Story as Niche Construction: The Cultural Evolution of Fictional Narratives

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Abstract

Some Evolutionary Psychologists – such as Tooby & Cosmides (2001) – argue that engagement with fictional narratives is adaptive, that humans have evolved genetically to be driven to, and capable of, engaging with stories because they provide a reproductive benefit. I will argue that evidence that purports to show that the human brain is hard-wired for engagement with fictional narratives is weak. In contrast, I outline a more plausible account: that the practice of fictional engagement is better explained as an exaptation. Through a process of scaffolded learning, capacities that have likely been selected for other reasons are co-opted and extended to allow an individual to engage with their culture's stories. From here I situate fictional narratives within a 'fiction niche', a suite of practices and storytelling norms of form and content that are passed down from generation to generation, and which each new member is inducted into. I conclude by briefly discussing some of the functional roles such a niche might serve: in particular providing a shared cultural reference point that facilitates interactions between individuals within a community, and normalising behaviour across the population in ways that foster group identity and social cohesion.

Certification of Original Content

I certify that the content of this work (of 20,466 words) is original, except where indicated, and has not been submitted as part of any other degree.

- Graham Thomas

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Introduction

Over recent years, the attempt to uncover the evolutionary roots of human cognition has led to a number of novel hypothesis regarding the function and origin of particular human capacities and behaviours. One of these is our ability and drive to engage in fictional narratives, or stories. A number of theorists have posited that our fictional engagement may be adaptive; that it may facilitate reproductive success. Therefore, the ability and drive to process non-veridical fictional narratives may have been favoured genetically by natural selection. In this thesis, I look to assess a particular subset of these arguments, and to provide what I see as a more plausible alternative: that rather than selected for genetically, storytelling is a product of cultural evolution, one that co-opts capacities selected for other reasons, and brings them to bear on a new domain.

My plan will proceed as follows:

Chapter 1 will give a brief overview of some of the background debate surrounding the intersection between culture, cognition, and evolution. I will contrast two approaches. One, exemplified in Evolutionary Psychology and wedded to the Modern Synthesis, emphasises the mind as modular in nature, consisting of dedicated neurocognitive processes that have been selected for genetically over extended evolutionary time. I will contrast this with calls for an Extended Synthesis, which instead places its emphasis on the brain's plasticity, capable of being shaped throughout development, and a range of non-genetic inheritance mechanisms that impact both human ontogeny and phylogeny.

The following chapters, Chapters 2 to 4, will then seek to apply these differing frameworks to the question of whether our capacity and drive to engage in fictional narratives can be considered an adaptation. In Chapter 2 I will outline and critique two broad lines of argument from the adaptationist camp, namely the developmental and instructional hypotheses. I will then look at some of the developmental evidence commonly said to support these. It will be my claim that evidence and reasoning used to support such accounts is weak. In Chapter 3 I will instead offer what I see as a more plausible developmental account: that our capacity and drive for fictional engagement arises out of scaffolded learning

that exploits the plasticity of human cognition, and shapes and extends its capacities into a new domain.

Chapter 4 will then seek to provide an alternative phylogeny to the adaptationist argument that an aesthetic and capacity for fictional engagement has been genetically selected for. I will instead look to apply concepts from the Extended Synthesis, to situate the origin of fiction within a broader context of a 'fiction niche', a suite of practices, norms, and institutions that are transmitted culturally from generation to generation. I argue that the primary function of the fiction niche is 'mindshaping' (Zawidzki, 2005), a way to normalise behaviours and beliefs across a population in order to facilitate cooperation and motivate collective action to deal with the threats and problems faced by the group.

Chapter 1: The Background

1.1 The Modern Synthesis and Evolutionary Psychology

The Modern Synthesis (MS) is a synthesis of Charles Darwin's theory of evolution by natural selection (Darwin, 1982) and modern genetics. It's often framed as a 'gene's eye view' approach (Danchin et al., 2011), one that treats genes as the primary unit of inheritance, and the gradual incremental mutation of said genes (or the organisation of them) as underlying the variation in an organism's characteristics or traits, otherwise known as the phenotype. Phenotypes (or more accurately the genes that determine them) that are a good 'fit' for their environment, i.e. that increase reproductive success, are likely to be more prevalent within a population. Those that decrease reproductive success are likely to be far less prevalent within a population, and more often than not weeded out entirely. In this way, natural selection is the force that drives much of an individual's phenotypic variation, and genes are the units of inheritance on which it acts, shaping the variation within and between species that pervades the natural world.

