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On the Origin of Storytelling: Evolutionary Theory and Literature.

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TABLE OF CONTENTS

Abstract.....	3
Introduction.....	4
1. Adaptive functions of storytelling: Social glue	9
1.1 Human bonding	9
1.2 Understanding and manipulating others	12
1.3 Religion.....	14
2. Adaptive functions of storytelling: Simulation	17
2.1 Pretend Play	17
2.2 Mirror Neurons.....	20
2.3 Dreams	27
3. Adaptive functions of storytelling: Anxiety	30
3.1 Stories produce and relieve anxiety.....	30
3.2 Anxiety and uncertainty	37
3.3 Stories have the power to heal.....	41
4. Adaptive functions of storytelling: Sexual display.....	44
4.1 Sexual selection at the heart of human artistic behaviour development.....	44
4.2 The human mind is a peacock's tail	44
4.3 The origin of narrative behaviour in artistic productions.....	48
4.4 The chaîne opératoire	50
5. Can evolution explain literature?.....	53
5.1 Nature vs Nurture?	53
5.2 Evolutionary psychology.....	56
5.3 Madame Bovary's Ovaries	61
5.3.1 Adultery	62
5.3.2 Male sexual jealousy.....	64
5.3.3 What women want.....	69
5.3.4 What men want	75
5.4 The Rape of Troy.....	79
Conclusion	88
Bibliography	98



Abstract

Università Ca' Foscari Venezia

Storytelling has always been part of men's life and it still has an important role today. At a certain point of his life path, Homo sapiens developed the ability to make and tell stories and even if it is not clear the reason and the mode yet, this new faculty had a crucial impact in its evolution. Literature, narration and all artistic forms had in the past and they still have a function, which is defined, in Darwinian terms, as a survival function: this specific hominid was given the opportunity to adapt, to overcome environmental issues, to dominate the whole planet and to tell stories to the whole world. Literary Darwinism is a new branch of literary criticism that tries to explain storytelling in evolutionary terms. When men interact with others, they tell their own personal story, a story that describes their identity, values and goals. Men's desires, impulses and basic needs are also world literature's central themes, which are based on the human life cycle: survival, growth, sex and love, family, community, aliens and enemies, and the life of the mind. My dissertation will focus on the analysis of this brand new dialogue between literature and biology, on the contribution of neurosciences and it will examine storytelling and arts in general in order to understand how they turned out to be essential for the Human evolution, representing in that way an advantage in terms of natural selection.



Introduction

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This dissertation examines some of the adaptive functions that art and in particular narration may have had and it analyses two critical reading proposals from the point of view of evolutionary psychology and literary Darwinism.

The publication of *On the Origin of Species* 160 years ago marked a key turning point in our history. With his observations Charles Darwin elaborated the theory of evolution that is at the basis of the modern scientific thought and of the human stories changing the way in which humanity looked at evolution, at the history of our planet and at our place within it. Darwin's idea was basically the following: the members of each species are different; some of them are stronger, others faster or maybe smarter. There is always a competition between members of the same species or belonging to different species, a constant struggle in which the penalty of defeat is death. The weaker and less suitable to live will succumb and die, while the strongest and most suitable to live will win and survive. It is this "survival of the fittest" that Charles Darwin calls natural selection. Furthermore, these favoured individuals will transmit their qualities to their offspring, and this will ensure that the descendants will be more suited to the environment in which they will be born. According to Darwin, natural selection determined not only the evolution of physical traits, but also mental traits. All our mental abilities such as remembering, recognizing, making decisions, experiencing emotions should be understood as the fruit of a long evolutionary history. In addition to natural selection, Darwin also introduces the concept of sexual selection to which he will dedicate an entire volume entitled *The Descent of Man, and Selection in relation to Sex*, claiming that there are some features or traits that, despite being disadvantageous in terms of survival, have been somehow selected.

Darwin was influenced by several important works, and he himself later became a source of inspiration for many other scholars and writers. His work has fascinated the public interest over the years and it is easy to understand why: evolution provides good ideas and ingredients for books and plays, themes belonging both to the animal kingdom and to the human one. There is the competition between members of a group, often to win over a potential partner or to become the chief; the struggle for survival; the defence of the territory from enemies; sex and offspring. In addition to novelists, his theories have also influenced the research of some scholars who are called literary darwinists. Literary Darwinism, also known as evolutionary literary study, is a relatively new branch of literary criticism whose main purpose is to understand literature through the lens of evolution. The starting point of this school of thought is the hypothesis that storytelling and literature belong to the basic repertoire of human biological adaptation and



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Venezia

constitute an adaptive advantage. Thus literary darwinists try to understand what survival functions might serve literature, and to answer the question they look at literary themes related to reproduction such as sexual desire, jealousy, maternal love, status and kinship; they compare our reproductive strategies to those found in other animals and they use the Darwinian framework to question the likelihood of competing literary schools' readings. For example, they criticize the feminists' and poststructuralists' view that text largely support artificial, arbitrary, oppressive social constructs. Literary darwinists claim that literature does not stand apart from either human genetic behavioural tendencies or human culture; rather, culture is a medium through which humans organize their genetic behavioural tendencies. They work for what they call "consilience", which is the blending of humanities and sciences. Therefore, evolutionary scholars who are part of this branch belong to the most disparate sectors: biology, anthropology, ethnography, psychology and many others. Joseph Carroll, a prominent exponent of literary Darwinism, maintains that their goal is to see how all literature and all the products of the human imagination can be understood through this evolutionary perspective. There are some darwinists who think that art is a by-product of brain development, but the majority of literary darwinists see art as an adaptation, something that helped the species survive and reproduce and which became an inherited trait. Evolution is nothing if not efficient. Thus art as an adaptation means it is truly effecting both individual and group survival. Literary Darwinism deals with language and texts: language has a communicative function, that is the capacity to describe the real world for personal communication; it has an imaginary function, that is the ability to describe things that are not currently present in the real world (make believe, pretend play, imagination which help us to navigate the imaginary world); and it has a fitness indicator function, that is the time when language is used as a way to show skills; it functions on a sexual selection side for both genders. Literary darwinists believe that human beings are all cavemen at heart, that many of human ways of behaving can be traced back to human ancient Pleistocene ancestors. This branch of literary theory has caused a clamour since its beginning, receiving strong accusations on one side and great applause on the other.

Storytelling has always been part of humans' life and it still has an important role today. At a certain stage of its evolution homo sapiens developed the ability to create stories, a characteristic that has distinguished and benefited it among other species, and even if it is not clear the reason and the mode yet, this new faculty had a crucial impact in its evolution. The so-called narrative behaviour concerns the whole species, indeed it concerns only and exclusively the human species - humans of all latitudes, all ages and all cultures. The question



from which literary Darwinism's investigation begins is this: if stories have always survived and have accompanied the evolution of homo sapiens since the most distant origins (or perhaps even earlier than homo sapiens itself) it is absolutely evident that storytelling had a decisive function for this evolution. It was Carroll, with the publication of *Evolution and Literary Theory* (1995), who raised the question of the evolutionary origin of storytelling. Carroll was and still

is convinced that everything in human experience and in literature can be reduced to the themes of reproduction and survival. Modern aesthetics suggests that literature and the arts in general do not have a function, but today there is sufficient evidence to prove the contrary. According to literary darwinists, literature, storytelling and all the art forms do have a function, that is, a survival function: they gave this specific hominid the opportunity to adapt better, to overcome environmental issues, to dominate the whole planet and to tell stories to the whole planet.

Telling stories certainly required energy and time, resources that hominids could employ in other activities such as looking for food or protecting themselves from enemies. Thus it is legitimate to ask why that type of activity was not eliminated by natural selection. Our species is addicted to stories: even when we are not reading a novel and our body is still, sitting on the sofa, our mind is free to wander in imaginary worlds and does so frequently; when our body sleeps, the mind is awake and tells itself stories. Although we do not know for sure how this human appetite for stories has increased the chances of survival and the reproduction of the human species, some scholars over the last years have proposed different hypotheses. In the first part of my dissertation I am going to analyse some of the adaptive functions of storytelling, and in particular: storytelling as social glue (Wiessner, Dissanayake), as simulator of experiences (Oatley, Gottschall), as sexual display (Miller), and as producer - but at the same time - antidote of anxiety (Austin, Cometa).

The first proposal I take into consideration suggests that storytelling promoted the cooperation and the union of the group. Since ancient times human beings have lived and worked together in order to live better and to survive the dangers and difficulties, hence the importance of sharing information with others. The paintings that we can still observe inside ancient caves already told stories. Our ancestors had to run away from ferocious animals, understand whether a particular food was harmful or not, organize a hunting expedition, build useful tools, just to mention some examples. Through the exchange of experiences with other members of the community, but also, and above all, with older people, the human being would have saved time and energy to face a given situation. From others' stories, it was possible to understand which behaviour was advantageous to adopt for the purpose of individual and group survival, to plan for the future and to predict the consequences of a specific action. In evolutionary terms,



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religion has also proved beneficial to humans, promoting a positive behaviour, and putting the interests of the group in the foreground with respect to those of opponents. Even today, communication is essential, whether it takes place between professionals, friends or relatives. Storytelling, according to other study proposals, also represents a way to experiment and train oneself to face a situation without running the risk of dangers. Human beings begin to tell stories from an early age through play, precisely simulating their parents or other individuals with whom they come into contact. From an early age they are also able to understand the intentions of others and manipulate people (and this too turned out to be an excellent survival strategy). The individual at some point abandons - at least in part - games, but continues to train himself/herself by reading books for example, which allow him/her to empathize with the characters. It was said in the past that human minds mirror one another, and today it is even easier to believe it thanks to the discoveries made by the neurosciences. Human beings know how to recognize other people's gestures; they can recognize emotions even by looking at the face of a stranger or imagining it. This happens thanks to the activation of mirror neurons that also have to do with the interpretation humans give to actions. Throughout our lives we imitate others and put ourselves in others' shoes, we also pretend to be who we are not. This is the reason why there exist novels, theatre plays and movies: they arise from our need to imitate and live other realities. Dreams can also be considered simulations of experiences that we have already faced, that we will have to face or that we will surely never face, but in any case they would have all offered an evolutionary advantage to humans: reworking the stress accumulated during the day and helping to remember or forget some experiences.

The stories are able to introduce, but also resolve anxiety. We are attracted by stories in which we are pursued by predators that want to devour us, stories that show us complicated social situations, stories in which we are called to solve a mystery, or stories about the unknown. We are also attracted by the stories that are expertly interrupted by the authors: this expedient causes us anxiety because we are led to want to know the ending, to put a point to the story, but it also causes our brain to predict how it *could* (prediction was also a very useful behaviour in the past). The role of stories in psychoanalysis is highlighted. Dialogue is the starting point for the care of the patients, who tell their own story to another person, a doctor, who in this way gets in touch with them. Instead of avoiding the problem, some methodologies advise addressing it by recreating a personal story focusing on the positive aspects of one's life. Literature can help experiment new scenarios, so that they become more manageable in real life, thus causing us less anxiety. Moreover, stories are also a good way to get away from reality that can sometimes be heavy.



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Venezia

Another motivation given to the development of storytelling concerns the sexual sphere of the human being. Some scholars have indeed hypothesized that the hominids who possessed artistic abilities, and therefore also a capacity for storytelling, would have had more chance of winning over a partner and consequently more chances to reproduce. The human mind is compared to a peacock's tail that apparently might seem a useless burden, a stumbling block in case of escape, but which instead turns out to be fundamental during the mating season.

Cometa's proposal according to which there is the possibility to find the origin of our narrative behaviour in the cave paintings or in the ancient tools is very interesting. Art products' creation required a series of phases that presuppose a mature and conscious intentionality as well as a rudimentary idea of time divided into sequences: it was necessary to think of the object to be built, procure the material, sculpt it following an idea, and decorate it in case. Thus Cometa advises future narrative theorists to try to find the origin of stories among lithic artefacts. We do not yet have the certainty that the creation of certain objects was somehow driven by sexual selection, and that therefore sexual selection played a much more important role than it was believed so far, but research is still open and there is a good chance that the entanglement between embodied actions, the thought's form and the narrative development will be further deepened.

The second part of the thesis is dedicated to other scholars belonging to the circle of evolutionists: David Barash, Nanelle Barash, and Jonathan Gottschall. Their contribution is different from that offered by researchers of storytelling adaptive functions. Evolutionary research on narration (and literature) starts from a re-reading of Darwin's aesthetics, and from the attempt to apply the fundamental categories of evolutionism (natural selection, sexual selection, adaptation, etc.) to literary theory, and this is exactly what the three authors did. They belong to the group of evolutionary psychology whose main idea is that the human mind is a collection of modules which has been programmed by natural selection when our ancestors roamed the Pleistocene savannah. The goal of evolutionary psychology is to understand how the mind works by discovering what the modules that compose it are and how they have evolved. Human beings' behaviour depends on these modules and is selected to achieve a specific purpose: to survive and reproduce. In the interpretation of David and Nanelle Barash the ways of behaving of great literary works' protagonists are compared to those of animals (adultery, jealousy, altruism, etc.). According to the two authors in the same way as there are anatomical differences between males and females, there must be differences also on a behavioural level. Both sexes, however, have one thing in common, namely that of seeking strategies to win over a partner and thus ensure descent. Gottschall tries to explain instead what



sparked the violence of the men who participated in the Trojan war. He believes that the violence - and the subsequent rape - is justified by the fact that there was a lack of women and that therefore men, always driven by the instinct to reproduce, acted brutally because not having a woman would have meant not being able to have descendants. I will highlight the main features of the two analysis proposals, though questioning some solid points of evolutionary psychology that often lead to reductive conclusions.

1. Adaptive functions of storytelling: Social glue

1.1 Human bonding

Human beings have always felt the need to express themselves, to tell stories, to share their identity and adventures with others. The origins of storytelling are rooted in the distant past; humans have been telling stories for thousands of years, an incredible amount of time in which they have evolved in the way of communicating and using tools. New technologies, the Internet and, in particular, social media are the triggering factors of the storytelling boom in the last few years. Long before the words accompanied them, hominids organized their thoughts and conveyed their ideas in images. Cave paintings, like those of Lascaux or Chauvet, can be considered the first example of storytelling. In these places there is not only the origin of the image, but probably also the origin of narrative behaviour. The bulls depicted inside the caves tell the story of human beings, they are not just common animals, but they are representations of the first clans, and the fight between those bulls represents the fight between the clans; even writing and all our storytelling can be included in the same story of “representation”. Storytelling takes place when we share true or fiction narratives with others; it is a communicative act often performed to transmit experiential information. The emergence of storytelling represented a great turning point in human evolution since it marked the phase in which human beings acquired the ability to recreate situations for others and to communicate what they considered to be interesting and valuable. The advent of language allowed human beings to verbally share their own experiences with others, thus offering to others useful information for survival; in this way the individual could accumulate more knowledge than



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Venezia

he/she would have obtained on his/her own, saving time and energy. Thanks to the exchange of information, there was no longer any need to risk one's own life, to embark on an impossible battle with a ferocious animal, to venture into unknown places or to eat harmful food. Listening to the past experiences of others through storytelling also helped in planning: this practice allowed the individual to get organized and being ready for the action knowing what was waiting for him/her. Supposing that in the past there have been periods of famine that have occurred with a certain cadence, thanks to the story a member of my group told me, I know in advance how to behave in order to avoid being without food and vital resources. If I know the strategies of an enemy people who have threatened my group in the past, I know how to deal with a possible dangerous situation and I'm on alert not to be caught by surprise. Even the ability to make speculations has been very useful because imagining events or problems that could occur helped to train the mind to find possible solutions.

While in the past it was more probable that at the death of the individual the information he/she knew disappeared with him/her, the oral transmission process allowed stories to be passed down from generation to generation, thus humans could also get access to the baggage of experiences of individuals that were no longer alive; and obviously over time more and more stories and information were accumulated. The wisdom of the elderly was transmitted to the youngest, therefore we could also assume that storytelling was a first form of educational system.

Perhaps these stories were told at night around a fire; that is hypothesized by Polly Wiessner, who spent 40 years studying the Kalahari Bushmen. The Bushmen are a nomadic people of hunters and gatherers from southern Africa. Some studies suggest that they constitute one of the oldest branches of the evolution of modern man, having remained genetically isolated for an estimated time of 100,000 years. For thousands of years, they have found their subsistence in the desert thanks to an in-depth knowledge of the environment. Analysing their conversations, Wiessner noted that the Bushmen talk about any topic: marriages, murders, social norms, famine, environment, wild animals, interactions with other groups, myths and traditions; but there are also complaints, criticisms, gossip and economic issues in their discussions. From the analysis of the data a fundamental difference emerged: while during the day practical questions are discussed and resolved, at night, instead, tensions and daily worries give way to stories, such as the evocation of anecdotes and adventures experienced during the day or in previous eras, that also involve people not present, or to songs and dances; in this way the collective memory, the sense of belonging to the group and the sharing of cultural values are strengthened. The definitive control of fire took place around 400,000 years ago, at the same time as man developed language, religious beliefs and the transmission of cultural knowledge



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Venezia

and values. According to Wiessner's research, it was thanks to this "extra time" for social interactions, granted by the light of fire, that the human being began his/her inner development. Telling stories may have helped human culture and thought to evolve, reinforcing traditions, promoting harmony and equality, strengthening bonds, sharing emotions, and spreading a broad sense of community.

The life of hunter-gatherers depends - and presumably depended - heavily on cooperation with others (food exchange, work aid, support in the events of disgrace, etc.). The maintenance of civil relations between group members is essential for survival, while conflict situations harm both the community and the individual. In the absence of institutions dedicated to the protection of the person or with the aim of enforcing the rules, group harmony is maintained by encouraging pro-social behaviour and discouraging the anti-social ones. Especially in small communities, humans are very sensitive to the judgment and the opinion of others. Stories can report positive and negative examples of social behaviour, what is right and what is wrong to do, what is allowed or forbidden to do. Since breaking the rules can lead to serious consequences, the story is also used as a guide for compliance with social norms. The model of anti-social behaviour is the one who gets what he/she wants with deception, not through cooperation. This person - physically or mentally - hurts others in order to reach his/her goals, ignores advices, does not learn from mistakes, does not care if others suffer because of him/her, does not help others in case of need, but rather, take advantage of someone else's weak moment to gain a personal advantage.

There are also other scholars who agreed with Wiessner's proposal that storytelling helped develop a sense of cooperation within the groups of our ancestors. Smith and his colleagues tried to understand what was the function and the content of the storytelling of another population of hunter-gatherers, the Agta:

(i) Agta stories convey messages of cooperation, sex equality and social egalitarianism; (ii) stories from other hunter-gatherer societies also appear designed to coordinate social behaviour and promote cooperation; (iii) individuals from camps with a greater proportion of skilled storytellers are more cooperative; (iv) skilled storytellers are preferred social partners and more likely to be cooperated with and (v) skilled storytellers possess greater reproductive success. (Smith 2017:2)

They therefore seem to confirm the hypothesis of the adaptive function of storytelling. The stories of the elders told to children often contained natural humanized entities, conveyed



notions and principles that govern society, in particular gender equality, friendship, cooperation, group identity and social acceptance. Similar to what happened in other tribes, these stories promoted a behaviour aimed to help other people and condemned selfish behaviour highlighting the possible punishments to which the one who did not respect the norms would be subjected. Their research showed that in the groups in which there were more skilled storytellers the whole community had a greater level of cooperation.

1.2 Understanding and manipulating others

There are different studies, based on evolutionary psychology's theories, which claim that homo sapiens developed certain aesthetic preferences in order to improve its survival and reproductive success. The set of these theories is part of a branch known as evolutionary aesthetics. In *What Is Art For?*, Ellen Dissanayake outlines an original theory of human beings' artistic behaviour. She believes that art - not only visual art, but also music, dance, poetic language - can only be understood if one considers it to be the product of a specific "behaviour" of homo sapiens. An important factor of this hypothesis is, in fact, that art is conceived as a behaviour and not as an object or a product. This behaviour is defined by the notion of "making special", the capacity to transform an ordinary experience into something extra-ordinary.

I suggested that elements of what we today call the arts (e.g., pattern, vividness) would have existed first in nonaesthetic contexts. But because these elements were inherently gratifying (perceptually, emotionally, cognitively) to humans, humans who had an inherent proclivity for making special would use them - not for their own sake, but instead, in ethological terms, as "enabling mechanisms" - in the performance of other selectively valuable behaviours. (Dissanayake 2003: 24)

According to the author, this inherited tendency - which is intrinsic to the human species in the same way as speech and toolmaking - existed in our ancestral past, is a universal phenomenon, concerns ontogenesis (newborn's cognitive and physical evolution), is a source of pleasure, it concerns important aspects of life - in particular the social one - and it is a biologically costly behaviour that would have been eliminated in the course of evolution if it had not given relevant adaptive advantages. Humans tend to make special only what they really care about or that they



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intend to use with caution and efficacy (tools, weapons, ornaments, etc.). A decorated object is, in fact, used with greater attention and has a value. This attitude is activated in the first weeks of life during the interaction between the mother and the newborn through the so-called *babytalk* or *motherese* that allows the couple to develop a bond that produces harmony, an adjustment of emotions and a cognitive practice. In *The Poetics of babytalk*, Dissanayake mentions a series of “studies of infant social abilities [which] make clear that babies come into the world ready to engage interactively with the people around them, and that their responses in turn influence how others behave towards them.” (Miall & Dissanayake 2003: 339).

Because we lived as foragers or hunter-gatherers for thousands of generations, being artistic is very deeply dyed into us. Young babies, without being taught, suddenly begin to sing and move, then they start to play with words, to colour, they love to make believe and pretend. Today children imitate their parents driving, cooking, working, etc., thus children are natural born imitators, but in the pre-modern societies they imitated people making arts. During that time, children learned about their society through the arts, which were not just for art sake, but they were practical and functional. According to Dissanayake, art is capable of relieving tension and anxiety, but it also promotes a sense of coping with uncertainty that makes individuals feel part of a group, thus this function would be beneficial both for the individual and for the whole group. Art, as well as play, presumes other typically human cognitive abilities such as the use of imagination, decoupling - our ability to separate mental actions from physical actions - and pretend play. Ellen Dissanayake introduces important reflections in the field of literary theory, especially for the so-called “theory of mind”, from which derives, among other things, the notion of the “Machiavellian intelligence”, or the social brain hypothesis, a form of reasoning that allows us to understand the intentions of others, but also, at the same time, to manipulate others using fiction and simulation. This hypothesis “posits that large brains and distinctive cognitive abilities of humans have evolved via intense social competition in which social competitors developed increasingly sophisticated ‘Machiavellian’ strategies as a means to achieve higher social and reproductive success.” (Sergey Gavrilets & Aaron Vose 2006). Therefore, even according to this theory, individuals capable of developing successful social strategies would have had an evolutionary advantage, and consequently more chances to survive, but unlike the honest, loyal, useful and supportive behaviour that was promoted by the tribes analysed above, Machiavellian intelligence suggests that human beings have also used strategies, such as deception, manipulation, and dishonesty in order to gain advantages. The human being is a social animal, but in his/her nature also hides a primitive instinct of individualism. At times, in fact, the nature of “homo hominis lupus” prevails, i.e. that tendency



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to affirm oneself even to the detriment of others. It happens, however, that when humans realize that they are having difficulty in solving certain problems, they seek the help of others. To belong to a group, one must also be ready to sacrifice oneself, to put the interests of the whole community above the individual's interests.

Nancy E. Aiken and Kathryn Coe, two other influential figures of evolutionary aesthetics, deepened some of Ellen Dissanayake's theses with elements borrowed from evolutionary psychology and ethnography. Their research is based more on visual culture than on the narrative one, nevertheless many of their insights have been used both by literary darwinists and by literary cognitivists. In traditional societies, the stories told to children often contained important information that would have an important influence on their behaviour. Many mnemonic techniques - repetitions, songs, etc. - were used to ensure that stories - and lessons - were easily remembered. Analysing the traditional Australian Aborigine stories about "Dreamtime", Aiken and Coe highlighted the main themes addressed, such as kin relationships, generosity, and obligations. They contain advice on how to act in certain situations and rules to follow which allowed the ancestors "to succeed in life both socially and physically." (Aiken 2013). Probably the way of life of the inhabitants of the Palaeolithic was different from that of the current Australian aborigines, but Aiken maintains that social interactions and norms were probably similar.

Coe argues that traditions were transmitted from mother to son (and future generations) as long as they were formulated in a prelinguistic form such as babytalk, or in a narrative form. It emerges from her thesis that the ultimate goal of making special is the group's cohesion and the transmission of contents (traditions) that reinforce it. The heart of Coe's argumentation is that the proximal purpose of visual art is to draw attention and influence social behaviour in ways that promote success in descendants. According to Coe, storytelling can influence social behaviour, not only because it allows the exchange of information essential for survival, but also because it helps to transmit "fundamental values". Coe is well aware that some traditions impose inhumane practices but she claims that their transmission over the millennia shows that they have been beneficial for reproduction and survival.

1.3 Religion



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“Without the art of storytelling, without the human impulse to catch and hold the attention of others through narratives that include agents with expectation-violating, larger-than-life powers, religion could not have arisen.” (Boyd 2005: 166).

According to the palaeontologists, homo sapiens' first spiritual beliefs manifested themselves during the Upper Palaeolithic (about forty thousand years ago), and the first clues seem to be highlighted by the phenomenon of artistic creativity. Our ancestors created objects for ritual uses, produced wonderful works of art inspired by myth, practiced rituals connected with their beliefs. Cave paintings (basically visual stories) and all the different objects that were found in the “sanctuary-caves”, reveal to us the presence of habitual and widespread practices, and places reserved for intellectual activities such as artistic creativity and worship. The Neanderthals, who populated Europe and Asia for 170,000 years, already practiced sepulchral rites. They laid the bodies of the dead in ditches covered with limestone slabs - to defend the corpse from the scavengers - along with stone tools and parts of animals, in some cases even flowers, and later also necklaces, bracelets and headbands. Signs of defleshing have been found on the skulls as evidence of cannibalism or perhaps because they were turned into cult objects. Other elements would indicate that they practiced primitive forms of totemism, animal worship, and propitiatory rites for hunting. The cave paintings found at Chauvet (dating back to 30,000 years ago) and Lascaux (17,000 years ago) show representations of anthropomorphic beings (half human and half bird or half lion), an indication of ancient shamanic and magical-superstitious beliefs. Since ancient times, and for over 30,000 years, the cult of the so-called “Palaeolithic Venuses” - small statues in mammoth ivory, in ceramics, or other materials, with very pronounced sexual attributes - has spread everywhere. The Venuses did not have any practical function, they would have been icons of fertility, life and abundance, or representations of Mother Earth. The available data can be interpreted in different ways and, although there are indications of ritual attitudes, it is not always clear to what extent one can speak of religious behaviour. As far as the attitude towards the dead is concerned there are concepts concerning the vision of the afterlife and the belief in survival after death.

Religion is the maximum expression of narrations over human minds. Believers regulate their own life, based on what sacred stories prescribe: the way of eating, washing, dressing, the time to have sex, to forgive, and to wage a holy war. Even today, in this age of great scientific discoveries, God is not dead. Scholars speculate that it is not plausible that religious beliefs developed independently in different populations around the world only by pure chance; even the fact that all religions have some basic characteristics in common lead to think that



spirituality must be rooted very deeply in human nature. Given its high price represented by sacrifices, rituals, prohibitions and taboos, why did not evolution work against it? After all, an animal sacrificed to the deity represented an important deprivation for the family. The most common explanation for the existence of religious tendencies is that humans wanted to give an order and a meaning to life and existence. To satisfy their sense of curiosity, human beings feel the need to find answers for big unanswered questions such as: Why am I here? Where does the sun go at night? What is there after death? (Gottschall 2013: 115-120). According to many, religion exists because basically the human being does not like the inexplicable.

