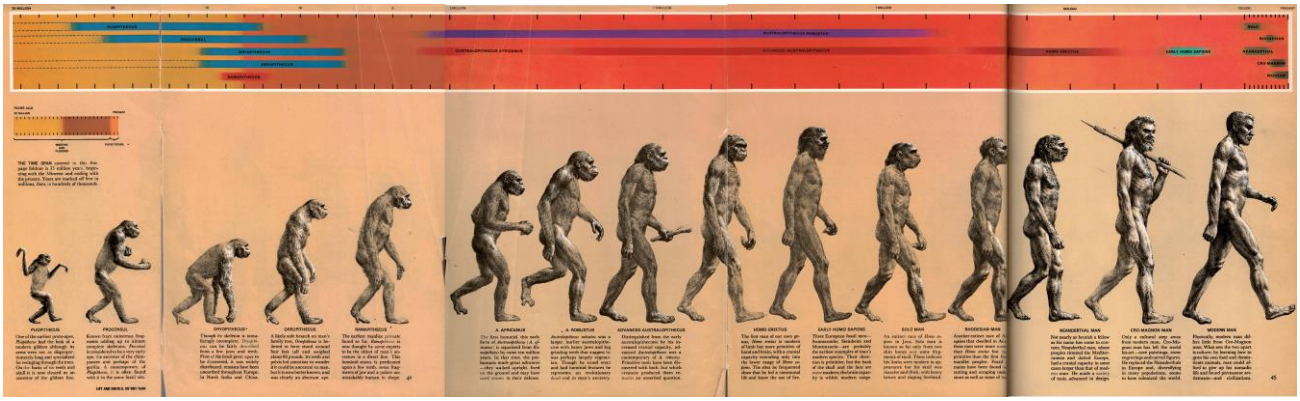


Figure 4.7, '*The Road to Homo Sapiens*' image by Rudolph Zallinger that was used to coin the term The March of Progress (Howell, 1965)

Image A, shown above in Figure 4.6, is an artistic representation of three hominin species positioned in a line of progress from the Smithsonian Museum website. Image D, shown previously in Figure 3.7, is the first image which appears when 'human evolution' is typed into the Google Image search bar and comes from the Britannica website. The image is

of five physically athletic male hominins walking in a human lineage descent line, interestingly facing the opposite direction of the more classical versions of the image. This change in direction may have been a means to dissociate the image with notions of progressionism, however, results from questionnaire question 5 asking respondents to justify their choice of Image D as the most accurate image (see Figure 3.6), illustrate that the theory is ingrained into the image trope. Respondents claimed that the image was correct as "it shows an actual progression through the species" and shows the "gradual development" that they expected. Respondents even suggested that the notion of progression is synonymous to evolution as Image D "shows the progression (evolution) of humanity" (see Appendix 9). Results from Figure 3.6 show that a greater number of media respondents selected Image D and Image A as accurate portrayals of evolution than the anthropology group. A similar trend of disparities between the anthropology group and media group concerning ideas of progressionism can also be seen in the results from questionnaire question 9 that asked respondents to comment on the portrayal of human diversity in the images.

As can be seen in Figure 3.12, the majority of respondents (89.7%) did not find issue with the portrayal of progressionism within the images presented in questionnaire questions 4 and 6. Progressionism was the least mentioned aspect of human diversity out of the three considered in the questionnaire question 9 analysis. However, unlike with the analysis of race and gender issues the anthropology group and media group were not statistically equal in their perceptions as significantly more anthropology respondents mentioned the issue of progressionism than media respondents. These results are suggestive of a direct link between source interaction and progressionist beliefs, with a greater number of respondents who have not interacted with anthropological sources believing in evolutionary progression than those who have interacted with anthropological sources. This corelation is further evidenced by the

results of experiment question 2 which showed that 78% of the media group believed that *Homo sapiens* directly descended from Neanderthals, in contrast, the majority of anthropology students (63%) did not believe this statement (see Figure 3.33). Although *Homo sapiens* and *Homo neanderthalensis* are known to have mated (National Human Genome Research Institute, 2010), evidence suggests that *Homo sapiens* originated in Africa (Cann et al., 1987), not Eurasia as the Neanderthals did. Thus, *Homo sapiens* did not descend from *Homo neanderthalensis*. This fact is taught to students of biological anthropology, but it would seem that such ideas have not been updated in popular perceptions of evolution.

The notion of progressionism could be suggested to be maintained by imagery such as Images A and D as well as other sources that portray evolution as a movement from 'ape-like' to 'human-like'. Results for questionnaire question 11 showed that the anthropology group's most selected term to describe Neanderthals was 'human-like' (see Figure 3.19). In contrast to this, the majority of the media group in the experiment question 1 statements suggested that Neanderthals were ape-like (see Figure 3.29); however, a majority also agreed that Neanderthals were human-like a few statements prior (see Figure 3.30). This discrepancy of opinions between the same media respondents is evidence of the progressionist arguments that they are exposed to which portrays evolution as a linear process of change from apes to humans. A notion which has long been taught in biological anthropology to be incorrect to the extent that more recent theories, such as reticulate evolution, even advocate for a completely non-hierarchical theory of evolution that doesn't have discrete species and genus lines but argues for a complex story of hybridization, phylogenetic tree webbing and cross-cutting lineages (Winder & Winder, 2014). However, in the opposing portrayals of evolution seen in the media, Neanderthals are positioned just before *Homo sapiens* and thus

can be interpreted as more human-like in comparison to the hominins depicted prior, while simultaneously appearing more ape-like in comparison to *Homo sapiens*.

4.4 The Impact of Imagery

4.4.1 Images as Sources of Information

It has been argued by Moser (1992) that visual imagery is not a mere accessory to textual information that translates the theory explained in the text, instead she suggests that images should be considered as influential documents that convey arguments of their own. The analysis conducted on the images from questionnaire questions 4 and 6 are supportive of this argument as they each contained theories concerning human origins research. Image E for example, contained a seemingly hidden argument concerning the place of women in evolutionary history and Images A and D contained arguments of evolutionary progression. Therefore, images should instead be considered as a means of persuasion (Lipphardt & Sommer, 2015), yet, it has been suggested that they do not achieve this actively but in a passive and unquestioned manner (Wiber, 1998). Wiber (1998) argued that images, unlike text which requires additional time to read, are able to convey a wealth of information at a glance and will often be accepted without criticism. Wiber supported this finding through her experiment which included interviews focused on how students interpret the content of human evolution illustrations. Wiber found that many students believed that the portrayal of race in the images she presented, which were similar to that of this study, was seen as empirical fact until the students were informed of the connotations such tropes held. This result would likely be reflective of the respondents within this study also, as the majority did not express concern for the portrayal of race in the questionnaire questions 4 and 6 images

(see Figure 3.13). In this sense the images were uncritically accepted whereas the verbal explanation of the images' contents was not.

The notion of images being uncriticized also correlates with the notion that scientific research is often accepted uncritically by the public. As discussed previously, the research of a scientific discipline is often considered as undisputed fact as opposed to a potential theory or interpretation (Hager, 1997), which is problematic for a discipline where physical evidence is minimal. Paleoanthropological research, and in turn paleoanthropological imagery, relies heavily on analogy (Sperling, 1991) and interpretation in order to form understandings about human evolution. As such, scientific imagery that contains persuasive arguments and individual interpretations (Moser, 1992) are likely to be accepted uncritically due to the formatting of the source as well as the content. A notion which was made apparent by the results of questionnaire question 5 where respondents associated a scientific aesthetic with factual accuracy. When the public perceive an image like that of Image D as highly accurate due to its "scientific" art style (see Appendix 9), they are also perceiving the linear progression of evolution as accurate by association. This illustrates how images are a subjective source of information that are often considered in an objective way, especially when associated with a scientific discipline. This is made further apparent by the large number of anthropology students (50%) who perceived Image D as the most accurate (see Figure 3.6) despite the majority of the experiment anthropology group showing in Figure 3.33 that they did not perceive the notion of a linear evolution as correct.

4.4.2 The Priming Task Split by the Primes

With the observed knowledge that images are uncritically absorbed and the suggestion by Wiber (1998) that text is not absorbed as uncritically as images, it was

hypothesised that the priming task in this thesis' experiment would demonstrate a bias towards the effectiveness of the image primes. The purpose of the priming task was to analyse the difference between visual imagery and verbal media in terms of their ability to convey stereotypes and persuade opinions. Evidence from the priming task found that images were not more persuasive than text and that the formatting of the prime had no significant effect on the way in which stereotypes were absorbed. When split by the primes that respondents had engaged with, the results from the experiment question 1 statements showed that the primes were effective for four of the statements as there was a statistically significant difference for these statements between two or more of the primed conditions. This statistical difference was found between the primes when respondents were asked to rank their agreement with the statements 'Neanderthals were intelligent' (see Figure 3.21), 'Neanderthals wore clothing' (see Figure 3.23), and 'Neanderthals were ape-like' (see Figure 3.24). Results for both of these statements showed that respondents who received a stereotyped prime reacted negatively to the statements and respondents who received a non-stereotyped prime reacted in a more positive manner to the statements, suggesting the effectiveness of the primes. However, the Dunn Bonferroni tests showed that there was not a significant difference between the formatting of the primes and the reactions that respondents gave. In order to provide evidence to support the notion that images are more persuasive than text there would need to be a statistically significant difference between primes on the same stereotype level (i.e. both stereotyped) that were of opposing formats (i.e. visual and verbal). As this was not the case, these results simply illustrate that negative stereotypes influence negative responses independent of source formatting.

There was one statistically significant difference found between the formatting of the primes for the case of the statement 'Neanderthals were hairy'. As can be seen in Figure 3.22,

a greater percentage of non-stereotyped image respondents agreed with the statement than non-stereotyped text respondents, which was deemed statistically significant through a Dunn Bonferroni test. The extent of Neanderthal body hair was explicitly stated and shown within the primes (see Appendix 4) with the stereotyped primes illustrating a Neanderthal covered in body hair and the non-stereotyped primes illustrating a Neanderthal with only facial hair. The difference found within the results suggested that the non-stereotyped image respondents believed the Neanderthal individual was hairier than the non-stereotyped text respondents despite the fact that both primes were referencing the same Neanderthal individual. This is suggestive of the encoded messages (Wiber, 1998) and arguments (Moser, 1992) disguised within imagery as there was a perceived difference between the depiction and the description of the same Neanderthal individual. The individual in the non-stereotyped image is depicted as far less hirsute than the individual in the stereotyped image, which was a visual means by Keith to make the Neanderthal appear more like 'Us' as the non-stereotyped image was produced as a direct response to the stereotyped image. These images were used to advocate theories concerning the place of Neanderthals in the *Homo sapiens* lineage (Moser, 1998). However, despite Keith using the image to argue for the inclusion of Neanderthals, the Neanderthal individual in the non-stereotyped image appears hairy when compared to common depictions of *Homo sapiens* in imagery such as the *Homo sapiens* individual in Image D (Figure 3.7). In this case Keith appears to be utilising the common artistic trope of using hair as a means to 'other' a species (Berman, 1999) while simultaneously using the hair trope to humanise the same species. Keith utilising encoded imagery in this manner is fitting with the knowledge that 3 years after the production of this image, Keith amended his beliefs to instead advocate for a non-linear approach to evolution

as a means to remove Neanderthals from the *Homo sapiens* lineage (Keith, 1914). This result is suggestive of the persuasive abilities of visual media.

However, results for the other statements (see Figure 3.1) and questions within the priming task (see Figure 3.32, Figure 3.34, and Figure 3.36) did not suggest that imagery was more persuasive than text. The extent to which imagery demonstrated the inclusion of subliminal stereotypical tropes appeared minimal due to the fact that many of the behaviour-based statements that required respondents to be influenced by further interpretations of the primes, such as 'Neanderthals were primitive', 'Neanderthals were moral' and 'Neanderthals were cannibals', were not deemed statistically significant. Instead, statements which focused on Neanderthal appearance such as 'Neanderthals were ape-like', 'Neanderthals were hairy', and 'Neanderthals wore clothing' were shown to be statistically significant. However, the statements of 'ape-like' and 'intelligent' were not explicitly addressed within the primes as 'hairy' and 'clothing' were (see Appendix 4) and as such could be considered evidence for the support of subliminal coding within imagery. Yet, this would also support the notion that such coding would therefore be present within the subtext of verbal media as the formatting of the primes was considered statistically nonsignificant for these statements. Thus, the priming task as a whole suggests that stereotypes are being absorbed by respondents to the same extent through both visual and verbal media. It is also important to note that respondents who received a textual prime put more trust in their prime than respondents who received a visual prime (see Figure 3.38), although this result was not found to be significant, the lack of additional trust respondents placed in the visual primes further negates the argument proposed by Wiber (1998) that images are uncritically absorbed, and textual information receives more criticism. When split by the primes, the priming task did not provide conclusive evidence to suggest that stereotypes in visual formats

are more persuasive, believable, and uncritically accepted as previous research has suggested.

4.4.3 The Priming Task Split by Engagement with Anthropological Education

When the priming task results were split by engagement with anthropological education as opposed to the primes, a greater degree of difference between the test groups was observed. The primed conditions only proved effective on four of the experiment question 1 statements and only showed the possible influence of formatting on one of these statements. In contrast, splitting the data by engagement with anthropological education provided significant results for more of the experiment question 1 statements than the primes did, as well as on other questions within the priming task. Results from the priming task found that respondents who stated in the demographics section of the experiment that they studied anthropology and/or archaeology were less likely to choose responses that were negatively charged. Instead, anthropology students mostly chose responses that were neutral or that portrayed Neanderthals in a positive light. In contrast, the experiment's media group respondents mostly chose responses that reflected negative Neanderthal stereotypes when there was a statistical difference between the groups. For example, in the experiment statements a significantly greater number of media respondents agreed with the statement 'Neanderthals were primitive' than anthropology respondents (see Figure 3.27). Many of the statements that showed a statistical difference between the media group and the anthropology group regarded Neanderthal behaviour which was not explicitly addressed within the primes (see Appendix 4). This is suggestive of the influential power of anthropological education as palaeoanthropology has had an increased focus on Neanderthal behaviour in recent decades as opposed to discussions of their physical attributes

(Edgeworth, 2006). Recent research on Neanderthal behaviour has portrayed them as caring (Trinkaus & Zimmerman, 1982), artistically cultured (Zilhão et al., 2010; Marris, 2018), and articulate (Barney et al., 2012).

However, in the instance of the statement 'Neanderthals wore clothing', Figure 3.29 shows that a significantly greater number of media respondents agreed with the statement than anthropology respondents which is not the expected trend considering the rest of the data. This statement was deemed to be statistically significant when split by the primes as well as when split by engagement with anthropological education. Another statement that was deemed statistically significant when split by anthropological education as well as the primes was the statement 'Neanderthals were hairy', where more media respondents agreed with the statement than did anthropology respondents (see Figure 3.25). Both of these statements were explicitly addressed within the primes (see Appendix 4). As approximately half of the media respondents agreed with the statement that 'Neanderthals wore clothing' and half of the primes (both non-stereotyped primes) stated this was the case, the responses of the media group for these two statements are suggestive of the increased impact the primes had on the media group as opposed to the anthropology group. This is further evidenced by the results of Figure 3.39 which show that a significantly greater number of media respondents trusted the accuracy of the prime they were given than the anthropology respondents. This finding implies that the media group were more susceptible to the primes and the information contained within them. Therefore, popular science images are not uncritically accepted because they are images and thus intrinsically deemed accurate as Wiber (1998) suggested but because of the susceptibility of the audience that is accepting them. This increased level of susceptibility to the primes seems directly correlated to their lack of engagement with academic sources as this was the defining difference between the

media group and the anthropology group, which was shown to be valid within the questionnaire data (see Figure 3.2). Evidence from the priming task when split with primes also suggests that the media group is susceptible to verbal media as well as visual media. Overall, the priming task evidence does not show conclusive evidence that visual media is a more persuasive format for perpetuating stereotypes than verbal media, but it does show that the media group, i.e. the general public, are less likely to critique information that they are given and even perceive heavily stereotyped information as accurate.

4.4.4 The Picture Superiority Effect

Although evidence from the priming task did not support the hypothesis that imagery is a more persuasive format than text, research surrounding the picture superiority effect strongly suggests that images are a more memorable format than words (Paivio, 1971). There exists an extensive amount literature surrounding the picture superiority effect in psychology which advocates that the way in which information is coded for in the human mind results in the better retention and recall of visual as opposed to verbal information (Grady et al., 1998). This has been supported by works such as Standing et al. (1970) who found that humans can remember and recognize more than 2,000 images with at least 90% accuracy over long retention intervals. A feat which other studies have suggested greatly exceeds the human ability to recall words (Paivio, 1971). There are few recent studies which have tested the picture superiority effect in the literature as it is a well-supported theory, instead more recent studies involve the application of the theory to different situations; in this case the theory was applied to the recall of human evolution stereotypes. However, despite an abundance of literature suggesting that images are more memorable that words, the results of the recall

task did not find a statistically significant difference between the recall of the visual primes and the recall of the textual primes (see Table 3.3, correct statements row).

In relation to the human evolutionary stereotypes, the results suggested that the verbal primes were statistically superior to the visual primes in conveying and transmitting stereotypes (see Table 3.3, correct stereotypes row). The priming task did not find this same difference; however, the memorability of stereotypes does not necessarily directly correlate to the persuasive ability of the source. In fact, although the stereotypes of the verbal primes were better remembered, the visual primes were found to elicit the creation of additional stereotypes that were not explicitly shown within the primes (see Table 3.3, incorrect stereotypes row), especially negative stereotypes (see Figure 3.40). This difference was due to the formatting and not the stereotype level of the sources as the effect of the stereotyped and non-stereotyped content of the primes was deemed nonsignificant (see Table 3.4). Thus, these results are suggestive of the hidden, persuasive tropes harboured within human evolutionary imagery that elicit further stereotypical thinking than explicitly shown.

The additional stereotypes that the stereotyped image elicited from respondents were that the Neanderthal individual was “aggressive”, “primitive”, and “ape-like” as well as appearing “brutal” in nature (see Appendix 8). These stereotypes are all associated with classical depictions of the primitive ‘Other’ with excessive body hair, nakedness, and proximity to the open environment being key tropes used in images (Berman, 1999), such as Figure 1.5 of Native Americans and in the stereotyped image in this experiment, to denote primitivity. Ape-like features have also been used to further signify primitivity as a means of distancing Neanderthals from the progressed ‘Us’. Furthermore, the additional stereotypes that the non-stereotyped image elicited were reflective of the classic caveman iconography

of a Neanderthal “holding a club” and “looking puzzled” (see Appendix 8). Such tropes can be seen in depictions of early Neanderthals such as the first Neanderthal illustration that was published in *Harper’s Weekly* (Figure 1.10) as well as popular culture depictions such as those seen in Figures 4.1, 4.4, and 4.5. The influence of these hidden tropes on the visual prime respondents is highly suggestive of the persuasive nature of images over the persuasive nature of text which was shown to elicit less hidden stereotypes.

However, the textual primes were shown to be more memorable than the visual primes in terms of stereotypes. As this is unexpected from the vast amount of literature supporting the picture superiority effect it could be suggested, as discussed within the limitations of this thesis, that the way in which the ‘correct stereotypes’ were coded may have biased the textual primes. This may be why in this instance verbal primes were considered more memorable than visual primes in terms of human evolution stereotypes. This potential bias however does not negate the evidence for the persuasive nature of the hidden tropes within evolutionary imagery as there was no set list for coding ‘incorrect stereotypes’. The code for ‘correct stereotypes’ however potentially biased the textual primes as text respondents were indirectly provided with a clear outline of the ten stereotypes they were expected to recall. Therefore, this data may not be a reliable indicator of the application of the picture superiority effect to human evolutionary stereotypes and as such further research is required in this area to determine whether there was a significant issue with the composition of the recall task or whether this was the true effect of format on the memory of human evolutionary stereotypes. The notion of this being a true reflection may be accurate as it is clear that source format was not the only factor within human evolutionary stereotypes that affected the memorability of the primes. As Table 3.5 shows (correct stereotypes row), the anthropology group remembered the ‘correct stereotypes’ significantly better than the

media group which may have had an influence on the formatting outcome. It is also important to note that this did not affect the 'incorrect stereotypes' (see Table 3.5, incorrect stereotypes row) and as such additional stereotypes can be attributed to the hidden tropes of the visual primes.

4.5 The Impact of Anthropological Education

As shown above, both the priming task and the picture superiority recall test suggested that the extent to which respondents have studied anthropology and/or archaeology is a key factor to consider when testing for the influence of different media formats. Results from these two experiments suggested that respondents who have studied anthropology are better at remembering Neanderthal stereotypes, but this does not make them more susceptible to them. In fact, results showed that the media group, who have not studied anthropology, were more likely to believe information that they were supplied irrespective of what format the information was presented to them in. Some evidence has suggested that the hidden visual tropes within evolutionary imagery has further influenced the production of negative stereotypes, but a key component in the trust that people place into these additional stereotypes (see Figure 3.39), and the pre-existing stereotypes, appears to be the extent of anthropological education and not simply the format of the source (see Figure 3.38). This suggests that respondents were not more likely to believe the content of the primes due to the primes' formatting but due to the extent of the respondent's previous engagement with human evolution academia.

Results from both the experiment and the questionnaire have shown that the source types with which respondents engage greatly impact their perceptions of Neanderthals and

human evolution more generally. As Figure 3.2 has illustrated, both the anthropology group and the media group interacted heavily with non-academic sources concerning human evolution, particularly quasi-educational sources (Figure 3.3), however, the anthropology group was also shown to interact with academic sources, a source type with which the media group had a limited level of exposure. The negative portrayal of Neanderthals produced by the media group throughout the questionnaire and experiment data can be attributed to their lack of exposure to academic resources as the anthropology group, in contrast, produced a more positive portrayal of *Homo neanderthalensis*. For example, as can be seen in Figure 3.17, 94.7% of the anthropology group selected the Keith image (Picture B in Figure 3.16) which depicted Neanderthals in a very humanised way when compared to the second option of the Kupka image (Picture A in Figure 3.16); a statistically significant number of respondents in media group however selected the negatively stereotyped image that Kupka produced as the most 'Neanderthal-looking'. This trend can also be observed in the terms that respondents selected to describe Neanderthals from the given list (Table 2.1) as the two groups demonstrated polarised views, with the anthropology group responding as positively as the media group did negatively (see Figure 3.18). These opposing beliefs appear to directly correlate with the source type with which respondents engage as this is the only perceived difference between the demography of the anthropology group and the media group. Thus, it is clear from the results that exposure to academic sources can remove the conviction individuals have in negative human evolution stereotypes as both the anthropology group and the media group engaged with non-academic sources but only the anthropology group engaged with academic sources to a considerable degree.

It can also be argued from the results that an exposure to academic sources makes individuals less susceptible to the views of negative stereotypes as academic sources

encourage a more critical outlook on human evolution resources, both within and outside of academia. Results found that the anthropology group were more likely than the media group to critique and question information that they are presented; this was evidenced in the results of questionnaire question 9 which showed that significantly more anthropology respondents found issue with the portrayal of human diversity in the images they were presented than the media respondents found (see Figure 3.11). This, along with the evidence from the priming task that suggested the media group were more likely to believe information they were presented, suggests that anthropological education provides individuals with a critical skillset that aids in the challenging and repudiation of human evolution stereotypes.

This critical approach to human evolutionary sources is also evidenced in the anthropology groups' focus on factual information supported by peer-reviewed anthropological research. Responses by the anthropology group for questionnaire question 3, which asked them to describe a Neanderthal individual, focused mainly on the recall of information considered academically-factual concerning skeletal structure and recent theories within the field (see Appendix 5). As such, the majority of anthropology respondents provided a neutral description of a Neanderthal individual (see Figure 3.20); this still differed significantly from the media group who provided mostly negative descriptions. Thus, the influence of anthropological education does not necessarily equate to an overtly positive perception of Neanderthals, however, the perception of the anthropology group is more positive than that of the media group as neutral statements avoid the use of outdated negative stereotyping. Anthropology students do not necessarily have to be actively positive in order to express a positive attitude towards Neanderthals as a reliance on anthropological research, critical thinking and an understanding of stereotypical misconceptions can also achieve this.

5. Conclusion

Academic perceptions of *Homo neanderthalensis* have changed dramatically since the discovery of the species' type specimen, Feldhofer 1, in August 1856 (Trinkaus & Shipman, 1993). Paleoanthropological work over the last 150 years has transformed the Neanderthals from pithecoid brutes (Boule, 1913) to geographically varied *Homo sapiens* with symbolic culture (Kimbel & Lawrence, 1993). As such, the scholarly opinions of Neanderthals no longer involve the use of the negative stereotypes and misconceptions that were associated with the species during the 19th century. Instead, evidence has shown that those within the anthropological and archaeological disciplines maintain a positive attitude toward the species and often portray them in a favourable manner. However, evidence has also shown that the public's perceptions of Neanderthals, and human evolution more generally, are not congruent with recent academic research and instead echo the academic perceptions of 19th century palaeoanthropology, where Neanderthals were cavemen (Horrall, 2017) and evolution was progressive (Trinkaus & Shipman, 1993). These stereotypes were shown to be influenced by the non-academic human evolutionary sources with which the public were interacting, particularly those within the realm of quasi-education.

It has been argued by anthropologists such as Moser (1998), Wiber (1998), and Scott (2010) that the negative public perceptions of human evolution have remained since the 19th century due to the visual imagery that the public are exposed to. In her study, Wiber (1998) stated that the reason images were responsible for the perpetuation of human evolutionary stereotypes was because they are intrinsically more memorable and persuasive than text, however, she did not provide evidence to attest this assumption. As such, this thesis tested this assumption in order to determine how the negative stereotypes that surround popular

perceptions of Neanderthals are distributed and maintained. This was conducted through the use of a questionnaire and a dual-purpose experiment that involved a priming task and a picture superiority recall test.