The field of Evolutionary Psychology (EP) draws heavily on the metaphor and framework of the MS, arguing that any analysis of culture and human behaviour should ultimately rest in underlying cognitive mechanisms that have been selected for genetically over gradual evolutionary time (Barkow, Cosmides, & Tooby & Cosmides, 1992). These are said to provide the invariant and universal architecture of the human mind. Culture emerges as simply a product of these, and/or merely tinkering at their edges to elicit minor variations in behavioural output, without altering underlying structure. Importantly, these adaptations are not 'content free', as a general capacity for 'learning' might be said to be content free (the content being what is 'learned'), but have evolved to address specific problems. Rather than the result of socialisation or enculturation, behaviours and preferences such as sexual jealousy and mate selection (Buss, 1991), humour (Greengross, 2017), altruism (Hoffman, 1981), etc., are often said to have been 'hardwired' into the brain, the products of our genetic blueprint. The brain, according to proponents of EP, is not a general learning machine, but a conglomeration of distinct modular functions that have gradually emerged because they have, with increasing effectiveness, addressed specific problems in the environments of our ancestors (Schmitt, & Pilcher, 2004).

This essentially amounts to a picture of the brain as analogous to a computer, composed of functionally discrete 'information processing systems' instantiated in neural structures that extract information from their environment as input, act on it according to a set of formalised rules, and produce behaviour and changes in psychological states as their output (Cosmides & Tooby, 2010). These algorithms emerge throughout the developmental period, executed by the genetic script. The successful development of these mechanisms may depend on important critical periods, periods in the developmental cycle that act as 'developmental windows'. If the architecture receives the correct stimulus during the period, it will develop to full functionality. Starving it of informational input may result in a lost opportunity, as the cognitive mechanism in question may never develop, making future use far more difficult, or impossible.

The claim that human beings have evolved fixed cognitive mechanisms in response to selective pressures, and that these may be subject to critical developmental periods, taken at its broadest is relatively uncontroversial. Few would want to argue against some kind of universal cognitive architecture that may underlie low-level processing of vision, or hearing, or metabolic regulation, for example. Rather, disagreements rest on how specific these mechanisms are, how many there are, how discrete they are, and whether they truly can be seen as fixed informational processing systems, or whether and to what degree they may be shaped by their environments. These disagreements become particularly explicit when we enter the realm of social behaviour. How much of our social life is governed by the fixed architecture of the human mind, and how much might we be shaped by our social environments? How specifically selected for are certain behaviours and preferences such that we can say we have been 'pre-programmed' for them? On the flip side, how much 'work' does culture do in shaping behaviour and psychology, and can its results produce novel behaviours and practices that can themselves be subject to selective pressures?

What's at stake here regarding our concept of culture (and stories) is whether it merely serves as informational input to evolved cognitive architecture, or whether (a) it plays a more fundamental role in shaping the expression of that architecture, altering the *way* we process information, and/or (b) it can itself have important evolutionary consequences, and be subject to selective pressures. These are two very different ways of looking at the relationship between the brain and its environment, and so the brain and culture. One, the EP

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account, takes a standard information processing approach. The other paints a more entwined interrelationship, the brain as enmeshed and embedded developmentally within its environment, fundamentally shaped by it, and shaping it. On the latter, culture itself emerges as a necessary unit of analysis for many evolutionary (and otherwise) explanations of human behaviour and traits, rather than merely 'informational grist' for the brain's 'mill'. In the following sections we will look briefly at the evidence for and against these two differing accounts.

1.2 Modularity and Innateness

One of the central claims of Evolutionary Psychologists is that the brain is massively modular in nature. That is, it is primarily constituted by functionally discrete information processing systems that have evolved incrementally over evolutionary time. What counts as a 'module', its necessary and sufficient conditions, is a matter of some debate, but generally a number of minimal conditions should obtain. According to Carruthers (2003), we should expect modules to be innate (genetically scripted); functionally dissociable; domain specific (dedicated to processing of information of a specific type); informationally encapsulated (inaccessible to other mechanisms); and instantiated in specific neural structures (localised or distributed).