Moreover, the making special ability comes into action especially when humans intend to regain control of an uncertain situation that causes anxiety (therefore it has a strong adaptive value), hence the creation of rituals and ceremonies through which humans try to magically ward off a danger, reduce a supposedly imminent risk or counteract a disease. Art, rituals, but also play are “behaviours” that allow man to regain control of a situation taking part to off-line experiences that in real life would cause anxiety or fear. They promote a sense of coping with uncertainty that makes individuals feel part of a group. Dissanayake maintains that:

Ritual ceremonies are universal, found in every human society. They serve numerous social purposes: they state and publicly reinforce the values of a group of people; they unite it in common purpose and belief; they “explain” the inexplicable - birth, death, illness, natural disaster - and attempt to control it and make it bearable. From the ethological perspective, people in social groups that did not have ceremonial rituals would not survive as well as those who did have them. They would be less cohesive and cooperative; they would respond to adversity in individualized, fragmented, unfocused, and ultimately less satisfactory ways. (Dissanayake 2003: 21)

Richard Dawkins is convinced that religion is the result of a tragic flaw in evolution. According to him the mind is vulnerable to religion in the same way that a computer is vulnerable to viruses (Dawkins 1991). David Sloan Wilson advances instead the hypothesis that the religious system has emerged as a stable component of all human societies because “it made them work better” (Gottschall 2013: 121). Human communities that accidentally possessed an instinct towards faith prevailed over non-religious people in such a decisive manner that religious tendencies have become a feature deeply rooted in our species. Wilson believes that religion provides multiple benefits to groups: “it defines a group as a group [...]; coordinates behaviour within the group setting up rules and norms, punishments and rewards; [...] provides a powerful incentive system that promotes group cooperation and suppresses selfishness [...]; the evolutionary function of religion is to bind people together and make them put the group’s



interests ahead of their own.” (Gottschall 2013: 122). Some features of religions that could be interpreted as irrational and dysfunctional are often perfectly reasonable in terms of evolution: religions cause people to behave correctly towards the members of their group and forcefully claim the interests of the group against competitors or opponents. Obviously one must not forget religion’s dark side: it does bring the members of the same faith together, but it leads believers of different faiths to move apart. Often myths’ purpose is not to provide an objective account of a certain event or situation, but to tell a story that unites a community; and supernatural myths are not the only stories that play a role of social glue. All peoples have committed the worst atrocities throughout history and it is not uncommon to find, even in school books, versions of history in which certain populations are portrayed as the best, most intelligent and the bravest, even if things went differently. Human beings are in fact “willing to imagine *almost* anything. This flexibility does not extend to the moral realm” (Gottschall 2013: 129). Some thinkers have argued that there is an “imaginative resistance”. Storytellers know this very well, but nevertheless they still inundate us with depravity, obscenity, and cruelty (think about *Lolita* or *Titus Andronicus*). The narrator does not ask us to approve rapes, killings and violence, even if sometimes one finds oneself perversely rooting for negative characters (however, usually there is no happy ending for them). Often narrative fiction carries the message that violence is acceptable only in certain well-defined circumstances: when the evil protagonist kills, his/her violent action is condemned; when the hero kills, he/she does it because it was the right thing to do. Like the stories told in the past around a fire, even literature of our times usually puts us in a position to approve honest, pro-social behaviour and to disapprove those characters who do not act for the common good.

2. Adaptive functions of storytelling: Simulation

2.1 Pretend Play

Brian Boyd suggests that art, and in particular the art of storytelling, offers an evolutionary advantage for human survival and reproduction, it is a human universal, and “it derives from play, itself an adaptation widespread among animals with flexible behaviours” (Boyd, 2009:1). Telling stories is a practice that develops spontaneously in the form of pretend play during childhood and continues to keep us company even in adulthood. The popular pretend play is a



game in which children imitate the actions of adults in a more or less truthful way. It allows the child to perform an adult experience, to develop creativity and language, and to give vent to imagination which stimulates the growth of an abstract thought. A classic example is that of the tea party, the child knows that the cup is empty and that the whole situation is a fiction, but nevertheless that cup is used with its real function. The child, in this way, tells a story through gestures, disguises, or objects. The simulation game is an extraordinary means of communication which aims to simplify and to imprint, through the repetition, concepts and experiences that otherwise would involve huge energy investments. Today, child psychology experts agree that game has a purpose, a biological function. Many animals, especially mammals, play, and this allows them to increase and improve their skills that will then be essential in case of attack or defence, but also in the education of their offspring. Therefore, in addition to reducing stress and reassuring the child making the world more habitable, playing helps young people to simulate actions, to train their bodies and their brains for the challenges of adult life, thus making them capable to build a social and emotional intelligence. Boyd claims that children's pretend play cannot be considered art, but it can shade into some famous art forms such as theatre, mime or narration (Boyd 2009: 5). Like game, fiction allows us to tackle problems without subjecting ourselves to real risks. Fiction does not establish our capacity to interpret the events, but it helps to improve it providing us with a broad spectrum of all possible opportunities and risks we might face in certain situations. Play and reading are two forms of training that lead us to a greater level of awareness and security. Our brain absorbs all the useful information coming from the environment, from a book or from others, it stores and then reuses them on a future occasion (I know how to deal with a particular situation because I have already experienced it, with play or reading).

The different forms of symbolic and fictional plays that accompany the child through his/her growth have been, and still are, the subject of studies in various disciplines, such as those dealing with the development of metacognition and the theory of the mind. Metacognition is the capacity to self-reflect on one's own thoughts, for theory of the mind we mean instead the sophisticated human ability to reflect not only on one's own thoughts, but also on those of other people, formulating hypotheses about others' behaviour. Understanding the intentions of other animate beings was at the time of our ancestors and it is still today a fundamental instrument for survival. The English psychoanalysts Peter Fonagy and Mary Target calls it "reflective functioning", which is, precisely, the capacity we have to grasp our mental states and those of the people we come into contact with. They argue that "reflective function or mentalization enables children to *'read' people's minds*. By attributing mental states to others, children make



people's behaviour meaningful and predictable." (Fonagy & Target 1997: 679-680). It is indeed a natural ability that we all have since birth, but it can be refined or inhibited by personal experience. Obviously, in this case, parents have an essential role because they are the first individuals with whom the child creates a bond. When the adult tells or reads stories to the child, they both perform an act of identification with someone else's experience. Boyd asserts that:

Fiction, like art in general, can be explained in terms of cognitive play with pattern — in this case, with patterns of social information — and in terms of the unique importance of human shared attention. [...] Even more than other social species, we depend on information about others' capacities, dispositions, intentions, actions, and reactions. Such "strategic information" catches our attention so forcefully that fiction can hold our interest, unlike almost anything else, for hours at a stretch. (Boyd, 2009: 130)

In the first half of the eighteenth century David Hume, in his *Treatise on Human Nature*, wrote: "In general we may remark, that the minds of men are mirrors to one another, not only because they reflect each other emotions, but also because those rays of passions, sentiments and opinions may be often reverberated, and may decay away by insensible degrees" (Hume 1896: 365). The Scottish philosopher maintained that we have a participation structure, i.e. sympathy, which allows us to ensure that we are able to mirror the emotions of others with our mind and not to remain indifferent. We can be mirrors because others' emotions are our own emotions. This process is described by Hume himself as "emotional infection"; if this mechanism did not exist, there would be no human species because sympathy is the ability that enables us to explain the situations of cooperation (wars excluded) which are the situations that allowed the human species to survive and dominate the Earth. The genesis of this capacity can be explained in evolutionary terms: human hunters in order to obtain the food (meat) they needed, constituted groups, thus developing more elaborate forms of cooperation. In *The Descent of Man and Selection in Relation to Sex* Charles Darwin stated that:

although man...has no special instincts to tell him how to aid his fellow-men, he still has the impulse, and with his improved intellectual faculties would naturally be much guided in this respect by reason and experience. Instinctive sympathy would, also, cause him to value highly the approbation of his fellow-men. (Darwin 1981: 87)

Man is a social animal and as such tends to be loyal to his companions and tries to help and defend them in times of need. He judges the actions of others and at the same time his actions are judged, therefore, for this reason, he is constantly seeking approval. Darwin read Hume's



...treatises and agreed with him on the importance of the role that sympathy had in interpersonal relationships arguing that natural selection would have favoured those individuals endowed with altruism and compassion:

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In however complex a manner this feeling may have originated, as it is one of high importance to all those animals which aid and defend each other, it will have been increased, through natural selection; for those communities which included the greatest number of the most sympathetic members would flourish best and rear the greatest number of offspring. (Darwin 1981: 82)

The concept of sympathy, i.e. the feeling of pity and sorrow for someone else's misfortune, was already present in 18th century philosophers' studies, while the term empathy, meaning the ability to understand and share the feelings of another, made its first appearance in Germany at the end of the 19th century during a debate on aesthetics. It is important to underline that sympathy for Hume does not stand for pity, it is rather "a psychological mechanism that can perform the function of converting an idea of an emotion into the felt emotion itself...So sympathizing with someone is a matter of experiencing the same emotion-type as that person is experiencing as a matter of fellow-feeling" (Boros et al. 2017: 264). According to Hume the principle of sympathy is the founding element of the complex forms of human society; for Darwin, the ability to identify oneself in the emotions of others and to share one's own emotions is a substantial element of human evolutionary history, but also – at different degrees – of other animals' history.

2.2 Mirror Neurons

Although Hume was neither the first nor the only philosopher to have emphasized the concept of sympathy, it is interesting to note how the affirmation that human minds mirror one another, immediately calls one of the most important discoveries of the twentieth century in the field of cognitive neuroscience: the discovery of mirror neurons. In the '80s and '90s a group of researchers from the University of Parma coordinated by Giacomo Rizzolatti and composed of Luciano Fadiga, Leonardo Fogassi, Vittorio Gallese and Giuseppe di Pellegrino was working on the study of the premotor cortex. They had implanted electrodes in a monkey's brain to see what were the neural regions responsible for some actions, like, for example, ordering the hand to reach and grab a little piece of food. They found out that certain specific areas of the monkey's brain were activated not only when the animals grab the food, but also every time



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they see another monkey or a person doing the same action. Mirror neurons are indeed a particular type of neurons that are activated both when the monkey performs a motor act, and when observing a motor act. Today we tend to talk about a “Mirror Mechanism”, that is, the ability to transform the information of actions (emotional or not) coming from the external world into motor actions of the individual (Rizzolatti & Craighero 2004: 169-187). The reason why this discovery aroused so much interest is that it gives a unitary interpretation of the perception of action: so, instead of having two separate worlds, a brain that understands and a brain that can do, they merge and give a single unified vision. The moment we look at something we excite a motor program which is inside us: if we want to drink, we use a specific motor program, and if we see a person grabbing a glass that particular motor program is stimulated; the same thing happens when we look at someone crying because inside our emotional system the same neurons, which are activated when we cry, are involved. A series of studies with brain imagining have shown that seeing the smiles printed on other people’s faces stimulate an automatic mirroring response in our brain: when we see a happy face we immediately feel a sort of happiness and what happen is that we firstly simulate the facial expression with our mere neurons and by doing that we send signals to the insula, which is a portion of the cerebral cortex, and through it all the way to the emotion brain centres and here we feel the emotion that the other person is feeling (Iacoboni 2008: 15-18).

Therefore, at this point, an empathic relationship is established, I and the other person are the same thing. We recognize others on the basis of an empathic mechanism, not through reasoning: we understand the pain of another human being not only by logical inference, but also because we have a mechanism inside us that makes us feel the same pain (Perazzolo 2014). Empathy means entering into the shoes of others because our brain tunes with the emotions of those around us. There is also another phenomenon which has been studied by social psychologists, called “Chameleon effect”: when people socially interact with other people, they tend to imitate each other; the more you tend to be a chameleon the more empathic you are. This tendency to imitate others correlates nicely with the tendency to empathize. As Adam Smith claimed in *The Theory of Moral Sentiments*: “How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it” (Smith 2005: 11), so we become happier when we care about others and we do not expect a reward in return.

Several studies have shown that mirror neurons could also be the basis of the human capacity to create powerful simulations in the mind when dealing with narrative fiction. According to a



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Venezia

pioneer of the description of the mirror neurons' role in human behaviour, Marco Iacoboni, movies seem so authentic to us “because mirror neurons in our brains re-create for us the experiences we see on the screen. We have empathy for the fictional characters – we know how they're feeling – because we literally experience the same feeling ourselves” (Iacoboni 2008: 4). It seems that we are actually biologically built to empathize with others.

As in any emerging scientific area, controversy abound; it is not certain whether mirror neurons are the definitive explanation or not, but we know from laboratory studies that stories affect us not only on a mental level, but also on a physical one, and this is easy to observe when we see the protagonist of a story in danger: our pulsations increase, our breath accelerates and we sweat more.

Narrative fiction projects us into simulations of problems that are very similar to those we face on a daily basis. Problems may have changed throughout history, but they still remain the undisputed protagonists of our lives and our stories: thousands of years ago hominids were dealing with lions, the search for food and a companion in order to survive on pain of death, today we still face battles which are inevitably of another kind, with ourselves and with others. Studies on brain and fiction have confirmed the theory that stories are simulations of problems suggesting that our neurons are activated in the same way that they would be activated if we really had to make the choice of the protagonist to escape, for example, from a difficult situation. Therefore, it seems credible that our immersion in fictional problem solving may enhance our ability to deal with real problems. When we practice a particular competence, we perfect its execution because the repetition of the tasks establishes denser and more efficient neural connections. In *How the Mind Works* the cognitive psychologist and linguist Steven Pinker claims that stories give us a mental archive of complex situations that one day we may find ourselves having to face, together with a series of possible operational solutions (Pinker 1997: chap. 8). The psychologist Keith Oatley believes instead that stories are like “flight simulators” of human social life:

Just as flight simulators allow pilots to train safely, stories safely train us for the big challenges of the social world. Like a flight simulator, fiction projects us into intense simulations of problems that run parallel to those we face in reality. And like a flight simulator, the main virtue of fiction is that we have a rich experience and don't die at the end. (Gottschall 2012: 58)

The flight simulator is a system capable of simulating the environment of a flying machine and it is used for pilot training; similarly, it is possible to assert that a story is a simulation of reality, and consequently people who consume a lot of stories should have greater competence in social



interactions than those who do not consume them. Although it may seem odd since we always imagine readers alone, sitting on a sofa all day long, according to many scholars, fiction readers have greater social skills than those who don't read at all or those who read mostly non-fiction. When we open a novel or watch a film we are transported to a parallel universe: we feel empathy for the characters, we feel their happiness, their desires, their fears. In this sense, we are attracted to narrative fiction because, overall, it is beneficial to us.

The literary scholar Jonathan Gottschall, who deals with literature and evolution, thinks that the problem-based structure reveals one of the main functions of storytelling: "it suggests that the human mind was shaped *for* story, so that it could be shaped *by* story" (Gottschall 2012: 56). Other evolutionary theorists also underline the possibility that stories offer to live surrogate experiences, to live in the shoes of characters who are completely different from us or have opposite values and principles, to enter the mind of serial killers or characters like Humbert Humbert for example, empathizing with them, and in some cases, thanks to the writer's skill, coming to understand the reason for certain gestures or ways of behaving.

Blackey Vermeule is very cautious in adopting the prospect of empathy. She does not believe that, in the case of literature, it is just a matter of total immersion in the character's point of view. In fact, we rarely get to feel the same feelings of the character (if we felt, for example, the same fear of the protagonist of a horror story, we would paralyze and this would not allow us to go on reading). On the contrary, the greatness of literary experience lies in staying in a territory between empathy and distance, a fact that allows us to experiment without running any risk.

In this context, the cognitive neuroscientist and one of the mirror neurons' discoverers, Vittorio Gallese, hypothesizes a *liberated embodied simulation*, a simulation that allows people to empathize with characters, with all the bodily implications that empathy has, without however having the body subjected to movements and/or emotions. In this regard professor Cometa believes that the power of storytelling lies precisely in the fact that empathy cannot "completely colonize our systems of reasoning" (Cometa 2017: 246). Gallese supports the thesis that empathy is the basis of our ability to maintain social relationships with others, relationships that allow to mirror ourselves in others' behaviour. According to him the notion of empathy should not be limited to the mere sharing of emotions and feelings. In an article published in 2011 in collaboration with a student of English literature at the University of Texas in Austin, Hannah Wojciehowski, Gallese writes:



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Empathy may be conceived as the outcome of our natural tendency to experience interpersonal relations first and foremost at the implicit level of intercorporeity. Our interpersonal relations – both in daily life as well as with fictional characters – are marked by our bodily involvement with the actions, emotions and sensations acted and expressed by others. (Gallese & Wojcickowski 2011: 14)

After several studies with the group of researchers from Parma, Gallese gets to discover that when the motor mirror neurons activate, there is a part of the motor system that activates, but muscles do not move. A part of our motor system is activated “as if” we were moving and for this to happen it is enough to watch someone else moving. The activation of a part of the motor brain in the absence of a movement production is defined as the simulation of a movement, but also our imagining to move can be described in the same way. Whenever we are sitting on the couch, we can imagine getting up, putting on a coat, and going out for a walk; when we imagine performing those actions while standing still, we activate some of the motor parts of our brain that are activated when the same actions are not imagined, but actually performed. Therefore, imagining to perform an action is equivalent to simulating it. The simulation characterizes a functioning modality of the brain, that we can call “modality as if”: it is as if we were moving, but in reality we do not move; it is as if we were in pain, but we actually do not feel pain, and so on. Embodied simulation is a functional theory that accounts for this particular brain’s functioning mode which is probably an important ingredient to explain how we represent ourselves in the world. This type of simulation is a model of perception and imagination. It is “embodied” because this mechanism embodies an abstract representation of the action in a non-linguistic, but bodily format (it cannot be linguistic because even the macaques have mirror neurons). In fact, there are various ways to represent the world, one of these is language that is probably the last way we invented to describe the world.

A very important aspect that concerns communication is that even when we read a phrase that describes an action there is the activation of the motor system, which is therefore activated not only when a person grabs a glass of water or sees someone else doing it, but also when he/she reads a phrase like “the girl was thirsty, so she took a glass of water”. Hence, also the linguistic aspect of communication has an embodied root, which is very different from the languages’ models we already know. Other regions of the brain responsible for mapping our emotions and sensations are activated even when those emotions and sensations are expressed by another individual. This means that when we are dealing with someone, even simply by looking at facial expressions, we implicitly assign him/her the status of another human being and a series of qualities that we normally attribute to ourselves; we do this without reasoning,



because we have mechanisms that allow us to get directly in tune with each other. We are biologically programmed to look for others, and to enter into a relationship with them; we were born to be empathetic, even though we often forget about it.

Thus, according to Gallese and Wojciewowski, intersubjectivity is inscribed in our brain-body system and is the foundation of the human condition (Gallese & Wojciewowski 2011: 15-19).

The two scholars conclude their article stating that “narrative is a peculiar form of mediated intersubjectivity, where the text – the medium – enables readers to entertain multiple relationships with fictional characters and through them with their author” (Gallese & Wojciewowski 2011: 26). They propose a literary narratology based on what they call Feeling of Body (FoB), i.e. a functional mechanism that characterizes the relationships and the empathic feeling that come from reading. Through the analysis of the novel *Mrs. Dalloway* by Virginia Woolf and the first Sonnet of Dante’s *Vita nuova*, they show how the mirror mechanism serves to understand the empathic effects arising from the relationship established between the author/reader and the literary text. The intersubjectivity of relationships, even the fictional ones like those between reader and characters, must be read in terms of intercorporeity: as has been pointed out before, the observation of a basic perception in another individual, such as disgust, causes the activation of the same brain areas that would be activated during the direct experience and, furthermore, such mirroring mechanisms are active even when one only imagines to do or perceive something. What Gallese and Wojciewowski discover is that bodily perceptions are even more powerful when they are activated through imaginary worlds, than through the real dimension.

That of mirror neurons was a discovery not only celebrated with great interest in the neuroscientific field both in Italy, in Europe and overseas, but also appreciated by a series of disciplines, both scientific and humanistic. In recent years, great strides have been made in the study of the mind. Various fields of study coming both from the world of science and from the human and social sciences (psychology, neuroscience, linguistics, art history, anthropology, etc...) have contributed to revolutionize our knowledge on topics such as memory, empathy, intersubjectivity. At the centre of the discussion there is the will to discover something more about what it means to be human. Mind and body are two words that describe different, but closely intertwined aspects of our biological nature. For centuries we have kept the body separated from the mind, the perceptions from the actions, and the I from the Other, but it seems that today we are moving in another direction. All these neuroscientific experiments are partly confirming and partly questioning some of the insights gained with regards to the factors responsible for the immersion effect in a fictional reality and people’s emotional identification



Università
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Venezia

and participation in the narrated events/characters. Although both the structuralist and post-structuralist approaches discouraged the tendency to consider the characters “as if” they were

real people cognitive narratologists believe that the analogy between the functioning of real bodies and minds and the fictional ones plays an important role in our way of relating to stories.

First-generation cognitive science is based on the metaphor of “the mind as a computer”, that is a system which manipulates symbols, transforms information using rules and procedures and stores the results of these operations in the form of symbolic representations. Second-generation cognitive science is focused on the embodiment and the interaction between the organism and its environment. One of the main ideas of second-generation cognitive science is that the human mind is fundamentally different from computers (computers can easily perform functions that are difficult for humans, but they seem ill-suited to perform tasks that are relatively simple for human beings, i.e. understanding a story) and the intelligence is not an abstract process, but there is always a relationship with the surrounding environment. There is a growing tendency in cognitive sciences to recognize that cognition is inseparable from the body of an organism and from the context in which it is situated. Cognitive psychologists and philosophers of the mind have discussed about the personal identity and how it is possible to understand other people’s behaviour. The great debate has traditionally been dominated by two positions, that of “theory theorists” and that of “simulation theorists”: the former argue that we come to understand the actions of other people because we possess a sort of collection of information (the so-called “folk psychology”) to which we draw to infer the states of mind of others. The simulation theorists, on the other hand, claim that we explain the behaviour of other people by “putting ourselves in their shoes”, i.e. by performing mental simulations of their psychological states.

According to cognitive studies, human beings’ brains work essentially in the same way. Cognitive literary theory tries to understand the ways in which our brain works when we read fiction analysing three important issues: the *blending*, that is the ability to merge concepts belonging to different logical and semantic domains connecting in this way different neural areas; the “theory of the mind” and *mind reading*, or the ability to interpret others’ intentions and thoughts; *empathy*, a much debated issue especially after the discovery of mirror neurons and other studies on primates. When we read fiction we can certainly have subjective reactions, give a different interpretation of the same story, but there are some biological characteristics that we all share as human beings when approaching a work of fiction. Lisa Zunshine bases her research on a neuroscientific study that shows how, when we interact with people, when we read other people’s mind - in the sense that we interpret their behaviour - we read behind their



gestures, their facial expressions and their physical appearance in order to understand what they really mean or what they want from us. According to her, we basically do the same thing when we read a book: we learn about the different characters, we analyse their behaviour and we try to understand what their aims and feelings are, based on the information that the text offers us. Since we relate in the same way with people and the characters, Zunshine's assumption is that

we actually get pleasure from reading books because we can exercise our mental skills, our mind-reading abilities in a safe context, which basically reassures us that we are able to understand other people's aims. She also claims that some people prefer a certain genre, others love many genres because they like to exercise their theory of mind in different ways. Zunshine refers in particular to the detective story whose characteristic features are suspense, having to handle various situations and characters, reconstructing a series of events and reworking them in the light of the clues that one gradually acquires until the killer's final revelation. Probably in the past, those who had developed an imaginative faculty (including the mind-reading skill and the cognitive mechanism that made humans able to elaborate and understand fiction and conceive the existence of fictional worlds) had much more refined forecasting and empathic abilities than those who had not acquired it; therefore, given the substantial benefit to be gained, in the course of natural selection this ability has been strengthened and implemented. Therefore, it can be said that art has contributed to the evolution of human beings both in terms of environmental adaptation and social interaction.

2.3 Dreams

In his thesis on narration as a specific behaviour of Homo sapiens, Gottschall refers to the simulation hypothesized by mirror neurons' scholars maintaining that:

the constant firing of our neurons in response to fictional stimuli strengthens and refines the neural pathways that lead to skillful navigation of life's problems...Fiction allows our brains to practice reacting to the kinds of challenges that are, and always were, most crucial to our success as a species. (Gottschall 2012: 67)

In other words, it does not mean that then, in real life, our brain makes us act as it did in fiction, but that the exercise of fiction permits a training and the consequent development of our cognitive faculties, which are useful when life presents us with its real problems.

The most interesting part of Gottschall's proposal is the one dedicated to dreams, or as he calls them "night stories", which is connected to the idea that storytelling gives an adaptive advantage



to the species. He claims that dreams have a therapeutic function as they allow us to rework the anxieties and difficulties of life, and they help us to store our memories or to forget them, acting like “waste” of brain’s activity. Every night, in sleep, we wander through another dimension of reality. In our dreams problems of real life and feelings like fear, terror and anguish seem to prevail. We live tragedies, sometimes we fly and sometimes we die. Dreams are defined as intense “sensorimotor hallucinations with a narrative structure” (Gottschall 2012: 70). They are fully-fledged night stories: there is usually a protagonist who fights to fulfil his/her wishes, but there is also a plot, a theme, a setting, a point of view, a perspective and other characters, just like in any story. Almost every culture had something to say about what the nature of dreams could be. For thousands of years, dreams have been considered encrypted messages coming from the spiritual world, which could only be decoded by priests and shamans. Then, in the twentieth century, those who followed the thought of Freud announced that dreams are indeed encrypted messages, but coming from the Id, and that only psychoanalysts were able to decode them. Many scientists believe that dreams can also be a kind of self-therapy, which helps us to cope with life’s anxieties or to clean up the mind from useless information as suggested by Nobel laureate Francis Crick. According to him “we dream in order to forget” (Crick 1983: 112). Others, instead, still maintain that dreams have no purpose at all.

The Random Activation Theories (RATs) state that dreaming is a by-product of neuronal activity. These theories are based on the idea that the brain has a very important task to accomplish overnight, especially during REM sleep, which is a sort of cleaning job that allows it to conclude all the routine tasks that it could not complete during the day. The only problem is that the information that is processed during the night is treated in the same way as that received during the day, with narrative circuits that try to transform it into a coherent narrative. Gottschall claims that “our inner storyteller does this for no practical reason. It just does it because it has a lifelong case of insomnia and because it is addicted to story – it simply can’t help it” (Gottschall 2012: 73). Dreams are weird because they are desperate attempts of the mind to derive neat narratives from random inputs. It seems that evolution has designed a solution that allows the mind to safely stage its simulations, as if dreams really do serve some important purpose that needs to be protected.

Dreaming is not a prerogative of humans, in fact, it is also present in other animals. Gottschall, in this regard, reports a 1965 study by French scientists Michel Jouvet and Jean-François Delorme who showed that by removing a part of the brain stem from a cat's brain, it was possible to inhibit the paralysis during the rapid eye movement (REM) sleep, that is REM without atony (the relaxed state of skeletal muscles): instead of lying still, cats in this condition



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Ca' Foscari
Venezia

walked and had an aggressive behaviour during sleep, just as if they were hunting. They seemed to dream about problems of feline life and in their dreams they went back over the strategies adopted for the great daily challenges. Jouvett's theory, the fact that dreaming has a sort of rehearsal function, has been confirmed over the years by numerous studies and it is close to the opposite of the Freudian theory on the satisfaction of unconscious desires (Gottschall 2012: 76-79).

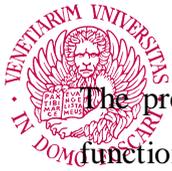
Our dreams are often nightmares, or, at least, we tend to remember those dreams which had a greater impact on us and made us wake up in a puddle of wetness. A study carried out by Katja Valli and Antti Revonsuo showed that young adults recalled 3.57 dreams per week, 72.1% of these ones included at least one threatening event (Valli & Revonsuo 2009: 26-28):

Rehearsal of threats including aggression (escape situations, nonphysical and direct physical aggression) is the most prominent type of threat practice (41.7% of all threats), averaging to a conservative estimate of 111 annual simulations (based on a threat simulation total of 266 per year). (Valli & Revonsuo 2009: 27)

Based on these observations, Revonsuo hypothesises the "Threat Simulation Theory", according to which the biological function of dreams is the realistic representation of threatening events and the virtual repetition of avoidance strategies of the aforesaid situations: an adaptive mechanism to which homo sapiens would come to cope with the daily threats of the ancestral environment that ended up limiting its reproductive success. This is what would cause the brain to increase the number of dramatic situations. Pleistocene individuals who made bizarre dreams, according to the Finnish cognitive neuroscientist, could reduce the stress accumulated in watchful life, resulting, compared to others who dreamed with a lower rate of oddness, more suited to the reproductive function.