It was shown that, to a certain degree, images are persuasive tools for the dissemination of stereotypes particularly through their use of harboured messages encoded within their design. These harboured messages often contain stereotypes surrounding 19th century perceptions of gender roles and race as well as classic caveman iconographic tropes and insinuations of a progressive evolutionary theory. These stereotypes were found to be uncritically accepted; however, this was not found to be unique to imagery as much of the information that was given to the public was shown to be uncritically absorbed, irrespective of its format. The extent to which visual imagery were found to be intrinsically persuasive was marginal as, on the whole, they were not found to be any more persuasive or memorable than textual media. As such there was not enough evidence within this thesis to support the hypothesis that images are more persuasive and memorable than words. However, further work may be required to provide a fully conclusive verdict on the memorability of visual media as the results of this study were not congruent with literature surrounding the picture superiority effect. Further work concerning the application of the picture superiority effect to other stereotyped media outside the realm of human evolution may also prove beneficial for providing insight on these results, as well as possibly aiding in the identification of the key perpetuator of other stereotypes.

The notion of images being the key perpetuator of human evolution stereotypes is still evidenced through other aspects of the thesis however. It has been shown throughout this thesis that palaeoanthropology is a highly visual discipline, and as such, so is the public science

of human evolution. There are many examples shown within this thesis of the stereotypical depictions that are used in various forms of non-academic media from quasi-educational sources such as museum displays and science magazines to entertainment-based sources such as films and internet memes. Such images have also been shown to be in continued reproduction and circulation within popular media, even within articles that are not specifically referencing the stereotypical image which they chose to include. This knowledge, alongside the findings of the undergraduate dissertation which preceded this thesis (Taylor, 2019) which found that media articles do not use more stereotypical language than anthropology articles, is suggestive of the visual imagery within popular media perpetuating negative stereotypes. This is not suggestive of images being more persuasive or memorable than text, but instead presents the notion that images may be more likely to perpetuate negative human evolutionary stereotypes than the text as they contain negative stereotypes that the accompanying text does not. However, the undergraduate dissertation only analysed the language use of newspaper articles which, by their nature, are the most likely non-academic source to report on recent anthropological findings and thus obtain their knowledge from recent anthropological publications. As evidence from this thesis suggests that there are numerous other non-academic sources with which the public interact, it cannot be assumed that the text within other sources reflect the findings from the undergraduate dissertation. Therefore, further work would be required here to analyse the extent of stereotypical language use across various non-academic sources in order to assess this assumption.

Even though there was no conclusive evidence to suggest that images were more persuasive and memorable that words or that images were the chief perpetuator of 19th century stereotypes, there was strong evidence to support the public's uncritical acceptance

of quasi-educational material. Evidence showed that the public engaged with and trusted quasi-educational material to a significant degree, which has been suggested previously by research concerning the CSI effect and the phenomenon that the public are highly likely to uncritically accept information of a scientific nature due to their belief that science is objective, bias free and trustworthy (Hager, 1997). Thus it can be suggested that the majority of the public uncritically absorb human evolution stereotypes as they believe them to be factually correct and from reputable sources. Unlike the general public, it was found that individuals who have a background in anthropology are more likely to critique and question information that they are presented concerning human evolution. These polar approaches to the verification of human evolution material provides an explanation for the continued belief in outdated stereotypes by the public. If popular media sources still contain stereotypes, as this thesis demonstrates that they do, the public are likely to continually absorb this information uncritically as they lack the anthropological education required to be knowledgeable enough on recent research to critique the information they are presented. Thus, further work on this matter which explores the way in which public science communication can be improved to promote accurate and relevant research would be beneficial. It would also be interesting to assess the effect that a change in the public communication of science would have on the public's interest and engagement with human evolutionary science and whether negative stereotypes, such as the caveman iconography, aided in attracting their attention.

Appendix

Appendix 1 – Information and consent form displayed to questionnaire participants.

Please read the following information before participating in this questionnaire

You are invited to take part in a study that I am conducting as part of my Postgraduate Masters Dissertation Project in Biological Anthropology at Durham University. This study has received ethical approval from the Durham University Anthropology Departmental Research Ethics Committee. Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant.

The purpose of this study is to investigate common perceptions of human evolution. Your participation in this research project is voluntary and as such you do not have to agree to take part. If you do agree to take part, you can choose to leave the questionnaire at any time by closing the window without providing reason. If you choose to withdraw from the study the information you provide will be deleted and not be included within the data; this will be done in-line with the official Durham University Privacy Policy. A full outline of this policy can be found here: https://www.dur.ac.uk/research.innovation/governance/ethics/considerations/people/consent/privacynotice/

All information obtained during the study will be kept confidential. Only the researcher and project supervisors (Dr T. Buck and Dr S. Street) will have direct access to this information. If the data is published it will be kept completely anonymous with no identifying information being included within the project data. The data collected will be used in this dissertation project and potential future publications. This dissertation will be published open access on the Durham University online depository for Higher Degree Theses.

If you have any questions you can contact me via email: ceri.l.taylor@durham.ac.uk. You can also email this address to request a research summary upon completion of the research.

By clicking 'Next' you are confirming that you are 18 years or over and consenting to the inclusion of your responses within the above-mentioned dissertation project, as well as further use in potential publications.

The questionnaire takes approximately 2-3 minutes to complete.

Appendix 2 – Information and consent form displayed to experiment participants.

Please read the following information before participating in this experiment:

You are invited to take part in a study that I am conducting as part of my Postgraduate Masters Dissertation Project in Biological Anthropology at Durham University. This study has received ethical approval from the Durham University Anthropology Departmental Research Ethics Committee. Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant.

The purpose of this study is to investigate common perceptions of human evolution. Your participation in this research project is voluntary and as such you do not have to agree to take part. If you do agree to take part, you can choose to leave the experiment at any time by closing the window without providing reason. If you choose to withdraw from the study the information you provide will be deleted and not be included within the data; this will be done in-line with the official Durham University Privacy Policy. A full outline of this policy can be found here: https://www.dur.ac.uk/research.innovation/governance/ethics/considerations/people/consent/privacynotice/

All information obtained during the study will be kept confidential. Only the researcher and project supervisors (Dr T. Buck and Dr S. Street) will have direct access to this information. If the data is published it will be kept completely anonymous with no identifying information being included within the project data. The data collected will be used in this dissertation project and potential future publications. This dissertation will be published open access on the Durham University online depository for Higher Degree Theses.

If you have any questions you can contact me via email: ceri.l.taylor@durham.ac.uk. You can also email this address to request a research summary upon completion of the research.

By clicking 'I consent' you are confirming that you are 18 years or over and consenting to the inclusion of your responses within the above-mentioned dissertation project, as well as further use in potential publications.

The experiment takes approximately 8 to 10 minutes to complete.

- ☐ I Consent
- ☐ I Do Not Consent

Appendix 3 – A copy of the questions asked within the questionnaire.

Demographics

1. What is your age?
   - ☐ 18-24
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55+
   - ☐ Prefer not to say

2. What is your gender?
   - ☐ Male
   - ☐ Female
   - ☐ Other
   - ☐ Prefer not to say

3. What is your ethnicity?
   - ☐ Asian / Asian-British
   - ☐ Black / Black -British / African / Caribbean
   - ☐ Mixed / Multiple ethnicities
   - ☐ White / White-British
   - ☐ Other
   - ☐ Prefer not to say

4. Do you or have you ever studied anthropology and/or archaeology?
   - ☐ Yes
   - ☐ No

Questions

1. Which of the following media have you read/seen recently regarding human evolution? (Please tick all that apply)
   - ☐ National Geographic
   - ☐ Films (e.g. The Croods)
   - ☐ Newspaper articles
   - ☐ Academic journal articles
   - ☐ Non-academic literature
   - ☐ Textbooks
   - ☐ Museum displays
   - ☐ Documentaries
   - ☐ Television programmes (e.g. The Flintstones)

- ☐ Social media
- ☐ None of the above
- ☐ Other

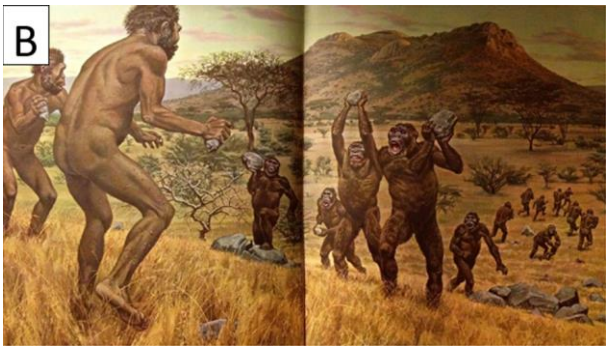
If you selected 'Other', please specify: _____

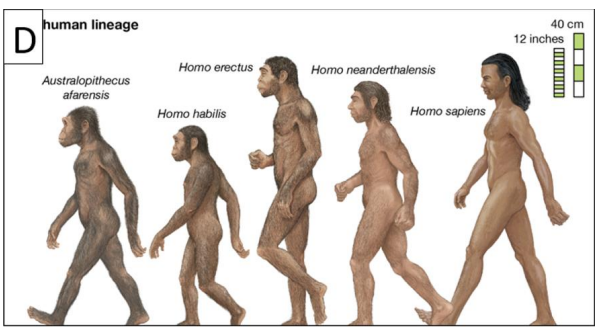
2. Which of the following sources would you trust most to provide accurate information about human evolution?
   - ☐ National Geographic
   - ☐ Film
   - ☐ Museum display
   - ☐ Google Images
   - ☐ Lecture slides
   - ☐ Museum website
   - ☐ Textbook

3. In detail, please describe what you think a Neanderthal looked like. Please be as descriptive as possible.

   _____
   _____

4. Which of these images do you think is the most accurate representation of our evolutionary history?





E

F

G

5. Why do you think this is the most accurate representation?

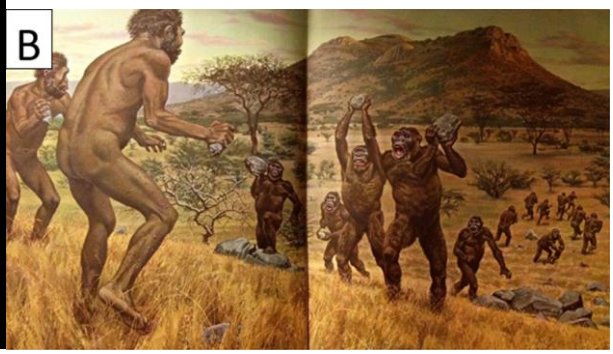
_____

_____

6. Which of these images do you think is the least accurate representation of our evolutionary past?

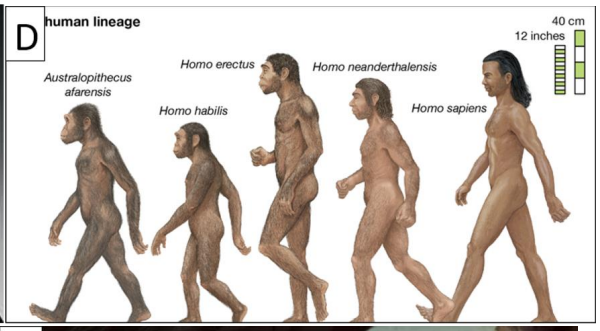
A

B



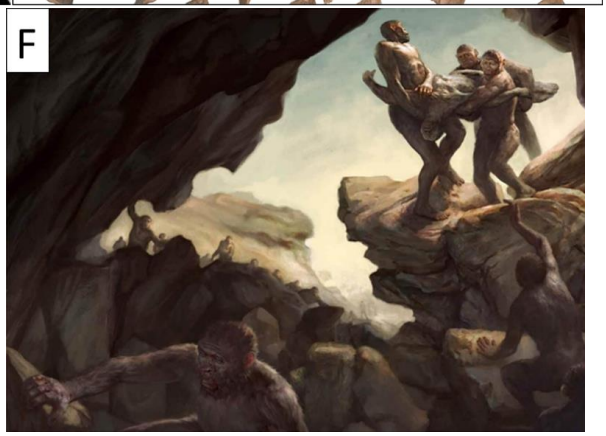
C

D



E

F



G

7. Why do you think this is the least accurate representation?

_____

_____

8. Do you see any common themes in how human evolution has been presented in these images?

_____

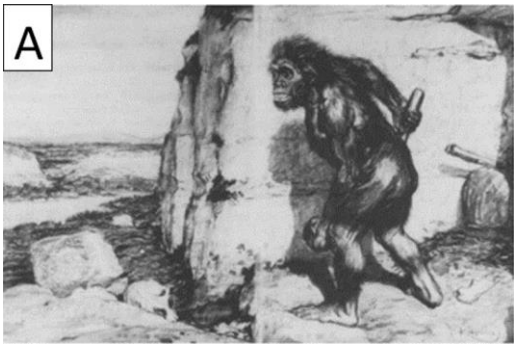
_____

9. What do you feel about the portrayal of human diversity in the images you have just seen?

_____

_____

10. Which of these image looks ‘more Neanderthal’ to you?



11. From the list below, which two words do you think best describes a Neanderthal?

- ☐ Basic
- ☐ Ape-like
- ☐ Civilised
- ☐ Unintelligent
- ☐ Sophisticated
- ☐ Non-aggressive
- ☐ Human
- ☐ Primitive
- ☐ Average-intelligence
- ☐ Barbaric
- ☐ Human-like
- ☐ Intelligent

Thank you for taking the time to participate in this study.

If you have any questions regarding the questionnaire or would like to request a research summary upon completion of this project please don't hesitate to contact me via email: ceri.l.taylor@durham.ac.uk

Appendix 4 – A copy of the questions and distraction task asked within the experiment

Demographics

1. What is your age?

   - ☐ 18-24
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55+
   - ☐ Prefer not to say

2. What is your gender?

   - ☐ Male
   - ☐ Female
   - ☐ Other
   - ☐ Prefer not to say

3. What is your ethnicity?
   - ☐ Asian / Asian-British
   - ☐ Black / Black -British / African / Caribbean
   - ☐ Mixed / Multiple ethnicities
   - ☐ White / White-British
   - ☐ Other
   - ☐ Prefer not to say

4. Do you or have you ever studied anthropology and/or archaeology?
   - ☐ Yes
   - ☐ No

Primes **[only one of the possible four was shown to each participant, decided by a randomiser]***

1. Please study the below description of a Neanderthal. You will be moved to the next slide automatically.

   A male individual stands outside of a cave holding a wooden club and a stone. He wears no clothing or accessories. He is covered in hair all over his body. He has an extremely muscular build with very defined muscles. He has a neutral facial expression. His mouth is open and showing teeth. He has prominent brow ridges and a wide nose. His feet are bare, and his toes are long. **[Stereotyped text]**

2. Please study the below description of a Neanderthal. You will be moved to the next slide automatically.

   A male individual sits inside of a cave making a stone tool using another stone. He wears some animal skins and a tooth necklace. He has facial hair but no other body hair. He has a muscular build, but his muscles aren't very defined. He has a neutral facial expression. His mouth is closed and not showing teeth. He has smooth brow ridges and a medium sized nose. His feet are bare and his toes are short. **[Non-stereotyped text]**

3. Please study the below image of a Neanderthal. You will be moved to the next slide automatically.

[Stereotyped image]

4. Please study the below image of a Neanderthal. You will be moved to the next slide automatically.

[Non-stereotyped image]

Questions

1. Please respond to the below statements about Neanderthals

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
Neanderthals were intelligent					
Neanderthals were hairy					
Neanderthals had culture					
Neanderthals were sophisticated					
Neanderthals were primitive					
Neanderthals were vicious					
Neanderthals were human-like					
Neanderthals were cannibals					
Neanderthals wore clothing					
Neanderthals were savage					
Neanderthals were civilised					
Neanderthals were barbaric					
Neanderthals were ape-like					
Neanderthals were moral					
Neanderthals were capable of making tools					

2. Do you think we descended from Neanderthals?
   - ☐ Yes
   - ☐ No

3. You've taken a DNA ancestry test. The results come back and you are 5% Neanderthal. What is your reaction?
   - ☐ Positive
   - ☐ Neutral
   - ☐ Negative

4. Why do you feel this way?

_____
_____

5. How would you feel if someone said “you’re such a Neanderthal” to you?
    - ☐ Positive
    - ☐ Neutral
    - ☐ Negative

6. Why do you feel this way?

_____
_____

7. Do you think the description/image you saw at the beginning of this experiment was an accurate depiction of a Neanderthal individual?
    - ☐ Yes
    - ☐ No

8. Why do you think this?

_____
_____

Distraction Task

Please complete the following arithmetic problems. You will be moved to the next slide automatically.

1. 16 + 13 =
2. 10 x 5 =
3. 19 – 16 =
4. 11 + 21 =
5. 16 + 14 =
6. 14 – 9 =
7. 15 x 5 =
8. 28 – 9 =
9. 12 + 15 =

10. 13 x 2 =
11. 12 + 30 =
12. 9 x 3 =
13. 7 + 7 =
14. 21 ÷ 3 =
15. 28 + 5 =
16. 19 – 12 =
17. 35 – 18 =
18. 5 x 4 =
19. 3 x 6 =
20. 36 ÷ 9 =
21. 5 + 17 =
22. 10 x 9 =
23. 18 ÷ 6 =
24. 13 + 18 =
25. 8 x 5 =
26. 28 – 12 =
27. 8 + 3 =
28. 2 x 16 =
29. 20 ÷ 4 =
30. 30 – 16 =

If you complete the above questions before the timer runs out, please wait for the timer to end and you will be moved on automatically.

Recall task

1. In as much detail as possible, please describe/recall the Neanderthal image or description that you saw at the beginning of this experiment.

_____
_____
_____
_____

Prize Draw

If you would like to enter into the £100 Amazon Voucher prize draw, please provide your email below

_____

Thank you for taking the time to participate in this study.

If you have any questions regarding the experiment or would like to request a research summary upon completion of this project please don't hesitate to contact me via email: ceri.l.taylor@durham.ac.uk

*The use of bold text with square brackets is to provide additional information for the reader. The contained information was not displayed to participants during the experiment.

Appendix 5 – Neanderthal descriptions given by the questionnaire anthropology group coded into positive, neutral and negative with the coded terms highlighted

POSITIVE

1. human, short, heavier set, stocky, heavier facial features, prominent brow, dense bones
2. human but shorter and stockier with larger facial features.
3. Neanderthals were humans and as such had all the characteristics that we commonly ascribe to the genus Homo -biped, opposable thumbs, big brain (1500cc capacity, a bit bigger in average than Homo sapiens), completely aligned toes, s-shaped spine, to name a few. In comparison to Homo sapiens, Neanderthals had a stockier body (shorter in average, wider shoulders, thicker limbs). They lacked a protruding chin, had wide noses, thicker browridges and a forehead that leaned back significantly more than it usually does in Homo sapiens. The skull was more elongated horizontally, with a protrusion at the back.
4. I believe that Neanderthals looked very similar to AMHs, so much so that if they were wearing modern clothing, they would not perceptively look too different. They were slightly smaller in height and stouter with a barrel-shaped chest. They were generally more robust with a thicker browridge, larger nasal aperture and eye sockets. Their cranial capacity overlaps with modern humans and could be slightly larger. Some Neanderthals had an occipital bun but again this probably wouldn't be too noticeable. They did not have chins like AMHs and had longer more robust calcanei which again wouldn't be too obvious from a distance. They stood upright, wore personal ornamentation such as corvid claws, feathers, shells and perforated carnivore incisors and they most likely wore clothes (they certainly had the technology). They are nothing like the hunched over primitive stereotype that Boule accidentally created with his artistic rendering of La Chapelle
5. Robust, broad, human, weathered
6. Barrel chested, short limbs. Greater supra orbital ridge (than H. sap), no chin. Hair just above shoulder length. Wearing fur clothing and carrying a pouch containing a lithics kit. Carrying a spear.

7. Compact muscular body with a relatively large head. May have had ginger hair and a higher-pitched voice

NEUTRAL

1. Low brow, shorter in stature, tanned skin,
2. Slightly shorter than modern Homo Sapiens, with a more 'stocky' builder (broader ribcage and thicker limbs). Slightly more pronounced browridge and heavier facial features.
3. Short but wide. Large features such a the nose. Bigger ribcage and feet. Tanned or olive skin tone.
4. Post-cranial skeleton like an Inuit on steroids. Strikingly large nose, missing chin, wide face, low vaulting cranium, large mandible. Might be able to pass on the tube but you'd know something was afoot
5. Stocky build, squarer jaw, wide nose, brow ridge
6. A lightly tanned skinned human, with dark hair and beard area (if male). Larger lips that considered 'normal' for humans today but apart from that, similar to males today
7. Shorter and heaver built than us, but otherwise closely recognisable as cousins to us. I imagine them with dark hair and skin
8. ~~FURROWED BROW, PALE WHITE, TALL, SLOUCHED (I DON'T KNOW WHY). LOTS AND LOTS OF CLOTHES ON~~
9. Obviously quite a hard question to answer, I think a Neanderthal may have been shorter than modern humans, rather stocky, with a slightly enlarged head
10. A similar stature to AMH but with more robust features such as skull shape and shoulders
11. Very stocky. Broad in the shoulder and hip, relative to height. Slightly more robust in facial features with a broad nose. Arms and legs relatively short compared to the trunk (their knuckles did not drag on the ground!).
12. Heavy brow ridges, stocky build
13. Shorter and more robust than Homo Sapiens. Possessed a larger cranium capacity, more defined brow-ridge and had a larger, more barrel-shaped chest in comparison with Homo Sapiens
14. Neanderthals, similar time humans, had larger skulls with a prominent brow bone. However, the skulls contained less space for a large brain. They walked erect and probably varied in skin colour as they were found mostly in Europe, but the cheddar man shows that dark skin was a possibility
15. Heavy brow ridge, robust skeleton, longer trunk, lower cranial vault
16. Not much different than Homo Sapiens, perhaps somewhat shorter with more pronounced facial features. Red hair and blue eyes were supposed to be more common among Neanderthal population.
17. Short and robust compared with the modern human. Sloping forehead, Projecting mid-face and jaw
18. fair skin and hair and thick eyebrows

19. It is difficult to be certain, because their appearance (as well as ours) is given by their DNA. The ancient DNA is difficult to interpret, because of its fragmentation, among other factors thus being burdensome to recover information from it
20. Large, prominent face (particularly nose and pre-orbital brow ridge, sturdy bones, robust
21. Large brow ridge, pronounced cheek bones, large, broad nose. Shorter on average than modern humans, but more robust - thicker limbs and torso
22. Stocky, shorter than H.sapiens and well built with larger bones. Crania have very prominent brow ridges and also have large noses and quite pronounced mid facial prognathism
23. Wide nose and brow, flat features almost like they were dropped and landed on their face. lighter skin with thick hair. Short but brawny. sunken in eyes
24. Similar to how we look know except with wider set/ larger features; i.e. facial and cranial
25. Neanderthals
26. Wide horizontal nose Prominent brow ridge Robust mandible Bipedal- angled femurs Opposable thumbs Strong and muscly arms and legs Big teeth/canines/molars Darker skin
27. Large brow ridges, thicker limbs, larger hands and feet than homo sapiens. Relatively small and very muscular, lacking a proper torso separating the stomach from the legs
28. More prominent brow ridge Wider skull/faces Muscular body On average slightly shorter than homo sapiens
29. Muscular, stocky and thick built - shorter than the average human today. More pronounced facial features. Can't really comment on skin, hair, eyes etc. But probably some variation in colour and tone across the population
30. More muscular than a homo sapiens, slightly shorter and stouter.
31. Like a homo sapiens but possibly with bigger muscles and a bigger bone structure. Smaller, sloping forehead and a thicker ridge of bone above the eyes
32. He looked like a modern human, with a less pronounced chin (almost absent), a different forehead shape and a strong eyebrows line. In general Neanderthals were more robust than modern humans and shorter than their coeval cousins, but we wouldn't really notice such a great difference if they were mixed with today's human population.
33. Very similar to modern humans. Flatter head that is longer from front to back. Generally more robust
34. Lower brow. Larger bone structure. Very similar to Homo Sapiens
35. Like us - but more distinct facial features and shorter/stockier in stature
36. Similar to modern humans, possibly indistinguishable. Perhaps shorter and broader with a more pronounced Forehead
37. Not dissimilar to modern humans, but some aspects more robust
38. elongated skull, much more prominent brow ridge, more prominent facial features in general. largely akin to modern humans, but with broader features
39. Neanderthals look similar to modern human but with more protruding facial features.