There are a number of important adaptive reasons why we might think it likely that the brain has evolved with massive modularity. One is efficiency of processing. Functionally dedicated domain specific subsystems are able to process inputs fast, automatically, and reliably (Tooby & Cosmides, 1992). In other words, they do one thing, and they do it well, bestowing a clear advantage for those organisms who exhibit the capacity. Proponents of EP argue that domain general capacities face the problem of combinatorial explosion. If, for example, every time a domain of action, say mate selection, requires the brain to draw on its entire store of knowledge and beliefs in order to output behaviour, such a calculation will be impractically slow at best, and computationally intractable at worst. Functional and domain specificity also allows the mechanism to be subject to strong selective pressures (Clune, Mouret & Lipson, 2013). If a cognitive mechanism addresses a specific problem in the environment, then it bestows a clear advantage, and gradual incremental changes can accrue that will both increase functional

specificity, and increase the effectiveness with which the module is able to address the problem. Domain specific modules, then, are highly heritable.

Modularity is strongly suggestive of innateness and therefore heavily weighted towards genes as the primary driving force behind variation. There is some limited empirical support for the massively modular hypothesis, with 'double dissociation' legion studies suggesting modules for speech production and comprehension may be dissociable (Medler, Dawson, & Kingstone, 2005)**,** although research has since suggested the picture may be somewhat more complicated (Maratsos, 1994). Nevertheless, the topic remains currently hotly debated within philosophy and the brain sciences (Karmiloff-Smith & Karmiloff-Smith, 1995).

While modularity suggests innateness, innateness itself may also be suggestive of modularity too, since if specialised functions have been selected for, then it stands to reason they are likely to exhibit persistent structures, the same way anatomy exhibits consistent structure in response to environmental pressures. There is some good evidence to suggest the existence of some innate cognitive capacities. Cognitive domains (e.g. mathematical understanding, theory of mind, etc) develop in similar time frames and trajectories, suggesting a shared innate developmental script across individuals. Proponents of EP also point to evidence of early competency in children as suggesting innateness. For example, infants as early as 12 hours after birth are thought to exhibit a preference for faces over other objects, suggesting the possibility of an innate 'facial recognition' mechanism, priming children for interactions with conspecifics (Leopold & Rhodes, 2010). Morton and Johnson (1991) claim facial recognition is underpinned by an innate subcortical neural system that benefits the later development of a cortical system after six months.

But the example of facial recognition may be a good case in point as to why we should be careful not to leap too quickly to hypotheses of innateness. From birth children also curiously show a preference, not just for faces, but for their mother's face over strangers'. From this we might initially be led to posit some kind of innate 'mother-detection module'. But research has found that this is instead likely an early association made by the child linking their mother's face with her voice, to which it had been exposed and accustomed throughout foetal development while in the womb (Sai, 2005). This 'inter-modal

activation' appears to play an important role in the way we identify and perceive faces (Kriegstein, Kleinschmidt, Sterzer & Giraud, 2005).

This demonstrates two things. Firstly, how the brain, from the earliest stages, even while still in the womb, appears primed to learn, to be shaped in response to its environmental context by making inter-modal links across stimuli. Secondly, a caution of how assumed innateness based on early exhibition of competency may lead us to look in the 'wrong place' in framing our hypotheses and our explanations. Others have suggested facial recognition in general may gain functional specificity from domain-general beginnings. Nelson (2001) has argued against the nativist model of Morton and Johnson, suggesting instead the presence of an innate *potential* for cortical specialisation. On this account, modularity arises out of use. The content of the processing, faces, is not specifically selected for itself. Children are bombarded with human faces from birth, as people hover over them, play with them, and speak to them, reinforcing links between 'faces and voices' that begin to be laid down before birth. What emerges as a honed mechanism for the identification of faces, rather than an innate module, may be the result of highly stimulating and repeated presentations to a developing brain that is searching for lively things to look at, listen to, touch, etc., and associations and connections to make.

Others have also suggested the possibility that infants may be primed to 'infer' visual facial structure from their own proprioceptive experience, meaning that what looks like a contentful domain-specific function may instead emerge out of another capacity entirely, the infant's experience of its own body (Wilkinson, Paikan, Gredebäck, Rea & Metta, 2014). All of this is not to say the evidence bears more strongly on the 'acquired' account of facial recognition, merely that there are other plausible accounts which may also have evidential support, and so we should perhaps not be so quick to assume innateness as an explanation for even lower-level automatic processing, let alone complex social behaviour.