Revonsuo's idea met some resistance, but also approval. Two evolutionary researchers, Michael S. Franklin and Michael J. Zyphur, proposed an extension of his theory: the repetition of social scenarios in dreams would have resulted in adapting the strengthening of the capacity for social relations, playing an important role in the survival of the species.

Data collected from over 500 dream reports by Hall and Van de Castle (1966) indicate that about 80% contained negative emotions, while only about 20% contained positive emotions. [...] Through appropriating and learning to deal with these threats in dreams, it is proposed here that an animal could increase its overall evolutionary fitness. (Franklin & Zyphur 2005: 66)



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The prevailing orientation of modern dream science is to attribute one or more biological functions to the phenomenon. Revonsuo recalls the proposal by Frederick Snyder, known as "threat theory", according to which every REM period is characterized by dreams with dangerous contents and is followed by brief awakenings having the function of preparing mammals to fight or flight. During sleep animals are, in fact, extremely vulnerable, so if the brain perceives a danger during sleep, it prepares the animal to wake up, if it does not perceive any danger, pleasant dreams are generated to ensure a good rest (Pace-Schott et al. 2003: 104-105).

3. Adaptive functions of storytelling: Anxiety

3.1 Stories produce and relieve anxiety

Human life has always been full of stress and strain. When our ancestors faced the threat of wild animals or hostile peoples, the changes taking place in their bodies prepared them for fight or flight. Today, the dangers are of a completely different nature, but when we find ourselves having to face a situation that scares us, or that we perceive as threatening, the same changes occur in us. When anxiety is moderate it can be useful, because it puts us on alert allowing us to react quickly. It can become a real problem when it is excessive compared to the situation we are facing or if it persists for a long time, to the point that doing the simplest thing can become a huge effort. Both anxiety and fear were fundamental experiences for the survival of the human species, since they prepared and prepare still today the human body to respond to threats and danger. According to Freud, the first anxiety develops at the moment of separation from our mother, the so-called "birth trauma", and then continues to accompany us throughout our lives: human beings can, in fact, find themselves facing the sense of abandonment, the lack of self-sufficiency, the fear of losing a love, and the threat of the emasculation that arises from the competition with the father. Ideas such as these have greatly influenced literary theory. From the second post-war period to the present day, the discourse on anxiety has shifted from philosophy to mass culture before, and then from mass culture to neuroscience. Today neuroscientific research allows us, at least, to delimit the meaning of this condition, to study its neurological mechanisms and to consider its disturbing implications for a narrative theory. Anxiety does not arise only as a reaction to a dangerous situation, but is an experience of



uncertainty.

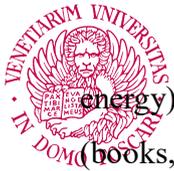
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The awareness of being vulnerable increases in moments of transformation and growth, and in moments of biological or social stress. When humans find themselves in the situation of having to confront their own fears for which no direct action is worth (escape, hide, immobility), they tend to “do something”: releasing anti-stress and prosocial hormones, such as oxytocin and vasopressin, and adopting an artistic, but also a playful and religious behaviour. There are various forms of anxiety: the one which derives from our altricial condition, i.e. being entrusted for a really long phase of life to the care of others (conspecifics and in particular parents); the anxiety which derives from the awareness of our instinctual limitations; the one that comes from the awareness of death and the uncertainty that consequently permeates our whole existence; the anxiety that derives from our impotence and above all uncertainty with respect to the threats that come from the environment, be they predators, as in the ancestral savannah, or our colleagues.

The most up-to-date analysis of the relationship between anxiety and literature is the one that Michael Austin leads in *Useful Fictions. Evolution, Anxiety, and the Origins of Literature*. He adopts the term “useful” in the title in an evolutionary sense, referring to something, in this case fiction, which is useful to the organism to pass its genes to the next generation. According to the author, anxiety is one of the homo sapiens’ most typical answers to the environment and to its own peers. Austin tries to trace the possible evolutionary foundations of human attraction to stories wondering why inventing stories - beyond the impulse to run away or attack (fight-or-flight response), or to freeze - is one of the most common responses to anxiety. One of the main questions that arises at the beginning of his study is “why do human beings enjoy fictional stories?”. Certainly stories give us pleasure, but why do we are the sorts of creatures who derive pleasure from stories, and especially from the fictional ones, i.e. stories that aren’t true? According to Austin some of the proximate causes are: they are pleasurable, they preserve important information, they transmit expectations and values, they teach important lessons; but what is/are the ultimate cause/s? We like sweet things, for example, because they give us pleasure, but actually what gives us pleasure is our taste buds, the organs of our body which evolved to produce favourable sensations upon certain stimuli. During the Pleistocene high caloric foods were in scarce supplies and sweet foods allowed primitive men to fill up the energies they needed, therefore there was an adaptive advantage to preferring that particular kind of food. Natural selection favoured people who found sweet food pleasurable, but this does not mean that everything that we currently derive pleasure from is adaptive. In



fact, today the situation is different, we consume a lot of refined sugar and our sweet tooth that once was adaptive has become maladaptive. Junk foods or rich deserts do not have survival value, they are basically pleasure technologies invented by humans for the sole purpose of giving themselves pleasure exploiting circuits that did have survival value in the past, but that do not necessarily foster their survival now. Austin believes that this highlights the fact that humans do not live in the world that they evolved to live in: a cheesecake is sweet, sweet used to mean ripe fruits, i.e. that food thanks to which people could have a better chance of surviving. A good example is given by the deer that evolved in an environment in which when approaching a predator - that was much better at detecting movements than seeing preys-, it remained completely still because this turned out to be the most advantageous strategy in the past, but today, however, it is the most disadvantageous one when it stands still at the sight of a car. Similarly, human beings evolved for what existed about forty thousand years ago. However, this hypothesis reflects the evolutionary psychology's idea according to which our brain is still calibrated for the EEA ("environment of evolutionary adaptedness"), that is the period in which our ancestors evolved from apes or primordial species to become human beings. The human mind would not be updated to the modern world in which we live, but it "was fixed and finished sometime before the past 100,000 years or so" (Carroll 2004: 65), so consequently humans still respond in a robotic way to their primitive instincts. Stating, as evolutionary psychologists do, that "the evolved structure of the human mind is adapted to the way of life of Pleistocene hunter-gatherers, and not necessarily to our modern circumstances" (Irons 1998: 195) is not correct because the 2 million years taken into consideration have witnessed the passing of different species of hominids that have undergone several changes especially on a mental level as also theorized by Mithen. He proposed a correction to this theory by claiming that the modern mind was born about 30,000 years ago, when there was the development of new connections between non-communicating parts of the human mind; he identifies in the so-called "creative explosion" that qualitative leap that allowed human beings to be so different from all the other animal species. Unfortunately, both the fossil and the archaeological documentation are incomplete for the critical period of our evolution during which the human capacity similar to the current one emerged, so it is still too early to take one side or the other. However, according to Austin we now live in a space-age culture with a stone age brain, this is why many of us still tend to prefer sweet foods that gave us the necessary energy and fatty foods that stored us for the winter - this was indeed a very adaptive way to approach food. Austin wonders if we can say the same about the stories. All human cultures have some form of storytelling or literature: it is a human universal. People from all over the world invest tremendous resources (money, time, attention,



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energy) that could be spent for other purposes in the production and consumption of narratives (books, movies, videogames, etc.). Daniel Dennett in *Freedom Evolves* wrote “any phenomenon that apparently exceeds the functional cries out for explanation. We don’t marvel at a creature doggedly grubbing in the earth with its nose for we figure it is seeking its food; if, however, it regularly interrupts its rooting with somersaults, we want to know why.” (Austin 2011: x). All activities are costly, so it is natural to wonder why people spend so much resources for narratives that most of the time do not even contain the truth. Austin argues that we find narrative pleasurable because it is the way we are built to think, it is a crucial component of cognition, we think in stories and by stories he means information in temporal and spatial sequence, both of which ultimately get to a causation sequence. Sequencing information allows us to predict the future, i.e. what is going to happen, and it allows us to manipulate variables “what would happen if” (Austin 2011: 22-23). “What is going to happen” and “what would happen if” are two counterfactual narratives in the sense that they are not – or not yet - reality, and it is important to remember that we are the only species that can conceive of counterfactuals. John Tooby and Leda Cosmides maintained that “almost all the phenomena that are central to the humanities are puzzling anomalies from an evolutionary perspective. Chief among these are the human attraction to fictional experience (in all media and genres) and other products of the imagination.” (Tooby and Cosmides 2001: 7). Just like Austin they try to understand why human beings, that depend on reliable information for almost everything they do, devote enormous resources producing and consuming information that is false and that they know to be false. Through his studies, Austin came to the conclusion that the human reason did not evolve to find the truth, but to defend positions and to get resources, often through figuring out how to manipulate other people in such a way as to obtain what we need from them. Moreover, he points out that “natural selection did not design us to be happy, and it doesn’t care whether or not we are emotionally fulfilled” (Austin 2011: x), the whole process of natural selection only care about survival and reproduction. These two observations led Austin to reflect on what then became the main focus of his research, namely anxiety. Anxiety, like pleasure, is well rooted in our biology; it is the most adaptive emotion, something that we experience far in excess of what is required for current conditions; it operates through the limbic system and invokes the “fight-or-flight” response; and, as Randolph M. Nesse suggests, it works on the “Smoke Detector Principle”, which means that anxiety encourages us to worry about things that are not true, because even a very small chance that something is going to be true is worth triggering our limbic response. Human beings were designed for a world which was much more dangerous than the one we live in now, a world full of predators that could kill them at any time,



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thus even the anxiety-producing mechanisms were designed for that kind of world. Assuming that in hominids world 99% of strange noises behind rocks and trees were made by squirrels or other harmless animals, while 1% was made by ferocious and hungry beasts, what strategy should a prehistoric hunter adopt? Should he stay calm, should he investigate to find out what it is or should he run away? The best response is to run away, because in 99% of the cases he will flee from nothing, but the other 1% of the time he will be saving his life. In doing so, he will survive, reproduce and pass on his genes to the next generation (Austin 2011: 54-55).

According to him, anxiety, having a function of protection against the possible threats that come from the outside world, plays a decisive role in the constitution of that transcultural and adaptive behaviour that is the animistic attitude. The instinctive tendency to animate things derives also from anxiety, from the advantage that comes from always be prepared for the worst, following the motto “better to be safe than sorry”. Those who are always ready to hypothesize a potential threat in natural phenomena are more likely to survive than those who tend to minimize potential dangers. For this reason, those who tend to infer an agency to inanimate things have greater chance of survival than those who approach, for example, a snake thinking it is a branch. The attitude toward animism is deeply rooted in our evolutionary history. Every story gives voice to the things that surround us as if they were living beings, allowing us to create also a bridge between us and the afterlife, with our dear departed ones. The tendency to attribute an agency to the non-animated world is considered to be a way to “invent” explanations that can allow us to control anxiety.

Anxiety involves three different response systems: a behavioural system, that is what one does when one feels anxious, a physiological system that has to do with what one feels and a cognitive system which refers to what one thinks. These systems are all coordinated by the amygdala which receives information from other parts of the brain and “triggers the physiological and behavioural responses typically associated with anxiety, such as elevation of heart rate and blood pressure, release of adrenaline, perspiration, and either aggression or flight.” (Austin 2011: 43). Anxiety can start from one of these systems and effect the other two, so if a person begins to act anxiously, he/she will become anxious and will start to make anxious thoughts; and if the person has nothing to be anxious about, his/her mind will begin to invent something to be worried about. There are drugs that are prescribed for the treatment of depression and anxiety disorders, that act by altering the chemicals in the brain and consequently one’s behaviour and cognition. Similarly, it is possible to produce and neutralize anxiety by telling yourself a story, but what kind of story? According to Austin “it is not



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important that this story be true; in fact, fictional narratives are in many ways more adaptive than true ones” (Austin 2011: 56), “given a choice between a useful fiction and a useless fact, natural selection will choose the useful fiction every time.” (Austin 2011: 137); evolution will favour those strategies for building narratives that are not going to make people happy, but rather nervous creatures. The story that a person will tell himself/herself will be: exaggerated - because the cost of overstating a danger is always less than the cost of understanding a danger; exciting - because this will produce adrenaline that will serve to make an immediate decision, that is to run away or fight; and speculative - because the time spent searching for the truth would jeopardize his/her life in vain (Austin 2011: 56). Austin believes that successful narratives are those that introduce and then resolve anxiety. The purpose of the narrative is not to find the truth, but to produce some consequence that is going to be adaptive: helping people to hunt, gather or mate. In the ancestral world, anxiety was mainly caused by the entities that could eat us or threaten our safety, people that we could not figure out (our survival depended on our capacity to predict what others were thinking, and our ability to manipulate people), puzzles we could not solve, things that were incomplete (we are designed to finish tasks), things that were unknown. All these are still today causes of anxiety.

In the book Austin cites the example of the parent-child chase play which is a human universal, but it is also prominent in many mammalian species. This play encourages both children and parents to practise strategies for avoiding predators using a deliberate fiction which “overrides the emotional defence system while still eliciting the physical response.” (Austin 2011: 57). The child is not afraid because he/she recognizes - already at the age of eighteen months - the difference between fiction and reality, between a fictional danger and a real one. This game trains the children to hide from predators and reassures them by making them understand that it is possible to find an escape route, to get out of dangerous situations. These first fictional narratives are specifically designed to provide training in tasks that are adaptive and to instil security so that anxiety could be neutralized.

According to Austin there are different kind of narratives which evolved from humans’ basic primal tasks. Much of the literature that has been produced by humans concerns people who are or are about to be eaten by someone or something (the wolf wants to eat Little Red Riding Hood, Polyphemus wants to eat Ulysses, the Minotaur eats people in the maze, and then there are zombies, vampires, aliens, etc...). Although today it is difficult for a human being to be eaten by someone or something, the fear of becoming a meal is the most basic primal fear that we have since we have been subjects of predation for a long time. Most of these narratives end with human ingenuity overcoming the predator, thus they are a great way to mentally



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practice those skills that could prove useful in a given environment and to feel a sense of relief once the monster is defeated. In addition to predation narratives, there are the narratives of social mores, which are stories about complicated social situations like those written by Jane Austen. We live in communities and we have to interact with other people every day, we have to understand group dynamics, how others are related to everyone else, who we can trust and who we cannot, and fiction allows us to practice reading other people's mind. "Misreading the intentions of a powerful multimillionaire in real life could have disastrous results; misreading Mr. Darcy's intentions in *Pride and Prejudice* allows us to learn from our mistakes without suffering any real consequences." (Austin 2011: 9). This kind of narrative gives us pleasure because it consists in practising something that causes us enormous anxiety which is the interaction with other people. Another type of narrative that over the years has had great success is that of detention, stories in which the author creates a problem and invites us to solve it. Mystery novels, like those of Sherlock Holmes, offer us the opportunity to practice our problem solving strategies a lot, and even if in most of our lives we will not have to face the same situations, the mental work of gathering information, combining the various clues, and then solving the puzzle turns out to be very useful, it has an adaptive value. Therefore, according to Austin, novels of social mores, predation and problem solving stories are the three forms of narratives that define the kind of literature that attracts us. Moreover, he argues that a good storyteller knows how to keep readers' interest, by finding a balance between revealing and withholding information. The anxiety that we feel when we have incomplete information is known as the "Zeigarnik effect", named for the psychologist who noticed that, in a crowded restaurant, a waiter was able to remember all the orders partially executed, while he/she remembered nothing of the orders already concluded. She showed with her study that it is easier for the human mind to continue an action which has already begun and to carry it out, rather than having to face a task from scratch. The Zeigarnik effect is the psychological phenomenon underlying the cliffhanger's narrative functioning. Writers of novels or soap operas exploit this mechanism by interrupting the stories or the episodes with the classic cliffhanger, leaving the plot unfinished in order to encourage the viewer to follow the next episode, or to buy the next book of the saga. As Austin suggests "a cognitive predisposition to feel tension about incomplete or missing information makes sense in an environment full of predators and natural perils, where learning 'the rest of the story' could make the difference between finding a good meal and becoming one." (Austin 2011: 66). And finally, we are also very attracted by stories about the unknown, because they allow us to learn something that we knew nothing about, which gives us comfort. Therefore, what gives us pleasure in a narrative is the possibility it



gives us to: exercise our mental muscles (in the same way that some people take pleasure in training body's muscles), solve puzzles (giving us the perception of competence), complete the picture (since we do not like incomplete things), and demystify the unknown.

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Austin's book is one of the most lucid contributions on the relationship between storytelling/ literature and anxiety because it insists on the structural mechanisms that make the narrative a sort of anti-anxiety gym. Apparently, he does not opt for any of the overtly adaptationist theories of storytelling, although he is inclined to believe that literature is a kind of spandrel: it is not an adaptation in itself, but a side effect deriving from the combination of various adaptations. Austin defines the entire history of mankind as "a daily, delicate dance with anxiety" (Austin 2011: 45), a dance that strongly conditions our lives and which calls for special attention from literary theory as well as medicine.

3.2 Anxiety and uncertainty

In the last chapter of the book, which is entitled "Anthropology of anxiety", Cometa exposes a proposal that starts from the idea that narrative behaviour has to do with the dimension of homo sapiens as a "not really turned out well" animal. Cometa refers to the notion of the Mängelwesen (deficient being), according to which human beings are devoid of a rigid instinctual endowment and consequently they are much more open, than other animals, to an evolution and to a continuous development, precisely because they are incomplete, not entirely fixed in their form ("der Mensch das noch nicht festgestellte Tier ist" wrote Nietzsche in *Jenseits von Gut und Böse*, 1886). It was Gehlen who emphasized the peculiarity of man's position in the world. In his masterpiece *Man: His Nature and Place in the World*, he insisted on the fact that nature gave human beings an original evolutionary direction, but, unlike animals, they were – and are - not equipped with a biological kit that would allow them to adapt spontaneously to the environment. Humans have surely difficulty in facing certain dangers, they do not adapt to the environment obtaining immediate advantages, but they are able to adapt to all environments. Human beings' shortcomings put them in constantly confrontation with their precariousness, thus triggering anxiety; in order to compensate for these deficiencies humans are forced to invent narrative strategies which have the function of delimiting, curbing this anxiety, thus allowing somehow survival. It is then the complex of cultural forms (such as language) that compensates for this deficiency. Therefore, humans are essentially beings who compensate, who make their



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particular eccentricity the starting point of a path of acquisitions and transformations. Gehlen stated that “if the world that man knows is the world built by his/her action, man, by nature, or rather by his/her organic lack, is destined to dominate nature, and since we usually call this domain ‘culture’, culture becomes for man what the environment is for the animal, that is the essential condition for survival.” (Galimberti 1999: 171). It is true that culture helps human beings to limit the damages that come from the environment, but, at the same time, it puts them in an increasingly complex network of meanings that makes them exposed to a multitude of options that further complicate their survival effort by unleashing more anxiety. Furthermore, culture allowed homo sapiens to be aware of death, that is, to know in advance that anything can happen tomorrow and tomorrow one can also die, and even this triggers anxiety. It is precisely the faculty of anticipating ideas that leads man to be afraid of the future and to become anxious. According to the neuroscientist Joseph LeDoux, anxiety is a consequence of being creative in making predictions. A physiological state of tension is useful because it allows us to be prepared for sudden changes and dangers, but in any case, as with all things, it must not exceed certain thresholds. LeDoux believes that drugs are not the optimal solution because they buffer the symptom, but they do not resolve the situation. LeDoux’s assumption is that a limited amount of avoidance can help fight anxiety. In psychology the tendency to avoid confrontation with the phenomena that generate anxiety is considered a wrong behaviour because one loses the possibility of extinguishing the anxiety itself. Doing something to avoid the unleashing of anxiety is what LeDoux calls “proactive avoidance”. An example of this strategy is represented by the classic social phobia that can be avoided by inventing a parallel activity: simulating a phone call to get away from the situation that causes anxiety. In this way, one does not run away from anxiety, but one does interrupt its flow by doing something else; we do not freeze like animals do (LeDoux thinks that the freezing behaviour of animals is equivalent to avoidance in humans). “When avoidance prevents one from dealing with life, it is maladaptive. But when avoidance is proactive and part of active coping and agency, it helps the person control the accelerator, brakes, and the track switches. It is a useful adaptive activity.” (LeDoux 2013).

The “Pleistocene stress” played a decisive role in the process of homo sapiens’ adaptation, in fact, as amply demonstrated by literary darwinists, stress management depended on the ability to avoid dangers that would lead to extinction. Stress is the effect of the uncertainty that human beings experience with respect to the environment and conspecifics, and is fuelled by imagination. The struggle for survival is therefore, first of all, a struggle to reduce and suppress anxiety. The passage from the mouth of the lion to the discomfort of civilization



is short, therefore it is not strange that the consideration on anxiety and on uncertainty has become a central topic in modern and contemporary thought.

It is a condition that binds us partially to animals, at least from the biological point of view. The uncertainty derives from humans' ontological deficiencies and from the indeterminacy of inhabiting the world, both on the temporal level (the uncertainty with respect to the future and the awareness of one's own death), and on the spatial level (the uncertainty of one's own ecological niche that exposes him/her to a "stepmother" nature and to the aggressiveness of conspecifics). Anxiety is personal because it represents the awareness that something is going to happen to me, unlike fear that can be for things and situations that do not concern me directly. The other fundamental characteristic of anxiety lies in the awareness that one wants to do something even if one does not know if he/she will succeed. This is why anxiety must be considered a state, an existential condition, precisely because it confronts people with the unknown and the uncertain. The root of almost all human anxieties lies in the awareness of knowing that we grow old, we will die, we will lose the people we love, that we will probably experience professional failures, personal humiliation, identity crisis, that we will have to negotiate between our personal freedom and the impositions coming from the outside. Impotence and uncertainty are the two existential phenomena that have marked the history of human evolution. Impotence characterizes homo sapiens as a natural, physical and biological being and it is the consequence of instinctual deficits accumulated during evolution, both on the phylogenetic side (erect posture, obstetrical dilemma etc.) and on the ontogenetic one (the altricial condition in particular); in order to compensate for these deficits, human beings resorted to a whole series of action and control strategies of reality that have exponentially refined their ability to create objects, rituals, and works of art. This, in fact, implemented our cognitive fluidity and consequently our imagination. Uncertainty, on the other hand, characterizes homo sapiens as historical being. Man is the only animal that has a history and is aware of it, thus he/she is constantly suspended between past and future, both harbingers of uncertainty and existential instability. All these experiences produce anxiety and anxiety must be immediately reduced in order not to transform the eminently adaptive phenomenon into a handicap. It is no coincidence that numerous narrative theories, both traditional and post-darwinist ones, identify in a sort of phenomenology of anxiety, or more precisely of all the emotions that are based on uncertainty, the main key to understanding the dual and sometimes ambiguous relationship that links homo sapiens to storytelling.

In order to illustrate the role that anxiety has in the evolution of literature, Cometa follows Michael Austin's line of thought. The two authors agree in stating that: human cognition is



inextricably linked to the creation of narratives; when we experience anxiety we feel compelled to fight it and this struggle often involves the invention of a narration; narratives we generate should not always be true to respond effectively to anxiety - in many cases counterfactual narratives work better than truth; the “useful fictions” created by human beings in response to anxiety are part of the cognitive design in which fiction, narration and other stories we call “literature” are developed.

According to Cometa, fundamental categories such as compensation and exemption can be interpreted in an evolutionary key and can provide some explanations for human narrative behaviour. Compensation consists in the ability to make up for one’s biological deficits by resorting to technique and culture. E. O. Wilson, for example, conceives art as a form of compensation for the uncertainty and above all for the confusion in which human being is forced to live because of the flexibility and adaptability of his/her mind (Carroll 2004: xxi). Dissanayake agrees that the emergence of complex thought led human beings to experience anxiety and uncertainty, and it is precisely at this stage that, according to her, rituals were born. Rituals are collective ceremonies that helped and help people to get rid of anxiety by manipulating emotions through art (music, dance, etc.). The feeling of relief is due to the fact that in situations of stress, situations in which you tend to lose control, relying on an artistic activity organized in repetitive patterns (specific rhythms, movements, steps, etc.) that follow certain rules, allows us to reacquire a sort of virtual control of the situation. According to Dissanayake, anxiety gives an advantage because it forces human beings to do something, following codified procedures that prepare them to resist, to react to events, and lead them to develop various forms of self-control. Furthermore, anxiety drives people to seek cooperation and consolation, strengthening social and group identity (Dissanayake 2009: 136- 158).

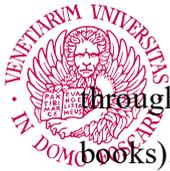
Conscience’s exponential growth has not only offered advantages, but it has also generated a sense of emptiness, of exile, of loss of control over reality and, in order not to succumb, the human being has devised strategies for exemption. Faced with the bombardment of stimuli from outside, men do not react with the instinctive, immediate and automatic behaviour which is typical of animals, but they have the ability to distance from them. Through the various forms of compensation and exemption, human beings try to regain control over a physical, psychic, social and potentially always anxious and threatening reality; whether it is predators (as in the ancestral savannah), the risks of social life, the complexity and the alienation of modern life, or, more simply, the awareness of the human finitude or the restlessness that



comes from knowing that we have a future, anxiety transforms the network of meanings in which we are entangled into an oppressive and depressive existential condition. Our capacity to temporarily suspend reality through fiction (pretend play, illusion, make-believe), the various forms of offline thinking and the possibility of experiencing situations through simulations imply a detachment from everyday reality. Eibl proposed the term “Lustmodus”, or pleasure mode, highlighting the human ability to engage in activities that are disconnected from other functions and designed to limit stress. Game is one of the activities that have no purpose other than relaxing both mind and body and release stress through the simulation of ways of behaving, situations, actions, etc. which detach us from reality. Not only game has this power, but also movies, concerts, food, sport activities, holidays, television, books and magazines, non-reproductive sex, etc. (Rüdiger & Engel 2004: 31- 48). According to Cometa, art and literature give men evolutionary advantages not only because they stimulate the production of simulations that please and simplify human existence, but also because they give information that are transmitted in a cost-effective way: information compressed in time and space - this facilitates the understanding -, and whose reception does not involve excessive physical effort; thus thanks to these features they can reduce anxiety.

3.3 Stories have the power to heal

Cometa’s main assumption is that storytelling is an antidote for anxiety. Narration, fiction, literature and even literary atheism, which have always been interested in the feeling of uncertainty, end up becoming therapeutic instruments. Much of psychoanalysis is based on literature and it has, in turn, resorted to literature for therapeutic purposes. Cometa firmly believes that one can take care of the self, starting from the reconstruction of the self, even with the help of narratives and especially those literary genres which concern the self, such as autobiography, diaries, confessions, etc. Many recent therapeutic methodologies recourse to narration in daily medical practice. In his book entitled *The Man Who Mistook His Wife for a Hat and Other Clinical Tales*, Oliver Sacks maintained that the first contact between a doctor and a patient takes always place through a story, the description of one’s struggle and the need to re-build or invent an alternative story. Their relationship comes from a dialogue, so in addition to medical knowledge, it is essential that the doctor has empathic skills. The patient tells his/her own story, but relates to a person who is in turn a bearer of stories, experiences, relationships that precede and that will follow the anamnesis. Anxiety disorders can be treated



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through pharmacological treatment and/or psychological treatment (also supported by self-help books). Pharmacological treatment is effective, but often anxiety disorders recur when

In his book, Cometa lists some of the narrative therapies that had the greatest clinical successes: the narrative therapy by Michael White and David Epston, the attachment narrative theory (ANT) by Rudi Dallos and the narrative exposure therapy (NET) by Maggie Schauer. The therapeutic work with NET, for example, is based on encouraging the individual to tell the story of the trauma and to relive the scenarios through imaginative exposure techniques, the autobiography in particular. According to Schauer, NET is particularly effective in the treatment of trauma survivors (victims of torture, war, sexual assault, mistreatment, natural disasters, political and religious discriminations - such as migrants, etc.). When the path of life has been damaged by repeated traumatic events, the individual refuses to relive them in discursive way, because just thinking about it causes painful emotions automatically. People avoid this process and try to interrupt the memories as soon as possible, but by avoiding memories, they are inhibiting the habitual elaboration of the experience, and as a result the structure centred on fear seems to consolidate and the disorder begins to develop. The NET bypasses this obstacle with the patient reconstruction of his/her existence by starting from the few fragments of positive life that the individual manages to reconnect and then reorganizing the memories in a coherent chronological narration. This is a complex and long-lasting strategy, which contributes to the consolidation of identity, and it is, at the same time, a form of empowerment.