40. Similar to an anatomically modern human but perhaps shorter and more robust in stature. Also, possibly with a larger nose according to some recent studies
41. Similar in morphology to a homo sapiens but larger overall. More robust bones, slightly pronounced brow ridge. Physique similar to larger Scandinavian people, like I imaging large 'Viking' people to look like
42. Neanderthals were similar to modern humans in size and stature. Their larger skull and brow ridge was at the extreme of modern human physiology. Eye colour has been suggested as green but I'm not sure on what basis, and skin colour as Hispanic, again I'm unsure of the evidence
43. Neanderthals had a more prognathic and robust skull and smaller brain to body mass ratio. However, they were bipedal and resembled homo sapiens in most characteristics, some even propose that we are one species. To conclude: not very different from you and me except for some more impressive teeth and eyebrows.
44. more robust and stockier than homo sapiens, barrel chest and wider pelvis (i.e. wider body), shorter forearms and legs than h.sapiens, pronounced browridge, occipital bun, and more projected nose, but overall pretty similar to homo sapiens
45. Exactly as seen in museum displays, modern day human like but with minor differences particularly to the skull, and difference in posture and body dimensions

NEGATIVE

1. Like a human but a more slouched "ape like" posture. More muscular than a human and hairier. The face would have a more prominent brow and fatter nose. Hands would be bigger than that of the average human
2. Double-arched browridge, mid-facial prognathism, shorter and more stocky and broad than us in their torso and probably quite muscular and hairy
3. A less developed human who hunted and gathered, with more primate features than Homo sapiens
4. Ridged Forehead, Red Hair, Slightly stooped, very Hairy
5. Neanderthals looked very similar to homo sapiens but were stockier and more robust with features like heavy brow ridges and wider more flared nostrils. I picture them with a more obviously muscular build than homo sapiens. I picture a more curved stature (like a hunch) and more body hair than homo sapiens which I think is residual from before my anthropology degree, like the image of the stereotyped cave man Neanderthal is still somewhat ingrained in my mind.
6. Short, stocky, stooped, heavy facial bone structure
7. Very similar to humans, however shorter and with more body hair. I'd also expect bad posture depending on the position of the hips
8. Neanderthals have characteristics of primates that humans have today. They are similar to homo erectus and homo sapiens. They were much hairier than today's human, with wider simian foreheads and though they were bipeds, they still used rudimentary tools
9. Large brow, flattened skull shape, prominent brow, broad shouldered, solidly built, short and stocky, hairy.

10. Heavy set features, large brow, small eyes and pronounced jaw. Arching back with muscular limbs. Tan, rough skin with dark hair
11. Large height, stocky build, barrel chest, large cranium, hairy, strong limbs, large teeth, possbily injured/ limping, muscular
12. Smaller than modern human, more unkempt
13. Taller than the average human today (around 7ft). Lots of facial hair. Bigger skulls (and more square shaped) than humans today Bigger teeth Defined brow ridges
14. Thicker, more pronounced brow than current humans, with larger skull. Hairier body, more powerful build (i.e. more muscle, stocky, thicker bones). Shorter than a modern human
15. Shorter than average human, thick brow ridge, hairy, stocky. Facial features quite similar to human
16. Like a modern day human with more body hair, a more stooped posture and a slightly more ape-like face
17. Stocky frames, hairy
18. Slightly shorter than a modern human, bipedal, with a large brow ridge and pronounced jaw. Overall head size larger than modern human. Dark hair. No clothes but perhaps with a basic covering (ie. animal hide) if in a colder environment
19. I think they looked like a larger version of what we look like today. Dark skin, dark features, taller in height and heavier in weight. Gorilla like almost
20. Bigger nose, bigger faces, more stocky bodies, hairier
21. Close to a human but not as fully developed. Much hairier and poor posture. Bulkier and shorter
22. Perception that they were hairy, primitive, big dysfunctional hands, etc. In reality, similar to homo sapien (just not as effective) leading to some people being part neanderthal even today

Appendix 6 – Neanderthal descriptions given by the questionnaire media group coded into positive, neutral and negative with the coded terms highlighted

POSITIVE

1. ~~AN OVERGROWN APE THAT WALKED UPRIGHT AND HAD ADVANCED THINKING AND REASONING ABILITIES~~

NEUTRAL

1. Big jaw and nose
2. Short, bulky, sloping forehead and large nose
3. Shorter than humans, different skull shape
4. Small forehead, protruding eyebrow bone, short, muscular build

5. Shorter and more muscular than humans with a prominant forehead. Fair skinned and adapted to survive in cold climates
6. Looks similar to a human with broader features and a more pronounced forehead
7. Very similar to early humans. On average shorter than the human race, although broader shouldered. Hair coverage would be similar to humans. Features were more pronounced/broader (e.g. brow, nose and jaw)
8. About 5ft tall, muscular, strong chin, average Mancunian
9. shorter with larger chests
10. Prominent forehead/brow and a wider nose. Their trunk was also wider and they had large hands and feet
11. Human like, shorter, darker skinned generally, flatter face, stockier
12. Small, big jaw
13. A long, low skull with a prominent brow ridge above their eyes. Middle part of the face protruded forward and they had a large, wide nose
14. Similar to a modern-day humans, with natural variances, particularly the skulls and spine (larger skull, curved spine). Bi-pedal species, but larger in structure and stature than modern day-humans (wide shoulders, longer legs/arms).
15. Small, stocky, dark haired, big brown eyes
16. A heavy set human ...large jaw ...bulbous nose....hairy....small in height ...similar to an aborigine
17. Heavier and more muscular than modern man. Prominent nose and brows and a sloping forehead. Not sure of their height but probably not as tall as modern man
18. Many common features to humans today. The human species is very varied anyway so whilst Neanderthals are traditionally pictured as dark skinned and maybe hairier than western images of modern man I'm not sure that's particularly accurate.
19. Mix of "Asian"/"African"-looking face, tanned skin, short
20. Modern human(ish) in appearance with enlarged facial features. (nose, mouth, forehead) Heavier boned , stocky build
21. Short, squat, round face, big nose, prominent jaw
22. More or less like humans today but with coarser features
23. Neanderthals were shorter, stockier and more muscular than modern man. They have large noses and a pronounced brow
24. Just like humans, but a bit smaller
25. cross between a monkey and a homo sapiens. heavier brow
26. Very similar to humans but their features are accentuated with larger faces, larger noses, and are they are taller
27. Pronounced features, tall
28. Probably strongly built. Not very tall
29. No idea – something big
30. An extinct species that lived in Europe and parts of Asia 40000 years ago

NEGATIVE

1. gruff big muscles square head dirty big nose dark hair

2. Like a human but with different jaw structure and back posture. Smaller than an average human
3. Similar to a homo sapien but more hairy and slightly larger skull shape
4. Human like with deepened facial changes and hairy
5. Similar to modern humans, however shorter, more muscular, larger head/skull, more primitive
6. Hairy ape like man eating monster
7. A cave man with a lot of hair and hunched over. Muscular and tanned. Monkey-like features such as a big face, hands and ears
8. Short, hunchbacked, muscular, hairy, thick jaw
9. Only really have the image of a male one in my mind Hairy Pale skin Kind of hunched posture
10. Protruding jaw Dark hair Long arms
11. Hunched over, muscular, hairy, short in height
12. Like humans but shorter and hairy
13. Massive jaws, very hairy, big foreheads
14. Heavy set hirsute individual with strong upper body, with a slightly forward lean
15. Hairy, messy
16. Olive skinned, long untidy dark brown hair, coarse facial features, muscular, average height
17. Big built/body, tall, hairy, almost monkey like
18. Muscular, hairy, strong brow bone, wide nosed
19. Similar to a human but more ape like such as having a more prominent brow and longer arms and more hairy
20. Mostly similar to a modern human. Slightly shorter in stature with longer arms and a smaller skull
21. Short height compared to humans, with a larger skull and exaggerated facial features (e.g. nose and mouth). Long hair, large body build, potentially slightly hunched
22. Human like with a slight forward bend in the body
23. Thick, heavy forehead, set jaw. Very hairy
24. Big forehead/brow and nose, tanned skin, bulky/muscly, long unkempt hair, poor teeth
25. Kind of like a human in terms of limbs, but hairier and bigger and with a larger forehead and bigger hands and feet
26. Male or female person, just after the dinosaur era. They were very hairy, primitive in actions, pronounced jaws and couldn't speak, except for grunting sounds. Walked in a stooped style, using their upper arms as an aid to get around by dragging their fists along the ground, similar to the gait of a gorilla today
27. poor posture. distinct characteristic features. large ears. men would have long hair and a beard
28. Short not upright Hairy Short neck longer arms
29. White, ape looking with lots of hair
30. Like a modern day human with ape like features, more hair and bent over. With very limited communication skills

31. A hunched back with ape-like features
32. Monkey like shape, but less hair than a monkey but a lot more than a human of today
33. Short, hunched, hairy. Thick limbed. Protruding forehead
34. Smaller than a homosapien, with a smaller brain capacity than a homosapien but larger brain capacity than an ape
35. Ape like facial and bodily structure. Crouched and bent rather than stood upright fully like a human today
36. Human form with shorter legs and longer arms. Lean and muscular. Body was hairy. Head had a strong larger jaw with bigger teeth. larger forehead, and nose
37. Hunched, hairy, muscular
38. Like a caveman
39. Shorter than a homo sapiens, hairier, maybe with more muscle as they would use them more
40. ~~LIKE A HUMAN IN LOOKS. THICKER DARKER, WEATHER BEATEN SKIN, STRONGER, HAIRIER. LIMITED VOCABULARY, CLOTHES~~
41. A shorter hairier version of modern humans
42. ~~A CAVEMAN. LONG HAIR, BAD POSTURE, LITTLE TO NO TEETH (THOSE THAT HAVE TEETH ARE SHARP), AND THEY WEAR ANIMAL SKIN CLOTHES~~
43. Like us now but with more hair and hunched, more muscular, wider head/jaw
44. Ape like and they were quite hairy. But looking at pictures of them I can see the resemblance to us
45. They looked a lot like humans but their back was more hunched and their heads were smaller
46. early human with hair similar to an ape, Walking on two legs, large head. A hunter gatherer
47. long hair
48. Long hair, slightly hunched, bigger but less sophisticated brains
49. Wild, feral, living wild and off the land. Dresses with a loin cloth
50. Standing upright, but slightly bent over. Hairy. Stock. Broad forehead. Large hands and feet
51. Slightly shorter than Homo sapiens, hairy, flat face, big nose
52. Resembled humans but stooped over and sticky build and maybe hairier
53. Large head, heavy facial bone structure, brown hair, tanned, large boned, carnivorous teeth
54. Slightly hunched with prominent brow, long arms
55. Slightly larger build than humans now and more hairy
56. Like humans today but with more pronounced facial features, more body hair, shorter and more muscular
57. Short, hirsute, unkempt, stooped, Brown eyed
58. Long arms, broader shoulders, high voor head, pointing chin
59. Hairy to protect from weather. Stronger teeth or more teeth for eating meat. More athletic because of hunting.
60. Ape like in stature, large head, very distinct bone structure on face, large protruding bones above eyes

61. Think that Neanderthal was like an inferior copy of us. Designed to survive the cold and hostile environments
62. Like a modern day human but with a more pronounced forehead and jaw, more hunched over appearance, more bodily hair
63. Dark skin, large Bulbous nose, dark eyes, dark hair, high cheekbones, large mouth, thin lips, Long arms, short legs, medium torso, Large white set teeth. I also believe many Neanderthals were hermaphrodites
64. Hunched, shorter human. Hairy with a cruder facial structure. Darker skin
65. Sloping forehead- very rough features - human in feature but not as refined as modern homo sapiens man. Not as upright and more bent over with long arms
66. Fairly similar but more simian in appearance to the homo sapien of today
67. In between a human and an ape. Slouchy, long arms, very hairy. Facial feature similar to an ape
68. More hunched over than a human, more hair, thicker skull, bigger feet and hands
69. muscular, more hairy, larger head, more stout. larger hands and feet.
70. Much like homo sapiens, but perhaps shorter, broader, stockier, just generally more rugged, slightly stooped in posture perhaps
71. Hunched back, long scraggly hair and beard. Tanned skin, I think of a man. Big feet and hands, low brow bone
72. Hairy! The skull was, I believe, larger than homo sapiens', though their total height lesser. I think - but cannot say with any degree of certainty - that they were stocky while we are slender. Otherwise, very much like a human
73. kind of like a hairy muscly human with poor posture. Caucasian complexion but with slightly darker skin
74. big hairy hunchback
75. Close in resemblance to a monkey with some human like features (less hair etc)
76. Hairy, hunched back
77. Hairy stooped
78. Naked and skinny
79. Shorter, stockier and hairier than modern day humans, bad posture, wide strong jaw
80. ~~HALF MAN HALF APE. HUNCHED OVER SLIGHTLY. A LOT OF BODY HAIR. PROTRUDING FOREHEAD. TANNED SKIN. USED WOOD AS TOOLS AND WEAPONS~~
81. They had longer arms. Their hands, feet, foreheads and noses were larger than today's human form. They probably had much more body hair then humans today. They were a bit stooped in posture but could walk upright. Though they couldn't talk I assume they had some form of communication
82. More stereotypically primal features than Homo sapiens. Tall and bulky. Coarse hair
83. Smaller skull with broader facial features, short with more curved spine and longer arms, darker skin complexion with more body and facial hair
84. A Neanderthal is an unveiled individual whom I would consider to look like a caveman with long arms, a stature similar to an ape, and longer face than the current human and a hunch over posture. They would have an excessive amount of hair in light of the lack of development of society and would be unlikely to wear clothes- their skin would

likely be darker due to exposure to sunlight and their feet and hands extremely calloused from the hard ground

85. Somewhere on the evolutionary scale between an ape and a human. Short. Hairy. Not very smart
86. Rather shorter than modern humans. Stockier. Protruding forehead. Considerably hairier than humans
87. A neanderthal was relatively short height wise. Quite hairy and tanned, the head was flatter than humans today
88. Larger forehead and a protruding chin. Hairier and smaller than Homo sapiens
89. Much like a modern human, but with a larger head and forehead, shorter and more stooped
90. ~~SIMILAR TO HOW WE LOOK NOW, ONLY HAIRIER AND MORE OF A HUNCHED SPINE. YET THEY WERE STILL ABLE TO CRAFT BASIC CLOTHING~~
91. ~~AVERAGE HIGHT OF ABOUT 150 CM, BIG EYE SCULL AND DIFFERENT SHAPE OF FACE THAN HUMANS HAVE, LONG ARMS, A BIT ARCHED BACK, CLOTHES FROM ANIMAL SKINS AND PLANTS~~
92. Mix of a man and gorilla, Hunched muscular and hairier human, broader and shorter
93. tall, hairy, almost ape like. I don't know why but I perceive a Neanderthal as a gigantic ape
94. Like modern humans but smaller, more hunched and hairier
95. Like a human now, but shorter with an elongated skull and large jaw, heavy facial features. Hairy. Thick limbs
96. Hairy and hunchback, with a flat face
97. Bipedal, more Caucasian traits than a Sapiens (lighter skin and eyes sometimes), robust, built, large nose, hairy, large skull.
98. Long hair on head. Large nose and facial features. Walking on 2 legs. Muscular build
99. They had large heads, their skulls were shaped differently to ours. They had large feet and curved spines so did not walk as upright as homo-sapiens
100. From what I've gathered they would be shorter than modern homo-sapiens. Thick set, broader hips and shoulders with large, sloping facial features. Typically darker skin tone and long, matted hair

Appendix 7 – Table to show the coding for experiment recall task including test 1 (number of correct statements) and test 2 (number of correct and incorrect stereotypes)

Prime	Respondent number	Did anth/ arch?	Number of correct statements	Number of correct stereotypes	Number of incorrect stereotypes
Non-stereotyped Text	NST1	No	5	3	0
	NST2	No	7	4	1
	NST3	No	7	6	1
	NST4	Yes	8	7	0
	NST5	Yes	6	4	1

	NST6	Yes	4	2	1
	NST7	No	14	9	0
	NST8	No	5	2	1
	NST9	No	7	4	2
	NST10	No	9	4	0
	NST11	No	3	2	3
	NST12	No	15	7	0
	NST13	No	6	4	0
	NST14	Yes	6	4	0
	NST15	No	3	1	2
	NST16	No	5	4	0
	NST17	No	4	3	2
	NST18	No	11	6	0
	NST19	Yes	7	4	1
	NST20	Yes	8	4	0
	NST21	Yes	11	7	1
	NST22	No	7	3	0
	NST23	Yes	5	4	1
	NST24	No	4	3	2
	NST25	No	3	2	1
	NST26	No	10	4	0
	NST27	No	6	3	0
	NST28	No	10	6	0
	NST29	No	4	3	0
	NST30	No	7	5	2
	NST31	No	9	5	1
	NST32	No	12	6	0
	NST33	No	3	3	0
	NST34	Yes	14	8	0
	NST35	Yes	9	5	0
Stereotyped Text	ST1	Yes	3	4	1
	ST2	No	12	6	0
	ST3	Yes	6	5	1
	ST4	Yes	5	4	0
	ST5	Yes	10	7	2
	ST6	Yes	11	7	0
	ST7	No	6	5	0
	ST8	No	5	4	0
	ST9	No	7	5	0
	ST10	No	4	4	1
	ST11	Yes	9	5	1
	ST12	No	6	5	1
	ST13	No	3	2	0
	ST14	No	12	7	1
	ST15	No	7	5	0
	ST16	No	6	4	0
	ST17	Yes	5	5	0
	ST18	Yes	4	5	0
	ST19	Yes	9	7	0
	ST20	Yes	3	0	3

	ST21	No	6	3	0
	ST22	No	7	3	0
	ST23	No	8	4	0
	ST24	No	7	4	0
	ST25	No	5	3	0
	ST26	Yes	1	1	1
	ST27	No	11	6	0
	ST28	No	5	3	0
	ST29	No	8	5	0
	ST30	No	10	6	0
	ST31	No	6	5	0
	ST32	No	4	3	2
	ST33	No	8	6	0
	ST34	No	4	4	1
	ST35	Yes	9	6	0
	ST36	Yes	10	6	0
Non-stereotyped Image	NSI1	No	8	4	3
	NSI2	No	5	2	0
	NSI3	No	5	2	1
	NSI4	No	14	5	2
	NSI5	Yes	10	4	0
	NSI6	Yes	10	5	1
	NSI7	Yes	7	6	0
	NSI8	No	14	6	0
	NSI9	No	11	6	1
	NSI10	No	6	3	1
	NSI11	Yes	8	5	0
	NSI12	No	3	2	1
	NSI13	No	4	4	0
	NSI14	No	5	4	0
	NSI15	Yes	7	4	1
	NSI16	No	10	4	3
	NSI17	Yes	6	3	0
	NSI18	No	4	2	0
	NSI19	No	8	1	0
	NSI20	Yes	8	4	1
	NSI21	No	6	2	1
	NSI22	No	7	3	0
	NSI23	Yes	5	3	1
	NSI24	No	4	3	2
	NSI25	Yes	7	4	0
	NSI26	No	8	3	0
	NSI27	Yes	5	2	0
	NSI28	Yes	8	2	1
	NSI29	No	3	2	0
	NSI30	No	3	1	0
	NSI31	No	3	1	1
	NSI32	No	7	4	1
	NSI33	No	9	2	0

	NSI34	No	11	4	0
	NSI35	No	3	1	1
	NSI36	No	5	4	0
	NSI37	No	8	4	0
	NSI38	No	7	3	0
Stereotyped Image	SI1	No	6	5	0
	SI2	Yes	8	5	2
	SI3	No	5	2	2
	SI4	No	4	2	1
	SI5	Yes	4	3	0
	SI6	Yes	7	5	1
	SI7	Yes	10	5	1
	SI8	Yes	5	3	0
	SI9	No	6	2	2
	SI10	No	3	1	1
	SI11	No	8	4	0
	SI12	No	5	2	1
	SI13	No	7	3	1
	SI14	No	6	4	1
	SI15	No	4	3	1
	SI16	No	7	3	0
	SI17	No	4	2	2
	SI18	No	3	1	2
	SI19	No	9	3	2
	SI20	No	7	3	1
	SI21	No	9	4	1
	SI22	No	7	3	1
	SI23	No	3	1	0
	SI24	Yes	4	3	2
	SI25	No	5	3	1
	SI26	No	9	7	1
	SI27	No	4	2	1
	SI28	Yes	9	3	2
	SI29	No	7	4	0
	SI30	No	6	4	1
	SI31	No	7	5	0
	SI32	No	4	2	1
	SI33	No	5	3	0
	SI34	No	5	2	1
	SI35	No	6	2	1
	SI36	Yes	7	2	0
	SI37	No	6	3	2
	SI38	No	7	2	1
	SI39	No	7	3	1
	SI40	Yes	7	4	1
	SI41	No	9	4	1
	SI42	No	9	4	1
	SI43	No	9	5	1

Appendix 8 – Experiment recall task responses grouped by prime and highlighted to show incorrect stereotypes with red being negative and green being positive

STEREOTYPED IMAGE

1. The Neanderthal was very hairy all over, he had what seemed like a club in his hand. He also had two legs with a very prominent face. He had brow ridges with big teeth.
2. Thick dark hair covering most of the body except the feet. Robust muscular body with short legs. dragging a club. Very pronounced brow ridges. Dark eyes. Mouth open. Unintelligent facial expression.
3. Short, hairy, ape like facial features, erect, muscular, capable of using tools.
4. He is a little bit short. He has a lot of hair and the hair is long. He looks brutal.
5. Strong, big eyes, hairy, big short toes
6. The neanderthal was large and muscular, covered in dark hairs, and slightly bent over. It had an aggressive-looking face and large feet. It was holding a piece of wood in one hand that might look like a tool.
7. gorilla-like figure, appeared male, muscular, hairy, bipedal, ape-like face, holding a club, other hand was clenched, large hands and feet, wary expression
8. Hairy, holding a stick on his right hand and looking towards the left. His back vas visible and he was also holding a circular object with his left hand.
9. It was of a hairy ape like creature, which was standing on its legs in an upright position. It was facing slightly to the left and had a club/stick in it's right hand.
10. Ape like Dark in colour Hairy
11. Stood outside of a cave, muscular with a prominent brow wielding a stone club. It had a neutral expression with teeth on show. The bottom jaw protruded
12. A human like ape, hairy with protruding jaw and slightly bent over carrying a tool.
13. Black and white, against rock background, very hairy, hunched over, looking angrily at viewer, holding weapon in right hand, big feet
14. Hairy apelike man, greys ale, holding a stick in hand. Big feet
15. ape like, hairy, barefooted with club in hand
16. A hairy male Neanderthal with his left foot forward, and behind his back his right arm holding a tool of some sort. He was hunched over a little.
17. It looked hairy and like an ape or an animal, with human features. It had a weapon and some clothing.
18. Hair ape like creature
19. Hairy, muscly, holding a tool, hunched, looking over it's shoulder with an intense expression, facing away from the viewer, looked quite primitive / similar to a monkey but standing up
20. Hairy, hunchbacked, somewhere between a chimpanzee and a human. Wearing a loin cloth. Chimp like face. Pronounced brows.
21. Was facing left/away from front with head turned over left shoulder looking back. Was carrying a long stick/tool in right hand. Rock face looking background. Stood on two muscular legs and general muscular body with hair like an ape.

22. It was a small-ish human-like figure all covered in hair except the face. He was standing almost upright on 2 feet and was holding some kind of club/tool
23. Small, hairy being taking up most of the image.
24. A hairy, scary looking man that looks very ape-like, holding a wooden bat.
25. Has a tool in its hand Very hairy Big muscles (defined) Monkey resemblance
26. Hair all over - Ape like face - very large open mouth, flat nose, overhanging forehead - Holding a tool of some sort - Legs slightly bent, leaning forward: different posture to modern humans - large hands and feet - walking on two legs - seemed quite bulky, not sure if muscle or fat or skin
27. Hairy, human like ape, carrying a tool of some description
28. Figure standing next to a wall with their back towards the viewer, head turned to look ever their shoulder. Long arms and a stick in their right hand, the left clinched in a fist. The figure is very hairy with ape like features and large feet.
29. An upright muscly, hirsute figure. Holding a club in the right hand whilst looking back over the left shoulder. Had a round object in the left hand. Unclothed
30. Hairy body. Big feet. Muscly. Quite hunched. Ape-like. Protruding mouth.
31. Hairy Holding a club or stick in its right hand Shorter (or maybe just broader) than a modern human Jawline juts out Strong brow More teeth visible than I can even physically show More teeth in general Looked muscular
32. The Neanderthal was looking at a rock, it bared a resemblance to an ape. It was standing on two feet with what looked like a tool in it's hand. Its whole body was covered in hair, it was making a face as though it was in pain/ a little bit angry.
33. Stood upright and seems to be communicating through facial expressions at least, looks a bit like the eyebrows are raised as if waiting for the answer to a question, distracted from working on something, tool in hand, hairy but just like a human apart from face.
34. It was a black and white hairy monkey/ape, with some kind of tool in its hand, it had a supposed expression on its face
35. Black and white drawing, of a Neanderthal walking, back not completely upright. Face is not flat, more monkey like. It is very hairy all over the body. The shadow of the face of the Neanderthaler is shown on the ground.
36. Very hairy, face aggressive, holding some kind of tool/weapon behind itself - concealing? Short and stout. Black and white image. Defensive stance.
37. He was a hairy ape like man, hunched over and holding a club. Looked intimidating.
38. Neanderthal was depicted as hairy, they were holding some sort of tool that looked like a thick stick with one hand, they had a chimp-like face that didn't have any hair on it, they looked like they were walking, the background looked like the side of a cliff/big rock
39. It's a hairy ape like man in a cave, leaning over to the left side of the image, holding a club looking object on the right side
40. It was hairy, unclothed, ape like, big mouth, black and white, big hands and feet
41. The Neanderthal was facing away from the viewer but turned so you could see their face. It was hairy and looked male. It was holding a stick type item in its right hand and something round in its left. It was hairy and a mix of human and ape like features

42. It was a short humanoid figure. The figure was mostly covered in hair from head to toe and had a slight hunch in it's back. The figure was muscular with a face that showed a mix of ape like features (pronounced brow) and a homo-sapiens like features (flat nose).
43. A hairy person with strong muscular build protruding teeth large feet and toes holding a wooden club standing outside a cave

NON-STEREOTYPED IMAGE

1. A hairy man, mainly naked sat on a rock looking at what appeared to be stones. He looked puzzled. Quite well built and masculine, but had ape like features
2. The picture was of a man with a lump rock in one had and what looked like a sharper thinner rock in the other hand. He was leaning on what looked like a cave wall
3. In a cave Sitting down Romantically postured Wearing small amounts of basic clothing Fashioning some kind of tool
4. Dark thick fairly long hair, appeared to be on his face too. Face had thick expression lines. Nose looked wide. Some kind of necklace, it looked like incisor teeth with the shape of it. Bulky wide muscular body. He was holding something in his right hand. He was seated on rocks (in a cave?) Image was a black and grey sketch like charcoal Barefoot Same number of fingers and toes as humans
5. A male individual was sitting on a large rock in what looked like a cave. He had dark, medium length hair. He appeared to be wearing some form of shell type necklace. He had a what appeared to be stones or rocks in each hand and appeared to be hitting on onto the other. He did not have much body hair.
6. A man with a tooth like looking necklace, holding a rock in one hand and what looked like part od a rock, some wood with the other (maybe he was making a tool). Had some clothing semi covering him and was sat in a cave/ dark place, with a wooden stick or something like that resting beside him. Looked like he could just be a hipster human man with his hair and facial features.
7. white muscular guy, Stocky build, hairy/bearded, carving a tool, sitting in a cave, wearing clothes
8. Gray scale, the Neanderthal was sitting on a rock in what looks like a cave, the drawing shows what could be fire on the left hand side, the Neanderthal is muscular, in their right hand they are holding a rock, in their left something that looks like another rock with lines running across it. The Neanderthal appears to be in the process of fashioning a tool, and is barefoot but wearing something around his waist, and has a beard and longish hair
9. Well muscled male, seated. bearded with body hair. wearing loincloth. in right hand held ball shaped tool/implement or could be fruit. in left hand held hollowed out trough could have been natural or man-made. looked like in cave with some light but could not tell whether light natural or not. barefooted.