1.3 Environment of Evolutionary Adaptiveness (EEA)

The upshot of this innateness is that, due to the gradual and incremental nature of genetic evolution, Evolutionary Psychologists argue that the brain's architecture has been laid down in a vastly different environment to our modern world. It is the result of selective pressures faced by our ancestors up to 2 million years ago. While not intended to demarcate a specific

time or place, the sum of these selective pressures is referred to as the Environment of Evolutionary Adaptiveness (EEA) (Tooby & Cosmides, 1992).

By attributing the structure of these mechanisms to a much earlier period, the mechanism is distanced from its current environmental context. What we should find, then, is that there are likely to be mismatches. Many mechanisms, and the behaviours they produce, may be maladapted to the current environments human beings find themselves faced with, which have changed rapidly in the last 10,000 years with the inventions of agriculture, technology, and the modern metropolis.

We can see, then, how Evolutionary Psychology might be said to be tightly wedded to the tenets of the Modern Synthesis, in its insistence on the brain as modular/computational, genes as the unit of selection that determines its functional structure, and evolution as occurring gradually and incrementally over extended time. Some proponents of EP argue that this extends beyond lower-level processes, such as vision and face recognition, to many higher-order processes, for example belief formation, allowing for the possibility that our social behaviour may also be products of our evolutionary heritage. In the following sections we will look at the evidence that supports a very different picture of cognition, one that calls into question the massively modular hypothesis, and so too much of the innateness it presumes.

1.4 Plasticity

A number of biologists, philosophers, and others argue that biological evidence points to many organisms, including humans, exhibiting varying degrees of phenotypic plasticity, able to alter their phenotype in response to their environments, and that these can have evolutionary consequences (Fusco & Minelli, 2010; Pigliucci, 2001). The human brain, it's argued, represents a case exemplar in plasticity, with neurons capable of rewiring and reorganising well beyond 'critical developmental periods' (Papagno, & Vallar, 2014), and the suggestion that cognitive capacities that may have evolved for one purpose can be exapted for other non-adapted practices (Anderson, 2010).

An emerging body of work in neuroscience is beginning to show the ways environment and culture can shape the brain structurally. Even well into adult life, the brain

remains highly plastic, able to adapt and change to new demands. In a 2006 longitudinal study of London taxi driver trainees, Maguire, Woollett and Spiers (2006) found significant increase in grey matter in the hippocampus of trainees who went on to successfully complete the pre-registration test, which requires detailed memorisation of the layout of the city, including up to 25,000 streets and significant landmarks. This demonstrates how culture can alter structure. Even lower-order processing systems like the visual system, thought to be a good candidate for modularity, are increasingly being shown to be moulded by culture (Chiao & Immordino-Yang, 2013), along with theory of mind (Kobayashi, Glover, & Temple, 2006), and empathy (Cheon et al., 2011).

Much of this recent research calls into question the modularity and innateness of the structure and function of the human brain. Instead, the emphasis is on its ability for structural change and neural reorganisation, well beyond even the developmental period. This may require new ways of thinking about the brain's developmental co-dependence on the broader physical and social environments it is situated in.

1.5 Niche construction

If the brain has evolved to be highly plastic, then variation in its structure, function, and processes can be driven not just by genes, but by the environment, including culture. This may mean that any evolutionary account of cognition will require a 'multi-dimensional approach' (Zeligowski, Jablonka & Lamb, 2005), one that incorporates a range of inheritance mechanisms including genes, epigenetics, behaviour, and the symbolic systems of a culture.

In addition to their plasticity, many organisms are not simply passive recipients of their environments. They are agents capable of self-selecting them, and actively shaping them in ways that have important developmental and evolutionary consequences. Called Niche Construction, this is the process by which organisms alter and create selective and developmental pressures in ways that are inherited across generations (Odling-Smee, 1995). The common example given here is of the beaver's dam. Beavers create dams, a process that radically alters their ecology. The kinds of 'beaver features', or phenotypes, that bestowed a reproductive advantage in the 'non-dam' world, may not be required in the 'dam world', or may even be deleterious in this altered ecology. New beavers are born into already-altered 'niches', which modify selective and developmental pressures that are maintained by each

subsequent generation. What's inherited here, and what is causally relevant for the development of the beaver's phenotype, is not just genes, but the niche they are born into and embedded within. Human beings are niche constructors par excellence. Beyond merely physical alterations to their environments, they also shape them through culture (Laland, Odling-Smee, & Feldman, 2001), directing the development of new members born into their environments through the transmission of knowledge and practices.