Another form of collaboration between narration and therapy is that proposed for the treatment of obsessive-compulsive disorders (OCD), which are widely connected to anxiety, but also to thought and narrative. OCD are characterized by recurrent thoughts, images or impulses, which trigger anxiety/disgust and lead the individual to carry out repetitive material or mental actions in order to calm down. They are forms of repetitive reasoning, and for O'Connor, Aardema and Pélissier "the unit of language most closely connected to reasoning is the narrative unit, not the isolated thought or statement." (O'Connor, Aardema, and Pélissier, 2005: x). The therapy suggested by these three authors, unlike others, does not focus on rewriting the patient's personal history to deactivate the trauma, but its uniqueness lies in literary theory, and in particular on the dialogic theories of Bakhtin and Dostoevskij, thus demonstrating that narrative therapy is not based only on the creative abilities of the doctor-



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patient relationship, nor on the ability to narrate and write stories. Patients can be treated through the dialogic method: in this context the doctor's task is to make hypotheses about the meanings of the patients' experiences and let them make their own interpretations so that they understand that different visions of the same phenomenon are possible. The task of narrative theory is to allow the subject to review his/her own history and beliefs, and to replace phrases like "I'm an obsessive person" with "I'm a person who has obsessive thoughts but I can have an influence over them." (O' Connor 2002: 345). People, through their stories, become protagonists of the care process. Through stories they manage to make sense of what frightens them and to avoid at least one of the components of anxiety, that is uncertainty.

Cometa emphasizes that in all the practices listed so far the empathic aspect is fundamental. Narrative is a gym of empathy, which does not concern only patients and their stories, but it involves, as we have seen, also doctors, patients' families and the relationship between the doctors themselves. The doctor must be able to empathize with people and to take charge of their suffering. The narration of the patient and of those who take care of him/her is an essential element of contemporary medicine, which is based precisely on the active participation of the subjects involved. According to Cometa "whatever the way in which we link narration, mind and life, the presupposition of a narrative therapy can only be that mind and life can be modified (even on a biological level) through narration and that this narrative can be rewritten through a complex interaction between doctor and patient." (Cometa 2017: 344). Our ability to modify our personal stories, our memories gave us and gives us the possibility of not remaining anchored to the past and it is also the reason why narrative therapies have reason to exist. Cometa believes that literature, and narratives in general, are an extraordinary strategy to contain anxiety and that this is one of the reasons why they are necessary for survival. Literature helps us in the construction of our narrative self and in the experimentation of future scenarios that thus become controllable and more easily manageable, so as to counter our anxiety over the uncertainties of existence. Stories also give us a way to avoid our troubles by entering imaginary worlds, they distract and entertain us. Getting lost in a good story is indeed a great way to relax and escape reality.



4. Adaptive functions of storytelling: Sexual display

Un4.1 Sexual selection at the heart of human artistic behaviour development

Ca' Foscari

Venezia

Charles Darwin's interest in aesthetics and the arts clearly emerges with his publication of *The Descent of Man and Selection in Relation to Sex* (1871) in which he exposes a functionalist rather than an adaptationist theory on the origin of the animal aesthetic sense, whose cornerstone is the concept of sexual selection. However, the chapter on sexual selection was soon closed probably because in an age in which women could not even vote, a theory that attached huge importance to the female choice was unlikely to have an easy life. At that time, many male scientists believed that human females were barely capable of discernment and choice in every aspect of life, thus they could not accept the idea that the sexual preferences of female animals, considered mere egg-repositories, could have such a great impact on the progress of evolution. Darwin was hindered, above all, by Alfred Russel Wallace, co-discoverer of the principle of natural selection, who denied the existence of a female choice and stated that animals shown no sexual preferences. The main result of the Darwin-Wallace controversy was that most darwinist biologists avoided the subject of sexual selection until the end of 1970s, when numerous studies began to confirm the hypothesis formulated by Darwin according to which the bright colours and the articulated songs of many animals are often the result of the selection process carried out by the females in favour of the males with the most developed ornaments. The aspect that made Darwin suspicious was that these costly traits did not seem to have a clear and specific function, they did not help the animal to run from danger, to eat, or to fight.

Today, the sexual selection theory is fully credited by evolutionists as the evolutionary mechanism capable of developing in species those morphological, aesthetic, and behavioural traits which are apparently useless and counterproductive in a survival perspective. These traits are "fitness indicators", i.e. spies for the verification of an individual's genetic kit, which are exhibited during courtship to impress the partner. Thus, sexual selection may be even more powerful than selection aimed at survival. In this case, evolution would not be determined simply by the survival of the fittest, but by the reproduction of the most seductive.

4.2 The human mind is a peacock's tail

Sexual selection has certainly given shape to the human body, so the question that scientists



came up with was whether it had also shaped the human mind. Many proposals have been put forward starting from the idea that natural selection alone cannot fully explain the brain's Un growth which was unique, capricious and occurred in a very short time. Unfortunately, mating Ca preferences and courtship behaviour are not fossilized, so it is difficult to reconstruct the Ve patterns of sexual selection in extinct animals. We could, however, suppose that hominids adopted strategies similar to those used by primates that have become increasingly complex as the brain and the social relations have undergone changes.

The idea of exploiting sexual selection theory to investigate human behaviour represented a turning point for human sciences and certainly a great success for evolutionary psychology. Until a few years ago, this methodology would have been unthinkable and scholars who wanted to “darwinize” human sciences had to rely on natural selection theory, which still today remains a foundation for evolutionary psychology’s surveys. There is no doubt that the study and observation of animals and humans’ behaviour in an evolutionary key can help us better understand our way of being, of feeling, of perceiving reality and the relationships with our conspecifics, and trying to understand how the human mind evolved can help us discover something more about human nature. While culture soon became the main explanation of all human social and communicative ways of behaving, sexual competition, which “probably underlies many political, economic, sociological, anthropological, criminological, cultural, ideological, religious, moral and artistic phenomena” (Miller 1998: 25), has not often been evaluated as an explanatory principle. Some scholars, such as Geoffrey Miller, propose to think of culture as “an emergent phenomenon arising from sexual competition among vast numbers of individuals pursuing different mating strategies in different display arenas” (Miller 1998: 25), rather than considering it the reason for individual human behaviour.

At the beginning of the twentieth century, the mathematical biologist Ronald Fisher further developed Darwin’s theory on sexual selection proposing two ideas, the first one concerning sexual ornaments which evolved as indicators of fitness, health and energy, and the second one focusing instead on the mechanism called “runaway selection”, according to which the female preferences can bring male ornaments to the extreme, explaining that “this is because a female who prefers a super-ornamented male will tend to produce super-ornamented sons, who will be super-attractive to other females, and who will therefore produce more grandchildren” (Miller 2000: 56). Evolution, according to him, favours super-choosy females and a striking example of this theory is the majestic peacock’s tail, which despite being a



disadvantageous element for the animal, has been selected by peahens over time (however, what is certain is that if the courtship trait becomes too costly so as to put at risk many individuals' lives, the whole species would become extinct).

Drawing on this theory, the evolutionary psychologist Geoffrey Miller promotes his thesis according to which the human brain is nothing but a very sophisticated peacock's tail. Sexual selection would have accelerated the evolution of the efficient brain of the anthropomorphic monkey transforming it into a much more complex and energy-hungry organ. In the human species, mental fitness indicators have assumed, thanks to language, a prominent role compared to physical fitness ones. Having a refined vocabulary, a strong sense of humor, inspiration, imagination, creativity, showing a good capacity for dialogue and nobility of spirit are some of the qualities that are appreciated in human sexual selection. In *The Mating Mind. How Sexual Choice Shaped the Evolution of Human Nature*, Miller places sexual selection (and courtship) at the centre of Homo sapiens artistic behaviour' evolution. He took inspiration from the birds of Central Park that every spring perform articulated songs to attract a possible partner. Miller wonders whether some of our human abilities may have developed for the same purpose, like, for example, "human language [which] evolved to be much more elaborate than necessary for basic survival functions", art and music which seem to be "pointless wastes of energy" or "human morality and humor [which] seem irrelevant to the business of finding food and avoiding predators", adding that "if human intelligence and creativity were so useful, it is puzzling that other apes did not evolve them" (Miller 2000: 2). Miller believes that the human brain developed as a sexual ornament to be used in courtship. The choice of the partner, according to him, would have fallen on those individuals who had "more complex and creative behavioural courtship displays such as stories, myths, jokes, rituals, dance, music, art, and sexual foreplay" that matured thanks to those modifications undergone by the brain (Miller 1998: 22-23).

Our ancestors lived in small tribes of mobile hunter-gatherers, groups composed predominantly of females with their offspring and males wandering around and occasionally trying to approach the females. The idea of the male as a greedy and ruthless hunter was a great success in the 20th century, but, as a matter of fact, we were more prey than predators. The hunting activity was very dangerous and expensive, so it is more likely that collecting plants and small animals was the main occupation of both sexes. The discovery of some hominids' bipedal footprints in Tanzania showed a marked dimorphism between males and females. Given the relationship that exists in primates between the degree of sexual dimorphism and the type



of social organization, it has been hypothesized that the social structure of our ancestors was, in all probability, similar to that of the current gorillas, i.e. a harem. In choosing a mate, our

Unancestors paid attention to:

Ca' Foscari

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Creativity and the love for novelty are two aspects of the brain that evolved through the runaway sexual selection and that affected the mate choice in many species. In our modern society the global economy revolves around television, cinema, publishing, art, fashion, all fields deeply influenced by the human neophilia. Just as today's entertainment industry amuses us, it is reasonable to think that hominids living in the ancestral savannah entertained each other with creative displays, which became more and more articulated over the years. Miller maintains that “this hypothesis can explain the mysterious ‘cultural’ capacities that are universally and uniquely developed in humans, such as language, music, dance, art, humor, intellectual creativity, and innovative sexual play [that] are all highly valued during mate choice and highly useful during courtship.” (Miller 1998: 23). Of course, Miller is well aware that saying that language - which is the main instrument used today during the human courtship -, for example, has been shaped only by sexual selection is risky and foolish because language other than being used during courtship, also served to communicate hunting techniques to a friend, suggest which berries and tubers to collect, recall the children from an imminent danger; there were various forces that collaborated in shaping language, but he is still convinced that “some of the more mysterious aspects of language can be understood only by thinking about how language is used in courtship.” (Miller 1998).

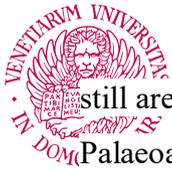
Sexual selection favours what one can perceive. As the researcher suggests, heart ventricles cannot have been modified by sexual selection in the course of evolution because we could not and cannot see them, and surely “vivisection is not a practical method for choosing a sexual partner” (Miller 2000: 10). Initially, hominids could not easily perceive their conspecifics' thoughts, but language's arrival allowed them to do so. The thought consequently underwent modifications due to sexual selection. Miller asserts that “through language, and other new forms of expression such as art and music, our ancestors could act more like



psychologists – in addition to acting like beauty contest judges – when choosing mates [and for this reason] during human evolution, sexual selection seems to have shifted its primary target from body to mind.” (Miller 2000: 10). Language is for Miller a courtship signal, a system of communication similar to dances or songs adopted by many animals. Just as the genes for the most beautiful peacock’s tails have been selected, in the same way, the genes of good conversational skills were favoured by sexual selection and handed down. Each animal species has evolved various ways to advertise their fitness during courtship. As for the human being, storytelling, art, humor, music, dance, kindness, altruism and other forms of sexual displays fostered reproduction and consequently survival. Therefore, claiming that – as evolutionary psychology does – men’s wealth and women’s physical beauty are the only indicators of fitness in the human species is not accurate. According to Miller, “by intelligently choosing their sexual partners for their mental abilities, our ancestors became the intelligent force behind the human mind’s evolution.” (Miller 2012: 4). A recent study published in *Nature Communications* entitled “Cooperation and the Evolution of Hunter-gatherer Storytelling” has shown that for the members of two Agta hunter-gatherer communities (about 1250 people), in the Palanan region of the Philippines, storytelling has a great importance, so much so that those who possess this ability are valued “twice as much as being a good hunter” (Yong 2017). The best storytellers, those who had invested time and resources in the acquisition of this skill, using energies in the exhibition and in the cognitive re-elaboration of the narrated contents, had a 0.53 more living sons than the mediocre narrators. In addition to being more likely to find a partner, the other members of the community were more inclined to give gifts to the good storyteller’s family, to do him favours, to take care of his offspring, or to assist a sick person of his family. Storytelling, like art in general, is a display of skill; the ability to create a story allows individuals to show their fitness to a potential partner. For Miller these courtship displays are not a useless luxury that drowns excess energies, but they are the way genes can manage to pass from one generation to another.

4.3 The origin of narrative behaviour in artistic productions

As has been pointed out earlier, artistic productions (accessories, paintings, songs, narrations, etc.) had an important function according to Miller in terms of survival linked to reproduction. Other authors focused instead on analysing the same artistic products because they were and



still are convinced that narrative behaviour was born thanks to them.

UnAfrican apes that existed in a period between 10 and 4 million years ago. Hominids show great
Ca diversity in the fossil records, and not all of them are necessarily ancestral to living humans.
Ve Three million years ago our ancestors were already able to walk on two feet and build tools, but
they still had brains of the same size as those of chimpanzees. We can argue that each of them
was an individual of a very intelligent homo species, but not a human being yet. If one looks
for when men started to think in an advanced way, to fantasize, to talk, to tell stories, one finds
out that these faculties arrived very late in the history of human evolution. Encephalization, that
is, the volumetric growth and the development of the processes regarding the organic and
psychological functions of the brain, began for no apparent reason two million years ago and
then stopped 100.000 years ago, which means that revolutionary changes took place in a very
short period of time. In order to tell stories, what is needed, first of all, is the ability to imagine,
and then a capacity for syntactic language. Only modern men can generate mental images that
go beyond a mere external observation. The start date of the symbolic thought's manifestation
in homo sapiens is still debated, but what we can infer from various studies is that man first
began to communicate by emitting few guttural sounds, then gradually, thanks also to the
modification of the laryngeal-pharyngeal apparatus, those sounds became increasingly complex
until they turned into real words; thus the formation of a real language probably happened later
than the rise of symbolic abilities in the human mind. According to the anthropologist Ian
Tattersall "the symbolic thought allows hominids with clever hands to not only re-make their
mental worlds but also shape the physical world around them in unprecedentedly complex
ways, as modern humans do." (Tattersall 2016: 258).

The material evidence of tools gives us direct archaeological evidence for hominids' behaviour, which undergone rapid change at some point. It is very likely that the changes in the brain did not happen overnight, but chances are that there were lots and lots of mutations over a span of hundreds of thousands of years that sculpted the brain to give it all the powers that it has today; thus it may not have been the size of the human brain, but its wiring that endowed us with powerful new skills. For almost a million years, ancient stone tool people have continued to create a variety of simple implements repeatedly. Their minds were oriented toward survival, they have the ability to make tools which had some sophistication to them, but the fact that they continued making them means that they had a kind of mental template, a regularity of thinking that kept producing the same things over and over again. Between 40,000



and 10,000 years ago there has been a qualitative and quantitative increase in human cultural production - this period is called “Upper Palaeolithic Revolution”- but the discovery of some “artistic” artefacts, such as some very ancient necklaces and decorative shells, has forced scientists to recalculate the cognitive explosion that presides over symbolic thinking, making it date back to, at least, 250,000 years ago. People of that time found it necessary to say things about themselves using durable material items. Durable items like beads, for example, are of no use for hunting, gathering or protection, but they suggest that those people who produced them had more on their minds than simple survival. Over time they were not just making beads, they were mass producing them. Indeed, they were spending thousands of hours making them when they could have been doing other things that we might think to be more productive. These primordial personal ornaments constitute real treasures because they are the evidence of our cultural and creative beginnings recalling a time when bands of humans began interacting socially with one another and they presuppose that hominids were already taking into account the effect that those objects had on others - the one who was wearing the beaded necklace was not only able to produce a representation of its valuable thing but also a meta-representation of it. This population of modern sapiens was able with its “technology” to cover the caves with the pictorial representation of extinct animals, to create jewels and musical instruments; at a certain point, these early art forms began to acquire a value: an object that required time and energy to be designed, could be donated in exchange for other goods, food or clothes for example. Those who knew how to build a useful and, at the same time, beautiful object would have been favoured. Art also became a social and economic indicator of an individual, and an instrument that identify a people. Human art evolved and still evolves because it benefits both communities and individuals, being a vehicle of information, rejecting boredom, loosening nervous tension and giving pleasure.

4.4 The chaîne opératoire

In recent years, archaeology has evolved to become also archaeology of the mind. The task of cognitive archaeology lies in understanding the mental architecture of homo sapiens, not from the point of view of the study of the brain, but from the point of view of its material culture; if cognitive archaeology and cognitive sciences are able to provide us with tools to study how the mind works, then it is possible to believe that they can also help us to discover how narrative works. Professor Michele Cometa’s assumption, which is now particularly accredited, is that



our ability to manipulate objects, such as lithic artefacts or pottery, presupposes narrative skills: one must be able to think what he or she wants to do, to apply this in a process called “chaîne opératoire” (operational chain) as proposed by the French paleoanthropologist André Leroi-Gourhan, and then one must be able to imagine/ foresee in some way how the story will end up; if this is true, it means that the narrative behaviour existed even before language developed in a complete way. Today there are many reasons to believe this hypothesis because thanks to neurosciences we are beginning to understand that manipulating tools and speaking are procedures that belong to the same part of the brain, they share the same neural base. As Stout and Chaminade claim “although language processing was long viewed as a functionally specialized and anatomically discrete module within the brain, it is now clear that the so-called ‘language areas’ contribute to a wide array of non-linguistic behaviours, including tool use.” (Stout & Chaminade 2012).

Making complex ornaments required some phases that can make us understand that at the base of the production there was a conscious and mature intentionality: going in search of certain shells in distant places, using sharp tools to drill them, looking for other materials to be able to paint them; these steps are part of a “shared symbolic language”. In this regard, André Leroi-Gourhan introduces the concept of the chaîne opératoire, that is, the set of concatenated steps that occur in the production of lithic artefacts; in *Perché le storie ci aiutano a vivere: la letteratura necessaria*, Cometa suggests that this chain can also be considered a narrative sequence, and precisely for this reason it can be hypothesized that the narrative thought developed in a very remote phase, even before the evolution of language. Neurosciences based on brain imaging have shown that our language skills developed in parallel with our manual skills and therefore, by studying the relationship between gesture and hand and between mouth and hand, according to Cometa, we could find indications to trace the origins of language; even objects that come to us from the past are the product of the relationship between a gesture and a hand. Detecting the overlaps in the activation of brain parts that preside over language and those which preside over the use and the creation of tools is indeed an enormously promising path.

Instead of starting from language, the archaeological research starts from the tools, that is, for example, from lithic artefacts, from funeral practices, from the first notational systems, from the cave paintings, which in turn are interpreted as a prosthesis of mental processes that extend beyond the brain and the body. Narrative and literature theorists, who are interested in the origins of storytelling, will then have to look for traces of narrative behaviour in the material



remains.

Cognitive archaeologists argue that the human mind acquired its peculiar creative abilities when it managed to blend concepts belonging to different logical spheres, thus creating more intricate and complex neural connections between different parts of the brain. Tools give wide evidence of homo sapiens' blending ability, the capacity to merge, for example, two different mental spaces, such as beauty and function: some chopping tools have embedded shells, which had been selected with evident decorative functions. Our distant precursor, therefore, was able to apply an aesthetic criterion, while he/she was focused on creating a perfectly functional tool. Some of these creations seem to have been designed only for an aesthetic purpose. Having argued in the previous chapter that the various forms of art developed through sexual selection, Marek Kohn and Steven Mithen believe that hand axes, especially the most beautiful ones which show no signs of use, were a fitness indicator and a valid criterion for choosing the partner to mate with. We are dealing with an object that at first glance may seem a simple survival tool, but which in reality was produced to be an expensive fitness signaller. The hand axe can be considered the first art object produced by our ancestors, from which the whole history of art started. According to Kohn and Mithen's interpretation:

Those hominids (male or female) who were able to make fine symmetrical hand-axes may have been preferentially chosen by the opposite sex as mates. Just as a peacock's tail may reliably indicate its 'success', so might the manufacture of a fine symmetrical handaxe have been a reliable indicator of the hominid's ability to secure food, find shelter, escape from predation and compete successfully within the social group. Such hominids would have been attractive mates, their abilities indicating 'good genes'. (Kohn & Mithen 1999: 522)

The chaîne opératoire presupposes a narration because whoever created a hand axe or a necklace, was able to predict (imagine) what kind of object would come out from the selected stone or bone and therefore he or she had a rudimentary idea of time – a before-during-after – and the possibility of imagine what is not yet to be seen, which is the finished product. The sense of time is the fundamental condition of a story and it comes into play not only for the production of a lithic artefact, but also for the production of real notational systems, such as the moon phases engraved on bones. These representations suggest that our ancestors were aware of the passing of time, the changing of seasons, the succession of natural phases. According to Cometa, if we consider the lithic artefacts' production as a mental process that develops over time, then it will be possible to see in the operative sequences the dawn of narrative behaviour.



Università
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We cannot be sure of how things went, but it is clear that the human mind operates through very special cognitive mechanisms that we can gather under the concept of imagination. Cognitive archaeology invites us to think of tools not as simple supports that transmit and propagate ideas, but as embodiments of ideas, the products of a relationship between ideas, gestures and materials. The experiments on the construction of lithic tools have shown that the operative sequences, although standardized and learned by imitation, are oriented and guided by how the stone responds to the action of man; the sculptor does not apply a preconceived thought, but works according to the random fracturing of the stone using creativity. We do not know exactly whether the creation of certain tools, the use of jewels and colours on the body, the performance of dances or songs, the storytelling have been driven by sexual selection, or if perhaps sexual selection has helped the human being to go a little further, to look for novelty, beauty, peculiarity because he/she had somehow understood that using those strategies would have given him/her some more chances to win over a mate. What we know with more certainty is that the research is not over yet and that the challenge of cognitive science and also of the literary theory of the future lies in understanding the entanglement between the embodied action, the thought's form and the narrative development.

5. Can evolution explain literature?

5.1 Nature vs Nurture?

In 1973 the great biologist Theodosius Dobzhansky, one of the most important founders of the modern theory of evolution, wrote in *The American Biology Teacher* that “nothing in biology makes sense except in the light of evolution”, in fact, while biology identifies and analyses the great brain that characterizes human beings, the long neck of giraffes, the robust horns of deer, evolution provides explanations on why organisms are the way they are. Thus, the question that inevitably springs to the mind of many scholars of the evolutionary literary studies is the following: just as evolution can explain to us why humans have a big brain, could it also explain human culture - therefore also literature? In recent years Dobzhansky's statement has gained more and more value, especially since the boundaries between biology and social sciences have begun to blur.



In the previous chapters, some theories supported by a part of evolutionary literary scholars have been analysed, in particular, some proposals regarding the adaptive functions that the stories and the arts in general have had, and still have: transmitting useful information, offering scenarios for practicing adaptive activities, participating in simulated lives to understand others, serving as fitness indicators to increase reproductive success, strengthening individuals' social identity, exorcising fears and relieving stress. Other scholars have, instead, devoted themselves to the critical reading of literary works interpreting fiction in terms of evolutionary biology. As suggested by Joseph Carroll:

Darwinian literary science takes literary texts or the production of literature as its subject matter, but it studies this subject by adopting the methods of social science—statistical analysis and experimentation. It seeks both to use literature as a source of data for social science and to provide literary critics with empirical facts that can constrain and direct their interpretive efforts. (Buss 2005: 935)

In his article published in *The New York Times* “The Literary Darwinists”, D. T. Max asserts that “just as Charles Darwin studied animals to discover the patterns behind their development, literary Darwinists read books in search of innate patterns of human behaviour: child bearing and rearing, efforts to acquire resources (money, property, influence) and competition and cooperation within families and communities.” According to them “it’s impossible to fully appreciate and understand a literary text unless you keep in mind that humans behave in certain universal ways and do so because that behaviours are hard-wired into us”. They claim that “the most effective and truest works of literature are those that reference or exemplify these basic facts” (Max 2005).

Human universals are traits which are shared by all members of our species and can be genetic, anatomical, physiological, or psychological and behavioural. While the existence of genetic, anatomical or physiological human universals is not questioned, some controversy arises for the traits connected to our minds and our behaviour, specifically “the question of whether the brain is wired to predispose certain patterns of learning and behaviour, or the brain is a blank slate, free of all but the most elemental drivers and ready to be molded almost entirely by culture and personal history” (Gottschall and Wilson 2005: viii). Although some traits can be traced back to ancient times, with the appearance of the first hominids, this does not give us the mathematical certainty that they are innate, rather than the result of a cultural process. For example, tool making already existed within the first settlements of our ancestors, but this does not mean that it is an innate universal. This recalls the historical distinction between nature and nurture, between patterns that are within our genes and patterns that we learn



through experience. The consequence of men's evolution that has exercised the most profound influence on nature and human societies has been the emergence of culture, understood as the Unset of learned ideas and ways of behaving that human beings acquire as members of society, Ca and the set of products and structures that men create and use. Darwin argued that man's Ve evolution was the result of the relationship of co-dependency generated between nature and culture. However, no one had a clear idea of how this cooperation took place. The discourse was rather complex; nevertheless, it was understood that the behaviour, together with the biological structure, decreed the life or death of the organism. Proposing to derive human psychology and behaviour exclusively from biological factors - and therefore from natural selection - meant to give them absolute power; on the other hand, attributing social and historical phenomena solely to culture, completely eradicating them from the influence of instincts, meant adhering to an oppositional reductionism.

Hume maintained that either humans' actions are determined or they are random, there is nothing one could do about them in any case; John Locke conceived the mind as a blank slate upon which experience makes its mark; Darwin's half cousin Francis Galton was the one who coined the expression "nature vs nurture" and believed that our behaviour is genetically controlled; the thesis of Lamarck, completely rejected by Darwin, suggested that the behaviour directed the evolution (only those giraffes that exerted a tension with the neck upwards could survive managing to feed themselves when the vegetation on the ground was insufficient); according to Pavlov the mind can be conditioned by the environment; Freud thought that behaviour is influenced by parents, dreams, jokes and sex and that the psyche appeared split, torn between instincts carried by opposing forces, such as nature and culture. He developed a scientific and philosophical theory, according to which unconscious psychic processes exert decisive influences on thought, human behaviour and interactions between individuals; in psychology, the behaviourist approach emphasized actions rather than psychological contents: ideas were a product of behaviour. Consciousness was secondary or even superfluous. The crisis of conscience, the loss of decision-making autonomy left vacant the position of human organism's command. Consciousness appeared to be attacked both from the outside - society - and from within - the unconscious impulses; E.O. Wilson in his *Sociobiology* wrote that animal behaviour was not the exclusive fruit of learning and imitation, but it had a genetic basis; Dawkins came up with a different reading: human beings are replicators of genes and ideas, and functional ideas are those that allow their survival; Noam Chomsky was on the "nature side", supposing that humans are born with a capacity of grammar, i.e. it is inherent; according to the queer theory the gender identity, the sexual identity and the sexual acts of



each individual are wholly or partly socially constructed. While gay and lesbian studies analyse in particular the way in which a behaviour is defined as “natural” or “unnatural” with respect to heterosexual behaviour, queer theory strives to understand any sexual activity or identity that falls within the categories of normative and deviant; literary darwinists think that nature and nurture coexist. They are not mutually exclusive, they interact.