10. A hairy man in a loin cloth, sitting in a cave. He was using stones as some sort of tool. He was in the sitting position.
11. A man, almost naked, with long hair and strong muscular build; using a tool to strike something in his hand - possibly striking a flake off a flint core - the picture was too dark and small on phone screen to be certain. The man was sitting with his back to a rock wall.
12. Male sitting holding club somewhat hairy fairly coarse features
13. Long wire hair, necklace of bones, barely clothed, muscular
14. Male sitting on rock, had beard and was wearing animal skins. Bear feet
15. The fellow was sat in a cave with a stone in "his" hand, perhaps using it to work on something else in his other hand. Though it might be a pestle and mortar type process. In my head he was quite hairy but I don't think he had a beard (maybe he was having a shave!). He was fairly muscular and wore a loincloth, though may be again me assuming he had a loincloth as I can't really remember...
16. An adult male, seated, long dark hair tied up and beard, attempting to break open a large shell, possibly fruit using a rock as a tool. Wearing only some kind of loincloth. Possibly depicted in too large a body frame, too upright, and facial features too much like modern man (skulls found have a more protruding jaw) to be realistic but the message is Neanderthal we're hunter/gatherers and had skills, e.g. to use tools.
17. He was making tools from stone. He had a stone? Necklace. Sitting on something. He was in a cave?
18. he was sitting in eve cave and making something.
19. Holding orb/rock, sitting, leaning, contemplating, cave like setting, dark, damp, contemplative, fire
20. A man holding a stone tool about to hit another object. Sat on a rock with bare chest and legs. Wearing a necklace. Hairy body including chest, long hair
21. Neanderthal sitting down in what seems to be a cave, wearing a necklace and using primitive tools - a rock in one hand and something else in the other
22. A man sitting down wearing little clothing in what looks like a cave carving a weapon/tool out of stone. He is alone and seems very determined to do a good job and very focused.
23. Human like, facial hair, sat with a piece of fruit (or tool) in hand. Some clothing. Black and white drawing.
24. Thoughtful face, concentrated, hairy, big feet, wearing a loincloth, making a tool, necklace
25. A Neanderthal was sat with a hammer stone in his raised right hand, about to strike a partially-completed hand axe in his lap. The neanderthal had facial hair and wore skin clothing.
26. The Neanderthal is sitting hunched over on a rock wearing some kind of loin cloth thing. He has a beard a shoulder length hair and is holding an item that looks like a semi circular shaped stone in his hand. He is in a cave
27. An artistic impression of a Neanderthal sitting on a rock wearing a rag around his waist resting his head on his fist with his back arched

28. There was a bulkily built muscular man sitting on a rock. He had shaggy hair and a beard but I don't remember clothes. Looked pensive
29. male sitting with a bowl
30. The Neanderthal man was in a sitting position. It seemed to be eating something/ holding something in its hand
31. Ape looking figure in rags squatting on a rock
32. - had a rock used as a tool - wore clothing - looked physically human - were in some kind of house like structure - muscular - not excessive body hair
33. The Neanderthal was sitting in what looked like a cave, holding an object. In the corner there was a fire. The Neanderthal had a large beard, and long dark hair, and looked to be quite muscled and strong.
34. A male Neanderthal was sitting on stones. He was mostly naked with only animal fur covering his private part. He had a hairy face and long beard. He was holding an apple in one hand and a knife in the other. There were also animal horns on the bottom right corner.
35. Black and white, hairy, holding basic tools, I think there was a fire?
36. Beard Holding an apple Minimal clothing Sitting by a cave? Long hair
37. A man sat down in a cave. Holding 2 objects, one in each hand. He wasn't clothed, apart from maybe a wrap around his hips. He had a beard and quite long hair
38. The sketch was black and white. It was on a man, with a bun in his hair, sitting down facing the left and had a bowl in his hand. It looked like he was in a cave

STEREOTYPED TEXT

1. The Neanderthal was hairy whilst holding a club. He has brow ridges with sharp teeth. He was also wearing clothes.
2. A male stands naked in front of a cave holding a stone and wooden club. He is covered in hair and has a neutral expression but with his mouth open and showing teeth. He has bare feet and long toes.
3. of a hairy man with an open mouth and teeth showing with pronounced brow ridge and long toes and long limbs
4. hair all over body. no clothes. prominent brow bone. entrance of a cave. baring teeth.
5. male, bare feet, no cloths nor accessries. have a tool, stand by the cave, no facial hair. not very tall, have prominent brow bone. neutral expression, with mouth open, you can see he's teeth.
6. A Neanderthal was stood outside cave naked but covered in hair holding a club with his mouth open showing teeth. Neutral face. Long toes. Wide nose and robust brow ridge
7. Very muscular, hairy, carrying a club, outside a cave, prominent brow, barring teeth
8. Very hairy. Mouth slightly apart showing Teeth. Legs with defined muscles. Carrying club.

9. Naked, hairy male. Prominent eyebrows and teeth. Stood in front of a cave entrance
10. He was standing next to a female holding a club. He was hairy all over with large toes.
11. The description at the beginning: - person standing outside cave with club and stone. Person was hairy and face showed teeth. Muscular body and large feet and toes
12. A man with hair all over his body, not wearing any clothes, carrying a club which he had made himself, bare feet with long toes,
13. Neanderthals were hairy, opened mouths and bared their teeth.
14. Tall figure standing at the entrance to a cave holding a club and a stone. Covered in hair. Very muscular with very defined muscles. Neutral facial expression, showing some teeth. Define brows and wide bridged nose. Not wearing any clothes
15. Covered in hair Standing outside the front of a cave holding a club and showing his teeth. Long toes. Wide nose.
16. Outside a cave, holding a stone and wooden club. No clothes, covered in hair. Prominent brow.
17. -Hairy -Outside a Cave -Tool in their hand? -Man? – V Muscly?
18. Heavy brow, covered with hair, big nose, vacant look, muscular,
19. He is standing outside a cave. His body is very muscular. He is covered in hair. His mouth is open and broad. He has a prominent brow bone. He is wearing no clothes or ornaments.
20. Ape like, not much emotion to the expression apart from confusion really. Primitive features
21. Standing outside a cave Baring teeth but not smiling Hair all over the body Holding a club
22. The Neanderthal stood outside his cave. He had a neutral expression. he had large and defined muscles. He bared his teeth
23. Standing outside a cave, holding a wooden club and a stone, muscular build, covered in hair, open mouth showing teeth.
24. They are covered from head to toe in hair. Have a muscular/strong physique with large muscles They have large feet and long toes They live in caves They wear no clothing
25. Stood outside of a cave naked and hairy, holding a club.
26. hairy utilising of tools
27. Hair covers the body No clothes or accessories Barefoot with long toes Outside a cave carrying a club and rock No facial expression, open mouth, teeth showing
28. He was male, hairy, stood in front of a cave, had a bat in his hand
29. Standing outside a cave, naked, long toes, hairy, neutral expression but baring teeth, holding a club
30. A man standing covered in hair, with no clothing, holding a club and a stone. Neutral facial expression, but teeth showing. Muscular build. Large feet with long toe nails.
31. Very muscular, hairy, long toes, pronounced brow bone, teeth showing mouth slightly open
32. Primitive Large brow and big noses Wore little clothing Very hair on their body and face

33. He had a wide nose and prominent brow ridge Didn't wear clothes or accessories. Possibly standing outside a cave. Body covered in hair.
34. No clothing, hair all over the body, very muscular build and defined muscles, tools including a spear, defined face with depth and big teeth
35. Open mouth with bare teeth but neutral facial expression, wide nose, prominent eyebrows, muscular build, naked, hairy (?), long toes
36. a man is standing outside a cave. he has a neutral expression. his mouth is open showing teeth. he has hair all over his body. he is wearing no clothes. he has defined muscular body. he has long toes

NON-STEREOTYPED TEXT

1. He was in a cave making stone tools. He was strong but his muscles were not defined.
2. Hairy, muscular but not defined, used a stone to make a tool out of another stone. Live in caves. Small toes, bare feet,
3. A Neanderthal man sitting in a cave wearing animal skins making stone tools. His body was muscular but not defined. He had a pronounced brow and wide nose.
4. Wearing animal skin. Tooth necklace. Hair only on face. Smooth brow ridges. Using a stone to make a tool with another stone. Small nose. Small toes.
5. A neanderthal man sat by a fire using one stone to shape another. He had facial hair, but wasn't hairy. He was muscular, but not so defined.
6. Hairy, muscles, no shoes, sat in a cave
7. A man is seated in a cave, making a stone tool with another stone. He has facial hair but not much body hair, medium nose and straight brow. He is wearing animal skin and a tooth necklace. He is of a muscular built but the muscles are not very defined/prominent. He has his mouth closed and a neutral expression.
8. Sat in a cave making a stone weapon head out of stone. Facial hair, short toes
9. Crouched inside a cave ...short feet ...toes...slightly bent...hairless body...hair on head...concentrating on a task...short in height...muscular arms and legs...
10. It wasn’t smiling, had a beard but none on its chest. Bare feet and short toes. Strong but not muscularity defined. Had a necklace with a tooth on.
11. Hairy body, very muscular but not that defined muscles, big and wide nose, tall, not many clothes, worn out or dirty feet/hands, broad body
12. A male sits outside a cave he has long hair but his body is not covered with hair. He wears a necklace made of teeth. He is hitting a stone with another blunt stone. His mouth is closed and shows no teeth. His feet are bare and his toes short. His forehead is straight and shows no facial expression.
13. Had hair on face but not on body. Had necklace of teeth. Muscular but not overly muscular. Mouth was closed.
14. Not much hair, neutral expression, making tools with stone, tooth necklace, some clothes, in a cave
15. Sat in a cave, Simple cloth for clothes Thick nose, with dark lines on

16. He was making a tool using a stone. He had short toes, was slightly muscular
17. Hair on the body but not the face. Carved a stone tool with another tool. Long hair? Cloth as clothes?
18. There was an individual sitting in a cave. He was making tools. Had a hairy face but a hairless body which was muscular but not defined muscles. He had a smooth ridge across his brow and a medium sized nose with a neutral expression on his face.
19. Sitting in a cave, with small bare feet, lots of facial hair but not much hair elsewhere, muscular but not defined, using a stone tool
20. A male Neanderthal is sitting in a cave, shaping a stone tool with another stone tool. He has facial hair but no other hair. His brow is smooth.
21. Male Neanderthal, sitting inside cave, near a fire, wearing animal skin, using a stone to made a stone tool, smooth brow ridge, facial hair but no other body hair, slim but muscular, short toes.
22. He has a stone tool made with another tool and is sat in a cave. Medium sized head. Facial hair but no body hair.
23. A man sitting in a cave making stone tools. Wearing a tiger skin, facial hair only.
24. Hairy, wearing a bone necklace and cloth, muscles not defined, barefoot, short toes.
25. Hair on its head but not on its body. Carried tools. Ape like.
26. A man sits by the entrance of a cave. He carves a stone tool with another stone. His mouth is closed, without showing teeth. He doesn't show much expression. He isn't very hairy, just hair on his face, nowhere else.
27. Sitting in a cave. Small toes. Animal skin for clothing. no facial hair. Had tools.
28. A man sat making a stone tool using another stone, he has facial hair but no other hair and is wearing an animal skin. He has a flat brow ridge. He's not wearing shoes and he has short toes.
29. He has muscles but not very well defined. Smooth jaws. Hairy but not very
30. Not very hairy Male, beard Holding rock in his hand Sat fairly straight Lean, not excessively muscular Teeth hidden in mouth Jaw not protruding Short toes
31. Lots of hair on his face but not anywhere else. Wearing animal skin. Making a tool with a rock from another rock. Short toes. Animal tooth necklace. Sitting in a cave.
32. Sits in a cave, using a stone to sharpen a tool. Wearing animal skins and tooth necklace. Facial hair but not body hair. Neutral facial expression. Smooth brow, mouth closed and no teeth showing.
33. short toes. Facial hair. Using a tool.
34. A male sits in a cave making a stone tool with another stone. He has facial hair but no hair on the rest of his body. He is wearing animal skins and a tooth necklace. He is muscular but his muscles are not well defined. He has soft brow ridges. His facial expression is neutral, his mouth is closed
35. A man sitting in a cave making stone tools using a stone, wearing a tooth necklace. He is muscular but not very defined, and is wearing an animal skin.

Appendix 9 – List of the responses given to questionnaire question 5 for both the anthropology and media respondents who selected Image D (Google Image) as the most accurate portrayal of human evolution

ANTHROPOLOGY GROUP

1. Because it shows an actual progression through the species.
2. accurately labelled and demonstrated the variation of hominids
3. It fits my perceptions of evolution as the development from monkey to man
4. Because it demonstrates a wide range of evolutionary relatives
5. factual not stereotypical
6. It shows the progression (evolution) of humanity
7. Shows the stages of evolution the clearest
8. Images are what we are familiar with seeing
9. D best shows the diversity of hominid forms
10. Shows gradual development; though there are probably steps missing
11. One reason is that choice A only shows forehead sizes, is not labeled, and does not provide much info.
12. It looks at the literal physicality, whereas most of the others base it off of the social 'brutality' of past groups
13. It's clearly laid out representation of evolution, there are others I'd consider accurate but they are more interpretive and only focus on a single part of a culture
14. Shows a variety of the species from 'Lucy' to Homo sapiens
15. Because multiple types of humans existed at the same time. It was not the case that they all just came from one another as they are all different species of humans.
16. Whilst it's missing some key hominids, it's not depicting a linear process or fabricated scenario
17. Too much emphasis on hair and colour in the others.
18. It is the most detailed example
19. Scientific names and information included, no speculation about behaviour/hunting etc.
20. shows diversity in some features (ie height & build) but also similarities
21. It is the least sensationalised imaged in this selection.
22. Human evolution wasnt a steady progession in height etc (meanin we didnt start off crouched and slowly learn how to stand up straight like the 'march of progress' suggests. Species did change gradually over time but it most accurately represents the different species of humans, especially as humans were able to stand up straight since the Australopithecus. What i mean is the typically in the media earlier humans are seen as barbaric and distanced from us when we are far more different than the media represent
23. Looks the most scientific at first glance
24. It is not an artistic representation (like most of the other images) and the different stages of evolution are labelled

25. it clearly shows the various species of early hominids and the differences and similarities between them
26. More comprehensive and academic
27. Stages shown
28. Provides the most information (scale, height comparison, species names, etc)
29. Because it’s co
30. Labels the species it is trying to represent, image shows them with traits derived from the osteology
31. They all have shortcomings but this is the least worst
32. Besides the clear gaps within the lineage presented it is the most informatative. It isn't animated to begin and shows a diverse selection of the evolutionary path of humans rather than a humans fighting monkeys.
33. Appears the most scientific and covers the most sub-species of human lineage
34. it is an evoultionary image of man
35. Represents several stages of evolutionary history as opposed to just one. Also, the modern human does not have a significantly lighter skin tone than the neanderthal.
36. Human evolution isn't a straight line to Sapiens. There are multiple different species that were active at different times and areas that likely never met a homo sapiens
37. Shows developmental stages of change

MEDIA GROUP

1. more detail looks scientific
2. Comparative artwork, labeling, scale
3. Looks a bit more legit
4. Numerous human species living at one time
5. this image shows progression from one species to another, whereas the others seem to be artistic depictions.
6. Not a radical evolution and skin colour doesnt change
7. Shows the different stages we went through to evolve into where we are now
8. Seems to be based on scientific research
9. As it shows multiple states of evolution
10. Shows all stages
11. Scientific drawing instead of artistic
12. looks more scientific
13. Familiar imagery
14. Maps out human evolution
15. Looks scientific
16. Because you can see the similarities and small development over time
17. it shows it on a timescale
18. Because it looks like it came from an accurate source and has been researched
19. This is the picture I associate with evolution

20. I think this image incorporates more stages to show how humans evolved, including important changes in physical appearance and build.
21. Seen similar on trusted sites
22. It isn't a painting or drawing of a dramatic scene, it's quite a factual picture of how we may have evolved based on evidence so far.
23. We came from apes and it shows a progression
24. As that is what most books or films show us how the human species developed from an ape resembling being
25. Although A shows what I imagine is an accurate lineage. I believe D shows our various ancestors and names them.
26. Because you can see that there is not much difference between the images so the evolution is easier to see.
27. Shows representations of different periods of the evolution through time.
28. It clearly labels the different stages of evolution
29. Often described in books and tv documentaries
30. Shows the stages
31. Shows the stages of progress
32. Seems like a diagram with several evolutionary stages.
33. It is what I have been taught.
34. It shows a believable evolutionary progression
35. it has a length scale and scientific names
36. It shows the other homo species
37. Because through looking at pictures and shown this at school
38. It shows the progression over time.
39. shows the changes in how the human race has developed and evolved over time
40. Most common one ive seen
41. Shows evaloution rather than one point in time
42. Just looks informative and textbook style
43. Most publicised one
44. They have measurements, but know that they are approximations without trying to make them look "real", and so is a good representation of an entire group
45. Shows change from bones found
46. Shows the different branches of the human lineage -- ergo giving better area of comparison between homosapiens (us) vs the other branches of evolution (I view evolution as less 'linear' and more 'different aspects evolve/develop differently based on enviornmental factors and one humany being might have X trait but another in a different enviornment will have Y because that makes it better for survival, whereas X would be less useful.')
47. Most scientific
48. It shows progress
49. Because it shows human lineage and appears to be from a textbook
50. Shows how much man has evolved in time
51. Cartoon caractures man made
52. Shows the full form with nothing distracting around it

53. There are different species of humans just as there are with animals species
54. It's what I perceive it to be by what I have learnt and seen.
55. By bones and bodies that have been excavated.
56. Because its the only one that seems to show definitive evolution
57. Shows a developmental pattern
58. I believe in evolution, scientifically speaking Humans share many genetic features with monkeys. I believe that the resemblance is too much to disregard that we did evolve.
59. It shows the progression of the evolution from the beginning to the end
60. Because it is the most specific (though only relatively) about the different human species the history of evolution
61. Think this was the image I was given in school history lessons
62. from lessons at school
63. It clearly shows a progression
64. I believe I have seen it previously in a scientific context as a representation of evolution
65. A and D are the only images to show progress/difference between eras and I chose D because the figures were more comparable to each other and made more sense on a timeline
66. They explain the scientific names of the types of humans, and shows their heights as well. This information makes me believe this image is the most accurate.
67. Looks like a reasonable time line
68. more scientific
69. It's the one ive seen most and it has the most stages to show the full development
70. It has the walking men
71. Shows the clear steps
72. Looks scientific
73. Clear images of progressive changes through to modern day man
74. Nit sure
75. Most scientific diagram
76. Looks more scientific rather than art and sculpture
77. Shows a full and gradual evolution- not a cartoon- has a more educational /authoritative “look and feel” in how the information is presented. Also closest to what you get shown in school etc so your mind links this with factual information
78. Its a good scale of where we come from including the proper scientific name aswell as height.
79. Because it shoes the gradual evolution over time
80. It seems studies were done to come to this depiction
81. Shows progression and therefore the changes brought about by evolution are more evident
82. Best comparative guide to size in different species of human
83. It shows progression. It gives some idea of size. It looks like it comes from a scientific resource rather than for entertainment purposes
84. Anatomically depicted
85. Variety and illustrative
86. It’s not pop culture and has at least some degree of information

87. It shows the evolution of humans step by step
88. Shows different stages, seems the most logical / clear
89. It shows the development best

Appendix 10 – List of the responses given to questionnaire question 7 for both the anthropology and media respondents who selected Image E (film) as the least accurate portrayal of human evolution

ANTHROPOLOGY GROUP

1. Projects modern views onto ancient people
2. wildly fictional based off stereotypes
3. It is a carciture of humanity
4. It's a joke
5. Because "the bible" wasnt a choice, lol.
6. It's childish looking. If the characters were dressed differently, they'd look exactly like modern himans
7. Cinematic claymation image created for entertainment and basic comprehension as opposed to accuracy
8. Cartoon for entertainment purposes
9. This is a cartoon portrayal for comedy effect
10. It seems to me quite unclear what is going on here or what the people are doing. I watched some time ago the beginning of the Croods film and I stopped watching it because of how annoyingly stereotypical I found the characters -this is not just because it's a kids' movie, Ice Age portrayed people from the Late Upper Palaeolithic that felt very much human. Image E just seems another stereotypical image that doesn't really say much.
11. It is not intended to be educational first and foremost, it is simply entertaining.
12. it is a cartoon
13. It is from a cartoon
14. Is a cartoon
15. humans not differentiated
16. made purely for entertainment; no attempt at accuracy
17. it is a cartoon and the content is probably toned down
18. Popular culture - not scientifically based
19. There is no evidence for blue dye in Palaeolithic. It is unsure that whether Palaeolithic humans used clubs and have pig noses. It is unlikely to walk along with a boar without hurting yourself.
20. it is a cheildren's film designed to entertain rather than inform
21. It is quite difficult to trust cartoons.
22. It's virtual figures
23. It is a childlike cartoon

24. It's a cartoon
25. it is an animated kids movie
26. For the reasons previously mentioned, E perpetuates the 'primitive caveman' stereotype, yet the film mixes up different prehistoric periods. It has no bearing on the archaeological record but is an excellent film.
27. It looks like a fun cartoon
28. It's an animation, not an attempt to accurately portay evolution
29. They all have shortcomings but this is the least worst
30. It's based upon stereotypical perceptions of what a 'caveman' was
31. it is a cartoon version - fictional representational
32. Cartoons are often dramatised and exaggerated for entertainment, therefore not as accurate
33. The concept of one species of "caveman" that eventually evolved in Homo Sapiens is fundamentally untrue
34. It's a cartoon

MEDIA GROUP

1. modified truth to make entertaining
2. Because its from a childrens film
3. Because its from a childrens film
4. from a comedy film
5. Cartoon
6. It's a freaking cartoon
7. This image appears to be from a cartoon intended for entertainment rather than historical accuracy.
8. It is a cartoon and so it's probably inaccurate and stereotypical
9. Used for an animated film rather than accurate purposes
10. Because it's a cartoon
11. It's a cartoon
12. Cartoon model for children
13. its a cartoon
14. You would expect the cartoon to be less accurate than textbooks or documentaries
15. Too cartoonish
16. It's a cartoon
17. Cartoon
18. Comic drawings
19. it's made for entertainment
20. Because I assume that the animation was made for entertainment purposes and not particularly concerned with historical accuracy
21. One of the biggest aspects of evolution is changes to the brain and thus the head
22. It is just a cartoon and is unlikely to be based on scientific fact
23. This seems less reliable as it's a cartoon.