While biological adaptation is dependent on genetics and is passed on from parents to the offspring and so on, cultural adaptation happens in a lifespan of an individual and it is about the shifting of behaviour among a group within a generation. A good example is provided by eating utensils: we don't need forks or chopsticks to eat because we have hands, but nevertheless they evolved from our collective knowledge in a way that they would accommodate our cultural needs for manners, cleanliness and efficiency (nobody needs to know how to eat with hands because that happens naturally, it's hardwired, but somebody has to teach us how to use utensils). One of the most important developments in evolutionary social sciences over the past thirty years has been the gradual development of a more biocultural understanding of human behaviour, the realization that humans are cultural animals, because in the past there was a strong dichotomy, nurture scholars said that all was nurture, while biology scholars tended to reduce everything to biology. Evolutionary psychologists affirm that all human beings share some behavioural characteristics, which are products of natural selection and constitute human nature. Some other scholars argue that what we know today about what is called human nature is extremely thin, and scientists must be cautious when making assumptions because the question is too hard. Very little is known about the nature of simple organisms such as insects, therefore what they question is how it is possible to know the nature of a complex creature like the human being. However, “it appears that being interested in human nature, and particularly in the tension between universal notions and cultural specifics, is in fact itself a universal.” (Antweiler 2018: 12).

5.2 Evolutionary psychology

Evolutionary psychology is a theoretical approach to psychology and a school of the human evolutionary sciences that was founded by Donald Symons, Leda Cosmides and John Tooby. Evolutionary psychologists are interested in how human evolutionary history affects the way humans think today. “These researchers argue that selection will have favoured psychological mechanisms that are suited to efficiently solving problems within specific domains, and this



perspective has been applied to a broad range of topics, including mate choice, aggression, social exchange and morality.” (Brown 2013: 108-109). They affirm that regardless the culture in which we grow up we all tend to respond the same way to a variety of phenomena: we are afraid of certain types of animals, we are attracted to certain body types, we feel repulsion towards nauseating smells, we have a preference for certain foods, and more. They try to answer the question: why have we evolved a brain that makes us perceive some things as bad and others as good? According to them, it is not possible to understand behaviour or the internal psychological states outside the context of evolution. As Darwin argued, traits in populations change over time, some traits are heritable, there is variability in those traits, some versions of those traits are more adaptive than others, and sometimes the introduction of a new random trait, a mutation, may occur. For scholars who come from a darwinian tradition, it is easy to apply the same notions also to behaviour, which includes all the traits that can be heritable and which can come with a certain degree of variation among individuals; moreover, some ways of behaving may be more adaptive than others, and the more adaptive ones usually become more commonplace, occasionally undergoing a mutation that will introduce a new variability. This leads to the conclusion that behaviour has genetic components, and is therefore a genetic trait. Over the years some misunderstandings have arisen as to whether human behaviour was exclusively genetically determined, but as evolutionary psychologist David Buss argues “human behaviour cannot occur without two ingredients: (1) evolved adaptations and (2) environmental input that triggers the development and activation of these adaptations.” (Buss 2016: 16). Neither evolutionary theorists nor evolutionary psychologists believe that human behaviour depends only on genes. It is also important to remember that evolution does not imply that we cannot change our behaviour and it is not true that our existing adaptations are optimally designed (Buss 2016: 18).

In addition to the concept of natural selection that concerns the processes which make individuals who are the best able to adapt to the environment in which they live survive, Darwin also introduced another evolutionary mechanism, which he called sexual selection; according to it many animals develop traits which had no value in survival terms, and that in some cases even put their lives at risk, but help them maximize their reproductive success. Mating has an important role in evolution, and that is why evolutionary psychologists are so interested in studying the mechanisms to attract and protect mates. The purpose of their research is in fact to analyse social behaviour such as mating, parenting, interactions with the family and the community, to identify the cognitive and emotional processes that represent human nature, and



the way in which they evolved within our species, to basically understand why human beings behave as they do.

The most controversial aspect of this theoretical approach, which has given rise to numerous accusations of sexism and conservatism, concerns sex differences. This represents a significant exception to the claim of universality because in addition to a significant sexual dimorphism of bodily traits between men and women, many evolutionary psychologists claim that there is also a sexual dimorphism of psychological modules. Men and women's bodies are very similar, but also extremely different at the same time; men, for example, produce sperm, while women eggs. Similarly, according to evolutionary psychologists, cognitive abilities are the same in many respects, but they differ a lot especially with regard to mating. As emphasized by Edward H. Hagen:

if you consider these implications to be racist or sexist, then EP is racist or sexist. Nothing in evolutionary theory, however, privileges one group over another or males over females. Are ovaries superior to testicles? The question is meaningless. Are male mate preferences superior to female mate preferences? The question is equally meaningless. (Buss 2005: 168)

David Buss, an author who made important contributions to the field of evolutionary psychology, argues that there are big differences between men and women as far as reproduction is concerned. In order to understand his hypotheses it is necessary to bear in mind Darwin's theory of sexual selection, that deals with the evolution of characteristics because of the mating advantage rather than survival advantage, and it occurs through two causal processes: *intrasexual* or same-sex competition, with animals fighting over access to females, and *intersexual* selection which involves the preferential mate choice, according to which if members of one sex have some agreement about the qualities they desire in members of the opposite sex, then those who have the desired qualities have a mating advantage (Buss 1988: 616).

Buss's empirical research focuses on issues such as how humans compete for mates, what are their mating strategies and their mate preferences. His proposal takes up Trivers' hypotheses on different levels of parental investment, which would derive from the size difference between gametes: in humans and other mammals, females are the one who invest a lot more for different reasons, such as the rarity of the eggs, the gestation, the breastfeeding, the weight of the newborn's treatments, therefore they tend to be more selective in the choice of a long-term partner. In Buss's first study, which collected data from 37 different cultures, the main sex differences between men and women were found in two clusters: women's preference for mates with



resources (food, money, protection, territory/home, etc.) and the qualities that tend to lead to those resources over time (ambition, hard work, perseverance, etc.), and men's propensity to choose young and physically attractive partners (Buss 1989: 1-14). His analysis was carried out by administering to a sample of both single and married people between 16 and 30 years old, questionnaires in which, in the first part, bibliographic data (sex, age, religion, marital status, number of brothers and/or sisters, etc.) were requested, the second section required reporting at what age the respondent would have preferred to marry, the age difference he/she would have preferred between him/her and the partner, if the subject preferred to be the oldest or youngest in the couple and how many children he/she wanted, and finally, in the third part of the survey, the respondent had to rate which of the 18 characteristics listed he/she would have considered the most important in choosing a mate (Buss 1989: 4-5). A criticism that has been raised concerns the fact that Buss's research, as well as many other studies conducted using his original findings as a reference, took into consideration only data from western and industrialized countries, therefore according to some scholars it was not possible to reach the conclusion that mate choice criteria are the same in all the cultures of the world. In this regard, Gottschall and his colleagues decided to deepen Buss's work by analysing 658 traditional folktales from 48 different cultures, and 240 classics of Western literature, trying to identify common patterns in the different cultural areas, in order to better define the contours of human nature. The results of this content analysis are consistent with those of Buss: in the analysed stories, males' main criterion in mate selection seems to be females' physical appearance, whereas female characters seem to give more importance to males' wealth and social status (Gottschall 2004b: 102-112). It is interesting to note that, while Buss's work included a questionnaire to be filled out based on the respondents' preferences, Gottschall's method did not directly use people, but it exploited the idea that literature, as well as folktales that have been transmitted orally, is a great information repository about human nature.

Another scholar who tried to uncover the aspects of human nature placing emphasis, once again, on the differences between men and women, was the psychologist and evolutionary biologist David Barash. In the work *Making Sense of Sex: How Genes and Gender Influence Our Relationships*, he identified, together with his wife and psychiatrist Judith Eve Lipton, the distinctive features between male and female in terms of anatomy, physiology and behaviour. There seems to be no doubt that a large component of male/female differences is socially constructed, but according to the two authors, social sciences specialists have given insufficient attention to what it is that underlies being a male and being a female in all living beings. They feel safe in saying that there are male/female differences when it comes to behaviour



particularly with regard to aggression, violence and aspects of sexuality. Women, by nature, are more prone to caring for young children and more “careful comparison shoppers” (Barash and Lipton 1997: 76) in their search for the most suitable companion, while men are more inclined to be aggressive and more opportunistic sexual exploiters than women. Barash stated that “males are driven by their genes to reproduce: they tend to be more promiscuous because, in the past, that was their best way to reproduce the most offspring” suggesting immediately afterwards that “if you get caught fooling around, don’t say the Devil made you do it. It’s the devil in your DNA” (Holcomb 1993: 54). This does not mean that one does not have to take responsibility for one’s actions, also because “if you tell the judge that your genes made you do it, she can tell you that her genes are making her throw you in jail” as Hagen recommends (Buss 2005: 151).

Barash proposes that a reason which would explain man’s philandering could be traced back to his polygynous past, that is from situations where a small number of men was able, by dint of aggression and greater physical size, to get access to a larger number of women (Barash 2014: 6-8). Moreover, many studies have shown that hormones influence the cognitive and behavioural sphere: as evidenced by some tests, excessive testosterone levels negatively affect the parental behaviour of some male mice, for example, that will be brought to kill strange pups, but also of female rabbits that, after receiving a testosterone injection, will be less inclined to take care of their puppies and will even tend to kill them or eat them (Barash and Lipton 1997: 130).

In *Making Sense of Sex*, Barash and Lipton are keen to stress that there is a wide range of individual differences, there are variations and gradations, women who are aggressive and men who are nurturant, but the two authors are confident in saying that it is impossible not to recognize the dichotomy between males and females, one of the clearest ways in which the natural world is cleaved in two.

Some would say, “If men are more likely to be violent or if women are more likely to do the parenting, it is because that is how society has been organized, not because of the nature of men and women.” But such statements ignore the bigger question: *Why* are societies organized in this way? And why are they *all* organized in the same basic way? Also, it is a coincidence that similar patterns are found among other, similar animals and that those differences are consistent with biological theory? (Barash and Lipton 1997: 207).



5.3 *Madame Bovary's Ovaries*

In 2005, David Barash took a literary journey with his daughter Nanelle R. Barash in search of universals. Their biological background allowed them to apply an evolutionary perspective to examine literary texts. Their book with the captivating title *Madame Bovary's Ovaries. A Darwinian Look at Literature* does not offer the only key, but a possible new interpretation of some masterpieces, starting from a clear premise: “people are biological creatures and... as such they share a universal, evolved human nature” (Barash 2005: 9). The two authors assign to each literary work a specific darwinian drawer, here are some examples: in the “adultery” drawer they placed *Anna Karenina* and *Madame Bovary*, *Othello* is stored in the “male sexual jealousy” section, Jane Austen’s novels in “the search for fortune in men”, *Romeo and Juliet* belong to the “hormonal ferment” category, while *Cinderella* and *Harry Potter* fit in “struggle of being stepchildren”. Barashes’ purpose is to show how Darwin’s discoveries are useful to interpret literature and may “help the reader to see what was always there” (Barash 2005: 3), that is human nature; indeed, although people live in different places, in different eras and with different cultural traditions, human nature is always the same. According to them, those who want to grasp the human nature of the Bronze Age, for example, have to look for it in the works of Shakespeare, Dante or Homer.

Human beings are products of evolution by natural selection, and as a result, they try to enhance their fitness because this permits them to be more successful in transmitting their genes and moving the species forward. The concept of fitness did not exist at the time of Darwin but he introduced it as the “Struggle for Existence used in a large and metaphorical sense, including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny” (Bordalejo 2009: 62). This does not mean that people desperately try to have as many children as possible, but it means that they inherited their ancestors’ genes who did reproduce and survive, so even if many years have passed, we still “unconsciously behave in ways designed to enhance our success in doing so, that is, to benefit what biologists call our fitness”. (Barash 2008: 4).

Literature is produced and consumed by men and women, so when dealing with a textual criticism one must keep in mind that, beyond the text itself, there are writers and readers. *Madame Bovary's Ovaries* does not offer us information on why the authors of the various literary works feel the urgency and the need to write, on why human beings spend so much time and resources creating stories, or any other artistic product. It is easier to explain why humans spend time reading stories, especially those novels that resist time and space, that are read years



after their publication and by any cultural group in the world. Certainly, besides appreciating the richness of language, the imaginative effort and the artistry of these literary products, one finds in them something more. “The reason *Othello* is still being read and performed five hundred years after Shakespeare wrote it is because this play tells us something timeless and universal... not so much about a fellow named Othello but about ourselves. It speaks to the Othello within everyone: our shared human nature.” (Barash 2005: 2). Thus, in their essay, father and daughter explore various aspects of human behaviour, especially that adopted in the mating sphere, rooting them to the animal repertoire. Although they admit to treating the subject lightly, the Barashes are very serious about the message they want to deliver with their book. In the past, many scholars have tried to keep the so-called “two cultures”, the humanities and the sciences, separate, others, still today, maintain that while science always makes enormous progress and continues to offer us answers, literature, and the arts in general, do not bring anything new, they are no longer considered a means to knowledge. The Barashes absolutely disagree with these statements and support John Brockman’s idea that a “third culture” is emerging, that is a real creative-constructive dialogue between the many and various disciplines. “Now that biologists have begun clarifying their perspective on what it means to be human, it is time to look for it – for ourselves, in the deepest sense – where it has always been: in our greatest, most resonant stories” (Barash 2015: 251).

Below I will examine some examples of the survey method used in *Madame Bovary’s Ovaries* which, as has been pointed out, seeks to unite biology and literature.

5.3.1 *Adultery*

In *Madame Bovary’s Ovaries* it is reported that according to biologists “a major reason why Emma wanted sex with Rodolphe, Léon, and the marquis (the last unconsummated) was because deep inside (in the DNA of her brain) she heard a subliminal Darwinian whisper that tickled her ovaries, even though she may not have acknowledged it” (Barash 2005: 101), a sort of natural call that she was not willing to recognize and that did not allow her to act consciously. The Barashes continue arguing that “smart women sometimes really do make foolish choices, and a whiff of Darwin enables us to glimpse some of the reasons why” (Barash 2005: 101). The complex and contradictory figure of Madame Bovary is then summarized with a vague “whisper of the ovaries”, avoiding any cultural explanation to her behaviour; she is just an organism who seeks food to satisfy a personal and momentary pleasure rather than a biological



hunger. This is just an example of simplification that the two authors propose within the book, and that disappoints both the common reader and the darwinists themselves. Goodheart stated in his *Darwinian Misadventures in the Humanities* that “the Darwinian literary world as imagined by the Barashes is a jungle or a zoo” (Goodheart 2018: 13), an observation that can already be sensed from the cover of the book. Joseph Carroll expressed a negative opinion of Barashes’ commentary defining it “a vulgar form of literary Darwinism”, a sort of mere list of Darwinian themes found in the various literary texts analysed (Carroll 2011: 81). Nevertheless, it is interesting to note how they justify certain human actions and ways of behaving with a very frank and fun approach.

What happens in many species of animals is that whoever has something more to offer than others, such as more wealth, more intelligence, more physical prowess, more courage, wins. In the case of Madame Bovary, Charles seems to be a good catch for Emma’s father, Monsieur Rouault, who is a farmer in a very difficult economic situation; but then, shortly after the wedding, Emma realizes that Charles, a man without ambition, quite boring, dull-witted and who is not an actual doctor, was not really what she wanted. By nature of their biology, males are prone to desire other affairs simply for the sexual opportunity – sex for sex’s sake –, whereas females are more inclined to be adulterous when they’re unhappy with their current relationship. While reflecting on her dissatisfaction, Emma exclaims “It’s pathetic! What a booby!” referring to her husband, and the Barashes, like true evolutionary literary critics, cannot help but notice that the term “booby” is also used to refer to numerous species of seabirds whose “females are especially prone to copulating with other males when their mate is, well, a genuine booby” (Barash 2005: 105). According to the two authors, adultery would be justified as Emma’s desire to improve her evolutionary condition, and, perhaps, one reason could be precisely the alleged “stupidity” of her husband who would not offer good genes for her offspring. In my opinion, however, Barash and Barash fail to explain the girl’s suicide. The act of voluntarily taking one’s own life away goes, in fact, against the very principle of survival. It is true that Emma gives birth to a child, so genetically speaking a part of her will continue to live, but her daughter will be condemned to a miserable life without either of her parents; we know from the end that unfortunately Berthe Bovary won’t find another family able to raise and love her, but she will be entrusted, after a short time spent with her grandmother, to an aunt who will send her to work in a cotton-mill because she was left without money, the last francs she had were in fact used to pay for the trip to the grandmother’s home. As will be discussed further in the next section, the Barashes argue that by nature the woman’s infidelity triggers violence in men – “a man is *expected* to react intolerantly to his wife’s adultery.” (Barash 2015: 114): Othello, who kills



Desdemona in the nuptial bed suffocating her with a pillow, swept away by jealousy, is a clear example; but in the case of *Madame Bovary*, Charles continues to love her even after discovering the betrayal. Anna Karenina's apparently cold husband shows in the end a little jealousy towards Vronsky and anger towards his wife, but certainly not violence. All this because "even when, for whatever reason, the husband doesn't exact physical vengeance as such, a philandering wife is nearly always punished" (Barash 2005: 118). According to the Barashes, there are, in fact, exceptions, "people whose actions run contrary to prediction" (Barash 2015: 118), but they deserve further study only if one starts "with an expectation of what human beings 'naturally' are like". (Barash 2015: 118).

The explanations given by the Barashes seem to be a little weak and trivial. A biological explanation can be given to Emma's marriage, infidelity and suicide, but on the whole her behaviour is completely irrational in evolutionary terms. The aspect that is not taken into consideration by the two authors is the main condition of the protagonist Emma Bovary: the psychological and social dissatisfaction with her own existence, which translates into boredom, indolence, escape into imaginary worlds where to live a life full of all her repressed ambitions. Emma is an unconscious victim of two different worlds, that of her life expectancy, fed by her romantic readings, and that of the mediocre and provincial existence in which she lives, alongside a good and honest, but also not very intelligent and ambitious husband. Therefore, it cannot be affirmed that the main cause of her infidelity is of biological matrix; there is a series of reasons that derive precisely from this fragile condition and that lead her to make certain decisions and to perform certain acts. Her adultery and her suicide reflect the culmination of the tension between the spiritual aspirations she has, and the material reality she is experiencing.

5.3.2 Male sexual jealousy

In the animal world, and hence also in the human world, the main target of the mating competition is obviously the egg maker that can guarantee a descent to the sperm maker; successful males are the ones who succeed in beating other competitors to win a female and, even better, conquering more than one target. There are animals that tend to be monogamous and other polygamists, and as far as man is concerned, monogamy prevails even though strongly conditioned by religion and civil laws. However, the Barashes believe that even within the most faithful men, that biological womanizer instinct remains alive and waits to emerge. According



to evolutionary psychology's theories, in the past, both men and women had the need to create monogamous relationships for survival reasons, thus moving away from the natural, Unpromiscuous and unregulated sexuality. From the biological point of view, the monogamous Couple is created to allow the reproduction and breeding of the offspring. In order to explain the reasons for the formation of the couple, evolutionary psychologists focused on the observation of reproductive success: the man must, in his life, impregnate as many women as possible in order to expand their reproductive capacity to the maximum level, while the woman must protect and raise her children. The theories proposed by evolutionary psychology have often been considered contradictory and the question of monogamy represents an example. It has been observed that the monogamous couple is not particularly functional to reproduction, at least in a quantitative sense, since the number of children that one can have from the same woman is necessarily limited. Evolutionary psychologists argue that monogamy is widespread, but that falling in love is short-lived. As soon as the bonds with the fixed partner are loosened, the man resumes his search for other women.

Othello lives in a society that imposes monogamy and therefore he must be content with a Desdemona at a time, a woman who he is happy to protect for her reproductive prerogative. This inevitably results in a sexual jealousy that puts him on alert to detect any possible intruder who could invade his territory; a condition, the one just described, that becomes even worse when a persistent little voice gets in the way and convinces him of his wife's infidelity. "Oh, beware, my lord, of jealousy! It is the green-eyed monster which doth mock The meat it feeds on." (Shakespeare 3.3. 165-167). The bright-eyed monster that blinds those who stare at it took possession of the protagonist's heart, making love give way to a sick sense of possession.

Buss' studies have highlighted differences between male and female jealousy: the jealousy felt by men who suspect a sexual betrayal is more intense than that experienced by women, who instead respond to a hypothetical sentimental betrayal with a greater level of stress. Evolutionary psychology holds that jealousy is necessary for the survival of the species: an adaptive emotional reaction to a situation that potentially threatens the relationship. Gender differences with respect to this sentiment also make us reflect on the ways in which the couple can overcome a possible betrayal: a man will be more reluctant to forgive his partner if she has entertained a sexual relationship with another man. Conversely, a woman will be more upset when she finds out that her partner has feelings towards another woman. Buss suggests that males are cued to respond more strongly to sexual infidelity – even if, as in Othello's case, it is a suspicion of betrayal which, however, turns into conviction – because males need to protect themselves from cuckoldry, they need to make sure that their females are not having sex with



other men. The doubt that arises is this: is it possible that the atavistic instincts always prevail, and instead common sense, love, or the pleasure of conquest do not? Is it possible that Othello is driven solely by his instincts and has no decision-making power? Is the Self as powerful as we think it is?

When evolutionary psychologists refer to the mind they mean the set of information processing devices that are responsible for all the conscious and non-conscious mental activity and that generate human behaviour. These programs were designed by natural selection in order to solve adaptive problems – even sexual jealousy – that were faced by our ancestors. According to Tooby and Cosmides, it is not behaviour which is universal, but actually the genetic developmental basis of the programs. Human behaviour is the most flexible behaviour of all the other animal species, and it is dependent on information from the environment, thus evolutionary psychologists assume that there must be varying behaviour depending on the environments that one encounters. Human brains have many different learning mechanisms which are designed for learning about different aspects of the world and which structure even our social and moral intuitions (e.g. how to behave and cooperate with other people). The domain-specific programs sift information, make inferences about what is true, find ways to be valuable to other people, create our perceptions, provide universal structures of meaning that allow us to understand our actions and others' intentions. In recent years, the modularity of the mind has been challenged by several neuroscientists who have demonstrated through the functional magnetic resonance imaging (fMRI) that it is impossible to determine the brain areas involved in a specific emotion (e.g. jealousy) – indeed, fMRI shows that every emotion activates many brain areas simultaneously; but according to evolutionary psychology those cognitive mechanisms – modules – actually interact with one another. Each specific-domain mechanism operates in an unconscious and mandatory way and is specifically wired to solve a certain problem: a program which is good for choosing nutritious food is ill suited to do a different task, such as looking for a mate. However, there is not a single module designed to search for food, presumably different modules are activated at the same time; they do not work in isolation, but they interact with each other to complete a certain task. The more mechanisms our brain has, the more intelligent it is because it is able to solve many problems. Pinker stated that:

Instincts are often thought of as the opposite of reasoning, decision making, and learning. But the reasoning, decision-making, and learning programs that evolutionary psychologists have been discovering (1) are complexly specialized for solving an adaptive problem, (2) reliably develop in all normal human beings, (3) develop without any conscious effort and in the absence



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of formal instruction, (4) are applied without any awareness of their underlying logic, and (5) are distinct from more general abilities to process information or behave intelligently. In other words, they have all the hallmarks of what we usually think of as instinct. (Buss 2005: 18)

Tooby and Cosmides agree with this observation maintaining that those specialized circuits can be thought as instincts. Since these mechanisms are adapted to the conditions of the ancestral world, they do not need to be fitness-enhancing for the current world (such as our desire to eat sweet foods, an excellent strategy for hominids, but not for us today). As mentioned before, “human behaviour is flexible, but this flexibility concerns the means, not the ends, because the experiential goals that motivate human behaviour are both inflexible and specific” (Garvey 2011:21); over the years we have developed a wide variety of ways to obtain sugar, but the goal of eating sugar has remained unchanged: to experience the sensation of sweetness. Today we can decide to avoid eating industrial products filled with refined sugar, but the desire to eat sweet things still arises in a mandatory way.

In order to understand how these cognitive mechanisms work, we could take as an example a zebra that eats in peace and sees a lion that does not seem to be hungry, but that suddenly gives the zebra a look and seems to be preparing for the hunt. The zebra will feel the urge to stop what it was doing at that moment to run away. In the course of evolution both humans and animals have developed programs to solve ancestral adaptive problems (in this case the fear of predators), shutting down certain mechanisms and activating other mechanisms in a very coordinated way. We can think of sexual jealousy in the same way: it shifts our attention, suddenly through certain clues we begin to re-evaluate past episodes, to notice the sudden absences of the partner, to think about where our partner is, what he/she is doing, etc. It is very difficult to study for an exam or concentrate at work when the whole system of sexual jealousy is activated because our brain starts to process information in a particular way that is suitable to solve that specific problem and part of that emotional state consists precisely in deactivating other types of adaptive mechanisms (focusing on eating in the case of the zebra). The mechanism – or the set of mechanisms – involved in solving the problem takes over; you do not say “I think I’m going to go into the jealousy mode right now”, but your state is triggered by signals that make you understand that the situation has arisen. One might think at this point that we do not have the total control over ourselves, over our mind; it seems that I am not the one who choose the modules, but are the modules that choose me. According to evolutionary psychologists, we all have a personal agency, we are the authors of our actions; it is not impossible to disrupt our sense of agency (it is possible for example by lesions, brain damage or drugs), but it is really difficult. Therefore, one deduces that the human being sometimes has



the ability to control and overcome the emotions generated by the cognitive mechanisms, but other times they are so strong that they are not manageable. What is not clear, in the proposition of evolutionary psychology, is how humans are able to override the automatic responses, and how these ones are different from those of people with addiction problems or certain pathologies (Alzheimer, autism, etc.). One senses that some evolved desires are easier to

override and for this reason they should not be an obstacle to our freedom, while others probably do. A precise answer has not yet been given. Evolutionary psychologists focus more on explaining why certain behaviours exist, why humans act in a certain way when they have to face a problem, but then they do not explain why humans behave differently from the ways their domain-specific mechanisms are designed to make them behave (e.g. man tends to be a womanizer, but then he is able to resist this temptation in some way).

For evolutionary psychologists there is always some psychological mechanism that create our experience of the world. All the modules exist in our heads, but they are not being activated all the time; they do their work without us being conscious of them; we only become consciously aware of them when they are all put together in a perception of the world. You can find yourself in a situation where you have to face different problems, thus at this point arises the question of prioritization: a system is going to be controlling your behaviour in that particular situation. According to evolutionary psychology jealousy is an indispensable feeling, unless it results in a form of paranoid jealousy, that is when one is convinced that the partner is cheating even if the person has not the slightest proof. In this case we speak of a pathology because there is a complete deformation of reality. When Othello begins to be suspicious, his cognitive mechanisms responsible for solving the problem of sexual jealousy take over consistently. They are activated because Othello is convinced there is evidence. Iago informs him that he saw in Cassio's hands the handkerchief that the Moor had given to Desdemona, and that he heard Cassio whispering in his sleep words addressed to the woman, while dreaming to kiss her and cursing the fate that had entrusted her to the Moor. And then other suspicions: the handkerchief that is found in Cassio's room; while Cassio speaks with Iago of the relationship with the courtesan Bianca, Othello believes that he is referring to Desdemona; the happiness of Desdemona for the friend Cassio who was entrusted with the command of Ciprio; Desdemona who bursts into tears when she finds out that Cassio died in an ambush (a lie invented by Othello). All clues that lead the Moor to delirium and to perform the atrocious act.

According to the Barashes, as well as by Iago's words, this paranoid conviction of the partner's infidelity is fuelled by Othello's insecurity, he is indeed aware of being older than the person he loves, of finding himself in a socially inferior position – despite being a general in the



Venetian military – and of not being white in a society that does not accept who is different if not for pure convenience; to this is added Cassio’s charm, fame and youth. This sort of inferiority complex leads Othello to be afraid that his own woman may become infatuated with the one he would like to look like, because “better” than him. Evolutionarily speaking, the older, successful and charismatic man – as is the Moor – attracts more women because he is able to guarantee wealth and protection, but at the same time some women could take advantage of the mature man and then betray him with a younger and stronger one. The Barashes maintain that women are inclined to seek “wealth, power, and protection from one man and sperm from another” (Barash 2005: 22).