24. The fictional animated feature is created more for entertainment purposes than educational purposes, so is likely the least accurate representation.
25. Because they look more like today's humans
26. Cartoon
27. It’s a cartoon made for entertainment and may not be 100% factual for the sake of humour and entertainment - it’ll be exaggerated
28. As the resemblance is not correct
29. Features are made to look comical in nature
30. Cartoons always tend to simplify things.
31. Cartoon
32. Because it's a child's cartoon.
33. This image is a comical representation used simply for the purpose of entertainment, particularly for children.
34. I don’t think they had rabbits?
35. I don't believe humans have ever been made of clay.
36. Immature
37. Animation
38. Only a cartoon - not accurate info
39. Cartoon really
40. Its a cartoon, ite just for entertainment.
41. It's from a film which aims to be entertaining instead of accurate.
42. Cartoon, doesn't look real
43. As it's a cartoon with Romans and primates
44. It's a catoon
45. It’s animated.
46. It depends on how you perceive - it in this case its a cartoon and to some especially children this is a good resource to an adult they relate better to a historical picture
47. Animation
48. Animated fiction, not real, Disney fictional film.
49. Looks like a cartoon
50. Cartoon
51. It's a cartoon
52. Fiction
53. Cartoon image makes life look fun not hard like i would imagine it.
54. B & E are characterizations
55. Because it’s from an animated film (even though it was a very good one!)
56. Comical
57. Cartoon caratures
58. It's a cartoon so it's been adapted to suit the medium
59. Too childish and over imaginative
60. It's a childmovie
61. It's a cartoon
62. It's animation and done as comedy.
63. They look to cute to survive a hostile environment

64. The picture depicts Several different moments in evolution history.
65. It's a cartoon
66. It’s a comedic cartoon
67. Cartoon - comical and humour inspired
68. cartoon view of life
69. Probably because it looks like a kids tv programme!
70. Its a cartoon
71. Because they are made to look comical
72. Tv cartoon
73. It’s a cartoon for kids and there are many species hunting together which probably didn’t happen
74. Is a kids movie so will be over simplified
75. Cartoon
76. seems to be more for entertainment
77. It's a cartoon.
78. Its a cartoon so not realistic, things will be changed to fit the animation theme
79. Planet of the Apes is not real. Obviously this is not a still from that motion picture but nevertheless it seems fanciful to suggest that we were in some kind of evolutionary armed conflict with other primates
80. it's an animated cartoon
81. It's cartoon firstly so distorts the appearance of Neanderthals but the hunting seems to be accurate.
82. Cartoon designed for entertainment not to inform
83. It’s a cartoon
84. The aim of the depiction is entertainment not to inform
85. A cartoon image
86. Not sure
87. Meant to be entertainment so facts likely sacrificed
88. It's a cartoon
89. It's a fun poster for a children's film. I don't think neanderthals skin would have been quite so pale or clean shaven
90. it’s claymation?
91. Cooperation and fraternity amongst species which I doubt occurred frequently if at all.
92. This is a children’s film not a historical depiction- they look too human like to be a Neanderthal
93. Its just a cartoon of a rough estimation of what our species was like millions of years ago.
94. Because it is cartoon depiction of earlyman
95. It’s a cartoon, which means a lot of the drawing is exaggerated and not convincing
96. More of a fantasy
97. It is presumably a children's animation and so it is likely not very accurate in order to make a more exciting story or to make characters look more appealing to kids
98. It’s a cartoon

99. It's a fictional cartoon
100. It’s clay
101. It is cartoon
102. Cartoon, made for comedic effect
103. I don't know what's happening in this picture
104. Hard to imagine a cartoon as being real life / hard to imagine that cartoon character looking 'real'
105. It’s a cartoon
106. It's a child's film
107. It’s a cartoon.

Appendix 11 – Responses given for questionnaire question 8 which looked at common themes between the given images

MEDIA GROUP

1. Like us but not as advanced/evolved as us, portrayed as lesser.
2. no
3. Starting from apes
4. They mostly seem to be represented as hunters, their skin colour is a lot darker, lack of clothes. Only portrayed as a single linear progression.
5. Major focus on homo sapien with other species seen as being ‘ape like’ when they were more similar to us
6. They all show a similar image in what our ancestors looked like
7. In the previous images evolution seems to be presented as a conflict between modern humans and primitive apes/ancestors.
8. They link it to hunting - the size of the people change as well from bigger to smaller
9. Idea of very primitive, previous species do not wear much if any clothing, a lot of focus on tools
10. Quite simple and barbaric
11. Less hair, taller.
12. Yes
13. All seem to be quite male, with females not as prevelant
14. yes
15. They all look relativity similar. More or less naked, hunting animals.
16. A few yes
17. Hairy Aggressive Scarcely dressed Largely Male
18. The final person is white
19. Same clothing, waving spears, same facial features
20. Humans used to be animal like, hunters
21. conflict
22. That we evolved from apes, there are also a lot of images depicting hunting/a fight to survive.

23. A general theme of gradual progression from ‘ape-like’ beings to modern humans
24. The representation of the appearance of Neanderthals in each image seems to be very similar. All of the images also demonstrate multiple stages of human evolution, to show the development rather than just one element of human history.
25. Yes ape like to human
26. Colour of the skin
27. Similar facial features
28. Hunting for food with primal tools e.g. spears From apes to humans
29. They’re male? Seem to show hunter/gathering behaviour and a simple way of life. Maybe less intelligent than humans now
30. ‘Monkey-like’ savages
31. change in characteristics
32. Yes.
33. No
34. The man look the same
35. Yes they are all primitive human like
36. The human evolution images shown frequently show black turning into white, which although may be the case I don’t think that is a significant part of evolution and is simply a change, I don’t think that this is actually evolution.
37. They all look like the monkey image I think of .
38. Yes
39. In the early stages of evolution man is represented as hairy and ape like.
40. Progressive evolution. Modern humans as pinicle/final form. Almost all male with the exception of croods. All olive-dark skin with the execption of the first image which shows the most modern human as white. Depicted in some as groups/packs. Tool use and clothing.
41. Violence, tribalism
42. They all show ape like resemblance
43. No
44. Wearing skins is more primitive. Upright stance is less primitive. Paler skin is less primitive.
45. It always includes movement.
46. Yes
47. Humans evolved from apes
48. Yes
49. It’s been simplified and the stages of evolution have been very exaggerated
50. Yes - we have adapted to the environment we live in. We provide for our families and keep them safe. We fight for our rights and for our lands,
51. Animals to humans
52. Cave man, living of land and appearance
53. Yes they’re as I’ve seen previously
54. Ape to human
55. Previously there was an idea of superiority attempting to be explained by physicality, such as smaller brains, more ape-like, which is also how people tried to explain African people as less advanced than white people. Currently there is hopefully a stronger push towards scientific accuracy and realism, and actually trying to understand the past
56. 1) Eyyyyyyyyyyyy linear evolution! 2) H U N T E R S. Gathering? Community? Culture? Nope, that doesn't exist! It was all about hunting and the typical 'primal' imagery. The creation of art? Storytelling? Nope, it's ALL A LIE and apparently does not exist (i.e., humans are

depicted in a very simiplistic, primitive manner, focusing only on the notion of survival. 3) Apparently we were all monkeys, just with less hair. 4) Only 'masculine' traits -- and a lack of any female humans.

57. They generally show early hominids as having long unkempt hair. Typically modern human behaviours: hunting, fighting, concern for the dead
58. Yes stature getting taller and features less harsh.
59. Anthropomorphic. Drawing close links to modern ideas of humans, how they look and behave differently to apes
60. Hunter-gatherer
61. Yes all show how we have evolved from ape like beings
62. Hight ,facial features ,always male
63. Darker rough skin due to exposure to the sun. The theory that we evolved from primates. Lack of civility.
64. All seem to be similar
65. Not that I saw
66. Only in that there was some animal basis
67. Yes many images portray the hunter/gatherer lifestyle
68. Two themes - either a progression or humans battling.
69. It's always presented in a very linear manner. It is also presented as traditional working with the environment as a means of saying that mankind was more primitive. It's a problematic presentation and leads to modern day racism.
70. Humans looked less like 'animals' or monkeys, they grew in size as they evolved, became whiter?
71. Ape type images evolving into modern humans.
72. Yes
73. Apparently only white men evolved?
74. A lot of one group versus the other. A lot of hunting scenes too
75. Very culture related group and a characteristic group that shows little overlap.
76. All tend to be depicted in quite foraging/animalistic ways
77. They are portrayed as primitive
78. Many of these images depict hunting scenes.
79. Evolution is presented as linear in some of them. It's all men, there are only some women in the background of the cartoon image, which implicitly is saying that evolution was driven by men and that somehow women just went along with it. Children and the elderly are also not represented, and in general you get the idea that other hominin species just used to live in caves and spend most of the time of the day hunting or fighting against each other. These images ignore activities such as moving from one base to another -which likely took much of their time-, caring for each other, gathering plants, etc.
80. In a clear scale from, worst to best showing the current state of humanity as our pinnacle.
81. Yes, they've been presented as cruel animalistic creatures depending on the quantity of hair.
82. I can see that the depictions of light skinned peoples have material culture (i.e. clothes, hair decorations) and the darker-skinned are displayed more primitively
83. hairyness/nakedness/unsophisticatedness
84. Yes, hairy apes to modern humans
85. hunting is often depicted along with use of tools, a linear 'progression' is often depicted with the end point of modern humans rather than a branching and complex family tree.
86. Hunting and fighting are deeply involved in their life.
87. images are all of adult males

88. early humans presented as 'primitive'
89. they evolved in groups
90. Except for the film clip, they all seem to be represented naked, suggesting the creators believe them to be unable to even think of the concept of clothing despite the loss of hair through evolution. This represents them is not intelligent life, effectively separating them from H. sapiens. They are also almost always in violent situations whether it be hunting or fighting (even carrying the dead).
91. previous human species are shorter, brutish, hairy, unkempt
92. There is a focus on a single human, implying that all humans must have evolved in the same way
93. Hairy, almost naked and with stone tools.
94. People are naked. WHYYY
95. Thicker brows for older ancestors, hairier to more hairless, hunting and living in caves/lack of permanent abodes.
96. there is always a tendency to portray neanderthals as inferior to homo sapiens when this is in fact unfounded and based on victorian ways of thinking
97. The idea of ''savage'' peoples becoming ''civilised'' in time.
98. Competition for survival
99. Nudity, unkempt hair
100. social creatures, bipedal, interacting with other species, large, naked, long hair, primitive
101. dark hair, white/tan skin
102. Most of them don't show evolving at all - they show a point in time in the past but not the evolving from there to here
103. Primitive, hunters, hairy and ape-like
104. Yes
105. Always male
106. Hairy to hairless - brutal to noble - moreover conflict-based evolution w/ inter-species battles rather than slow coexistent differentiation.
107. Human evolution is often portrayed as a linear progress. It is not linear and the term 'progress' does not describe evolution well. 'Better adapted' would be more accurate. There is also an implicit idea of hominins conquering nature in order to build civilization - eurocentric, colonialist, often racist discourse.
108. General theme of development from primate to human
109. we came from monkeys
110. Yes, there are all assuming the progress from apes to neaderthals and to homosapiens. It doesn't give explanation or room for variation or other theories
111. All men All beards
112. Stereotypical ideas of a caveman
113. Skin getting lighter.
114. Nudity hunting
115. No
116. Primitive
117. Only males are shown...where are the females?
118. Some are linear, emphasis on hunting and violence
119. ‘Lack’ of civilisation in human ancestors/other homo species
120. Violence (interpersonal and against other species), representations seem to be male dominated

121. there’s a lot of hunting images, which matches the hunter gatherer thing and also connectedness to nature. and some of the less nature-based ones have some linearity themes going on
122. We have evolutionary links with monkeys
123. Similar colour schemes, shows humans to be primitive
124. That evolution was essentially a march towards Homo Sapiens
125. Centred around conflict/ war
126. Only physical appearance, no other aspects of life
127. Less hair, become taller, higher cheekbones and thinner face
128. All our ancestors are monkey-like and look like cavemen
129. Change in physical features
130. Very much the idea of going from 'primitive' to 'developed', with no clothing/spears/very animalistic stances etc
131. There seems to be a lot of hunting imagery, quite animalistic behaviour displayed
132. From primitive and with nature to civilised and separated from nature.

ANTHROPOLOGY GROUP

1. all wearing same things looking animal like
2. Yes they make neanderthals look like monkeys
3. they look ‘feral’
4. Monkey-homosapian
5. Male Primitive Mostly nude White Hairy
6. Facial hair, and skull and facial structure
7. Linear evolution, oversimplified visions that lead to a misperception of how they really looked like
8. Yes
9. Mostly presented as several phases, or as a dramatic shift from 'cave men'
10. Yes, hunting is an important focus
11. Progression from brown skin to white skin
12. Nasty, brutish and short
13. All these images contain multiple humans
14. Hunting of animals, the look of the beings at that time
15. Most show the lineage from a more ape-like species to the present human species. The images show humans as not disimilar to their ape cousins; being territorial, hunting etc.
16. All primitive and reductive
17. Humans are seen as hunters
18. Hunting, athletic bodies, nudity.
19. A lot of hunting and nudity
20. Not greatly, there seems to be imagery that suggests violence
21. The faces and parts of the Bodies
22. Primate to human in stages
23. Yes coming from apes.
24. Shape of person
25. All men
26. Hair changes, size, hunting, foreheads
27. We are still hunter ..gatherers....

28. B, E, F & G all concentrate on violence or hunting. I'm sure there was violence and they were hunter/gatherers but there was more to their lives than just these aspects and that's never depicted.
29. Most show gradual change from more apelike to present form.
30. Mostly male, muscular, more body hair and pronounced facial features
31. Apelike figures, hunters
32. That we evolved from Apes
33. They are all quite dark skinned.
34. Yes.
35. Most pics seemed antagonistic, like there was a Neanderthal side and an "other." Most are depicted in what appears to be conflict.
36. That we have evolved from monkeys or apes
37. I guess the hunter, and hairy, less advanced. us being a progression from Neanderthals, evolution does not work that way. It has no desired outcome, it has no determined direction. Plus Neanderthals did not screw their ecosystems up!!
38. Yes. They are all walking upright and working together
39. There seems to be a them of multiple yet distinct stages of evolution onto specific "species" rather than gradual genetic mutation which could be more indistinct
40. Focus on hunter-gatherer and focus on change from animal to something more recognisable as ourselves
41. Humans as always the dominant species compared to similar species, or other animals in general
42. The images are almost exclusively of male members of the species.
43. large link with apes
44. Most have been presented wearing clothes (even though that probably wouldn't have happened) and most have shown adult males only
45. Yes. Although all in different contexts they all portray an image of either hunting animals and more protruding facial features etc.
46. The rise of the Homo Sapiens either by peace with other species or in direct competition with.
47. Scientists have an agenda which makes it want to appear as though homo sapiens are supremely intelligent in order to secure future funding as homo sapiens themselves. Also zoos may be in on this,as tying evolution to monkeys results in more 'educational' trips to the zoo. e.g. I went in S8 and my parents had to pay £20.
48. That we evolved from the primates
49. All the images have similar settings in terms of living conditions; most wear little if any clothes and facially have not developed to the level of humans; their muscles have clear definition and there is definite resemblance to an ape
50. Hunters.
51. Many seem to show the idea of different stages of evolution with an ancestor becoming 'closer' to human
52. Yes, hairy men. Some are hunched over hunting and others are stood up walking through evolution.
53. Instinct of survival
54. Most seem to portray early humans as very different to us and contain images of "hairy" or " primitive" people using "primitive" technology or engaged in some sort of ritual or violent confrontation.
55. Apes

56. Portrayed as savages and shows a constant clash between man and nature.
57. Ape to man
58. There seems to be a connection between human ancestors and animals. Excessive body hair also seems to be a given.
59. Two showed development from early humans. More showed the hunter gatherer or 'caveman' like lifestyle
60. Racial aspect in a few of them depicting evolution as leading to paler skin. Violence is in almost all the images.
61. Sociality and cooperation of species eg hunting and gathering together Also most images depict the Australopithecus and Homo species as male There is also conflict between species using tools Finally Neanderthals May have been involved in rituals and burials of the dead
62. It shows our evolution in a non modern context, everything was from living in hunter-gatherer societies and also shows some of the limited ways people understand our evolution
63. Dumb hairy men
64. Primitive people portrayed as savages and hunters
65. Yes: physical appearance
66. Hunched backs, savage like, dark skinned, bearded

Appendix 12 – Responses given for questionnaire question 9 which looked at the portrayal of human diversity in the given images

MEDIA GROUP

1. nothing
2. Probably shouldn't be so white? I'm not sure but I think there should be more ethnicities in there, and maybe some more women?
3. all fairly white, or at least evolve into a white male, all images are male
4. Very similar
5. Follow the ‘white man’ - little to no insight into other human races
6. there appears to be a significant amount of diversity between the different stages of human development.
7. It shows neanderthals usually as of black skin colour
8. There is not a lot of diversity and it seems we have decided on one type of portrayal
9. Doesn't show different ethnicities/cultures evolution
10. Not very diverse toward varying ethnicities or gender or age
11. There were no women in the pictures which could suggest there were no women neanderthals.
12. In some of the images I feel they are portrayed as "lesser" than us and unintelligent.
13. I think it is a fairly diverse representation
14. It’s sad but there are bigger issues
15. Not much diversity eg all same skin and hair colour
16. Don’t think it’s accurate in the slightest
17. How man has evolved

18. There are no women in the images so I don't think that its an exhaustive set of images on human evolution.
19. Appears to be a narrow narrative
20. It doesn't show much about human activity it seems more focused on human appearance and they all looked quite similar
21. Perhaps a lack of diversity in that most of the images seemed to show the evolution of white males.
22. There is not much representation of human diversity in these images as most seem to illustrate white males, all represented quite similarly across the images.
23. Quite accurate
24. No feelings
25. Unsure really
26. Not much diversity. They look similar to each other. Usually males hunting.
27. It is a true representation
28. uncertain about accuarcy
29. They appear to have progressed from ape to upright human.
30. Not great
31. None of those images depicted seemed to depict females. Homo sapiens were all relatively fair-skinned.
32. True
33. The images seem to be black under developed evolving to white developed
34. I don’t think the images show any diversity and simply focus upon the evolution of the white man rather than humans in general.
35. It looks like life was just about survival.
36. Most are portrayed as white backgrounds, rather than the more accurate African skin tones.
37. There was little diversity; no representation of different cultural ethnicities such as darker skin tones.
38. People who were diverse from the dominant were rejected
39. They dont show it except for maybe picture A. The others depict the same colour of skin, hair, facial features and big feet!
40. Interesting
41. No particular diversity shown
42. Too simplistic
43. Not very diverse, one would assume that all humans were originally white when we now know that this is actually the complete opposite.
44. That our ancestors were hunters and possibly fighters.
45. Humility because I realise how little I actually know about prehistoric humans.
46. It's not very diverse at all. Just white male figures
47. There is not that much diversity they are quite similar looking
48. It does not reflect diversity that much.
49. I feel they are quite accurate
50. Minimal diversity. Female? Race?
51. Primate to human makes the most sense to me and then Instagram ruined everything
52. That many share my beliefs on evolution that we come from apes.
53. Very narrow
54. I don’t feel anything
55. All have same theme
56. Some are pretty archaic and dated, while some seem relatively better

57. Mainly white people which is more than likely to be wrong.
58. Diversity? What is that? Some kind of cheese? (ON a serious note: as mentioned before, there is none. It's all very much framed into the idea that the past was just filled with what will eventually become 'white men'. (This is a more complex issue than that above statement, but as mentioned before, evolution is less linear, and more filled with branches. Branches, which apparently do not exist in the images).
59. All men and all white
60. Not sure, maybe not a true reflection on how we are and how we were.
61. Goes from monkeys to white, western features. Little evidence of black, blonde, ginger people
62. Male orientated, hunters meat eaters
63. Very interesting how we have evolved..
64. I'm not sure how much diversity there was in Neanderthals. I think they were a sub-species of humans but I don't know enough about them to comment on diversity
65. I've never given it a great deal of thought
66. True representation
67. Turning towards non white
68. I couldn't see any women. That's half the population. Skin tones appear to be light. Not sure if they were.
69. Mostly represents the male role and less so the female
70. It suggests a variety of information and that it is not completely agreed upon, on how we evolved.
71. It's fascinating, but other than hearsay, literature, etc we really can't tell.
72. They all look similar but more developed as time went on.
73. I'm not sure
74. Lack of ethnic diversity and history
75. I believe it would be ignorant of humans to disregard The similarities between Homo sapiens and Primates. Almost all photos showed the evolution of human from primate to Homosapien.
76. The enormity of evolution and how many changes/mutations had to occur to make homosapiens
77. Again it is super problematic and I think used to reinforce racism today
78. I feel as though it is not diverse at all, as you can only see what seems to be male humans, and the representations don't take into account different geographical origins
79. The whole monkey connection is rather offensive (probably more for some ethnic groups).
80. Shown as evolving into a white male ,
81. Most are standard of diversity in the last forty years
82. They are all male and most are dark skinned
83. I think diversity was fairly limited in early man due to his limited spread across the globe. Physical diversity has increased as man has spread across the globe encountering new physical and climatic challenges
84. i Don't understand the question
85. Interested to find out more give my preconceptions are not very accurate with regards to how we developed
86. I would like to see a female neanderthal as I have never seen what one would look like - I will google this after the questionnaire!
87. focus more on western people

88. Seems fairly accurate. Though perhaps some images are too 'white', particularly if man is supposed to have originated from Ethiopia (area).
89. You don't really think about women's development, and the standard is a "western" man. I wouldn't even know if this is true or if there were variations in ethnicity like we see now to be honest
90. If 'diversity' means race, then yes, evolution does is portrayed as a whitening.
91. everyone looks the same by the end with the same colour skin generally
92. not sure
93. I don't think that's the aim of the pictures, but does show some diversity, but that depends on what kind of diversity.
94. Not diverse at all One gender One skin tone
95. Not much diversity seen at all
96. Seems limited and the 'average' modern human is very euro centric in features
97. Despite the diversity, there appears to be common themes
98. It's poor. As stated earlier, it only shows adult males. No children. No females
99. Amazed at how we as humans have evolved over thousands of years with similar features and more than likely the same, if not very similar body organs and habits that we as humans have today.
100. That humanity or Homo sapiens are not the end of moral virtue or relatable existence. Often people can see resemblances in modern primates etc, but it's interesting to see non-Homo sapiens in a way that shows humanity is not so distinct.
101. They all seem to have a similar disposition in terms of complexion/skin and hair colour- Also, they are all male.
102. I believe there is little acknowledgement for a range of skin tones; both those who are extremely pale as well as from other ethnic backgrounds. I would say in reality the actual skin tone of Neanderthals would be slightly darker just based on their exposure to sunlight etc
103. I'm not sure.
104. It is stereotypical
105. There is no diversity. Literally just males. What about the females? I'm sure they played a big part since THEY gave birth to these men in the first place.
106. I don't see any diversity
107. Unsure
108. Not representative of real world diversity. However, many of the images depict images of ambiguous racial heritage. In balance, images skewed towards a Western perception of humanity.
109. Lack of diversity of ethnicity and gender
110. Not much
111. I don't know
112. Mainly white neanderthals shown? Not sure why
113. usually all are men of the same race
114. A lot of them are probably not very accurate and play into stereotypes / dominant representations which aren't real
115. Didn't especially pay attention but they were mostly white/tanned and I would have expected them to be black
116. It's not very diverse
117. Could be better

118. That we haven't changed much because deep down we're the same with instincts just now it's more superficial lifestyle to cover it

ANTHROPOLOGY GROUP

1. It's not very diverse, seeing as there were so many different evolutionary species. Also it's a bit odd about the skin colour thing as I can imagine people drawing the assumption that white people have evolutionarily progressed from black people (especially in the A) which obviously brings a lot of issues...
2. They all appear as white people, which is less likely that them being darker skinned as a protection from the sun in the hotter environments depicted
3. They all seem to represent the earlier stages of development and don't show a diverse society like we have today, there's no pale people or gingers
4. Again not that diverse all seem to be palish men lol
5. Limited. Focuses on evolution largely at one stage. Focuses on men and their aggressiveness. All characters look the same in the images
6. I think there is not much human diversity portrayed in these pictures, and when there is,it looks like a one-way path to modern humans from beastly beings.
7. No women? Also all conformed to the 'cave man' stereotype.
8. Generally there is a stronger focus on the male gender
9. Constricting
10. Perhaps in correct. I don't believe they were savage like
11. Very focused on Homo sapiens being more evolved and advanced and down plays the sophistication of other species who co existed at the same time
12. Problematic, no women, all young males, no children.
13. Too many men. Not enough women or children. Range of illustrated behaviour seems lacking.
14. Try to portrait that we are superior
15. I'm not convinced that any is an accurate representation of human origins.
16. Varies from the normally accepted sequence (which research may modify) to a cartoon at the other extreme
17. Image a showed that we evolved to be white, which is racist. However as Darwin was white that would be been his portrayal. Most images portray a western facial featurea
18. Not even near enough. And many of human early ancestors did not have skin as white as what is depicted.
19. I didn't much diversity. Most, of not all the images, portrayed the Homo sapiens as being white.
20. It is severely lacking!!
21. Not ideal. It needs to be more diversified
22. Good. Some images show good variations of diversity in evolution but others are very basic and erroneous
23. There is very little diversity depicted in these representations of early humans
24. Mainly male, where one might expect to be able to determine biological sex visually. But really I do not feel anything such considerations are just a fashionable distraction from real research.
25. There is very little portrayal of human diversity. They are shown with basic needs, including hunting and confrontation with other groups
26. It's non-existent: we only see adult men, no women, children or elderlies.