Sexual jealousy, often with a violent connotation, occurs in the literature of all time, thus, it is for the two authors a universal theme. As in the animal world, it is usually associated with the male of the species that competes with others, even with his friends if necessary. There are cases in which the woman has an active role in this, that is to encourage the feud, suggesting to her lover, for example, to kill her husband. Rarer is the opposite case, but the Barashes are keen to point out that “female-female competition is no less real than its male-male variety”, maybe it’s just a little less aggressive.

5.3.3 What women want

An example of sex difference is mate preferences. The preferences of one sex drive the competition’s strategies of the opposite sex, and this causes a selection pressure. Men and women have developed different selective preferences in mating. Buss suggests that men are probably looking for characteristics like youth and fertility indicators – women with a particular waist-hip ratio, for example – because female’s ability to have children decreases with age; women, instead, do not really need to worry about the physical appearance or the biological state of men, since they are able to continue to have children until later in life – unless they have serious genetic diseases that prevent from making healthy babies. For Buss, women are probably attracted to men with a good economic and social status, who have personality traits like loyalty, ambition and emotional stability (Buss 1989: 1-14).

In *The Descent of Man and Selection in Relation to Sex* Darwin stated that:

The sexual struggle is of two kinds; in the one it is between the individuals of the same sex, generally the male sex, in order to drive away or kill their rivals, the females remaining passive;



whilst in the other, the struggle is likewise between the individuals of the same sex, in order to excite or charm those of the opposite sex, generally the females, which no longer remain passive, but select the more agreeable partners. (Darwin 1981: 398)

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Therefore, according to him, it is possible to distinguish two forms of sexual selection: the first is that of the male fighting for the possession of the female, while the second one sees instead

the female playing a decisive role, having the last word in the choice. In many species, a lot of decision-making power is in the hands of the female. In their search for the right mate, females favour those with a greater propensity to parental investment and those with resources (food, money, protection, good genes, territory/home, etc.) that they are willing to share with the future family. Female choice puts women in the evolutionary driver's seat and we can confidently say that many women who populate the works of Jane Austen are fully-fledged drivers. The English writer with *Pride and Prejudice* "provides a textbook case of sexual selection in action" (Barash 2005: 55): we follow, step by step, the heroine who meets different types of possible partners, curious to find out who she will eventually choose. According to the Barashes, what the young ladies born from Austen's pen are looking for are those resources mentioned above: in a nutshell a good match who will be able to provide wealth. "Human beings, no less than blackbirds or woodchucks, find wealth appealing, not only as a goal for themselves but also as a sexual attractant when present in a potential partner" (Barash 2005: 43).

Animals, including humans, behave in order to leave as many copies of their genes in the next generation as possible; they try to maximize reproductive success through individual selection, but another way to pass their genes is to help close relatives to reproduce. This mechanism, known as "kin selection", favours altruism in order to increase the reproductive success of relatives who share a part of the same genes. Following the Barashes's advice to practice Darwinian lit-crit, I shall add that in *Pride and Prejudice*, Mrs. Bennet, the mother of our heroine, seems to act following this kinship instinct, when she tries in every way possible to marry off all her daughters; evolutionarily speaking, we could say that, in doing so, she is confident that her genes will continue to propagate even when she is gone, as also the British author Ben Macintyre affirms: "Mrs. Bennet is fabulously annoying in her matchmaking but she is doing only what every bonobo mother is hardwired to do: ensuring the continuance of her genetic line by breeding her offspring with sexually eligible partners." (Macintyre 2011). According to an evolutionary psychology theory, called hypergamy, literally "marrying up", women are driven by an instinctive desire, that is to try to improve their social condition just as Mrs. Bennet did years before: she was indeed a beautiful and lively girl, but in a socially and economically low position; by marrying Mr. Bennet, she managed to enhance her status a little,



and now she desires the same and even more for her daughters. Austen does not say that one should marry exclusively for money, but the novel does seem to endorse the idea that the characters who acquire the most money will be the happiest.

Obviously, in addition to resources, great importance is given to man's behaviour. Mr. Collins, for example, is certainly a good party, he has a good income and he will inherit the estate of Longbourn at the death of his cousin Mr. Bennet, but despite this, he is barely tolerated by most of the characters because of his pompous attitude, lack of intelligence, and his snobby and obsequious character. Moreover, women can be easily deceived, because it is also possible to fake a behaviour; and, in fact, Elizabeth Bennet and the other girls will all be fooled by Mr. Wickham. He is good-looking, charming, chivalrous and funny, apparently a perfect gentleman, but he turns out to be a false and opportunistic womanizer.

Another sign that is particularly appealing to women is man's inclination to take care of children, or more in general people who are in need. This behaviour causes the woman to predict that there is a parental potential in him and that the person will be able to do the same with her offspring. Mr. Darcy is a perfect example: he is a responsible, generous and honest man, he is protective and loving with his younger sister Georgiana (a few years before the beginning of the story he managed to save her from the clutches of the deceiver Mr. Wickham), he helps Lydia to get out of a situation that would have put in dire straits her reputation and that of the Bennet family, and after changing his mind about Jane's feelings, he convinces his dearest friend Charles Bingley to propose to the girl.

Elizabeth starts to fall in love with Mr. Darcy, in part when she learns the truth through the letter she receives from him - which allows her to understand who he really is - and partly when he rescues her sister Lydia. Evolutionary psychologists would also advance the most materialistic hypothesis of how the magnificent Darcy's estate, Pemberley, helped to win Elizabeth's heart, making her really sense the man's level of power and wealth. In one of the rare descriptions in the novel it is possible to feel Elizabeth's sensations the first time she visits the mansion:

It was a large, handsome stone building, standing well on rising ground, and backed by a ridge of high woody hills; and in front, a stream of some natural importance was swelled into greater, but without any artificial appearance. Its banks were neither formal nor falsely adorned. Elizabeth was delighted. She had never seen a place for which nature had done more, or where natural beauty had been so little counteracted by an awkward taste. They were all of them warm in their admiration; and at that moment she felt that to be mistress of Pemberley might be something! (Austen 1813: 169)

A little later in the chapter she says to herself:



“And of this place,” thought she, “I might have been mistress! [...]” (Austen 1813: 169)

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This statement could lead some to think that Elizabeth regretted not having accepted Darcy's marriage proposal and that this decision made her lose the chance to become herself the owner of that dwelling, while others - the less materialistic - would perceive from that sentence only her sadness of having lost the possibility of being the companion of such a special man. In his *The Annotated Pride and Prejudice*, David Shapard claims that Pemberley's physical characteristics play a crucial role in the plot, both because they illustrate the character of Darcy, and because Elizabeth's reaction to these characteristics leads her to change her attitude towards him (Austen and Shapard 2012: 477).

Therefore, in summary, according to an evolutionary perspective, a great catch must be wealthy, have a good behaviour and, lastly, good genes. In the animal world good genes can be perceived thanks to body size and colour, but also thanks to specific skills, such as singing or dancing, all characteristics that have been selected over the years because more advantageous to keep the species going. The same applies to human beings, but from this point of view, Jane Austen is not very helpful because characters' physical descriptions are scarce in her novels; we only know that Mr. Darcy drew the attention of both men and women “by his fine, tall person, handsome features, noble mien” (Austen 1813: 6), that Mr. Wickham's “appearance was greatly in his favour; he had all the best part of beauty, a fine countenance, a good figure, and very pleasing address” (Austen 1813: 51) and that Mr. Collins “was a tall, heavy-looking young man of five-and-twenty” (Austen 1813: 45). However, we can infer from her words that what was highly valued at that time was people's behaviour, as outlined above, and speech. According to a series of studies carried out by David Buss, men and women both seek essentially two traits in a partner: kindness and intelligence (Buss 1985: 47-51). The Barashes suggest that kindness is synonymous with “good behaviour” and intelligence with “good genes”. Women would favour men with these characteristics because this allows them to generate a child who will become, in turn, an ideal partner. This theory of evolutionary biology, known as the “sexy son hypothesis”, was introduced by Ronald Fisher in 1930 and it has often been combined with another theory, the “good genes hypothesis”, according to which females would choose the most attractive males because this also involves the presence of the best genes, or an overall genetic quality. “In other words, if you can get Bill Gates, Hugh Grant, and Jane Eyre's Mr. Rochester all rolled into one, you're in luck.” (Barash 2015: 64).



Therefore, for evolutionary psychology, women's preferences are those listed so far. However, feminists, among all, have seen in the evolutionary theories different forcing, as also evinced by the research conducted with the "speed dating" method. Eastwick and Finkel have shown that if women are asked to submit questionnaires with traditional questions about the ideal man type, the answers reflect not only their own desires, but also those of the family and the society; thus the answers are not at all predictive of the type of partners that women wish to have in reality. Similarly, with the technique of speed dating, women, presumably for casual sex encounters, can choose men who have no socio-economic status to boast, but who are simply young and attractive, contradicting what has hitherto been held by evolutionary psychology. This demonstrates the fact that women, as well as men, can be looking for short-term or long-term relationships, and there is no guarantee that all of them seek the same qualities in men; it is also possible that the same woman seeks different qualities depending on different circumstances. Furthermore, it could be said that all men who are not particularly rich, powerful or intelligent should all be without a partner today, or, even, they should not exist if these were the only main qualities they must possess in order to be chosen by a woman. From this perspective derives the attitude to think that there are better people, people more suitable than others to transmit their genes. One mistake that is often made is to believe that an individual is primarily motivated by conscious thoughts such as: "I have to have sex in order to replicate my genes". One could also learn that this happens, but it is not from this learning that our sexual will originates.

Following the reasoning carried out by the Barashes and by the evolutionary psychology, there would be, for example, no women who like men who are much younger than themselves and women who do not have an interest in having children and therefore do not seek those qualities in a man which would allow them to have and support an offspring. The reproductive instinct is often made to coincide with the parental instinct. Humans, like all the other living beings, feel impulses that push them to reproduce, but the biological urge leads them to have sex, not children. Our "instinct to breed" is analogous to the instinct of a bee to pollinate flowers: the bee visits the flower in search for food, not because it wants to pollinate it. The birth of the fruit is only a secondary effect. Many people stop reproducing when they reach the amount of children they consider to be sufficient; if there is an instinct that leads to reproduction, how is it that so many humans manage to dominate it without any effort?

Bonobos, that are our closest biologically related relatives, practice sex for social reasons far more than they do it for reproductive reasons. Sex often occurs among bonobos in aggressive contexts to make peace, to release tension, to establish ties even between individuals of the



same sex. Some anthropologists - including C. Owen Lovejoy and Helen Fisher - hypothesized that in our species sex is partially separated from reproduction because it is useful for cementing "mutually profitable relationships between men and women" (de Waal 2002: 50), and therefore it is not directly related to the ultimate goal of obtaining an offspring. Taking into account the frequency with which the members of our species feel the sexual stimulus, it is likely that human sexuality has a function mainly aimed at establishing a couple bond, rather than having a function that is clearly aimed at reproduction. Mark Elgar wrote in an article:

Imagine a population of people or animals who enjoy sex, where that enjoyment has a genetic basis. This would determine their reproductive success. Now introduce into this population those genetically predisposed to be sexually inactive. These sexually inactive individuals will not produce offspring, so there will be no sexually inactive individuals in the next generation. In other words, a genetic disposition to avoid sex will neither become established nor maintained. (Elgar 2015)

In an animal population, a genetic preference that repudiates sex cannot be established or maintained, because sexually inactive individuals cannot be preserved. But the human being, by exploiting his/her evolutionary characteristics, has found some ingenious ways to continue having sex without reproducing. Through contraception, humans have succeeded in splitting sex from reproduction. Today the theories promoted by evolutionary psychology are strongly criticized because it is difficult to argue that sexual attraction depends only on the need to have children without taking into consideration other motivations, such as desire, interest and fun. The main problem with this kind of interpretation is that the notion of instinct is often confused with that of desire. There is a desire to have children, as for many other things, but it is not an a priori instinct which is common to all people. Otherwise those who do not have and never had this "instinct" are against nature?

It is not yet clear whether our desire to have children is driven by genetics or society, but the fact remains that many people do not want to have them and they also resort to contraceptive methods that did not exist in the past. There are also women who become mothers, who are technically very good mothers, but who do not feel a genuine love for their child, who are unable to come into contact with the baby, who offer him/her a negative experience that could lead him/her to have problems in the future from an emotional and a relational point of view. What is certain is that the so-called maternal instinct is a social construct and not a biological fact. The only element related to biology is that feeling/ ability to protect and nurture the child that is encouraged by the production of certain hormones, such as the oxytocin and the dopamine, which trigger positive emotions. It has been discovered that also fathers and adoptive



parents receive a chemical boost which enables/helps them to look after their children. Sarah Blaffer Hrdy maintains that women who physically give birth and mothers who adopt “both undergo similar neuroendocrinological transformations - even in the absence of giving birth or of lactation.” (Gibbens 2018). It is a biological mechanism that helps to provide the baby with all the attention he/she needs. Among other things, similar mechanisms are triggered even when dealing with elderly or needy people, so it cannot be called “maternal instinct” but rather the desire to take care of another individual. For these reasons, it is simplistic for evolutionary psychology to say that all women are driven by the same desires and seek the same type of man.

5.3.4 *What men want*

And men, what do they want? Men, according to the Barashes, suffer from the “madonna/whore complex”: their preferences change whether if they are looking for a stable and lasting relationship or the “adventure of a night”. In order to talk about this topic, the two authors select *Tess of the d'Urbervilles*, a modern classic written by Thomas Hardy, which tells the vicissitudes of a poor young girl, commissioned by her father, John Durbeyfield, to find the noble relatives d'Urberville in hope to improve the family's economic situation; along the way, she comes across the evil cousin Alec, who seduces her. After becoming pregnant and losing her baby, she moves to a dairy farm where she meets Angel Clare, who becomes her husband, but who, unfortunately, do not give her the desired happiness; he leaves for Brazil and abandons her in poverty. He, then, returns to England with the intention of accepting Tess at last, but he finds out that she has moved in with Alec to save herself. The tragedy ends with the arrest of Tess who, in an extreme liberating act, stabs Alec to run away with her beloved Angel.

Angel Clare changes his mind about Tess and decides to abandon her after discovering that she is no longer a virgin. The Barashes emphasize the fact that, in most of humanity's history, in the succession of different societies, a man could have premarital affairs without being judged, while the same thing could not be said about women (think of the treatment that is reserved for Hester with the scarlet letter pinned on her chest). Men, by nature, are looking for non-pregnant women or women who have not been impregnated by other men. The male is looking for indicators, such as the small waist of the so-called hourglass figure, that the woman is not pregnant and has probably not had any other pregnancies in the past, so that she might be more likely to bear his own offspring. While females are sure of their own babies, males cannot really know who their offspring are, unless they do a DNA test (“Mommy's babies Daddy's maybes”),



and it is a risk for males because this circumstance would involve investing resources for a child who might have been fathered by others. “Nursing [for example] requires a tremendous expenditure of time and energy; it simply would not be fitness-enhancing for them”. The Barashes claim, in fact, that male breastfeeding is physiologically possible, since men have nipples and the potential to produce milk, but they do not lactate for this reason. I would argue that, as biology teaches us, during the fourth week of our embryonic stage we are almost identical, it is the advent of chromosome 23 that activates the first sexual differences. Before this happens, however, the asexual embryo develops the nipples, so this is why also males have them. During puberty, female hormones determine breast growth and milk production, which is activated only when the prolactin (scarcely present in men) peak is reached. The male brain suppresses female hormones, such as prolactin, and a healthy male liver has the task of disposing of those hormones’ excesses. “When a man *does* lactate (and yes, it happens) it is almost always a symptom of an underlying medical problem (or thanks to injections of estrogen and prolactin, which come with a slew of side effects)” (Vinopal 2017). Another reason why men do not nurse their children, according to the Barashes, would derive from the type of fertilization that in humans is internal, and in other animals is external. In the case of human beings, it is the mother who carries the child, sometimes risking her life to give birth, and takes care of the baby at least during the first year of life, whereas the fish and amphibians, for example, deposit eggs in the water that are then fertilized by the male sperm; this condition implies an equal weight in the care of the offspring.

The two authors compare Angel Clare to a ringdove, that rejects a female who, through her behaviour, reveals that she has already been courted - and perhaps inseminated - by another male. Angel refuses Tess even knowing that she no longer loves Alec and that the child she had did not survive. What men want is “reassurance, a neediness that inclines [them] to crave indications that any prospective mate is likely to be sexually faithful – and, conversely, to be turned off by indications that she isn’t, or wasn’t, and therefore might not be in the future” (Barash 2015: 74). Thus, for a long lasting relationship, men look for a madonna, a trustworthy and chaste woman “who will not squander the husband’s resources on another man’s offspring.” (Barash 2015: 75). At this point, it is interesting to remember how the complete original title of Hardy’s work was *Tess of the d’Urbervilles: A Pure Woman Faithfully Presented*, because Tess was indeed a pure woman, it was the rest of the world that was rotten.

Youth, a symbol of fertility, is another fundamental criterion for men in choosing a partner. It often happens that married men of a certain age leave their wives preferring very young models, as perfectly described in Olivia Goldsmith’s novel *The First Wives Club*. This male preference



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reaches its peak in Vladimir Nabokov's dramatic story *Lolita*, where the protagonist does not leave his middle-aged wife to marry a younger one, but marries an older woman with the express purpose of approaching her preteen daughter. In this extreme case even evolutionary biologists recognize something not merely immoral but biologically off base in the hero/villain's obsession with a 'nymphet'." (Barash 2015: 77), we are, after all, talking about a young girl, who, even if not directly specified, may not have the menstrual cycle yet, and therefore cannot be considered a woman.

Anthropologists argue that the preference for young women is a "cross-cultural universal" which means that there is no society in which an old woman is considered to be more sexually attractive than a twenty-year old girl. The descriptions of the female body are certainly not lacking in the world literary panorama and often highlight the social conventions of a given epoch. A particularly appreciated aspect of a woman's body is the breast, not only a symbol of sexual maturity, but also a source of nourishment for the child. Tess's physical attractiveness is often emphasized in the novel; she herself knows she is beautiful and the risk that this can entail. Although Alec and Angel see her differently, the first with greedy eyes and the second more ethereally, it is clear that they are both sexually attracted to her appearance. From one of her descriptions, it emerges that:

She had an attribute which amounted to a disadvantage just now; and it was this that caused Alec D'Urberville's eyes to rivet themselves upon her. It was a luxuriance of aspect, a fullness of growth, which made her appear more of a woman than she really was. She had inherited the feature from her mother without the quality it denoted. It had troubled her mind occasionally, till her companions had said that it was a fault which time would cure. (Hardy 2003: 42-43)

The "luxuriance of aspect" and the "fullness of growth" suggest that the girl was prosperous and curvaceous. In periods characterized by scarcity of food, large breast and broad hips are highly valued in a potential partner, while in places where there is an abundance of food a certain degree of slimness is seen as a health index. From the Venus of Willendorf to the Botticelli's Venus "beauty has never really been in the eye of the beholder; rather, it's in the brain, which interprets what the eye sees. And the brain was produced by natural selection. What it interprets as 'beautiful' - if 'beautiful' means 'desirable to mate with' - is whatever contributes to evolutionary success" (Barash 2015: 81). The Barashes often reiterate the concept that "both sexes are turned on by sexual partners who offer them the prospect of the greatest possible reproductive success, even though they typically don't know that this is happening" (Barash 2015: 78), because it is not the mind, but our genes that command us.



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Leaving aside the fact that obviously not all men seek young and beautiful women with a certain waist-hip ratio, that not all women seek a man who has good genes and a good bank account, and that everyone - speaking of both sexes - wants to have children, how would homosexuality be explained from an evolutionary point of view? Indeed, one of the greatest mysteries of biology applied to sex concerns homosexuality and transsexuality. How can it be that homosexuality gets passed on from generation to generation, why doesn't natural selection remove it if it wasn't optimal for reproductive purposes? Over the years some schools of thought have hypothesized that homosexuality was a natural predisposition - therefore related to heritability, biology, hormones and genetics - i.e. innate, while others maintained that homosexuality was a learned behaviour and subject to change. From the neurobiological point of view, sexual desire is the expression of a complex brain function, which induces the need and desire to behave sexually. Sexual desire is linked to the instinctual urge of the individual, to one's emotional motivation and to one's rational evaluation of the sexual situation, i.e. of the possible risks or advantages one can face. The strongest attraction is governed by pheromones, substances produced by the body with the function of sending signals to other individuals of the same species. Desire and pheromones depend on hormones; thus it is a fundamentally biological phenomenon, regardless of the sex one is attracted to.

According to Barash and Lipton, the behaviour of homosexual males and homosexual females seem to confirm the differences between males and females suggested by them. They argue that the patterns of homosexual people's sexual behaviour represent an exaggeration of straight people's sexual behaviour: men would generally have a more promiscuous attitude and more sexual partners than women, while women would instead give more value to emotional expression, to intimacy and they would tend to have monogamous relationships (Barash 2012: 94-95).

In the book *Homo Mysterious*, David Barash offers a number of different scenarios for the evolution of homosexuality focusing, however, mainly on the male one. According to him, it is possible that homosexuality emerged to provide assistance to siblings and other relatives, as in the case of the worker bees that have no reproductive potential, but help the species to survive; it is known as "inclusive fitness theory" or "kin selection", according to which natural selection would favour the evolution of an altruistic behaviour that allow individuals who share similar genetic heritage to make their resources available for the benefit of their relatives, equally guaranteeing the passage to the next generations of their genes. Another version of the kinship selection hypothesis is that homosexuals used to occupy high status positions within their societies - monks, shamans, etc. - providing in this way benefit to their families. It is also



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possible that homosexuality emerged because it produced benefits for the whole group. A society with a significant number of homosexual individuals leads to less competition between males for the possession of females, therefore less clashes between members of the same group. It has also been hypothesized the idea that homosexuality has granted an adaptive opportunity for sexual practice (as opposed to heterosexual intercourse, homosexual practice has less social repercussions), but there is no evidence that the individuals who experienced homosexual intercourses have somehow improved their hetero performances, so the “practice hypothesis” would apply more to animals than to men. In some species it has also been noted that the homosexual practice acts as a social glue, as a method of reconciliation after a conflict. Furthermore, it has been assumed that the genes which promote homosexuality have been selected due to women’s sexual preferences; women would have preferred homosexual men because they were less aggressive, more empathetic, cooperative and able to provide better support in the care of children. (Barash 2012: 90-134). These are just some of the many hypotheses that have been formulated on the evolution of homosexuality

5.4 The Rape of Troy

Peculiar and different from that by the Barashes, is the proposal by Jonathan Gottschall, an author who belongs to the circle of literary Darwinism. In his book entitled *The Rape of Troy. Evolution, Violence and the World of Homer*, Gottschall attempts an ambitious interpretation of the *Iliad* from an anthropological analysis of the so-called Greek Dark Ages (or Homeric Age) and the repercussions it would have had on the life of the poem’s characters and, above all, on social dynamics that must have motivated a war like that of Troy; motivations that Gottschall proposes to re-read in a strictly evolutionary perspective. For the literary scholar there is an exact correspondence between literary facts and biological facts, a perfect reflection of reality in fiction; according to him, in fact, literature is a truthful database of anthropological experiences, but as we know literature has a fictional nature that cannot be ignored.

The Trojan War was fought between the Achaeans and the powerful city of Troy, which stood at the entrance to the Strait of the Dardanelles - then called Hellespont - a key passage from the Mediterranean to the Black Sea. In 1200 BC, when war probably broke out, Troy had a great strategic importance because, given its position, it allowed the control of commercial traffic. For this reason, the Achaeans wished to seize it and attacked it, laying siege to it. According to Greek mythological tradition, the conflict began due to the abduction by Paris, the Trojan



prince, of Helen, the queen of Lacedaemon (the future Sparta), considered to be the most beautiful woman in the world. King Menelaus, Helen's husband, to avenge the offense, asks for the help of Agamemnon, his brother and king of Mycenae, and all the other Achaean princes. The conflict lasted about ten years, with heavy losses on both sides; in the tenth year Troy is conquered thanks to Ulysses' stratagem. The events that occurred during the last year of the war are narrated mainly in Homer's Iliad.

Although the war depended on the aforementioned socio-economic reasons, and on the warriors' desire to obtain status, prestige, fame and booty, in the Iliad even women are a goal: Helen, according to this interpretation, is no longer just a *casus belli*. The condition of permanent conflict described in the poem refers, in Gottschall's analysis, to a society in decline in which war seen as the conquest of resources is a daily necessity. All this is sharpened, according to the literary scholar, by the lack of young women, due to the widespread polygyny and the early death of female offspring that is not functional in such a militarized society. According to the literary scholar, the ultimate motivation of the young warriors described in the Iliad is the need for survival and reproduction, two needs which are the triggering causes of wars in general, but, in this case, the conspicuous deficit of women must have induced the Greeks to savagely fight in order to increase their reproductive opportunities by stealing women from neighbouring populations: a territorial competition that therefore had mainly sexual motivations.

Gottschall argues that males are genetically predisposed in certain environmental conditions to sexual violence as the only way out of the shortage of partners. He points out that war can radically change a man; in this context, man's hybrid and divided nature emerges: the figure of Hector is an example, a gentle and caring man who turns into a ruthless warrior during the battle, "a destructive lion on cattle" (Gottschall 2000: 7); but even Achilles himself is described as a conscientious, loyal, loving man, but at the same time a "raw meat eater" (Gottschall 2000: 7). Men are thus compared to animals when particularly violent scenes are described, and obviously the similarities that are created see fierce fighting lions, leopards, wolves against preys. The hero constantly fights against himself in order not to fall into what is called *hubris*, the arrogance of men and of demigods, the desire to assimilate to the gods. The one, who has too high ambitions and dares to cross the border set by the gods, incurs in the envy of the gods; in the same way, those who do not use their own abilities go out of the human sphere to fall back into a much lower sphere, the bestial one. Thanks to Darwin's contribution, we now know that the human being is really an animal, specifically a mammal and a primate. Gottschall, through Homer's human-animal comparisons, wants to show that the bond between men and



animals is deeper than it may seem.

According to the literary scholar, “the Iliad, like most every story, revolves around sex and the conflict that accompany it.” (Gottschall 2000: 14). In *The Descent of Man and Selection in Relation to Sex*, Darwin wrote that:

Women are the constant cause of war both between the individuals of the same tribe and between distinct tribes. So no doubt it was in ancient times: «nam fuit ante Helenam mulier terribilis belli causa». (Darwin 1981: 323).

The Latin quote is taken from Horace’s *Sermones* and says “for before Helen’s day a wench was the most dreadful cause of war”. The season of love is compared by Darwin to that of battle, and the capture and abduction of female beings is the first cause of war actions in some species of monkeys as in men. This ancient argument is lost in the mists of times, as another famous episode suggests: the rape of the Sabine women, which can also be explained in Darwinian terms as the need to keep the species going. Romulus was aware that, in the absence of women capable of childbearing, there could be no future for his people; but since the Romans did not have a good reputation, none of the neighbouring populations was willing to enter into agreements with them, nor were the fathers willing to give them their daughters as brides. Therefore, what they failed to do with good manners would be seized by force. As in the case of Troy, the need dictated by the struggle for survival led men to use extreme methods, even violating the sacred laws of hospitality.