27. I think they show a very simplified version in a lot of ways, one of these ways s ignoring the massive diversity that exists within humanity. I would always take these images as examples but not as the only possible examples.
28. Quite disgusted and annoyed. Our jobs should be to tell the story of those who can't, not turn them into simplistic beasts
29. Definitely needs some work to include concepts of material culture (e.g. specialised tool making, intentional burials, art, and co-habitation)
30. skin gets gradually whiter, maybe not representative of people of colour. Also a very male imagery theme (women in background or not present at all)
31. There isn't much diversity. No women or children. Hair and skin colour gradually gets lighter as they evolve.
32. I don't really understand the question? Do the pictures portray human diversity? At what point do we consider pre-human lineages to be human and which species are human and which are not? However I think the images are interesting and thought provoking.
33. The Homo sapiens evolution journey wasn't an easy path.
34. fairly limited. the white male in one image is strikingly different from ancestors with darker skin - obviously meant to show how 'evolved' this individual is
35. îdk
36. In the older imagery they seem to be a lot darker skinned than they are in the newer imagery. Especially when considering the claymation, however, this was set at the start of the invasion of the roman empire and so they would have been white then. It doesnt seem very diverse, with each individual being the exact same colour as the others in the image, not accounting for individuals ability to produce melanin. It's as if they are trying to prove to us theyre the same group by colouring them the exact same.
37. Largely or only male, little race variation
38. None of the humans represented here are black or Asian, so it raises the question of whether all humans evolved in the same way or whether some evolved differently
39. Not sure about it. Early human probably lived in small bands within the same family. But there is also evidence for interbreeding between different human species.
40. Seems rather Afro-Asia focussed. But it's hard to tell geography
41. It portrays humans as a homogenous group who evolved together from a single source.
42. the example figures often depict adult men, with a rather racially ambiguously tanned skin tone, however with some studies i.e cheddar man reconstruction the accuracy of skin tone has been considered
43. They address to different categories of people, from people working in academia to children.
44. Not academically precise enough because we human evolution is not linear
45. There was a little diversity in the first image but most of the others portray the typical 'cave man' archetype in Africa
46. there is no diversity
47. It is very white-centric and inaccurate
48. I think they're all men (although f and g are very small), which would have made evolution difficult!
49. They only showed adult males, also image A seemed a bit problematic in terms of race (i.e. showing the person with darkest skin as being the most primitive)
50. Not good. Again, implies that lightness of skin and lack of hair is superior - eurocentric, colonialist, racist.

51. All of the 'evolved' humans were Caucasian, which is further evidence to prove my point re. scientist's agenda - as the people who were working on anthropological research at the time of the evolution theory were predominantly Caucasian.
52. I don't really understand this question
53. Not very diverse, the images mostly focus on more modern species of Homo and do not reflect the diversity of Australopithecines or Paranthropines and how some of these species overlapped in time and space. There is no image illustrating the first potential hominins either.
54. Perceptions of Human diversity can be altered depending upon the intentions of the author/artist
55. For the most part oversimplified
56. That attempts are being made to make the subject more accessible to a wider audience, which is positive
57. They are all of their time. Some are attempting to portray early humans in a more sympathetic light. Others conform to older stereotypes.
58. i don't know, out of all the things for people to represent badly i'd rather it be 'evolution is linear' than eg 'vaccines cause autism'
59. Only men shown
60. I feel it was accurate in the sense that the humans shown were dark skinned and haired.
61. The majority of humans displayed appeared to either be caucasian or the most evolved form is caucasian
62. They're all presented as male or likely male, even though the type fossil for A. afarensis is female.
63. Mostly male therefore not fully representative Depicts most species as social and cooperative as well as some conflict which may be valid however there are also other themes which are hidden such as grooming feeding sleeping defence Images aren't all fully valid as human evolution isn't linear All species shown were pretty much bipedal, some still had ape like arboreal adaptations and some had more modern features Most had tool use
64. They all have the same colourings
65. It's surprising that there were so many human species
66. Mostly diverse, but they mostly showed humans fighting or hunting (violence/harsh practises portrayed)
67. Not much variation in portrayal

Appendix 13 – Responses given for experiment question 4 which asked respondents to justify their reaction to receiving a DNA ancestry test that revealed they were 5% Neanderthal

NON-STEREOTYPED IMAGE

1. It doesn't really affect the way I live today
2. It is interesting to learn about the history of your own descent
3. That knowledge doesn't effect the person I am. It's interesting but not enough to make me have a strong feeling about.

4. We are descended from them so there will surely be some trace of them in many people's dna
5. because I have no idea about what does that mean
6. i feel as if theres no negative connotation associated with neanderthalensis DNA expressed in human DNA.
7. because i don't really care? it's just a result, nothing else.
8. It's your past, why should it affect you now?
9. It's such a long time ago that it doesn't really matter
10. Because we started from somewhere and a neanderthal is as good a place as any! They survived through a lot of diversity so would be happy to have some of their survivors DNA within me.
11. Can't do much about the past
12. Could descend from a T-Rex for all I care. It's interesting but doesn't change the make up of the human species
13. Always thought I was decended from them
14. Expected that result
15. I'm sure most people have prehistoric DNA traits- we know there was an evolutionary process that eventually ended in today's human race. It doesn't make me the person I am . We are defined by the choices we make not our DNA
16. They are assumed to be uncivilised
17. If we evolved from them, I wouldn't be offended that they are found in my ancestry.
18. Interesting to know about our heritage. Proud that we have come so far.
19. its our past
20. I do not know enough about them. It would be unexpected.
21. Intriguing to understand your background
22. Something something I have X percent DNA in common with a banana... and ur mom
23. Neanderthals are part of the human past
24. Doesn't really make a difference to who I am, finding this out wouldn't change anything
25. feel it doesn't really affect who I am now as the percentage differences in how neaderthal people are don't matter to me personally
26. I'd enjoy any surprises in a DNA ancestry test result.
27. not offensive
28. Neanderthals are a key part of evolutionary history, and it would be interesting to know that my lineage was a part of that.
29. It's just a fact of life. I do think I resemble neanderthals in some ways- we look similar and I am competitive and sometimes really feel that primitive 'fight or flight' response.
30. I mostly feel surprise, that's a lot of neanderthal, but it wouldn't affect me in any significant way.
31. Having remnant Neanderthal DNA only means that we evolved from them, not that we are like them.
32. Because knowing what your ancestry was is so exciting that there's no need to be negative about it. There's nothing you can do about it anyway, might aswell feel positive about learning this in the first place
33. 5% is quite a lot considering how long ago neanderthals were around :/
34. I know this isn't uncommon. We descended from Neanderthals
35. It's super cool because they were a different human species
36. its not suprising news

NON-STEREOTYPED TEXT

1. I don’t really mind
2. This is said to be a normal result for people of european or asian ancestry
3. I do not feel that my ancestors from circa 40k years ago have such a dramatic impact on who I am as a person today, furthermore Neanderthals weren’t as stupid as people were originally led to believe
4. I would not be surprised to be have Neanderthals in my ancestry, therefore would not have a strong reaction
5. Homo sapiens are closely related to neanderthals, I wouldn't necessarily be that surprised
6. It does not affect how I think of myself
7. neutral
8. Evolution
9. I've taken a DNA test. It's fascinating. Why would it be negative?
10. It would be cool.
11. I don’t know enough about the subject to form an opinion.
12. It’s interesting to discover ancestral roots from such a long time ago
13. I feel this is unsurprising and therefore feel fairly unequivocal about this information
14. They are our ancestors so I’d expect to share a portion of DNA
15. It’s only natural, I should be proud of my origins.
16. My ancestors are part of me but who they were genetically doesn’t change my feelings. They lived too ling ago for me to feel directly attached.
17. I think it sounds quite cool to be part neanderthal
18. its interesting
19. It is a natural part of evolution, we have to be descended from somewhere.
20. Neanderthals are an interesting hominin species.
21. It is interesting to know where we descend from originally. It doesn’t mean that we are directly like Neanderthals now
22. Evolutionarily, it is impossible to be of one specific hominin species. Inter-mingling of species have had to occur for a myriad of different characteristics to exists for human beings.
23. Evolution suggests that we all must have come from a previous, and genetically distinct organism. What that organism does not affect the way in which our species should feel today. History cannot be a positive or a negative. It can only be.
24. Even if it's a bad thing, I'm 95% not Neanderthal. If you had 1/20th less mobility in your left hand than the average person, you'd never even notice, let alone care. If it's a good thing, if you had 1/20th more mobility, you'd also not care
25. interesting
26. genuinley interested
27. Interesting to find out where we come from
28. don’t think it'll affect me
29. It’s interesting if we can see the trace of our ancestors in our DNA. Nevermind if they are Neanderthals or Homo Sapiens.
30. As I don’t really think it’s new news
31. doesn't bother me
32. Everyone has got to come from somewhere. It doesn't define who you are.
33. We are all some part Neanderthal and so in that respect it’s not shocking. Having a higher % could partly be due to having not as many ancestors. I would feel slightly like I was related to a part of human history that is comparatively underdeveloped in terms of humans today

34. I don’t feel like it is a strange or embarrassing result, I would be interested in discovering more about it
35. My primary school lessons were somewhat correct

STEREOTYPED IMAGE

1. Although i find it interesting it doesn't really affect me in any way.
2. It doesn't really interest me or change my view of my identity
3. Humans aren’t any better. We cause wars and destroy the planet
4. It isn’t uncommon, and I don’t think it has any significant bearing on life today. It’s just a quirky thing like most of the dna tests
5. I find the idea of past interaction between modern humans and neanderthals very interesting and would be excited to be distantly related to this.
6. most people who are recently descended from populations outside Africa most likely are part neanderthal
7. It is interesting to know how different I think I am but obviously 5% is quite an influence. I would however, feel awkward about the connotations of neanderthal behaviour being associated with me.
8. I don't think a Neanderthal ancestry would have a lot of impact on my sense of self.
9. your ancestry is what it is. Link is so far back, traits will have changed considerably since then.
10. Does not affect me in any way
11. It is good to know where our race originated from and also that way we are able to study how man developed over the centuries, to who we are today.
12. Because some believe that characteristics that are in my family, e.g. red hair, may have come from Neanderthal Man. It is highly likely that different subspecies of man interbred.
13. I am who I am regardless of my ancestry.
14. It doesn’t really matter to me
15. I don't think that revelation would impact my life in any significant manner, but it would definitively confuse me. As far as I know, the DNA between humans and Neanderthals are very similar, so only having 5% would make we wonder where the other 95% comes from.
16. Because they were creative
17. Not really surprised
18. Feels less advanced/developed.
19. They get a bad press! I like Neanderthals, they're far removed from the frequent media representations of them being savage and "ape-like".
20. It’s amazing that Neanderthals and early humans cooperated!
21. No strong feelings on evolution
22. I think still I’m not 100% human
23. Coz I don’t mind
24. your ancestry had to start from the beginning of the human race
25. Seems pretty cool to have that heritage
26. It would not come as a surprise
27. We’re all descended from Neanderthals, it would be expected
28. Cool
29. It would be exciting

30. I wouldn’t mind either way - it wouldn’t particularly change who I am already and we are all descended from them anyway. It’s not like I have particularly Neanderthalic traits which I would then feel conscious of having received this test results.
31. It's interesting, but I don't see it as a good or a bad thing.
32. Does not affect my current life
33. To be expected- I imagine Neanderthals and early homosapians coexisted and very likely breed
34. I don't think that this will have a particular effect on the person that I am now, we had to evolve from something. It doesn't really make a difference.
35. It's a different species, it would be like coming back 5% chimpanzee. Not a positive thing.
36. it’s a small percentage
37. Have no strong feelings either way
38.
39. I'd find it interesting but also a bit odd!
40. Because it doesn‘t really have any meaning to me
41. we're closely related evolutionarily
42. I don’t feel like it changes my thoughts, but it could be a positive aspect of my personality.
43. As I have been led to believe that all humans are descendants of neanderthals so it's unsurprising
44. I don’t see it as a specifically good or bad thing.
45. It tells me about my ancestry, and that my ancestors most likely came out of Europe. It also shows that humans and neandethals interbred
46. Interesting finding and helps to further show my own history

STEREOTYPED TEXT

1. I would not be bothered by it.
2. I think our form of human from whatever descent is the more sophisticated but our origin doesn't change our current state.
3. I would expect a result of that nature
4. Does not bother me
5. look the same act similarly
6. I'm aware of the overlap period between Neanderthals and homo sapiens in Europe before Neanderthals went extinct, interesting to think that sexual relations happened between them that lead to offspring, interesting to draw more questions from it such as was there cohabitation, were there relationships etc so would be cool to carry part of history in my genes.
7. It is expected
8. It’s seems interesting to be connected biologically to something that was on the planet such a long time ago.
9. It's pretty funny
10. It's good to know your ancestors
11. Not sure
12. Whatever my DNA I am who I am
13. not sure
14. Because I always believed we were descended from Neanderthal
15. They're intelligent, can see how we have evolved.

16. It’s interesting to know that I descend from them partly and helps me understand my genetic makeup a little better.
17. Because it's quite rare to have that DNA
18. Surely everyone is descended from them a bit
19. Unchanging part of our nature
20. Interesting to descend from another species of hominin other than Homo Sapiens. Also is further evidence for interbreeding.
21. It's normal. I would have taken the test to find our my DNA ancestry (which is not accurate anyway), so would be positive about any results as they would be interesting.
22. That far back ancestral traits don’t really matter to who I am now
23. It doesn’t bother me if that’s what did happen. I’m on the fence a bit about evolution v religious theories
24. Doesn’t mean much to me and also it’s quite a small percentage.
25. I would not be surprised
26. I don’t know enough about them to have an opinion
27. Because we are descended from them (I think??)
28. The neanderthals and our other early ancestors were vital to our existence
29. Five percent seems like quote a lot. Associate Neanderthals with being a primitive species so feels insulting
30. To be expected? Aren't we all?
31. Ancestory isn't something that is important to me.
32. I would think that was pretty cool! But I don’t know much about what Neanderthals actually are
33. Primitive and negative connotations surrounding neanderthals
34. Not sure what it would mean to be Neanderthal so wouldn't know how to react to this
35. I am aware a lot of people have Neanderthal DNA. (Including myself- I've taken these DNA tests before!). It makes my ancestry more interesting

Appendix 14 – Responses given for experiment question 6 which asked respondents to justify their reaction to the phrase ‘you’re such a Neanderthal’

NON-STEREOTYPED IMAGE

1. It’s used as an insult but I don’t fine the actual insult insulting
2. It doesn't really offend me or get my angry if someone was to say that
3. It has certain connotations beyond simply a comparison to actual Neanderthals
4. They’re saying it as an insult, usually regarding lack of intelligence or primitive behaviour, but as I don’t view Neanderthals in that way their attempted insult would be neither here nor there to me.
5. In society, Neanderthals are typically viewed as barbaric and stupid, thus I would likely assume it was being intended as an insult
6. Has bad connotations, maybe suggesting you are stupid and clumsy
7. being compared to a Neanderthal is synonyms with being called stupid or slow

8. Because someone calling someone else a Neanderthal is most probably using it in an insulting sense, calling something stupid whether it was true or not
9. Because most people associate with Neanderthals as being immoral.
10. they are saying that your behaviour and culture have been little developed in many thousands of years.
11. It depends on how the term was used and in what context. Afterall we did descend from them, so it is a true fact.
12. A meaningless comment
13. Probably said as an insult
14. It makes me think of a more simple character
15. Because Neanderthals are perceived as unintelligent
16. I would assume that they didn't really know what they were talking about as Neanderthals are very complex.
17. It implies a primitive form of existence with little evidence of progressive or present day behaviours that are expected in today's civilisations
18. Because there were animal like
19. Coz I don't mind
20. why bother with what they say as no doubt they are the same.
21. Insulting/primitive/ignorant/idiotic (connotations)
22. It is an outdated insult. Doesn't really mean anything.
23. Neanderthals are associated with being primitive/stupid so it's obviously intended as an insult
24. It is simply used as a way of expressing views or actions perceived as old or ancient.
25. neanderthal is usually meant as a word/insult to imply that someone isn't intelligent, uncultured or barbaric
26. Implies stupid/negative
27. Neanderthals had big brains. Although the comment was probably intended as an insult, I would turn it around as a complement.
28. The common understanding of Neanderthals is negative so this seems likely to be an insult
29. It is an uneducated response. Please try harder with insults.
30. I guess it would depend on who said it and how. My friends used to joke about being troglodytes or Neanderthals in high school
31. I don't believe Neanderthals were primitive do not insulted
32. Often people perceive Neanderthals as primitive and therefore without modern manners and morals- if someone called me a Neanderthal, I'd assume this is what they meant
33. Not really an insult to me
34. Because they are perceived as a more primitive human, lacking sophistication, culture and manners
35. It could be meant as a throw-away comment, and wouldn't mean much.
36. It would be shocking that they even know this term in the first place
37. It has connotations of being uncivilised
38. generally used as an insult
39. Probably implies I am primitive, unintelligent, unsophisticated
40. I see myself as articulate

NON-STEREOTYPED TEXT

1. It isn't an insult or compliment

2. The connotstions are of being barbaric, uncivilised, not intelligent
3. I understand it's used as a derogatory term but my knowledge of Neanderthal man leads me to believe they were fairly developed for the time they lived in. My instinct would be to educate the person using the phrase
4. They'd obviously be insulting me
5. People often interpret 'neanderthal' as 'caveman' so it's probably meant as an insult
6. Not really an insult
7. Because the 'adjective' neanderthal seems to be used as a synonym for 'primitive
8. Conception of them being primitive and less civilised
9. Says more about them than me
10. They dont realise how we have all evolved
11. Because it is probably saying you are less developed than a human ?
12. Depending on the context, it could be a compliment/insult, but I think in most cases, it would just be a meaningless comment and thus would evoke no emotions.
13. They were intelligent and resorsfull
14. I would take it as rude, as if I was less intelligent/advanced.
15. No strong feelings towards Neanderthals, understand that it is just a phrase
16. People use this as an insult. I feel this is due to believing they are rough and not intelligent however they were able to survive and evovle showing intelligence. However, knowing it was intended as an insult would make it difficult to be positive about this
17. The word Neanderthal often has negative connotations
18. I do not know enough about Neanderthal to draw a conclusion from the description. It is clear they are from long ago so hard to make a judgement.
19. Because most people would use that word to describe someone less evolved / intelligent than humans as we know them.
20. Used as a stereotypical insult for a primitive, unskilled or stupid individual
21. As far as insults go it's pretty tame -- something a disgruntled maid in Downton Abbey might say. My friends spend most of their time calling me a faggot.
22. It would likely be intended as an insult.
23. not offended
24. The reaction to the above is subjective and I would not be offended by it in any way.
25. I think in this context it would be negative because it is being used to insinuate that you are less civilised and advanced compared to modern day humans.
26. Don't really mind, we are are so it's not an insult to me!
27. Don't know enough about them
28. I don't really think it's an insult
29. doesn't mean much to me
30. Like calling me an ape or something comparably stupid
31. It's the implication of what society thinks about neanderthals, if someone said that to me I'd think they were accusing me of being messy or having a lack of manners.
32. In that context it's being used as an insult, to imply stupidity.
33. They have a right to their opinion and would in fact be true.
34. Neanderthal is generally seen as an insult. Suggesting someone is unintelligent or backward
35. Due to the social connotations, as it generally implies you're slow/ barbaric/ ugly

STEREOTYPED IMAGE

1. I wouldn't really understand what it meant, whether it was an insult or a compliment

2. They are using the term neanderthal as an insult
3. Used in this way the term has taken on meaning as an insult. The negative feeling is from a social conception of what many people believe to be the primitive qualities of Neanderthals even if this is not actually accurate
4. because I think I'm not primitive
5. It is not good looking
6. I know that this would likely be used as in insult, but wouldn't feel very insulted.
7. before studying anthropology I would have seen it as an intended insult meaning I'm primitive and uncultured, but now it wouldn't mean anything because there's so much more to it that that
8. It's kind of a dumb insult
9. Because we are all animals, despite humans being very self aware and having a variety of different cultures etc. We have evolved to form the societies that are spread about this planet, but we should never forget that we are just one of the many life forms who have survived to this day. If being called a Neanderthal is meant in a negative way, then it's down to the ignorance of the person saying it.
10. Social connotation of being rough around the edges/barbaric
11. Purely due to the context as they are likely trying to say I'm Un-evolved and stupid. Even though it's possible the Neanderthal were in intelligent
12. I'm not offended I would assume they're joking
13. Doesn't really have a connected meaning for me
14. Not much of an insult
15. they're ugly
16. indifferent
17. It's often used as an insult, to suggest that the person is stupid
18. They are assumed to be uncivilised
19. I think there is a connotation that Neanderthals were not as clever as homosapiens / a bit more savage so I would feel offended or upset if I thought it was meant in that way.
20. they were primitive
21. Has connotations of unsophistication and incivility
22. Most people have a negative connotation when they say that
23. Depends on tone but could be negative?
24. It's no offensive nor a compliment- just the facts
25. Usually said in a negative way
26. It is normally used with a negative connotation
27. The comment seems meant as an insult in current culture regardless of traits of actual Neanderthals
28. Again it's a just name so doesn't worry me
29. I mean it's quite funny but it's an insult because it kind of means uncouth.
30. They probably mean it as an insult, so I should make the effort to be insulted by it. It's only polite
31. Neanderthal has a negative connotation added to it, I would be upset because the person was trying to insult me.
32. Negative connotations of being 'out of date' or unintelligent
33. because when they say that what they mean is'simple'
34. I wouldn't be bothered

35. It’s used in a way that suggests it is negative. When people talk of being similar to a neanderthal they often mean primitive or some other negative connotation, even if that’s not necessarily an accurate reflection of the species.
36. Connotations of unsophisticated etc. Although this isn't necessarily true, I'd know they were trying to be offensive.
37. It would imply I'm dumb/slow
38. Generally ‘Neanderthal’ is used as an insult rather than in a positive manner
39. I wouldn’t find it offensive, but it’s also not a compliment, I’d probably find it quite funny because imagining someone being that primitive is amusing
40. Primitive and negative connotations surrounding neanderthals
41. think they would be referring to the idea that you’re ‘under evolved’ and so telling you that you’re not very civilised and perhaps playing on the idea that you don’t have a lot in common with modern humans
42. On one hand it could be an insult, meaning 'brutish' or 'aggressive'; on the other hand it could mean 'stong' and 'powerful'

STEREOTYPED TEXT

1. It sounds like it would be used pejoratively: i would take offence at that rather than actually being called a Neanderthal
2. It is not a term to describe someone
3. The term has negative connotations and can be used as an insult
4. because i suppose nowadays it has connotations of bring brutish, and slow
5. Because, depending on their background, they are most likely to mean this as 'slow' or 'stupid' in comparison with other humans. it would be directed with offence.
6. it feels like i look like a neanderthal
7. They are known to be somewhat antisocial and incapable of communication. This is like being called stupid or a child.
8. It's meant as an insult, but I wouldn't care.
9. I would assume the person saying the phrase would be using it incorrectly
10. The term used in the context of the above statement, historically has a social stigma attached
11. Because people are misusing the name as a derogatory term
12. I think that would be funny and also the person who said it would be quite quirky.
13. I would take it as an insult as implies primitive and not civilised (by modern standards anyway)
14. It's only a comment
15. As above reply
16. If used in this context I feel it is generally meant in relation to negative misconceptions about Neanderthals, such as brutal, unintelligent, primitive person
17. Different appearance, not necessarily seem as “attractive” in modern culture.
18. I would take this to imply that I am stupid/ only able to understand very basic concepts
19. Negative connotations of ugly, hairy savage, stupid etc.
20. Because people use it as a derogatory insult
21. Negative connotations of primitive, uncivilised savage
22. It would depend on context. If meant as an insult i would have a negative reaction. If meant playfully i would probably laugh.
23. Neanderthal is used as an insult

24. Connotations with being stupid, ape like and more brawn than brains
25. Has implications of being barbaric, stupid, unsophisticated.
26. The phrase typically is used to imply a lack of civility and stupidity
27. I don't think I my thoughts and lifestyle are comparable.
28. They were essentially inferior to Homo sapiens which is why they died out, so it being called a Neanderthal is an insult.
29. Could be viewed as an insult
30. I would interpret it as an insult to mean unintelligent or brutish.
31. Because it is used to insinuate that you have not evolved into a human and are implying that you are more ape like and therefore less intelligent.
32. Because of the negative characteristics (less intelligent, ugly)
33. As it is used as a derogatory term, saying you're animalistic
34. I would take it as an insult suggesting I was primitive and unintelligent.
35. Stereotype of stupidity and being unsophisticated
36. same as the above reasons :)
37. Common society would use this as a negative insult
38. I wouldn't know what they meant by that, so I'd question them

Appendix 15 – Responses given for experiment question 8 which asked respondents to justify their perception of the primes' accuracy

NON-STEREOTYPICAL IMAGE

1. Just from what I've seen and read
2. From having a very basic knowledge in history and from watching tv shows about the stone age the picture has resembling features of what they have described a neanderthal man be look like
3. It would be pretty difficult to tell what they were really looked liked based solely on the skeletal evidence
4. I saw a model based on remains that had been found, it looked like a 'human' face as with the picture. They made jewellery too.
5. I think he was wearing a shell necklace and I'm not sure how likely or common this was. So that seems inaccurate. However the creation of stone tools occurred among Neanderthals so the simplistic depiction seems fairly accurate
6. Not too sure what they look like, that guy looked quite tall the and his features were not as defined as you sometimes see in neanderthal images
7. there were also Neanderthal women, not sure if Neanderthal were white?
8. Use of tools, living off the land, look similar to humans with slight differences in head shape
9. probably its just an image - many of the questions impossible to guess accurately except what is obvious from the picture
10. We knew they used caves as shelter, found stones to be useful as primitive tools and wore little clothing. He resembles man today and was quite hairy. Typical of a Neanderthal male
11. unsure
12. Looked more like homosapien

13. Well, not necessarily but it does show a Neanderthal using a tool and sitting in a cave, so perhaps fairly accurate.
14. A little glamourised but the artist is trying to demonstrate the ability of early tool making and planning. Not sure about the hair tied up but shows practicality so plausible.
15. I think it's more like a human
16. I don't know
17. From what I have read they were very intelligent and very clever.
18. Not traditional depiction.
19. Classic depictions like that show big muscular, hairy men. What about women? Not all body types are the same either.
20. It fits the description I have seen before and what I have read/seen from the few academic sources I have seen before in media.
21. It shows Neanderthal to be quite 'human' like/intelligent etc rather than a primitive ape like hominin
22. Making tools- but tbh I'm not so sure
23. The Neanderthal was depicted engaged in tool-making and we have archaeological evidence for this
24. Because it tallies with museum and exhibition presentations of them
25. It is an archaic artistic representation.
26. Feel like it's just generic cave man image
27. Need more detail about source of image
28. As it is a secondary source, one can never really be certain what it is depicting is correct. It may be somewhat accurate but without looking at other data, one cannot be certain
29. It seems like an old image so we likely didn't have the knowledge to accurately depict them.
30. Looked too human like?
31. it depicts a very basic lifestyle
32. For a man yes, but what about women? Did they look identical?
33. It's in line with what cultural beliefs say about Neanderthals
34. Similar to other pictures that I would associate with Neanderthals
35. Consistent with what I've seen before
36. It fits in with the stereotypes we usually see

NON-STEREOTYPICAL TEXT

1. It matches what I perceive then to be
2. This fits with what I have heard about them so assume to be true
3. It fits with other information I have been exposed to
4. It's as accurate as the archaeological record suggests
5. It was a relationship benign statement, it didn't offer anything that seemed out of place, for any early human for that matter
6. It was limited and simple
7. I think they were more muscular and hairy than is described. I'm not sure they wore tooth necklace.
8. What I have learnt
9. history
10. It matched how I would probably imagine one to be ?

11. No one obviously knows how exactly they looked like, but society has depicted Neanderthals in a certain way through books, movies, TV shows, etc. over the past few decades and the description at the beginning seems to match that depiction.
12. They looked like modern man and could make their own tools and clothing
13. It sounds accurate from what I've seen in media
14. I don't think it is possible to understand something in such detail with only the fossil record available
15. As far as I am aware this is how we believe they where in life due to the evidence found.
16. I have limited knowledge on them, so did not really consider whether your description was truthful
17. It is similar to watch I had previously depicted in my head.
18. The description of caves and making tools suggests a somewhat intelligent species. The physical descriptors also resembled those I have seen depicted in media and books.
19. Appears fairly neutral and based on research
20. Because I think you're trying to trick me; it seems too consistent with what popular culture has taught me about Neanderthals. By that I mean mainly Ice Age, but I'm sure there are others.
21. Based on my study and knowledge, it seemed more or less the same as modern scholarship on the topic.
22. not an expert
23. It cannot be an ''accurate'' description. A probable one,yes.
24. I think this description is commonly depicted in the media, but I don't think this is necessarily a realistic representation.
25. Somewhat accurate. I had thought that they would be more hairy, for example.
26. I don't have a great understanding so from my knowledge of things I've seen in the past that's what they look like
27. It doesn't sound like what they are described as in books and documentaries
28. Its only an estimate as we cant know for sure what they were like
29. Pretty much the same as other depictions that I know of
30. Sounds very human like, which I think of Neanderthals as being
31. My knowledge is limited but seems to reflect tv and books.
32. It is somewhat accurate. There is evidence that neanderthals used stone tools and may have made clothing or ornamented their bodies.
33. It reflects what I've seen of Neanderthals in media and the picture I've built up in my mind of an ape-like person living in a primitive society

STEREOTYPICAL IMAGE

1. From my knowledge, I understand a Neanderthal may have looked like this
2. The picture was a caricature of the view of neanderthals in popular culture
3. I have no other image to compare it to so this may really be close to what they looked like, however, Iwould not be surprised if this is wrong
4. from my imagination, I think it is a Neanderthal
5. Soft tissue may cannot be reconstructed by image
6. The image made neanderthals seem much more ape-like, aggressive and savage-looking than they actually were.

7. looks like the artist has drawn a gorilla standing up, is hard to tell if that's accurate or not but the artist has clearly intended them to look very primitive and I'm not sure that's appropriate
8. It seems to brute-ish when they probably looked more like humans
9. Because I am not sure if they were that hairy all over. It's the image that i grew up with of how Neanderthals were represented, but I'm not sure if now they think they were more human like with this different features.
10. Don't see why not
11. Because that's this imagery I've grown up with
12. All history books show you them like that
13. Because you showed me the image and then proceeded to ask educated questions about a Neanderthals.
14. What we're taught is the stereotypical Neanderthal
15. according to historical information
16. It's what we're often shown to be a Neanderthal in various forms of media
17. It is in line with most images we see of them
18. I feel like they are much closer to humans in terms of appearance than that picture portrayed (that's what Walking With Cavemen taught me anyway!) - but also, considering they lived such a long time ago, it's not possible to do an accurate depiction of them because we don't know exactly what they look like.
19. Seems sensible to be somewhat between apes and modern day humans.
20. Hairy and ape-like
21. I didn't imagine them to be so hairy
22. Clear image with one main focys
23. They were not barbaric, ape-like and as primitive as depicted
24. I think they were further to the right on a scale from Ape - Homosapien in terms of how they look
25. We understand bone structure and not much else about their features, anything else is an assumption
26. I wasn't around at the time so only have images like that one to guide me
27. It looked more like a monkey
28. I don't imagine it was a contemporary sketch of a neanderthal, so it was probably a guess at what they might've looked like, thousands of years later.
29. I think Neanderthals were more intelligent as a species than the picture made them look.
30. The individual in the picture had a tool, looked to be working on something and seemed to be communicating with facial expression
31. because it was just physical and that aligns with what i thought they looked like
32. Most other history of where humans come from is from ape type species
33. I mean, based on what I know there wasn't anything I could point out as inaccurate. It did look more like a monkey than the picture of Neanderthals I had in my head though, but since I am not sure how accurate that picture is that doesn't mean the picture is inaccurate. The head was bigger, or not as flat, as Homo Sapiens, which I am pretty sure is characteristic of Neanderthals. It looked like it was walking, which Neanderthals could do, though it was more hairy than I excpec
34. Looks like an old image - I'm critical of historic portrayals of the "other". Probably due to my anthropological training.
35. too hairy/ape-like
36. Not sure if it's an accurate depiction, I don't know where the source has come from

37. It’s probably more of a fantasised drawing than one grounded in scientific evidence like spectacular images of dinosaurs
38. I think the image was deliberately portraying Neanderthals as more ape like and distinct from homosapiens
39. It showed the fact that a Neanderthal was between human and ape. Physically the Neanderthal individual looked partially ape as it was hairy and had larger feet and build, but also human as it had distinctly human features. It also was carrying tools which i associate with a Neanderthal individual
40. I don't think Neanderthal's were as hairy or short as this depiction. I also think they stood morw upright and were morw human than ape (looks wise)

STEREOTYPICAL TEXT

1. The use of tools and the description of his face and body seem accurate to my understanding.
2. It corresponds roughly to what I have heard before but I cannot be sure it is accurate
3. because all those features fit in pretty well with evolutionary timescales, although the whole teeth showing thing might have been slightly descriptive i dont know
4. it is accurate to the best of my knowledge
5. couldn't remember the details of what I've learnt, according to my memory it's the right description
6. The hair, brow ridge and wide nose were accurate. The club and nudity are perhaps exaggerations of stereotypes
7. This is how they are portrayed in the media.
8. We don’t know what their skin and hair looked like
9. It seeks to describe Neanderthal man more akin to apes than humans
10. This is how I think neanderthals are portrayed in the media.
11. Think it was probably an accurate physical description
12. It's what I've read and seen on TV
13. Seems to be vaguely supported by archaeological evidence
14. It was presented as facts about the physical appearance of a Neanderthal to allow an interpretation to be made by individuals. It didn’t force me to feel either positively or negatively about a Neanderthal.
15. This is in line with what we have been taught.
16. I thought they were more human looking (as opposed to hairy all over like an ape). I also thought that they wore some form of clothing
17. From books and films.
18. Sounds too primitive to be accurate
19. It seems like the perceptions of Neanderthals in popular culture I.e movies, but also resonates with some more historical things such as hairy
20. It relies heavily on very old stereotypes. Most of the description relies on imagination and cannot be directly proven.
21. I don't know enough aboyt neanderthals to disagree
22. Despite DNA evidence we have no exact ideas really about what they look like, only what we think therefore no image can wholly represent a species unless there is hard evidence
23. Well I’m not sure - I don’t know that much about Neanderthals but I’d guess that they didn’t always go around baring their teeth and dragging clubs around

24. media depictions
25. This was my thoughts of the individual however I may be wrong
26. It covers the broad aspects of their appearance and build, as much as we really know
27. It described what I assumed would be a Neanderthal - and also correlated to book/pictures/film representations of them
28. Relative to homosapiens they're probably pretty uncivilised, but I think the description was likely going too far on what was the second most intelligent species alive at the time I think?
29. I could picture it in my head with what I thought was a Neanderthal beforw
30. Because of other pictures from school or films maybe
31. I'm not sure, but it sounded quite scary, didn't really seem to give a well rounded view
32. That is how I imagine a Neanderthal to be like from past descriptions.
33. similar to what I already thought
34. It fits in with the stereotype of how Neanderthals have been portrayed
35. It appears to be a common description given of Neanderthals
36. I would have thought they wore clothing

Bibliography

Abraham, L. & Appiah, O. (2006) Framing News Stories: The role of visual imagery in priming racial stereotypes. *Howard Journal of Communications*, 17(3), pp. 183-203.

Acheson, K. (2010) Gesner, Topsell, and the Purpose of Pictures in Early Modern Natural Histories. In: Cyril, M. & Hunter, W. (eds.) *Printed Images in Early Modern Britain: Essays in interpretation*. Farnham: Ashgate, pp. 127-144.

Adkins, L. & Adkins, R. (1989) *Archaeological Illustration*. Cambridge: Cambridge University Press.

Alberti, B., Fowles, S., Holbraad, M., Marshall, Y. & Whitmore, C. (2011) Words Otherwise: Archaeology, anthropology, and ontological difference. CA forum on theory in anthropology. *Current Anthropology*, 52(6), pp. 896-912.

Aldrich, R. (2009) Colonial Museums in a Postcolonial Europe. *African and Black Diaspora: An International Journal*, 2(2), pp. 137-156.

Amin, S. (1989) *Eurocentrism*. New York: Monthly Review.

Athreya, S. & Ackermann, R. (2019) Colonialism and Narratives of Origins in Asia and Africa. In: Porr, M. & Matthews J. (eds.) *Interrogating Human Origins: Decolonisation and the Deep Human Past*. London: Routledge, pp. 72-95.

Barnard, W. & Loomis, R. (1994) The Museum Exhibit as a Visual Learning Medium. *Visitor Behaviour*, 9(2), pp. 14-17.

Barney, A., Martelli, S., Serrurier, A. & Steele, J. (2012) Articulatory Capacity of Neanderthals, a Very Recent and Human-Like Fossil Hominin. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1585), pp. 88-102.

Barry, A. (1997) *Visual Intelligence: Perception, image, and manipulation in visual communication*. Albany: State University of New York Press.

Berman, J. (1999) Bad Hair Day in the Palaeolithic: Modern (re)constructions of the cave man. *American Anthropologist*, 101(2), pp. 288-304.

Bernard, H. (2006) *Research Methods in Anthropology: Qualitative and quantitative approaches*. Oxford: Altamira Press.

Binford, L. (1985) Human Ancestors: Changing views of their behaviour. *Journal of Anthropology and Archaeology*, 4, pp. 292-327.

Blake, C. (1862) On the Crania of the Most Ancient Races of Men. *The Geologist*, 5(6), pp. 205-233.

Blanc, A. & Serge, A. (1953) *Excursion au Mont Circé*. Rome: INQUA.

Bland, D. (1958) *A History of Book Illustration: The illuminated manuscript and the printed book*. London: Faber and Faber.

Boule, M. (1911) L'Homme Fossile de La Chappelle-aux-Saints. *Annales de Paléontologie*, 6, pp. 1-64.

Boule, M. (1912) L'Homme Fossile de La Chappelle-aux-Saints. *Annales de Paléontologie*, 7, pp. 65-208.

Boule, M. (1913) L'Homme Fossile de La Chappelle-aux-Saints. *Annales de Paléontologie*, 8, pp. 209-279.

Bouquet, M. (1998) Strangers in Paradise: An encounter with the fossil man at the Dutch Museum of Natural History. In: MacDonald, S. (ed.) *The Politics of Display: Museums, science, culture*. London: Routledge, pp. 159-172.

Bowler, J. (1976) *Fossils and Progress: Palaeontology and the idea of progressive evolution in the nineteenth century*. New York: Science History Publications.

Brace, C. (1964) The Fate of the 'Classic' Neanderthals: A consideration of hominin catastrophism. *Current Anthropology*, 5(1), pp. 3-43.

Bräuer, G. (1984) A Craniological Approach to the Origin of Anatomically Modern *Homo sapiens* in Africa and the Implications for the Appearance of Modern Europeans. In: Smith, F. & Spencer, F. (eds.) *The Origins of Modern Humans: A world survey of the fossil evidence*. New York: Alan R. Inc, pp. 327-410.

Brehm, A. (1864) *Brehms Tierleben*. Hildburghausen: Bibliographisches Institut.

British Library (2020) Marvels of the East. *British Library*. Available at: https://www.bl.uk/collection-items/the-marvels-of-the-east [Accessed 10 Apr. 2020].

Cann, R., Stoneking, M. & Wilson A. (1987) Mitochondrial DNA and Human Evolution. *Nature*, 325, pp. 31-36.

Cartmill, M. (1990) Human Uniqueness and Theoretical Content in Palaeoanthropology. *International Journal of Primatology*, 11(3), pp. 173-193.

Cartmill, M. (2001) Taxonomic Revolutions and the Animal-Human Boundary. In: Corbey, R. & Roebrooks, W. (eds.) *Studying Human Origins*. Amsterdam: Amsterdam University Press, pp. 97-106.

Catlin, R. (2019) Meet the Master Muralist Who Inspired Today's Generation of Paleoartists. *Smithsonian Magazine*, 4 Jun. 2019.

Champion, T. (1997) The Power of the Picture: The image of the ancient Gaul. In: Molyneaux, B. (ed.) *The Cultural Life of the Images: Visual representations in archaeology*. London: Routledge, pp. 211-229.

Chase, P. & Dibble, H. (1987) Middle Palaeolithic Symbolism: A review of current evidence and interpretations. *Journal of Anthropological Archaeology*, 6, pp. 263-296.

Cheng, Y. (2017) Is Peking Man Still Our Ancestor?: Genetics, anthropology, and the politics of racial nationalism in China. *The Journal of Asian Studies*, 76(3), pp. 575-602.

Chudoba, B. (2019) How Much Time Are Respondents Willing to Spend on Your Survey? *Survey Monkey*. Available at: https://www.surveymonkey.com/curiousity/surveycompletion times/ [Accessed 28 Mar. 2020].

Clark, K. (2018) Scoop: 23andMe is raising up to $300M. *Pitchbook*, 24 July.

Cline, E. (2011) *Ready Player One*. New York: Crown Publishing Group.

Cohen, B. (1994) From the Bowman to Clubman: Herakles and Olympia. *Art Bulletin*, 76(4), pp. 695-715.

Cole, S. & Dioso-Villa, R. (2007) CSI and its Effects: Media, juries, and the burden of proof. *New England Law Review*, 41(3), pp. 435-469.

Coltrane, S. & Messineo, M. (2000) The Perpetuation of Subtle Prejudice: Race and gender imagery in 1990s television advertising. *Sex Roles*, 42, pp. 363-389.

Conkey, M. & Williams, S. (1991) Original Narratives: The political economy of gender in archaeology. In: di Leonardo, M. (ed.) *Gender at the Crossroads of Knowledge: Feminist anthropology in the postmodern era*. Berkeley: University of California Press, pp. 102-139.

Conkey, M. (1991) Contexts of Action, Contexts for Power: Material culture and gender in the Magdalenian. In: Gero, J. & Conkey, M. (eds.) *Endangering Archaeology: Women and prehistory*. Oxford: Basil Blackwell, pp. 57-92.

Conlin, J. (2014) *Evolution and the Victorians: Science, culture and politics in Darwin's Britain*. London: Bloomsbury.

Craik, F. (2014) Effects of Distraction on Memory and Cognition: A commentary. *Frontiers in Psychology*, 5(841), pp. 1-5.

Criado-Perez, C. (2019) *Invisible Women: Exposing data bias in a world designed for men*. London: Chatto & Windus.

Daley, J. (2017) Controversial Study Claims Apes and Human Ancestors Split in Southern Europe. *Smithsonian Magazine*, 23 May.

Dampier, W. (1697) *A New Voyage Round the World*. London: Adam and Charles Black.

Dancy, M., Rainey, K., Stearns, E., Mickelson, R. & Moller, S. (2020) Undergraduates' Awareness of White and Male Privilege in STEM. *International Journal of Stem Education*, 7(52), pp. 1-17.

Dannemann, M. & Kelso, J. (2017) The Contribution of Neanderthals to Phenotypic Variation in Modern Humans. *The American Journal of Human Genetics*, 101(4), pp. 578-589.

Dart, R. (1925) *Australopithecus africanus*: The man-ape of Africa. *Nature*, 115, pp. 195-199.

Darwin, C. (1839) *Journal of Researches into the Natural History and Geology of the Countries Visited During Voyage of the H.M.S Beagle Round the World, Under the Command of Captain Fitz Ray, R.A*. London: John Murray.

Darwin, C. (1859) *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. London: John Murray.

Darwin, C. (1871) *The Descent of Man, and Selection in Relation to Sex*. London: John Murray.

Darwin, C. (1882) *The Descent of Man, and Selection in Relation to Sex*, 2nd edition. London: John Murray.

Dawson, C. & Woodward, A. (1913) On the Discovery of a Palaeolithic Human Skull and Mandible in a Flint-Bearing Gravel Overlaying the Wealden (Hasting Beds) at Piltdown, Fletching (Sussex). *Geological Magazine*, 5(10), pp. 42-44.

Deary, T. & Brown, M. (2008) *Savage Stone Age.* Croydon: Scholastic Children's Books.

Deary, T. (2021) Terry Deary's Biography. *Terry Deary: Best selling Author and Television Personality*. Available at: http://www.terry-deary.com/pg/terry-deary-biography [Accessed 2 Feb. 2021].

Dennell, R. (2001) From Sangria to Olduvai, 1937-1960: The quest for 'centres' of hominid origins in Asia and Africa. In: Corbey, R. & Roebroeks, W. (eds.) *Studying Human Origins: Disciplinary History and Epistemology*. Amsterdam: Amsterdam University Press, pp. 45-66.

Dennell, R. (2018) Where Evolutionary Biology Meets History: Ethno-nationalism and modern human origins in East Asia. In: Schwartz, J. (ed.) *Rethinking Human Evolution*. London: The MIIT Press, pp. 229-252.

Dickason, O. (1977) The Concept of L'Homme Sauvage and Early French Colonialism in the Americas. *Revue Française d'Histoire D'outre-Mer*, 64(234), pp. 5-32.

Drell, J. (2000) Neanderthals: A history of interpretation. *Oxford Journal of Archaeology*, 19(1), pp. 1-24.

Dubois, E. (1891) Palaeontologische onderzoekingen op Java. *Extra bijvoegsel der Javasche Courant, Verslag van het Mijnwezen over het 4e kwartaal* 1890, pp. 14-18.

Dubois, E. (1894) *Pithecanthropus erectus, einen menschenaenliche Uebergangsform aus Java*. Batavia: Landesdruckerei.

Duhard, J. (1993) *Realisme de L'image feminine paleolithique: Cahiers du Quarternarie*. Paris: CNRS Editions.

Early Man (2018) Directed by Park, N. Bristol: Aardman Animations Ltd.

Edgeworth, M. (2006) Multiple Origins, Development, and Potential of Ethnographies of Archaeology. In: Edgeworth, M. (ed.) *Ethnographies of Archaeological Practice*. Oxford: AltaMira Press, pp. 1-19.

Eilberg-Schwartz, H. & Doniger, W. (1995) *Off with Her Head! The denial of women's identity in myth, religion, and culture*. Los Angeles: University of California Press.

Elder, G. (1996) *Chronic Vigour: Darwin, Anglicans, Catholics, and the development of a doctrine of providential evolution*. Maryland: University Press of America.

Farland-Smith, D. (2019) Developing Young Scientists: The importance of addressing stereotypes in early childhood education. *Intech Open*, 1, pp. 1-12.

Fedigan, L. & Strum, S. (1999) A Brief History of Primate Studies: National traditions, disciplinary origins, and stages in North American field research. In: Dolhinow, P. & Fuentes, A. (eds.) *The Nonhuman Primates*. California: Mayfield Publishing Company, pp. 258-269.

Fedigan, L. (1986) The Changing Role of Women in Models of Human Evolution. *Annual Review of Anthropology*, 15, pp. 25-66.

Field, A. (2009) *Discovering Statistics Using SPSS: And sex and drugs and rock 'n' roll*. London: SAGE.

Figuier, L. (1870) *L'homme Primitif*. Paris: Libraire Hachette et Cie.

Flynn, T. & Barringer, T. (1998) *Colonialism and the Object: Empire Material Culture, and the Museum*. London: Psychology Press.

Fuhlrott, J. (1856) Menschliche Überreste aus einer Felsengrotte des Düsselthals. *Eberfeld*, September 4.

Galesic, M. & Bosnjak, M. (2009) Effects of Questionnaire Length on Participation and Indicators of Response Quality in a Web Survey. *Public Opinion Quarterly*, 73(2), pp. 349-360.

Gamble, C. (1992) Figures of Fun: Theories about cavemen. *Archaeological Review from Cambridge*, 11(2), pp. 357-372.

Gasman, D. (1971) *The Scientific Origins of National Socialis: Social Darwinism in Ernst Haeckel and the German Monist League*. New York: Elsevier.

Gehring, R., Toglia, M. & Kimble, G. (1976) Recognition Memory for Words and Pictures at Short and Long Retention Intervals. *Memory and Cognition*, 4(3), pp. 256-260.

GEICO (2004) *GEICO Caveman* [Advertised on American Broadcasting Company].

Glascock, J. & Preston-Schreck, C. (2004) Gender and Racial Stereotypes in Daily Newspaper Comics: A time-honoured tradition? *Sex Roles*, 51, pp. 423-431.

Glaser, B. & Strauss, A. (1967) *The Discovery of Grounded Theory: Strategies for qualitive research*. Chicago: Aldine.

Goodman, M. (1962) Immunochemistry of the Primates and Primate Evolution. *Annals of the New York Academy of Sciences*, 102, pp. 219-234.

Goodrum, M. (2009) The History of Human Origins Research and its Place in the History of Science: Research problems and historiography. *History of Science*, 47, pp. 337-357.

Gordon-Chipembere, N. (2011) *Representation and Black Womanhood: The legacy of Sarah Baartman*. New York: Springer.

Gorjanović-Kramberger, D. (1901) Der Palaolische Mensch und sein Zeitgnossen aus dem Diluvium von Krapinain Kroatien. *Mitt Anthrop*, 31, pp. 164-197.

Gorvett, Z. (2021) Here's What We Know Sex with Neanderthal was Like. *BBC Future*, 13 Jan.

Gottbath, L. (2020) In 2020, The Black Lives Matter Movement Shook the World: Local BLM organisers reflect on a year that rocked the United States, and chart their priorities for 2021. *Al Jazeera*, 31 Dec.

Gould, S. (2001) A Tale of Two Work Sites. In: Gould, S. (ed.) *The Lying Stones of Marrakech: Penultimate Reflections in Natural History*. New York: Vintage, pp. 251-268.

Grady, C., McIntosh, A., Rajah, M. & Crank, F. (1998) Neural Correlates of the Episodic Encoding of Pictures and Words. *Proceedings of the National Academy of Sciences of the United States of America*, 95, pp. 2703-2708.

Grant, J. (2007) *Corrupted Science: Fraud, ideology and politics in science*. Arizona: See Sharp Press.

Gregory, W. (1914) The Dawn Man of Piltdown, England. *American Museum Journal*, 14, pp. 189-200.

Gregory, W. (1927) Did Man Originate in Central Asia? (Mongolia in the New World, Part V). *The Scientific Monthly*, 24(5), pp. 385-401.

Greve, J, (2021) White House Defends Biden's 'Neanderthal Thinking' Comment on Ending Mask Mandates. *The Guardian*, 4 Mar.

Gundling, T. (2010) Human Origins Studies: A historical perspective. *Evolution: Education and Outreach*, 3, pp. 314-321.

Haeckel, E. (1883) *The History of Creation, or the Development of the Earth and its Inhabitants by Natural Causes: A popular exposition of the doctrine of evolution in general, and that of Darwin, Goethe, and Lamarck in particular.* New York: Appleton.

Haeusler, M., Trinkaus, E., Fornai, C., Müller, J., Bonneau, N., Boeni, T. & Frater, N. (2019) Morphology, Pathology, and the Vertebral Posture of the La Chapelle-aux-Saints Neanderthal. *Proceedings of the National Academy of Sciences of the United States of America*, 116(11), pp. 4923-4927.

Hager, L. (1997) Sex and Gender in Palaeoanthropology. In: Hager, L. (ed.) *Women in Human Evolution*. New York: Routledge, pp. 1-28.

Hammond, M. (1979) A Framework of Plausibility for an Anthropological Forgery: The Piltdown case. *Anthropology*, 3(1), pp. 47-58.

Hammond, M. (1982) The Expulsion of the Neanderthals from Human Ancestry: Marcellin Boule and the social context of scientific research. *Social Studies of Science*, 12(1), pp. 1-36.

Harari, Y. (2011) *Sapiens: A brief history of humankind*. New York: HarperCollins.

Harari, Y. (2020) *Sapiens: A graphic history: The birth of humankind.* London: Jonathan Cape.

Harper's Weekly (1873) The Neanderthal Man. *Harper's Weekly*, 17(864), p. 617.