The causes of the conflict in the Iliad are mainly disputes over the possession of women: Helen, Chryseis, Briseis, the slaves. According to legend, when Paris finds himself having to judge who among Hera, Athena and Aphrodite is the most beautiful goddess, he chooses Aphrodite who promises him the love of the most beautiful woman in the world, thus renouncing the wisdom and strength in battle offered by Athena, and the wealth and immense powers offered by Hera. Not treasures, nor military prowess, but a woman who carries with her the promise of a reproductive opportunity. Gottschall maintains that this reproductive instinct leads males from all over the world, as well as the fictional characters of the Iliad, to risk their lives in order to obtain the necessary resources - among all, the status, the honour and the glory - that would allow them to conquer the opposite sex. The supremacy and the glory are the values of the warrior society, in which the defence of honour is fundamental to obtaining prestige. According to Gottschall “for Homer’s heroes, as for ordinary men, women are not a proximate route to the ultimate goals of honour, political power, and social dominance. On the contrary, honour, political power, and social dominance are the proximate routes to the ultimate goal of women.” (Gottschall 2008: 10). I don’t think that the Greek hero had women in mind as a reward for his



Università Ca' Foscari Venezia

exploits. I believe instead that all heroes fought to see who could get the greatest fame. There are two terms in ancient Greek for fame, glory: *kudos* (κῦδος) and *kleos* (κλέος). *Kudos* is a

virtue that often occurs both in the Iliad and in the Odyssey and indicates the gift that only gods could donate to men by giving them victory, and thanks to this grace the warrior obtained *kleos*.

The universal value that the hero pursues is precisely to gain *kleos* thanks to the divine *kudos*.

Kleos is not only the fame guaranteed by Homer or by another poet who tells the hero's deeds that will be remembered in the future, but it is immediately measured by the *geras* (Γῆρας), the part of the booty that belongs to the hero and that is distributed after the war. Achilles was furious because he was deprived of part of the booty that was due to him, and therefore his value was not recognized. Achilles's rage is sometimes considered a whim - it is absurd to get so angry for a woman -, but in reality the problem is not the woman, but the fact that Agamemnon did not recognize his worth. Briseis is not a normal war booty, she is a *geras*, the symbol of Achilles' honour. The slaves represent the spoils of war and are the sign of the power and honour of those who own them. Later Achilles paid Agamemnon back in the same coin, refusing to have Briseis returned to him, an outrageous gesture that weakens Agamemnon's authority. When honour is affected, it is easy for conflict to break out as in the case of the Trojan war: Menelaus, in fact, loses his wife, but most importantly, in my opinion, his honour. Moreover, it is possible that Helen with her connection to Zeus (according to different versions of the myth he was her father) would have granted Menelaus access to the Elysian Fields, the place where the souls of those who were loved by the gods ended; therefore, wanting to regain Helen could be understood as a purely selfish act.

In the world of Homer, women are "property" to be disposed of at will, a bargaining chip that can be stolen like any other good. Agamemnon offers Achilles no less than twenty-nine women as a reward, Odysseus has fifty slave women, Priam has several concubines in addition to his wife Hecuba. Among the Achaeans the practice of appropriating the assets of the conquered people and raping their women was very common, so much so that as recalled by Gottschall the expression *kredemnon luesthai* (to loosen a veil) could mean either plundering a city or violating the chastity of a woman (Gottschall 2000: 69). Briseis and Andromache similarly recount Achilles' ravages in their respective cities; the modality was always the same: looting of goods, killing of men and abduction of women.

Odyssey's primary conflict arises from the fact that strangers, during Ulysses' absence, approached his wife and his slave women with the aim of stealing them. In particular, the man who would have won Penelope would have obtained, besides a wife, the right to command and all the material riches of the previous king of Ithaca. The condition of Odysseus reflects, in



Università
Ca' Foscari
Venezia

many respects, that of the Trojan warriors of the Iliad: a group of enemies invades their territory, longing for resources and lust. Penelope and the slaves are considered mere sexual objects and property of the king of Ithaca. Ulysses' wife is not the main character of the poem, but nevertheless it is a very important figure. She is described as a beautiful, but also intelligent woman thanks to the stratagem of the shroud's weaving, for example, she manages to avoid accepting marriage proposals from her suitors. In the Homeric world, Penelope embodied the masculine dream par excellence: a faithful and virtuous bride, who works all day at the loom waiting for her husband for twenty years. There is some evidence that she does not remarry because no man can be compared to Ulysses for prowess, physical power and fighting spirit (Gottschall 2008: 114). As we know, Penelope is left at home without the protection of her husband, because he, after Troy's fall, embarks on a return journey to Ithaca, which will last ten years. Gottschall states that women in antiquity and in prehistory have always needed men and their protection, but then he admits that also men have always needed the presence and assistance of women in return. Back home Odysseus discovers what happened in his absence and he unleashes his furious anger. The crimes of which the suitors are guilty are: the desire to gain access to Ulysses' property, the courting of Penelope and the seduction of slaves. Two of these offences belong to the sexual sphere.

Women in ancient Greek lacked most of the rights which were granted to adults and free citizens. They had to look after the children and the house, manage the slaves if they happened to be rich and they had to obey their fathers and, subsequently, their husbands. Women's essential role was to have children, thus ensuring that the man had legitimate descent. Forming a family was nothing but a way to guarantee the survival of society. In the Homeric poems, the Greek world is generally described as a society marked by a strong patriarchy. The house was founded on legitimate marriage and the inheritance was transmitted only to the legitimate heirs, while illegitimate children had no rights. In ancient Greek law the inheritance belonged exclusively to male children. The birth of a female child was, in fact, often considered a useless burden. The daughters were only the means to transmit the heritage to their male children; the Athenian fathers used to present them to future husbands saying: "I give you this girl that she may bear legitimate children" (Gottschall 2000: 129). Many biologists of that time thought that the woman did not transmit anything to her children, since it was "the man [who] provided a seed which, by itself, held a self-contained organism. The mother served only to provide fertile grounds for cultivation of an already complete individual, or homunculus" (Gottschall 2000: 154).

Not surprisingly, in the Homeric poems, the father-son relationship is particularly emphasized.



The intensity of the relationship between father and son (such as between Odysseus and Telemachus, Priam and Hector, Hector and Astyanax, Peleus and Achilles, etc.) is in no way comparable to that between father and daughters; even when describing maternal love in poems, it refers to that for male children (Tethys and Achilles, Hecuba and Hector, Andromache and Astyanax etc.). Both in the Iliad and in the Odyssey heroes show a strong bond with their ancestors, and this is evident also through the recurrent use of the patronymics - even Zeus is known as "son of Cronus". Every hero could boast of a genealogical tree that in some cases went back to a deity and their main goal was to add branches to the tree, with a son who represented "the father's chance for a surrogate immortality" (Gottschall 2000: 162). Father and son were bound by a relationship of mutual care: the father had to take care of the education of the child and the child, once he became an adult, would take care of the father during the latter's old age. All these factors, the desire to have a progeny that was masculine because according to the beliefs of the time was the only one that guaranteed the descendants of one's own genes, and that was legitimate so as not to waste resources in looking after a child of another person, confirm the evolutionary theories.

Gottschall's analysis focuses on finding a relationship between "the Greek warriors' avarice for warbrides and their unconscious pursuit of genetic self-interest" (Gottschall 2000: 40). The most important aspect to keep in mind is that Greek warriors do not act consciously in trying to maximize their inclusive fitness, but rather, they are "functionally ignorant of the ultimate ends of their attempts to acquire nubile women." (Gottschall 2000: 40). As Gottschall explains:

A young man like Paris, courting Helen, has sex on his mind, not the desire for children or, much less, the desire to maximize his inclusive fitness. Yet we can see that this is a perfect example of how the proximate motivation, sexual lust, is employed in the service of the ultimate consideration, genetic proliferation. Paris, on some instinctive level, "sees" in beautiful Helen the perfect vessel for the advancement of his genes. (Gottschall 2000:40)

"One of the prime assumptions of evolutionary psychology is that living organisms are always performing an unconscious calculus, analysing the costs and benefits of actions in relation to fitness" (Gottschall 2000: 73). Evolutionary psychological theory suggests that individuals who are in difficult conditions due to lack of partners, for example, should be willing to accept a significantly greater risk in hopes of improving their opportunities; the males of some species, such as the mantis or the bee, die as a result of sexual intercourse. Studies have shown that when mantis females eat their partners they gain important amino acids that they incorporate into the laid eggs. Moreover, if they eat the male, they lay up to twice as many eggs. From the point of view of the male, surviving and mating with many females could be better in a sense,



Università
Ca' Foscari
Venezia

but the nutrients it provides to the eggs give its DNA a greater chance of being transmitted to the next generation. The drone, the male bee, once the mating is over, dies leaving part of its reproductive organ inside the female in such a way that its sperm does not come out and therefore is not wasted; drones' function is basically one and this is confirmed by the fact that those that have not had an intercourse with the queen remain in the hive until the arrival of the cold, when the other female bees left them to die of hunger in order not to waste the honey reserves. The mating of bees is considered to be by many the most obvious example of sexual suicide in the world of insects: despite the fact that these animals know that they are going to die, they still perform their duty. A risky behaviour that we could compare to that of the Homeric warriors: they know the risks they face, and yet they fight to get the chance, after the war, to get a woman. Following a typical darwinist reasoning, even apparently a maladaptive behaviour must offer an advantage if it is perpetrated for so long: daring too much, with the risk of dying young - as happens to many characters of the Iliad - still gives an advantage in terms of status to the subject who dares, if he finally survives, or to the relatives who remain, if the hero dies. In the evolutionary history of homo sapiens, the causes that led to a shortage of reproductively valuable females were different, such as polygynia, sexual taboos, menopause, infanticide. This scarcity of women has meant that human males, like most male mammals, have evolved to strive hard and sometimes even violently to conquer them. Gottschall maintains that males are genetically predisposed in certain environmental conditions to sexual violence as the only way out of the shortage of partners. Violence is often a characteristic of the man who has the desire to dominate. The fact that male's aggressiveness was inherited from the primitives can be demonstrated by the behaviour of some great apes, which often kill and raid neighbours. Evolutionary psychologists and other scholars are convinced that the propensity to violence developed because it would promote our ancestors' fitness. Gottschall reports the case of the Yanomamö tribes that were studied by the American anthropologist Napoleon Chagnon. According to Chagnon, the Yanomami are dirty, malodours, wily, aggressive and threatening, and live in a perennial state of war; they often fight for women and for sex, and the individuals with a warlike spirit, according to his investigation, have more wives and children than the more peaceful ones. These statements were denied by many other anthropologists who have argued instead that those men considered to be hostile were actually very peaceful. Gottschall agrees with Chagnon that the Greeks are "non-state peoples", i.e. without an organized governmental structure, like the Yanomamo tribes. The absence of laws and centralized power often leads to the outbreak of violent conflicts. Heroes are violent because they can act freely within a society that has no authority to limit the use of force. In this non-state condition what matters is the



status of the individual, in fact not only warriors are feared, but also priests and diviners. Chagnon's work has often been used by those writers who wanted to describe tribal peoples as savages, much more violent than the rest of us. Hence Gottschall limits himself to saying that if Chagnon's theories were to be confirmed, we would have the evidence that at least in those tribes the use of violence - in moderation - gives men an advantage in terms of survival.

Gottschall argues that rape in the context of war frequently occurs because men evolved into a war environment in which forced sex (as well as murder and cannibalism), under specific conditions, would have improved the fitness of the perpetrators. In addition to the mass rape of Trojan women, the extermination of Trojan male children also occurred, a behaviour that humans have in common with many animals, such as chimpanzees, gorillas, baboons and others. Males of these species kill cubs born from other males or cause abortions in females by attacking them. Females, who are forced not to carry on the pregnancy or to feed the puppies, are once again sexually available. While, in fact, the male is interested in having mating opportunities, the female's interest is to delay the reproduction until her current offspring becomes independent. Biologists claim that in situations where males have few opportunities, they resort to violence to get what is needed to survive and reproduce. We must obviously be careful to approach the human phenomenon to the animal one, because the risk we run is to simplify human behaviour ignoring the social influences to which it is subjected. However, following that reasoning, man could also be pushed to commit infanticide following the same unconscious calculation of fitness. We know that women do not experience estrus like animals, but similarly they are less fertile during breastfeeding. Gottschall suggests that perhaps a predatory male, such as Neoptolomus, would have killed Andromache's son, Astyanax, so that Priam's lineage had no descendants, but also to hasten Andromache's receptivity to conception (Gottschall 2000: 109). As was mentioned before, in ancient Greece, it was thought that the woman did not have the power to pass on the lineage, and it is precisely for this reason that it does not appear that Trojan girls were killed. Indeed, it would have been counterproductive because if we accept the idea that one of the main purposes of the Trojan war was to procure women, killing the girls would have led to the elimination of future fertile young people. Perhaps we can hypothesize that the new born females were at risk for the reason explained above (making the mother sexually available again).

Over the years there has been great debate among feminists, historians, evolutionary psychologists, anthropologists, sociologists, primatologists and so on regarding the human propensity to rape in war conditions. In the text *Explaining Wartime Rape*, Gottschall analyses the leading theoretical explanations that have addressed the theme of wartime rapes, which he



Università
Ca' Foscari
Venezia

divides into feminist theories, cultural pathology theories, strategic rape theories and biosocial theories. The first three lines of thought share some points: they claim that war rape is not incidental but it has a purpose (it is a tool of military strategy for example), they all discard the hypothesis of sexual desire as the main causal factor, and they believe that rape has no biological roots but depends on social and cultural factors that are characteristics of certain specific types of society. Some theorists assert that mass war rape is the result of the power inequality between genders (hence the desire of men to exercise a form of domination towards women), others argue that it is a “sexual urge”, an impulse dictated by the unregulated and chaotic context of war, others stress that it is not a sexual act but an act of aggression. For biosocial theories, on the other hand, the act of raping is “an inevitable, genetically determined reflex” (Gottschall 2004: 133) that is normally restrained by rules and norms of coexistence, but which overflows in contexts of extreme unruliness such as those caused by wars. Gottschall agrees with biosocial theories because they do not consider the genetic aspect of violence as the only factor, but as a factor of the same importance as others in the analysis of gender violence. Some studies of evolutionary psychology and sociobiology have recently asserted that rape can be considered a sort of reproductive strategy included within the natural evolutionary process. However, from an evolutionary point of view, rape could also lead to serious consequences: during mammals’ courtship, as we saw earlier, it is the female who chooses which partner to mix her genes with, based on instinctual preferences, and being deprived of the possibility of choice would mean risking having an unwanted child and without a father who takes care of it, and “being forced to copulate, [could] result in a devastating misallocation of reproductive and maternal resources”. While, as some scholars argue, for human males, like those of other species, sexual violence would consist in an adaptation occurring in our evolutionary history to increase one’s fitness and therefore have more chance of reproducing, women for the reasons mentioned above would have instead developed a natural refusal to have coercive sexual relationships.

To sum up according to Gottschall, “the best explanation for rape and concubinage in the Iliad resides in the rapists’ unconscious commitment to the goal of genetic proliferation.” (Gottschall 2000: 111). As David Barash argues, our behaviour, like that of the Iliad warriors, is strongly influenced by genes. Gottschall, however, is keen to stress that:

Biological insights into human behavior, as many evolutionary psychologists take pains to note, are not meant to excuse or justify human misbehavior. On the contrary, evolutionary insights may be most useful for informing us of the biological underpinning of unpleasant aspects of human behavior so we can refine the process of preventive socialization. (Gottschall 2000: 112)



Conclusion

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Venezia

In the first part of my thesis I showed how storytelling is one of the fundamental skills acquired by *Homo sapiens*, whose origins and development are worth exploring. It is such a huge part of our lives (daydreams, night dreams, novels, etc.), but at the same time it is kind of an evolutionary mystery. The answer to the question “why does the human species spend so much of its time constructing and consuming stories?” would probably be multi-part. The rediscovery of Darwin’s theory and aesthetics stimulated a whole series of theoretical-literary research with the same goal in mind, that is, the dialogue between literature and biology. Today the possibility of studying narration and literature’s origins is strictly linked to the construction of a model that holds together the development of cognitive skills (language, etc.) and material production (tools, etc.) in the broader context of a biopoetic niche as suggested by Cometa. The study of storytelling can provide us with many interesting insights into human nature and the strategic advantages that derive from our narrative behaviour; but the excessive attention to the origins could lead to neglect, in artistic and literary creation, the moment of reception.

Even without the help of language, humans demonstrate the ability to understand and represent events (images, films, mime, etc.). The advent of language has certainly facilitated the transmission of valuable and useful information for survival. If the presence of language is not fundamental, it is instead the capacity of representation which is purely human. Human beings imitate others’ gestures and ways of behaving from an early age and this allows them to acquire skills in a short time. The appeal for stories arises spontaneously during childhood, and once childhood is over, human beings become more consumers than art producers. For both consumers and producers, storytelling prevents boredom and counteracts routines, habits, but also anxiety and uncertainty. Just as experience makes situations familiar, narration also responds to the human need to deepen social relationships, creating bonds and the possibility of influencing other minds in a positive or negative way. Through stories it is possible to test scenarios that propose various alternatives, without running the risk that would result in a choice made in reality. Stories communicate and consolidate norms, provide to pass on models of behaviour and social cooperation. They develop the human capacity to see the world and themselves from different perspectives and also the human ability to predict possible events, thanks to the information acquired in the past through personal experience or through the stories told by others. The thirst for knowledge is inherent in the human being, thus even gossip could have had an evolutionary advantage over time. Storytelling - like all other art forms - would therefore offer an extraordinary stimulus that is even more evident today with the advent of



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Venezia

social-media, television, cinema and video games. Therefore, we can affirm that the narration has had and still has a strategic value, both for those who send the message, and for those who receive it. Whether the story is real or fake, it is always strategic. This is also demonstrated by today's film and advertising companies that try to attract the attention of the individual by striving to invent stories of people's interest. Storytelling is not an activity with predominantly aesthetic purposes, it is not considered simply an art form, but a man's necessity. Thus, according to the darwinist thesis, storytelling would have offered man evolutionary advantages. Other scholars have instead argued that it is a by-product of evolutionary adaptation, a sort of "luxury" that our brain, which is quite large, could afford beyond to derive advantages in terms of survival or social economy.

Both oral and written literature is a more recent phenomenon than narrative, thus it will be more difficult to formulate evolutionary hypotheses about its origin. A major obstacle is certainly the absence of material findings that could have helped us a lot, although lately cognitive archaeology is beginning to shed light on the organization of the first narrative sequences starting right from the tools that have come down to us. Moreover, attention must be paid to the terms used - art and literature - which are too generic in literary darwinism and usually indicate our (western) notion of art; the same applies to other concepts, such as imagination and fantasy, whose universality is yet to be demonstrated. However, the foundations are there, now we will need to continue and deepen our research by combining more and more disciplines from different fields that join forces for a common purpose.

In the second part of the thesis I presented an analysis of the results of two case studies: the interpretation of the great classics of literature by David and Nanelle Barash, and the analysis of the Homeric poems by Jonathan Gottschall from a modern evolutionary psychology's perspective. The Barashes contributed to literary criticism with their intriguing, but also questionable proposal, which saw as protagonists: Madame Bovary looking for more reproductive opportunities guided by her animalistic instinct, Elizabeth Bennet in search of a mate with the right requisites, Othello blinded by jealousy and by the fear that another man could take away his partner, Tess abandoned because she was already been seduced and no longer reliable. *Madame Bovary's Ovaries* is an example of reverse engineering, whose goal is to trace the characters in a text back to their ancestral roots, showing how behaviour increases human chances of survival and reproduction, how human behaviour might be guided by the inherited instincts that we all have and are part of human shared evolutionary history. Evolutionary psychologists try, in fact, to find out how human characters would use their Stone



Age mind to solve problems, as if they were hunter and gatherer in the ancestral world, including: procurement of resources, sexual selection, parental investment, fight of flight, cooperation, etc. Gottschall's work focused instead on finding the possible cause that triggered a fierce war such as that of Troy, which according to him was the shortage of women, which led men to act in a certain way in order to survive. The common thread that links these two interpretations is precisely this: the human being is led to adopt a certain behaviour because this would benefit him/her from an evolutionary point of view. In his book *How the Mind Works*, Steven Pinker stated that:

Characters in a fictitious world do exactly what our intelligence allows us to do in the real world. We watch what happens to them and mentally take notes on the outcomes of the strategies and tactics they use in pursuing their goals. What are those goals? A Darwinian would say that ultimately organisms have only two: to survive and to reproduce. And those are precisely the goals that drive the human organisms in fiction.” (Pinker 1997: 541).

Affirming, as darwinists do, that the human being is guided exclusively by survival and reproduction is, in my opinion, highly reductive and diminishes human nature itself. I believe that sociobiological approaches can be of help to the human sciences in revealing how our behaviour can be explained by evolution, without, however, imposing their ideas and refusing the proposals coming from the humanistic field. Contrary to animals, human beings do not act following an urge, because between instinct and action there is a gap, or a moment of hesitation, where lies the whole misfortune and at the same time the luck of humans. Our individual and social behaviour is a set of actions that are guided by what we believe and anticipate: that is, they can have a purpose, a direction and therefore can be motivated by the desire to obtain an advantage, a prize or a privilege. Thus, needs or desires drive animal or human individuals towards certain goals, rather than others. There may be negative forces that clash with our needs, like for example fear. The behaviour of an animal is regulated both by external stimuli and by internal stimuli. If an animal is thirsty it will look for water, while if it is hungry for food. Therefore, it will go in search of the stimulatory situation that will allow him to perform the satisfying action, implementing what is called “appetitive behaviour”. In humans, motivation has a more complex explanation: it is unlikely to be regulated by a single motivational force; human behaviour does not have a single cause. The impression one has is that the human being's types of behaviour always act as a shared heritage of the human species, not taking into account the great changes that the humans have undergone since they were still hominids, and the great influence that the environment and culture have had on their way of acting and making decisions. According to evolutionary psychology we would all be pushed by

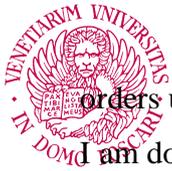


the same impulses and desires, we would all be attracted by the same physical and mental characteristics, we would like the same food and we would feel disgust with the same smells. Instead, reality clearly shows us that each individual has personal preferences, there are those who take pleasure in smelling the cigarette smoke, and those who cannot stand it. There are those who like to eat insects for example, and those who faint at the thought of it. If it is true that experiencing pain is a universal experience, then everyone should respond equally to it.

Instead, there are diametrically opposed answers to it: there are those who suffer, but there are also those who experience pleasure through pain or take pleasure in inflicting it on others. Psychology should better explain these facets of human behaviour and response. There are also often references to evolutionary phases of humanity, in particular to the Pleistocene, but as there is not a clear and secure paleoanthropological evidence yet, the risk is to falling into superficialism. This type of interpretation is based on the unverifiable assumption that every given biological characteristic is an evolutionary adaptation that provides an evolutionary advantage. This construct has been abused in the years because it can easily explain any kind of biological problem, even in the absence of certain scientific evidence; the tendency to explain human behaviour with an evolutionary just-so-story often takes over, and unfortunately in this study field there is a lack of scientific caution. It is interesting to note how evolutionary psychologists are so persistent in seeking the evolutionary roots of human behaviour, when there are several questions that show that it is a scientifically unreliable attempt.

The text, as previously mentioned, often uses simplifications and reductions without giving the reader a sufficient and complete answer. Carroll often considers the accusation of reductionism unnecessarily polemic, because to bring back to simple and verifiable facts every theoretical assumption is for him, if anything, a sign of scientificity. He argues that the greater the simplification, the more reliable the explanations will be. Opinion with which I disagree, since much depends on the field of application, it is not certain, in fact, that the reductionism necessary for exact sciences must also work for cultural sciences, which instead, need complexity and deepening. Furthermore, in recent years many theories supported by evolutionary psychology have been discredited by evolutionary biology, thus continuing to support certain positions is not recommended. But leaving aside the controversy, it is clear that the evolutionary approach - at least of this type - leaves the most perplexed, so it would need to be revisited.

One of the main risks that literary Darwinism runs is to embrace a determinism that denies culture, and therefore, individual human freedom and creativity. Determinism claims that behaviour is a chain of events, a cascade of reactions that follow one another, a stimulus that



orders us to think and speak. If things are really like this then I have not chosen to speak, what I am doing is not a free act. According to this interpretation, only physical laws dictate human behaviour, but while the growth of a plant is subject to certain natural laws, my decision to write a story does not. Human freedom is in fact understood as the freedom to create or the possibility to decide between different options, in this way I influence reality. At the beginning of the twentieth century, the psychological research was dominated by the behaviourist paradigm, according to which psychology can take exclusively the manifest behaviour of individuals as the object of study. Behavioural psychologists believed that the mind could not be studied in a scientific manner since it was not directly observable, and that therefore only through the study of different ways of behaving one could obtain information on its functioning. The first studies on animal behaviour had shown that through punishment and rewards it was possible to condition animal behaviour. The behaviour was defined, therefore, as a standard response, which was equal for all individuals, to stimuli coming from the environment. The mind for behaviourists had a passive and unimportant role. Response behaviour to environmental stimuli was determined by universal natural laws that left no room for the possibility of acting differently. Only at the end of the 1950s a new interpretation on the theme of the mind was proposed: mental schemes were not innate and stable, but influenced by the subject's past experiences, needs, interests and culture in which he lives. As Jerome Bruner argued, interactions with others, and the culture in which we live, decisively influence our idea of the world. We are the ones who create our reality.

According to literary darwinists, evolution and natural selection describe humanity, so it is not senseless to think that these resurface while humans write about themselves; on this I agree because I believe it is normal that fundamental biological truths about human nature are depicted in literature. The approach of evolutionary literary theory tends to focus mainly on the animal aspect of people in the novels, without dwelling on what makes us unique and human. In this regard, the writer Ian McEwan claims in a book of essays called *The Literary Animal* that "if one reads accounts of the systematic nonintrusive observations of troops of bonobo [...] one sees rehearsed all the major themes of the English 19th-Century novel: alliances made and broken, individuals rising while others fall, plots hatched, revenge, gratitude, injured pride, successful and unsuccessful courtship, bereavement and mourning." (Gottschall 2005: 11). What is written in a text, according to Gottschall, is inscribed in the biological patrimony of humanity, but it's one thing to say that literature is an infinite reservoir of information about the species, a truthful database of anthropological experiences, and it's another thing not to



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Ca' Foscari
Venezia

realize that all the stories follow social and environmental construction rules and do not mechanically reflect reality. The theory of evolution teaches us that in nature nothing is stable or fixed forever and that even our cognitive processes are discontinuous, unpredictable and even contradictory. One of the main problem with these kind of interpretations is the total overlap between literary characters and real people, an exact correspondence between literary facts and biological facts.

I believe that reading *Madame Bovary's Ovaries* could be an interesting gateway to the world of literary Darwinism stimulating the reader in later deepening his/her knowledge on sociobiology and evolutionary sciences. However, in my opinion, it is a fairly superficial interpretation because it limits itself to analysing the characters solely and exclusively from a biological point of view. The book seems to be trying to find in every way possible specific examples, ways of behaving, situations to support its theses - which is also understandable - instead of worrying about making a wide-ranging interpretative literary analysis; another problem of the book is reductionism, the fact that, according to the authors, all literary works are exclusively about sex and that human beings' behaviour - thus human nature - is conditioned only by sexual urges. Even if humans are compared to elephants, gorillas, birds and other inhabitants of the animal world, the Barashes often remind the reader that human beings are not just animals and that the greatness of a literary work is not based solely on its biological accuracy, which is a bit contradictory to affirm since their entire research - and literary analysis - has mainly focused on finding as many similarities between humans and animals. In my analysis I did not mentioned all the literary texts that the two authors have taken into consideration, but they certainly avoided, omitted or forgotten to address important topics that, in some cases, could even have undermined their own theses. It has the merit of being a fluent reading since the Barashes often use jokes and funny expressions to describe the various characters, but this and the fact of not having devoted too much time to the deepening of some biology's theories and fundamentals makes their study lose some credibility and scientificity. Barashes's study is based on the search for human universals, but one must take into account that even if some human ways of behaving are universal it does not mean that all men and women act in the same way: marriage is a human universal, it is common to almost all cultures, but not everyone decides to marry, religion is a universal, but not everyone believes in one or more gods, not all human beings wish to have children, not everyone would like to have a partner, not all men like young and beautiful women, and not all women choose men of status and wealth. This is because in addition to being human beings we have a personal identity and a specific culture that influence our way of being and our way of thinking. A tripartite division,



Università
Ca' Foscari
Venezia

like the one that Freud suggests. He hypothesizes the existence of a dimension of feelings and passions which belongs to what he calls the unconscious, or the dimension of the irrational that we never take into consideration because we are attested by rationality, which Freud calls the Ego. Below the ego Freud hypothesizes that there is a region in which the ego is not the protagonist because it is inhabited by the needs of the species which were: sexuality for offspring reproduction and aggression for the defence of the offspring. Freud warns us that this dimension conditions and determines us and is more powerful than our rational part, thus we need to analyse it (hence the term psychoanalysis). The two dimensions - conscious and unconscious - are in constant conflict because the demands of reason are not the same as the ones of irrationality. Then there is a third dimension that Freud signals which is that of the needs of society; society has rules, laws that conflict with the needs of the species which instead would like the full release of the drives. The ego is a very small part of our psyche that is balanced only when it manages to keep the needs of society and the needs of the species at a distance, satisfying both of them in the right measure. No human being is balanced because each of us suffers either from the invasion of drives or social rules. Freud believes that, compared to the primitive one, our society is an excessively repressive society, which causes us unhappiness, an unhappiness determined by the fact that in the course of our history we have privileged security over the expression of our drives. During the cultural context in which psychoanalysis developed (Romanticism) the conflicts of the human being were between what was allowed and what was forbidden; today, we live in an environment characterized by a culture of technology and productivity, thus the conflicts we have are different, they are more focused on what we are able to do and what is required of us (being able to live up to the expectations of others, of one's own objectives, etc...). Just as there was a great change between Romanticism and the present day it is logical to think that in the ancestral world the situation was even more different. Our attitude and our responses to reality are in fact strongly influenced by the environment and culture. From the Barashes' survey, it appears that human basic behaviour always act as a shared patrimony of the human species, without considering, however, the role that culture and the environment had and still has in shaping humans' behaviour, that, according to other scholars, has represented an enormous evolutionary advantage for human beings compared to animals. Biological evolution does not allow very rapid structural changes, and instead tends to conserve and stabilize the organism, unless change is indispensable. Cultural evolution flows much faster than biological evolution. The cultural evolution in man is based on the ability to acquire, model, change and restructure some ways of behaving that are much more complex and varied than those of a bird or a mouse, but much less than those of a



chimpanzee. As Denis Dutton claimed in *The Art Instinct* “it is evolution - most significantly the evolution of imagination and intellect - that enables us to transcend our animal selves” (Dutton 2009). Then, besides the actual characters, that express their emotions and show their behaviour through the pages, one should also consider the reader who perceives characters in a subjective manner, and the author who describes characters. The author tells people, his audience, the stories of other people, his characters. The audience responds with similar or different emotions than the writer. All these factors and set of interactions should be taken into consideration while trying to interpret a literary text; they would certainly have enriched Barashes’s analysis.

Gottschall, unlike the Barashes, makes it clear in his text that he distances himself from the accusations of determinism by asserting that wars do not depend only on genes, and from the accusations of reductionism by affirming that culture also plays a central role in the evolution of man. He believes that evolutionary psychology is able to explain human events giving “coequal emphasis on genetic and sociocultural factors” (Gottschall 2004: 134) and that it is precisely this branch of study that can help us interpret the Homeric wars, in the face of scarce archaeological evidence; in Gottschall’s opinion if war is a universal behaviour it means that there must be motivations that go beyond cultural circumstances.

The hypothesis according to which the violence of Greek bloody wars is to be attributed to the lack of reproductive resources could be taken into account, but it is still to be demonstrated. We do not know on what Gottschall bases this deduction concerning the dark age since it is not possible to find documents attesting to the fact that there was an actual lack of women in that period. From the text of the Iliad we could acquire information about the economic, political and social organization of the populations involved, their way of dressing and cooking food, the role of women, the treatment reserved for slaves, and much more, but we cannot draw conclusions about the real life of the Greeks of that time from such an uncertain source and a “once-upon-a-time” heroic world. People were and still are motivated by all the standard repertory of basic motives and emotions, i.e. hunger, reproduction, survival, sexual passion, etc., but it is important to keep in mind that what changes over time is our vision of the world; according to the news we have at our disposal, Homer wrote his poems in the 8th century BC, while the facts narrated date back to the 13th century BC, so even Homer’s vision of the world was different from that of his/her predecessors. Ancient Greek people, for example, had a vision of life and afterlife, that profoundly influenced how they behaved, what they felt and thought, thus it is difficult to understand Greek literature without knowing that whole worldview. Gottschall, on the other hand, is convinced that both the Iliad and the Odyssey are not mere



Università
Ca' Foscari
Venezia

stories, but real windows on the eighth century's life. He is aware that oral literature, as in this case, does not provide accurate details about history, but it is able to provide "polished lenses through which to view the immaterial nuances of the singer's culture at the time he delivers his poem." (Gottschall 2000: 26). The storyteller, through his verses, communicated the concerns, fears, hopes, values of his audience, of the Greeks, of the same culture that produced those verses; according to Gottschall, in fact, "rather than being history in a straightforward sense of the term, the Iliad and the Odyssey are more sophisticated and subtle indicators of the inner lives of Homeric Greeks." (Gottschall 2000: 26). What we know about the Greek dark ages is precisely what literary fictions tell us, and for this reason Gottschall's hypothesis may lead us to consider literary productions as a direct and reliable reflection of social facts. It is like saying that, in 2000 years, future literary theorists will take into consideration only the TV series or the various reality shows which are very much in vogue today to draw conclusions about our generation's behaviour. At this point it is natural to wonder what is the use of Gottschall's interpretation in order to understand, in this case, the Iliad and the Odyssey. We know nothing about the men who fought those wars, we do not have many political, economic and documentary sources, and yet how can we be sure that sexual motivation was the trigger for the war? And if we were to ascertain that sexual motivation was what triggered the war, would this notion help us to better understand the Iliad or the Odyssey?

I agree with Ian McEwan when he maintains that "our common nature, is what literature has always, knowingly and helplessly, given voice to. And it is this universality which the biological sciences, now entering another exhilarating phase, are set to explore further" (Gottschall & Wilson 2005: 19). Today's proposals, even with their flaws, are undoubtedly a good starting point to deepen the analysis of literary texts from the point of view of evolution.

Homo sapiens is the only (surviving) species who has elaborated very complex forms of narration through language; its narratives seem to be fitness-enhancing, so much so that it is not difficult to suppose a sort of innate preference for this behaviour. Today, it would be really incomprehensible to renounce an evolutionary interpretation of a phenomenon such as storytelling, but of course, the evolution of stories and our narrative behaviour cannot be explained solely by the darwinian theory. We are now witnessing an evident intensification of the dialogue between literary theory and evolutionism in that biocultural turn which marks the overcoming of the gap between the "two cultures". Since the 18th century the great branches of learning have been classified into the natural sciences, the social sciences and the humanities. There was the conviction that a clear line separated them, a wall that kept away what was



Wilson believes that human nature is neither the genes that prescribe human nature nor the cultural universals which are the product of human nature. In order to grasp the real meaning of the human condition, according to him, we need to examine the genes and culture not as autonomous fields, but in their coevolution. Brain and behaviour's evolution have progressed together for millions of years, but more recently cultural evolution has become undeniably faster than the genetic one. Culture is created by the common mind and each individual mind is, in turn, the product of the human brain, which is genetically structured. Throughout our lives, from birth to death, the mind grows by absorbing parts of the existing culture. Genes and culture are therefore connected in an inseparable way. Wilson maintains that in order to make a consilience connection we need to encourage the interaction of genetic evolution with cultural evolution, that is nature and nurture. The unification agenda of consilience provides the general framework within which it is possible to articulate the new dialogue between humanities and natural sciences. The complexity of the world cannot be understood without a vision capable of synthesizing natural sciences and humanities.



Bibliography

Università Ca' Foscari Venezia
Aiken, Nancy E. (2013) "Aesthetics and Evolution. Aisthesis." *Pratiche, linguaggi e saperi dell'estetico*, 6(2), pp. 61-73. doi:10.13128/Aisthesis-13769.

Antweiler, Christoph (2018) *Our Common Denominator: Human Universals Revisited*. S.l.: Berghahn Books.

Austen, Jane (1813) *Pride and Prejudice* [E-Reader Version] available from <<https://www.gutenberg.org/files/1342/old/pandp12p.pdf>> (accessed 10 February 2019)

Austen, Jane, and David M. Shapard (2012) *The Annotated Pride and Prejudice*. New York: Anchor Books.

Austin, Michael (2011) *Useful Fictions: Evolution, Anxiety, and the Origins of Literature*. Lincoln: University of Nebraska Press.

Bar-Yosef, Ofer, and Philip Van Peer (2009) "The Chaîne Opératoire Approach in Middle Paleolithic Archaeology." *Current Anthropology*, vol. 50, no. 1, pp. 103-131. [online] available from <www.jstor.org/stable/10.1086/592234> (accessed 4 June 2019)

Barash, David P. (2014) "Are Human Beings Naturally Violent and Warlike?" *Philosophy Now*. 105 pp. 6-8. [online] available from <https://philosophynow.org/issues/105/Are_Human_Beings_Naturally_Violent_And_Warlike> (accessed 10 April 2019)

Barash, David P. (2012) *Homo Mysterious: Evolutionary Puzzles of Human Nature*. New York: Oxford University Press.

Barash, David P., and Judith E. Lipton (2017) *Gender Gap: How Genes and Gender Influence Our Relationships*. London: Routledge.

Barash, David P., and Judith E. Lipton (2011) *How Women Got Their Curves and Other Just-so Stories: Evolutionary Enigmas*. New York: Columbia University Press.

Barash, David P., and Judith E. Lipton (1997) *Making Sense of Sex: How Genes and Gender Influence Our Relationships*. Washington, D.C: Island Press [for] Shearwater Books.

Barash, David P., and Nanelle R. Barash (2005) *Madame Bovary's Ovaries: A Darwinian Look at Literature*. New York: Bantam Dell.

Bennett, Kevin (2018) "Environment of Evolutionary Adaptedness (EEA)" *Encyclopedia of Personality and Individual Differences*. Springer International Publishing. doi: 10.1007/978-3-319-28099-8_1627-1.

Bordalejo, Barbara (ed.) (2009) "Online Variorum of Darwin's Origin of Species." [online] available from <<http://darwin-online.org.uk/Variorum/1860/1860-62-c-1859.html>>



The Complete Work of Charles Darwin Online (<http://darwin-online.org.uk/>), ed. by John van Wyhe.

Universit  G bor, Judit Szalai, and Oliv r Istv n T th (eds.) (2017) *The Concept of Affectivity in Early Modern Philosophy*, The Dean of the Faculty of Humanities of E tv s Lor nd University.

Boyd, Brian (2005) ed. by Jonathan Gottschall and David Sloan Wilson "Evolutionary Theories of Art." In *The Literary Animal*. Evanston, Ill.: Northwestern University Press, pp. 149-78.

Boyd, Brian (2009) *On the Origin of Stories: Evolution, Cognition, and Fiction*, Cambridge: Harvard University Press.

Brown, G.R., and P.J Richerson (2013) "Applying Evolutionary Theory to Human Behaviour: Past Differences and Current Debates." *Journal of Bioeconomics*. 16.2 pp. 105-128. doi: 10.1007/s10818-013-9166-4.

Buss, David M. (2016) *Evolutionary Psychology: The New Science of the Mind*. London: Routledge.

Buss, David M. (1985) "Human Mate Selection" *American Scientist*. 73 pp. 47-51. [online] available from <<https://labs.la.utexas.edu/buss/files/2015/09/Human-Mate-Selection-1985.pdf>> (accessed 6 March 2019)

Buss, David M. (1989) "Sex Differences in Human Mate Preferences: Evolutionary Hypotheses Tested in 37 Cultures." *Behavioral and Brain Sciences*. 12.1 pp. 1-14. doi: 10.1017/S0140525X00023992.

Buss, David M. (1988) "The Evolution of Human Intrasexual Competition: Tactics of Mate Attraction." *Journal of personality and social psychology*. 54.4 pp. 616-628. doi: 10.1037/0022-3514.54.4.616.

Buss, David M. (2005) *The Handbook of Evolutionary Psychology*. Hoboken, New Jersey: John Wiley & Sons Inc.

Carroll, Joseph (2004) *Literary Darwinism: Evolution, Human Nature, and Literature*. New York: Routledge.

Carroll, Joseph (2011) *Reading Human Nature: Literary Darwinism in Theory and Practice*. Albany N.Y.: State University of New York Press.

Coe, Kathryn, and Craig T. Paalmer (2008) "The Words of Our Ancestors: Kinship, Tradition, and Moral Codes." *World Cultures eJournal*, 16(1), University of California. [online] available from



<https://www.academia.edu/36035848/The_Words_of_Our_Ancestors_Kinship_Tradition_and_Moral_Codes> (accessed 14 June 2019)

Cometa, Michele (2018) *Letteratura e darwinismo: introduzione alla biopoetica*. Roma: Carocci Editore.

Cometa, Michele (2017) *Perché le storie ci aiutano a vivere: la letteratura necessaria*, Milano: Raffaello Cortina Editore.

Cometa, Michele (2010) *Studi culturali*, Napoli: Guida Editori.

Crick, Francis, and Graemi Mitchison (1983) "The function of dream sleep" in *Nature*, vol. 304.5922 pp. 14-20. [online] available from
<<https://profiles.nlm.nih.gov/ps/access/scbcdk.pdf>> (accessed 12 January 2019)

Darwin, Charles, John T. Bonner, and Robert M. C. May (1981) *The Descent of Man, and Selection in Relation to Sex*. Princeton: Princeton University Press.

Dawkins, Richard (1991) "Viruses of the Mind." [online] available from
<<https://www.inf.fu-berlin.de/lehre/pmo/eng/Dawkins-MindViruses.pdf>> (accessed 10 June 2019)

De Waal, Frans B. M. (2002) *Tree of Origin: What Primate Behavior Can Tell Us About Human Social Evolution*. Cambridge, Mass: Harvard University Press.

Dissanayake, Ellen (2009) "The Artification Hypothesis and Its Relevance to Cognitive Science, Evolutionary Aesthetics, and Neuroaesthetics", *Cognitive Semiotics*, Issue 5, pp. 136-158. [online] available from
<<https://www.degruyter.com/downloadpdf/j/cogsem.2009.5.issue-fall2009/cogsem.2009.5.fall2009.136/cogsem.2009.5.fall2009.136.pdf>> (accessed 15 May 2019)

Dissanayake, Ellen (2003) "The Core of Art: Making Special." *Journal of the Canadian Association for Curriculum Studies*, Vol. 1, Number 2.

Dobzhansky, Theodosius (1973) "Nothing in Biology Makes Sense Except in the Light of Evolution." *The American Biology Teacher*. 35.3 pp. 125-129.

Dutton, Denis (2009) *The Art Instinct: Beauty, Pleasure, & Human Evolution*. Oxford: Oxford University Press.

Elgar, Mark (2015) "Maternal instinct and biology: evolution ensures we want sex, not babies." *The Conversation*. Oct 23. [online] available from
<<https://theconversation.com/maternal-instinct-and-biology-evolution-ensures-we-want-sex-not-babies-46622>> (accessed 7 June 2019)



Università
Ca' Foscari
Venezia

Finkel, Eli J., and Paul W. Eastwick (2008) "Speed-Dating." *Current Directions in Psychological Science*, vol. 17, no. 3, pp. 193-197, doi:10.1111/j.1467-8721.2008.00573.x.

Gallert, Gustave, Roberto Speciale-Bagliacca, and Roberto Carifi (2014) *Madame Bovary*. Milano: Feltrinelli.

Fonagy, Peter, and Mary Target (1997) "Attachment and Reflective Function: Their Role in Self-Organization." *Development and Psychopathology*, vol. 9 no. 4.

Franklin, Michael S. and Michael J. Zyphur (2005) "The Role of Dreams in the Evolution of the Human Mind." *Evolutionary Psychology*.
doi:10.1177/147470490500300106.

Galimberti, Umberto (1999) *Psiche e techne: l'uomo nell'età della tecnica*. Milano: Feltrinelli Editore.

Garvey, Brian (2011) ed. by T. Reydon and K. Plaisance "Free Will, Compatibilism, and the Human Nature Wars." In *Philosophy of Behavioral Biology*, Boston Studies in the Philosophy of Science, Springer. [online] available from
<https://www.academia.edu/313159/Free_Will_Compatibilism_and_the_Human_Nature_Wars> (accessed 12 February 2019)

Gehlen, Arnold (1988) *Man: His Nature and Place in the World*. New York: Columbia University Press.

Gibbens, Sarah (2018) "Is Maternal Instinct Only for Moms? Here's the Science." *National Geographic*, May 9. [online] available from
<<https://news.nationalgeographic.com/2018/05/mothers-day-2018-maternal-instinct-oxytocin-babies-science/>> (accessed 7 June 2019)

Gibson, Kathleen (1991) "Tools, Language and Intelligence: Evolutionary Implications." *Man*, vol. 26, no. 2, pp. 255-264. [online] available from
<www.jstor.org/stable/2803831> (accessed 15 March 2019)

Goodheart, Eugene (2018) *Darwinian Misadventures in the Humanities*. London: Routledge.

Gottschall, Jonathan (2004) "Explaining wartime rape." *The Journal of Sex Research*, 41:2 pp. 129-136. doi: 10.1080/00224490409552221.

Gottschall, Jonathan (2000) *The Rape of Troy: A Neo-Darwinian Perspective on Conflict in the Iliad*. Internet resource.

Gottschall, Jonathan (2008) *The Rape of Troy: Evolution, Violence, and the World of Homer*. Leiden: Cambridge University Press.



Gottschall, Jonathan (2013) *The Storytelling Animal: How Stories Make Us Human*, Boston: Mariner Books.

Gottschall, Jonathan, and David Sloan Wilson (eds.) (2005) *The Literary Animal: Evolution and the Nature of Narrative*. Evanston, IL: Northwestern University Press, 2005.

Gottschall, Jonathan, Johanna Martin, Hadley Quish, and Jon Rea (2004b) "Sex Differences in Mate Choice Criteria Are Reflected in Folktales from Around the World and in Historical European Literature." *Evolution and Human Behavior*. 25.2 pp. 102-112.

Hallam, R.S., and K. P. O' Connor (2002) "A dialogical approach to obsessions." *Psychology and Psychotherapy: Theory, Research and Practice*, The British Psychological Society, 75, pp. 333-348.

Hardy, Thomas, and Tim Dolin (2003) *Tess of the D'urbervilles*. London: Penguin Books.

Holcomb, Harmon R. (1993) *Sociobiology, Sex, and Science*. Albany, N.Y: State University of New York Press.

Hume, David, and L. A. Selby-Bigge (1896) *A treatise of human nature*, Oxford: Clarendon Press.

Klein, Stanley B., Tim P. German, Leda Cosmides, and Rami Gabriel (2004) "A Theory of Autobiographical Memory: Necessary Components and Disorders Resulting from Their Loss." *Social Cognition*. Vol. 22, No. 5, pp. 460-490. [online] available from <<https://www.cep.ucsb.edu/papers/autobiographical04.pdf>> (accessed 7 June 2019)

Kohn, M., and S Mithen (1999) "Handaxes: Products of Sexual Selection?" *Antiquity Oxford*. 73.281 pp. 518-526. [online] available from <http://radicalanthropologygroup.org/sites/default/files/pdf/class_text_008.pdf> (accessed 6 March 2019)

Iacoboni, Marco (2009) *Mirroring People: The Science of Empathy and How We Connect with Others*, New York: Picador.

Irons, William (1998) "Adaptively relevant environments versus the environment of evolutionary adaptedness" *Evolutionary Anthropology*, 6, pp. 194-204. doi:10.1002/(SICI)1520-6505(1998)6:6<194::AID-EVAN2>3.0.CO;2-B.

LeDoux, Joseph (2013) "For the Anxious, Avoidance Can Have an Upside" *New York Times*, April 7. [online] available from <<https://opinionator.blogs.nytimes.com/2013/04/07/for-the-anxious-avoidance-can-have-an-upside/>> (accessed 25 May 2019)

Leroi-Gourhan, André (1995) *Il gesto e la parola*. Torino: Einaudi.



Università
Ca' Foscari
Venezia

Macintyre, Ben (2011) *The Last Word: Tales from the Tip of the Mother Tongue*.

A&C Black. Internet resource.

Madison, Paige (2018) "Who First Buried the Dead?" *Sapiens*, Feb 16. [online] available from <<https://www.sapiens.org/culture/hominin-burial/>> (accessed 12 June 2019)

Max, D. T. (2005) "The Literary Darwinists." *The New York Times* Nov 6. [online] available from <<https://www.nytimes.com/2005/11/06/magazine/the-literary-darwinists.html>> (accessed 27 January 2019)

Miall, D.S., and Ellen Dissanayake (2003) "The poetics of babytalk." *Human Nature*, Vol. 14, Issue 4, pp. 337-364. doi: 10.1007/s12110-003-1010-4.

Miller, Geoffrey F. (1998) ed. by C. Crawford and D. Krebs "How mate choice shaped human nature: A review of sexual selection and human evolution." In *Handbook of evolutionary psychology: Ideas, issues, and applications* (pp. 87-130). Lawrence Erlbaum.

Miller, Geoffrey F. (1998) "Sexual Selection and the Mind. A Talk with Geoffrey Miller." *Edge*. Edge Foundation, Inc. June 25. [Blog post] available from <<https://www.edge.org/conversation/sexual-selection-and-the-mind>> (accessed 2 March 2017)

Miller, Geoffrey F. (2000) *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*. New York: Anchor Books.

Mithen, Steven (2005) *The Prehistory of the Mind: A Search for the Origins of Art, Religion and Science*. London: Phoenix.

Nesse, Radolph M. (2001) "The Smoke Detector Principle. Natural Selection and the Regulation of Defensive Responses" *The New York Academy of Sciences*, 935: 75-85. doi:10.1111/j.1749-6632.2001.tb03472.x.

O'Connor, Kieron P., Frederick Aardema, and Marie-Claude Pélissier (2005) *Beyond Reasonable Doubt: Reasoning Processes in Obsessive-Compulsive Disorder and Related Disorders*. Chichester: John Wiley & Sons Inc. [online] available from <http://stop-abuse.ru/wp-content/uploads/2016/05/Kieron_OConnor_Frederick_Aardema_Marie-Claude_BookZZ.org_.pdf> (accessed 10 May 2019)

Omēros, and Richmond Lattimore (1961) *The Iliad of Homer* [lattimore]. Chicago: University of Chicago Press.

Pace-Schott, Edward Franz (2010) *Sleep and Dreaming: Scientific Advances and Reconsiderations*, Cambridge: Cambridge University Press.



Università
Ca' Foscari
Venezia

Perazzolo, Paolo (2014) "Rizzolatti: l'amore per il prossimo è dentro di noi." *Famiglia Cristiana*, July 7. [online] available from <[http://www.famigliacristiana.it/articolo/rizzolatti-l-](http://www.famigliacristiana.it/articolo/rizzolatti-l-amore-per-il-prossimo-e-dentro-di-noi.aspx)

[http://www.famigliacristiana.it/articolo/rizzolatti-l-](http://www.famigliacristiana.it/articolo/rizzolatti-l-amore-per-il-prossimo-e-dentro-di-noi.aspx)

[amore-per-il-prossimo-e-dentro-di-noi.aspx](http://www.famigliacristiana.it/articolo/rizzolatti-l-amore-per-il-prossimo-e-dentro-di-noi.aspx)> (accessed 13 January 2019)

Pinker, Steven (1997) *How the Mind Works*. New York, N.Y.: W.W. Norton.
Rizzolatti, Giacomo, and Laila Craighero (2004) "The Mirror-Neuron System" in *Annual Review of Neuroscience*, vol. 27, pp. 169-192.

Rossano, Matt J., and Benjamin Vandewalle (2016) ed. by James R. Liddle and Todd K. Shackelford "Belief, Ritual, and the Evolution of Religion." In *The Oxford Handbook of Evolutionary Psychology and Religion*. doi: 10.1093/oxfordhb/9780199397747.013.8.

Rüdiger Zymner, and Manfred Engel (Hg.) (2004) *Anthropologie der Literatur. Poetogene Strukturen und ästhetisch-soziale Handlungsfelder (Poetogenesis 2)*. Paderborn: Mentis Verlag.

Sacks, Oliver (1985) *The Man Who Mistook His Wife for a Hat and Other Clinical Tales*. New York: Summit Books. [online] available from <http://sajtichek.narod.ru/books/without_translation/wife_hat.pdf> (accessed 20 February 2019)

Sergey Gavrilets, and Aaron Vose (2006) "The dynamics of Machiavellian intelligence." *Proceedings of the National Academy of Sciences* Nov 103 (45) 16823-16828. doi: 10.1073/pnas.0601428103.

Shakespeare, William. *Othello* (2010) ed. by Brainerd Kellogg. New York: Clark & Maynard, 1892. Shakespeare Online. Feb 20. [online] available from <http://www.shakespeare-online.com/plays/othello_3_3.html> (accessed 2 March 2019)

Smith, Adam (1984) ed. by Alec L. Macfie and David D. Raphael *The Theory of Moral Sentiments*, Indianapolis: Liberty Fund.

Smith Daniel, Philip Schlaepfer, Katie Major, Mark Dyble, Abigail E. Page, James Thompson, Nikhil Chaudhary, Gul Deniz Salali, Ruth Mace, Leonora Astete, Marilyn Ngales, Lucio Vinicius & Andrea Bamberg Migliano (2017) "Cooperation and the evolution of hunter-gatherer storytelling" *Nature Communications* 8(1). doi: 10.1038/s41467-017-02036-8.

Stout, Dietrich, and Thierry Chaminade (2012) "Stone tools, language and the brain in human evolution." *Philosophical transactions of the Royal Society of London. Series B, Biological sciences* vol. 367, 1585 pp. 75-87. doi:10.1098/rstb.2011.0099. [online] available from <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3223784/>> (accessed 6 March 2019)



Università
Ca' Foscari
Venezia

Sugiyama, Michelle (2017) "Literary Prehistory: The Origins and Psychology of Storytelling" *Critical Approaches to Literature: Psychological*, Salem Press Editors: Robert

Tattersall, Ian (2016) "The Thinking Primate: Establishing a Context for the Emergence of Modern Human Cognition." *Proceedings of the American Philosophical Society*. 160.3 pp. 254-265.

Tooby, John, and Leda Cosmides (2001) "Does Beauty Build Adapted Minds?" Toward an Evolutionary Theory of Aesthetics, Fiction and Art." *SubStance: A Review of Theory and Literary Criticism* 30, no. 1-2, pp. 94-95. [online] available from <<https://www.cep.ucsb.edu/papers/beauty01.pdf>> (accessed 6 February 2019)

Valli, Katja, and Antti Revonsuo (2009) "The Threat Simulation Theory in Light of Recent Empirical Evidence: A Review." In *The American Journal of Psychology*, vol. 122, no. 1. [online] available from <www.jstor.org/stable/27784372> (accessed 16 January 2019)

Vinopal, Lauren (2017) "Science Explains Why Men Can't Lactate (But Sometimes Do) - Evolutionary biology explains why you're not the milkman." *Fatherly*, Aug 28. [online] available from <<https://www.fatherly.com/health-science/why-men-breastfeed-lactate/>> (accessed 6 March 2019)

Wiessner, P. W. (2014) "Embers of society: Firelight talk among the Ju/'hoansi Bushmen." *Proceedings of the National Academy of Sciences*, 111(39), 14027-14035.

Wilson, Edward O. (1998) *Consilience. The Unity of Knowledge*. New York: Alfred A. Knopf, Inc.

Wojciehowski, Hannah C., and Vittorio Gallese (2011) *How Stories Make Us Feel: Toward an Embodied Narratology*, California Italian Studies 2 (1). [online] available from <<https://escholarship.org/uc/item/3jg726c2>> (accessed 12 December 2018)

Zunshine, Lisa (2010) *Introduction to Cognitive Cultural Studies*. Baltimore: Johns Hopkins University Press.

Zunshine, Lisa (2006) *Why We Read Fiction: Theory of Mind and the Novel*. Columbus: Ohio State University Press.