Hawkes, K., O'Connell, J. & Jones, N. (2018) Hunter-Gatherer Studies and Human Evolution: A very selective review. *American Journal of Physical Anthropology*, 165(4), pp. 1-45.

Hegel, G. (1807) *The Phrenology of Spirit*. Translated by Findlay, J. & Miller, A. 1977. Oxford: Clarendon Press.

Hellenciaworld (2020) Herakles Near the Altar, Killing Busiris and His Priests. *Hellenciaworld.* Available at: http://www.hellenicaworld.com/Greece/Museum/NationalMuseumAthens/en/NAMAML9683A.html [Accessed 10 Apr. 2020].

Hendry, L. (2021) Human Evolution: Bringing a Neanderthal to Life: The making of our model. *Natural History Museum*. Available at: https://www.nhm.ac.uk/discover/bringing-a-neanderthal-to-life-the-making-of-our-model.html [Accessed 3 Feb. 2021].

Henke, W. (1999) Palaeoanthropology: A multi- and interdisciplinary approach. *Anthropologie*, 37(3), pp. 209-210.

Henke, W. (2007) Historical Overview of Palaeoanthropology Research. In: Henke, W. & Tattersall, I. (eds.) *Handbook of Palaeoanthropology*, Berlin: Springer Link, pp. 1-56.

Hern, A. (2015) Flickr Faces Complaints Over 'Offensive' Auto-Tagging for Photos: Auto-tagging system slaps 'animal' and 'ape' labels on images of black people, and tags concentration camps with 'jungle gym' and 'sport'. *The Guardian*, 20 May.

Hodder, I. (2012) Archaeology and Anthropology: the state of the relationship. In: Shankland, D. (ed.) *Archaeology and Anthropology: Past, present, and future*. London: Berg, pp. 65-75.

Honderich, T. (2005) *The Oxford Companion to Philosophy*. Oxford: Oxford University Press.

Hooton, E. (1949) *Up from the Ape*. New York: Macmillan.

Horrall, A. (2017) *Inventing the Caveman: From Darwin to the Flintstones*. Manchester: Manchester University Press.

Hovland, R., McMahan, C., Lee, G., Hwang, J. & Kim, J. (2005) Gender Role Portrayals in American and Korean Advertisements. *Sex Roles*, 53, pp. 887-899.

Howell, F. (1965) *Early Man*. New York: Time Inc.

Humphreys, R., Bam-Hutchison, J. & Ackermann, R. (2020) Archaeology is Changing, Slowly. But it's Still Tied Up in Colonial Practices. *The Conversation*, May 27. 2020.

Hunt, J. (1863) On the Negro's Place in Nature. *Journal of the Anthropological Society of London*, 2, pp. 15-56.

Huxley, T. (1863) *Evidence as to Man's Place in Nature*. Cambridge: Cambridge University Press.

Huxley, T. (1874) Note on the Resemblances and Differences in the Structure and the Development of the Brain in Man and Apes. In: Darwin, C. *Descent of Man*. 2nd Edition. London: John Murray.

Huxley, T. (1895) *Man's Place in Nature and Other Anthropological Essays*. London: Macmillan and Co.

IMDb (2007) The Big Bang Theory. *Important Movie Database*. Available at: https://www.imdb.com/title/tt00898266/ [Accessed 14 Feb. 2021].

IMDb (2009) Horrible Histories. *Important Movie Database*. Available at: https://www.imdb.com/title/tt1400819/ [Accessed 12 Feb. 2021].

IMDb (2018) Early Man. *Important Movie Database.* Available at: https://www.imdb.com/title/tt4701724/ [Accessed 5 Feb. 2021].

IMDb (2020) The Flintstones. *Important Movie Database*. Available at: https://www.imdb.com/title /tt0053502/ [Accessed 18 May. 2020].

Jochem, G. (2017) Neanderthal Genes Help Shape How Many Modern Humans Look. *National Public Radio*, 5 Oct.

Johanson, D. & Taieb, M. (1976) Plio-Pleistocene Hominid Discoveries in Hadar, Ethiopia. *Nature*, 260, pp. 293-297.

Keith, A. (1914) The Significance of the Discovery at Piltdown. *Bedrock*, 2, 435-453.

Kenny, R. (2007) From the Curse of Ham to the Curse of Nature: The influence of natural selection on the debate on human unity before the publication of 'The Decent of Man'. *The British Journal for the History of Science*, 40(3), pp. 367-388.

Kimbel, W. & Lawrence, M. (1993) *Species, Species Concepts and Primate Evolution*. New York: Plenum.

King, W. (1864) The Reputed Fossil Man of the Neanderthal. *Quarterly Review of Science*, 1, pp. 88-97.

Know Your Meme (2010) Confused Unga Bunga. *Know Your Meme*. Available at: https://knowyourmeme.com/memes/confused-unga-bunga [Accessed 5. Feb 2021].

Knox, R. (1857) *The Races of Men: A philosophical enquiry into the influence of race over the destines of nations*. London: Henry Renshaw.

Kuljian, C. (2016) *Darwin's Hunch: Science, race, and the search for human origins*. Johannesburg: Jacana Media.

Kupka, F. (1909) An Ancestor: The man of twenty thousand years ago. In: The Most Important Anthropological Discovery for Fifty Years. *The Illustrated London News*, 27 Feb.

Lamarck, J. (1809) *Philosophie Zoologique*. Paris: Musée d'Histoire Naturelle.

Lee, R. & DeVore, I. (1968) *Man the Hunter*. New York: Aldine.

Lenz, F. (1931) *Menschliche Auslese und Rassenhygiene (Eugenik).* Munich: Lehmann.

Ley, B., Jankowski, N. & Brewer, P. (2012) Investigating CSI: Portrayals of DNA evidence testing on a forensic crime show and their potential effects. *Sage Publications*, 21(1), pp. 51-67.

Lipphardt, V. & Sommer, M. (2015) Visibility Matters: Diagrammatic renderings of human evolution and diversity in physical, serological and molecular anthropology. *History of Human Sciences*, 28(5), pp. 3-16.

Lovejoy, A. (1936) *The Great Chain of Being: The study of the history of the idea*. Cambridge, Massachusetts: Harvard University Press.

Lovejoy, O. (1981) Origin of Man. *Science*, 211, pp. 341-350.

Low, B. (1979) Sexual Selection and Human Ornamentation. In: Chagnon, N. & Irons, W. (eds.) *Evolutionary Biology and Human Social Behaviour*. Duxbury: Arcadia, pp. 462-487.

Lubbock, J. (1865) *Prehistoric Times as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages*. London: Williams and Norgate.

Lyell, C. (1863) *Geographical Evidences of the Antiquity of Man*. London: John Murray.

Machin, R. (2008) Gender Representation in the Natural History Galleries at the Manchester Museum. *Museum and Society*, 6(1), pp. 54-67.

Malik, K. (1996) *The Meaning of Race: Race, history, and culture in Western society*. New York: NYU Press.

Marks, J. (2006) The Scientific and Cultural Meaning of the Odious Ape-Human Comparison. In: Ellison, G. & Goodman, A. (eds.) *The Nature of Difference: Science, society and human biology*. London: Taylor & Francis, pp. 35-51.

Marris, E. (2018) Neanderthal Artists Made Oldest-Known Cave Paintings. *Nature*, 22 Feb.

Martin, R. (2002) Primatology as an Essential Basis for Biological Anthropology. *Evolutionary Anthropology: Issues, News, and Reviews*, 11(1), pp. 3-6.

Mayer, A. (1864) Ueber die fossilen Ueberreste eines menchlichen Schädels und Skeletes in einer Felsenhöhle des Düssel-oder Neander-Thales. *Archiv für Anatomie, Physiologie und Wissenschaftliche Medicin*, 1, pp. 1-26.

McBrearty, S. & Brooks, A. (2000) The Revolution That Wasn't: A new interpretation of the origin of modern human behaviour. *Journal of Human Evolution*, 39, pp. 453-563.

Mills, E. (2019) Living Cultures. *Museums Association*. Available at: https://www.museums association.org /museums-journal/features/01022019-living-cultures [Accessed 9 Mar. 2020].

Moore, J. & Desmond, A. (2009) *Darwin's Sacred Cause: How a hatred of slavery shaped Darwin's views on human evolution.* London: Penguin UK.

Morgan, E. (1972) *The Descent of Woman*. London: Souvenir Press.

Morgan, L. (1877) *Ancient Society*. New York: Henry Holt and Company.

Moser, S. (1992) The Visual Language of Archaeology: A case study of the Neanderthals. *Antiquity*, 66, pp. 831-844.

Moser, S. (1993) Gender Stereotyping in Pictorial Reconstructions of Human Origins. In: du Cros, H. & Smith, L. (eds.) *Women in Archaeology: A feminist critique*. Canberra: Highland Press, pp. 75-92.

Moser, S. (1996) Visual Representations in Archaeology: Depicting the Missing-Link in human origins. In: Baigre, B. (ed.) *Picturing Knowledge: Historical and philosophical problems concerning the use of art and science*. Toronto: University of Toronto Press, pp. 184-214.

Moser, S. (1998) *Ancestral Images: The iconography of human origins*. Stroud: Sutton.

Moser, S. (2003) Representing Archaeological Knowledge in Museums: Exhibiting human origins and strategies for change. *Public Archaeology*, 3(1), pp. 3-20.

Moser, S. (2012) Archaeological Visualisation: Early artefact illustration and the creation og the archaeological image. In: Hodder, I. (ed.) *Archaeological Theory Today*. Cambridge: Polity Press, pp. 292-322.

Movius, H. (1953) The Mousterian Cave of Teshik-Tash, Southern Uzbekistand, Central Asia. *American School of Prehistoric Research Bulletin*, 17, pp. 11-71.

Murray, T. (2007) *Milestones in Archaeology: A chronological encyclopaedia*. California: ABC-CLIO.

Myers, G. (1988) Every Picture Tells a Story: Illustrations in E.O. Wilson's 'Sociobiology'. *Human Studies,* 11, pp. 235-269.

National Human Genome Project Institute (2003) 2003: Human Genome Project complete. *National Human Genome Institute.* Available at: https://www.genome.gov/25520492/online-education-kit-2003-human-genome-project-completed [Accessed 3. May 2020].

National Human Genome Project Institute (2010) Complete Neanderthal Genome Sequenced. *National Human Genome Institute*. Available at: https://www.genome.gov/27539119/2010-release-complete-neanderthal-genome-sequenced [Accessed 3 May. 2020].

Natural History Museum (2019) Record-Breaking Visitor Numbers for the Natural History Museum in London and Dippy on Tour. *Natural History Museum*. Available at: https://www.nhm.ac.uk/press-office/press-releases/record-breaking-visitor-numbers-for-the--natural-history-museum.html#:~:text=The%20Natural%20History%20Museum%20is,850%2C000%20unique%20visitors%20a%20month [Accessed 21 Jul. 2020]

Natural History Museum (2020) Human Evolution. *Natural History Museum*. Available at: https://www.nhm.ac.uk/visit/galleries-and-museum-map/human-evolution.html [Accessed 29 Jan. 2020].

Naturhistorisches Museum Vienne (2020) Naturhistorisches Museum Vienne: Muséum d'Histoire naturelle. *Naturhistorisches Museum Vienne*. Available at: https://www.wien.info/fr/sightseeing/museums-exhibitions/top/museum-natural-history [Accessed: 15 May. 2020].

Nee, S. (2005) The Great Chain of Being. *Nature*, 435, p. 429.

Nordenskiöld, E. (1929) *The History of Biology*. London: Kegan Paul, Trench, Trubner & Co.

O'Kelly, C. (1980) Sex-Role Imagery in Modern Art: An empirical examination. *Sex Roles*, 6, pp. 99-111.

Oakley, K. (1949) *Man the Tool-Maker*. London: British Museum Press.

Ogunnaike, O. (2016) From Heathen to Sub-Human: A genealogy of the influence of the decline of religion on the rise of modern racism. *Open Theology*, 2, pp. 785-803.

Paivio, A. (1971) *Imagery and Verbal Processes*. New York: Holt, Rhinehart and Winston.

Paivio, A. (1986) *Mental Representations: A dual-coding approach.* Oxford: Oxford University Press.

Parker, I. (2020) Yuval Noah Harari's History of Everyone, Ever: His blockbuster 'Sapiens' predicted the possible end of humankind, now what?. *The New Yorker,* 17 Feb.

Parsons, G. (1988) *Religion in Victorian Britain*. Manchester: Manchester University Press.

Patou-Mathis, M. (2000) Neanderthal Subsistence Behaviours in Europe. *International Journal of Osteoarchaeology*, 10, pp. 379-395.

Peresani, M., Vanhaeren, M., Quaggiotto, E., Queffelec, A. & d'Errico, F. (2013) An Ochred Fossil Marine Shell from the Mousterian of Fumane Cave, Italy. *PLoS One*, 8(7), pp.1-15.

Pettitt, P. (2011) *The Palaeolithic Origins of Human Burial*. London: Routledge.

Piltdown Man (1953) *Nature*, 172, pp. 981-982.

Plous, S. & Williams, T. (1995) Racial Stereotypes from the Days of American Slavery: A continuing legacy. *Journal of Applied Social Psychology*, 25, pp. 795-817.

Pobiner, B. (2016) Accepting, Understanding, Teaching, and Learning (Human) Evolution: Obstacles and opportunities. *Yearbook of Physical Anthropology*, 159, pp. 232-274.

Porr, M. & Matthews, J. (2019) Interrogating and Decolonising the Deep Human Past. In: Porr, M. & Matthews J. (eds.) *Interrogating Human Origins: Decolonisation and the Deep Human Past*. London: Routledge, pp. 3-32.

Pratt, T., Gaffney, M., Lovrich, N. & Johnson, C. (2006) This isn't CSI: Estimating the national backlog of forensic DNA cases and the barriers associated with case processing. *Criminal Justice Policy Review*, 17(1), pp. 32-47.

Protsch, R. (1975) The Absolute Dating of Upper Palaeolithic Sub-Saharan Fossil Hominids and their Place in Human Evolution. *Journal of Human Evolution*, 4(4), pp. 297-322.

Rae, P. & Perfect, T. (2014) Visual Distraction During Word-List Retrieval Does Not Consistently Disrupt Memory. *Frontiers in Psychology*, 5(362), pp. 1-11.

Reed, E. (1894) *Mr Punch's Prehistoric Peeps*. London: Read Books.

Rengger, J. (1830) *Naturgeschichte der Saeugethiere von Paraguay*. Basel: schweighausterschen buchhandlung.

Retroland (2011) The Flintstones. *Retroland*. Available at: http://www.retroland.com/the-flintstones/ [Accessed 18 May. 2020].

Reybrouck, D. (2002) Boule's Error: On the social context of scientific knowledge. *Antiquity*, 76, pp. 158-164.

Rosser, S. (1990) *Female-Friendly Science: Applying women's studies and methods and theories to attract students*. New York: Pergamon Press.

Rothery, D. (2015) *Geology: A complete introduction*. London: Hachette UK.

Rousseau, J. (1782) *Reveries of a Solitary Walker*. Paris: Bookking International.

Russel, L. (1997) Focusing on the Past: Visual and textual images of Aboriginal Australia in museums. In: Molyneaux, B. (ed.) *The Cultural Life of the Images: Visual representations in archaeology*. London: Routledge, pp. 230-246.

Russell, M. (2003) *Piltdown Man: The secret life of Charles Dawson and the world's greatest archaeological hoax*. Stroud: Tempus.

Sahlins, M. (1968) Notes on the Original Affluent Society. In: Lee, R. & DeVore, I. (eds.) *Man the Hunter*. New York: Aldine de Gruyter.

Sample, I. (2019) Bad Luck May Have Caused Neanderthals' Extinction – Study. *The Guardian*, 27 Nov.

Sankararaman, S., Patterson, N., Li, H., Paabo, S. & Reich, D. (2012) The Date of Interbreeding Between Neanderthals and Modern Humans. *PLoS Genetics*, 8(10), pp. 1-9.

Schaaffhausen, D. (1858) Zur Kenntnis des ältesten Rassenschädel. *Archiv für Anatomische und Physiologische Wissenschaftliche Medizin*, 25, pp. 453-478.

Schaaffhausen, D. (1861) On the Crania of the Most Ancient Races of Man. Translated by G. Busk. *Natural History Review*: *A Quarterly Journal of Biological Science*, 1, pp. 155-176.

Schoetensack, O. (1908) *Der Unterkiefer des Homo heidelbergensis aus dem Sanden von Mauer bei Heidelberg: ein Beitrag zur Paläontologie des Menschen*. Leipzig: Wilhelm Engelmann.

Schrenk, F., Müller, S. & Hemm, C. (2009) *The Neanderthals*. New York: Routledge.

Schultz, A. (1931) Man as a Primate. *The Scientific Monthly*, 33, pp. 385-412.

Science Photo Library (2020) Homo Heidelbergensis Hunting, Artwork. *Science Photo Library*. Available at: https://www.sciencephoto.com/media/471358/view [Accessed 29 Jan. 2020].

Scott, M. (2007) *Rethinking Evolution in the Museum: Envisioning African origins*. New York: Routledge.

Scott, M. (2010) The Pleasures and Pitfalls of Teaching Human Evolution in the Museum. *Evolution: Education and Outreach*, 3, pp. 403-409.

Sergei, S. (1939) Der Neandertalschadel vom Monte Circeo. *Anthropologischer Anzeiger*, 16, pp. 203-217.

Sherwood, M. (2004) Britain, the Slave Trade and Slavery. *Race and Class*, 46(2), pp. 54-77.

Shreeve, J. (2015) This Face Changes the Human Story, But How? *National Geographic*, September.

Simmons, J. (2016) *Museums: A history*. Maryland: Rowan & Littlefield.

Slocum, S. (1975) Women the Gatherer: Male bias in anthropology. In: Reiter, R. (ed.) *Towards an Anthropology of Women*. New York: Monthly Review Press, pp. 36-50.

Smith, G. (1924) *The Evolution of Man*. Oxford: Oxford University Press.

Smithsonian (2020) Hall of Human Origins. *Smithsonian Institution*. Available at: https://h umanorigins.si .edu/ [Accessed 29 Jan. 2020].

Soleki, R. (1975) Shanidar IV, a Neanderthal Flower Burial in Northern Iraq. *American Association for the Advancement of Science*, 190(4217), pp. 880-881.

Sommer, M. (2006) Mirror, Mirror on the Wall: Neanderthal as image and 'distortion' in early 20th century French science and press. *Social Studies in Science*, 36(2), pp. 207-240.

Sperling, S. (1991) Baboons with Briefcases vs. Langurs in Lipstick. In: di Leonardo, M. (ed.) *Gender at the Crossroads of Knowledge: Feminist anthropology in the post-modern era*. Berkeley: University of California Press, pp. 204-234.

Stafford, E. (2012) *Herakles: Gods and heroes of the Ancient World*. London: Routledge.

Standing, L., Conezion, J. & Haber, R. (1970) Perception and Memory for Pictures: Single-trial learning of 2500 visual stimuli. *Psychonomic Science*, 19, pp. 73-74.

Stanton, W. (1960) *The Leopard's Spots: Scientific attitudes towards race in America 1815-59*. Chicago: University of Chicago Press.

Stoczkowski, W. (1997) The Painter and the Prehistoric People: A hypothesis on canvas. In: Molyneaux, B. (ed.) *The Cultural Life of the Images: Visual representations in archaeology*. London: Routledge, pp. 249-262.

Strauss, W. & Cave, A. (1957) Pathology and Posture of Neanderthal Man. *The Quarterly Review of Biology*, 32(4), pp. 348-363.

Stringer, C. & Andrews, P. (1988) Genetic and Fossil Evidence for the Origin of Modern Humans. *Science*, 239, pp. 1263-1270.

Stringer, C. (2019) Human Evolution: Are Neanderthals the same species as us?. *Natural History Museum*. Available at: https://www.nhm.ac.uk/discover/are-neanderthals-same-species-as-us.html [Accessed 3 Feb. 2021].

Sturtevant, W. (1976) First Visual Images of Native America. In: Chiapelli, F. (ed.) *First Images of America: The impact of the New World on the Old*. Los Angeles: University of California Press, pp. 417-454.

Swamidass, J. (2019) *The Genealogical Adam and Eve: The surprising science of universal ancestry*. Illinois: InterVarsity Press.

Tanner, N. & Zihlman, A. (1976) Women in Evolution, Part I: Innovation and selection in human origins. *Signs: Journal of Women in Culture and Society*, 1(3), pp. 585-608.

Tattersall, I (2015) *The Strange Case of the Rickety Cossack*. New York: Palgrave MacMillan.

Taylor, C. (2019) 'You're Such a Neanderthal': The persistence of an academically challenged stereotype in the media (unpublished undergraduate dissertation). Durham University, Durham, England.

The Croods (2013) Directed by DeMicco, K. & Sander, C. California: DreamWorks Animation.

The Flintstones (1960) American Broadcasting Company, 30 Sept.

The Incredible Human Journey (2009) BBC Two Television, 10 May.

Theunissen, B. (1989) *Eugène Dubois and the Ape-Man from Java*. Heidelberg: Springer Netherlands.

Thomsen, C. (1836) Kortfattet udsigt over midesmaeker og oldsager fra Nordens oldtid. In: Rafn, C. (ed.) *Ledetraad til Nordisk Oldkyndighed*. Copenhagen: Kongelige Nordiske Oldskriftselskab.

Thomson, K. (1991) Piltdown Man: The great English mystery story. *American Scientist*, 79(3), pp. 194-201

Tooby, J. & DeVore, I. (1987) The Reconstruction of Hominid Behavioural Evolution Through Strategic Modelling. In: Kinzey, W. (ed.) *The Evolution of Human Behaviour: Primate models*. New York: State University of New York Press, pp. 183-237.

Trinkaus, E. & Shipman, S. (1993) *The Neanderthals: Changing the image of mankind*. London: Random House.

Trinkaus, E. & Zimmerman, M. (1982) Trauma Along the Shanidar Neanderthals. *American Journal of Physical Anthropology*, 57, pp. 61-76.

Tuttle, R. (2020) Human Evolution. *Britannica*. Available at: https://www.britannica.com /science/human-evolution [Accessed 29 Jan. 2020].

Unger, R. & Crawford, M. (1992) *Women and Gender: A feminist psychology*. New York: McGraw Hill.

Unsworth, A. & Voas, D. (2021) The Dawkins Effect? Celebrity scientists, (non)religious publics and changed attitudes to evolution. *Public Understandings of Science*, 1(1), pp. 1-21.

Van der Weiden, W. (1993) The Identity of the National Museum of Natural History: Past and future. Presented at symposium: *The identity of Natural History Museums*. De Nederlandse Museum Vereniging: Sectie Natuurhistorische Musea, 1 Apr. 1993.

van Wyhe, J. (2007) Mind the gap: Did Darwin avoid publishing his theory for many years? *Notes and Records of the Royal Society*, 61, pp. 177-205.

Virchow, R. (1871) *The Cranial Affinities of Man and the Ape*. Boston: Lee & Shephard.

Webrockonline (2020) The Flintstones and Hanna-Barbera. *Webrock.* Available at: http://www.webrockonline.com/images/fred_dino2.jpg [Accessed 21 Jan. 2020].

Wells, H. (1921) *The Grisly Folk*. Worcestershire: Read Books Ltd.

Weniger, G. (2006) Mettmann Fundort Neandertal. In: Horn, H. (ed.) *Neandertaler + Co: Eiszeitjägern auf der spur - streifzüge durch die Urgeschichte Nordrhein-Westfalens*. Darmstadt: Verlag Phillip von Zabern in Wissenschaftliche Buchgesellschaft, p. 183.

Wiber, M. (1998) *Erect Men and Undulating Women: The visual imagery of gender, 'race' and progress in reconstructive illustrations of human evolution*. Waterloo: Wilfred Laurier University Press.

Winder, I. & Winder, N. (2014) Reticulate Evolution and the Human Past: An anthropological perspective. *Annals of Human Biology*, 41(4), pp. 300-311.

Winkler, M. & van Helden, A. (1992) Representing the Heavens: Galileo and visual astronomy. *ISIS*, 83(2), pp. 195-217.

Wobst, H. (1977) Stylistic Behaviour and Information Exchange. In: Cleland, C. (ed.) *For the director: research essays in honour of James B. Griffin*. Michigan: University of Michigan Museum of Anthropology, pp. 317-343.

Wolpoff, M. & Caspari, R. (1997) *Race and Human Evolution*. New York: Simon and Schuster.

Woodward, A. (1921) A New Cave Man from Rhodesia, South Africa. *Nature*, 108, pp. 371-372.

Yuval Noah Harari (2021) About. *Yuval Noah Harari*. Available at: https://www.ynharari.com/about/ [Accessed 2 Feb. 2021].

Zhang, M. (2015) Google Photos Tags Two African Americans as Gorillas Through Facial Recognition Software. *Forbes*, 1 July.

Zihlman, A. (1997) The Palaeolithic Glass Ceiling. In: Hager, L. (ed.) *Women in Human Evolution*. London: Routledge, pp. 91-113.

Zilhão, J., Angelucci, D., Badal-Garcia, E., d'Errico, F., Daniel, F., Dayet, L., Douka, K., Higham, T., Martinez-Sanchez, M., Montes-Bernardez, R., Murcia-Mascaros, S., Perez-Sirvent, C., Roldan-Garcia, C., Vanhaeren, M., Villaverde, V., Wood, R. & Zapata, J. (2010) Symbolic Use of Marine Shells and Mineral Pigments by Iberian Neanderthals. *Proceedings of the National Academy of Sciences*, 107(3), pp. 1023-1028.