Plasticity, along with the ability to actively shape environments in ways that alter selective pressures, allows for a very different picture of the relationship between culture and cognition. Rather than modular information processors that take in information from the world, act on it, and produce behaviours, the Extended Synthesis emphasises the embedded and situated nature of human cognition and evolution, and the active role we play in shaping our development across evolutionary, historical, and developmental timeframes.

Some proponents of EP argue that the above criticisms, of innateness and the EEA, particularly those that cite evidence of plasticity, rest on a misrepresentation of their own case, which, they say, is entirely consistent with these empirical findings. Rather than espousing a strict 'structure before environment' conception of the human mind as strictly genetically determined, they argue their position accommodates a kind of 'interactionism' (Confer et al., 2010), one which collapses the nature/nurture distinction and sees these mechanisms as the joint products of their genes and the developmental conditions, including culture, that they find themselves within. There are two problems I see with this. Firstly, in making this concession proponents of EP threaten to undermine the foundations of the EP project itself. If it's accepted that the environment, including culture, can play an important role in shaping the cognitive architecture of the human mind, then on what grounds can we 'work backwards' from evidence of current traits, behaviours, etc., to 'transpose them' to an earlier period in human history, and to claim that these were fixed in said period? If cognition is a product of the 'always interaction' of the brain and its environment, then the functions we are working back from have 'always interacted' with their own current environment, throughout development and beyond. This, coupled with the epistemological difficulties in understanding the exact nature of the immediate environmental pressures faced by our ancestors, means any projecting of current behaviours and traits onto the distant period of the EEA rests on dubious ground from the get go.

Secondly, by positing some form of fixed underlying modular architecture (genes as developmental script), and the 'brain as a computer' processing informational inputs, it sets up 'nature', or its algorithms, as the a priori conditions that then process the environment. Genes are prioritised as the 'strong' force, and nurture (read environment) as the weak force, 'working with what it's got'. Rather than collapsing the distinction between nature and nurture, it re-enforces it by placing the weight of its explanations on the a priori fixed, genetically scripted, architecture. This can lead to hypotheses or explanations that in turn give undue weight to innateness, modularity, and genes, but miss the significant coupling with broader developmental conditions.

Chapter 2: Fictional Competency as Adaptation

Now that we have completed an overview of two very different ways of looking at the intersection between culture and cognition, it's time to apply them to the question of whether fiction should be considered an adaptation. Over recent years a number of scholars have defended the position that art, and fiction as a subset of art, is an adaptation. That is, they argue there must be some reproductive benefit in either the production or appreciation of fiction (or both), such that exhibiting the trait led to significant reproductive success, causing it to become fixed in the gene pool and a universal feature of human nature.

As I see it, any account must necessarily address three aspects:

1. It must explain the ubiquity of fiction, its universal presence in all cultures.

2. It must also explain the primary function, or functions (if any) of fictional narratives, such that they have ended up a universal feature of human experience.

3. And lastly, the account must explain why fiction is uniquely situated to serve the functions it serves. That is, it can't just be narratives, since not all narratives are fictional, and it is specifically fiction that we are concerned with. Any adequate account must be able to explain what it is specifically about fiction that accounts for the other two.

The following two chapters will look at some of the arguments given for why we should think of fiction as an adaptation, and will assess the evidence commonly presented to support them. It will be my claim that evidence presented for an adaptationist argument is weak, and can equally be accounted for by a kind of 'exaptation' theory. Rather than human brains evolving to seek out and tell stories, stories may have culturally evolved to fit human brains, adapted over time to co-opt pre-existing cognitive architecture and bring it to bear in a new capacity, one that is acquired, not innate.

2.2 Universality and Utility

There are usually two main reasons cited for why we should begin to suspect fiction of being an adaptation. Firstly, storytelling, and the appreciation of stories, is a feature of every culture. Across the world, people enjoy telling and listening to stories, and every culture has its own myths, legends, and tales that are passed down from generation to generation, often codified in written language, or oral traditions. It is what we might call a 'human universal' (Brown, 1991), a trait or practice found in every society. Secondly, engagement in fictional worlds is intrinsically enjoyable, people devote enormous swathes of time and energy to them, time that could be otherwise spent maximising survival or reproductive success. Why would people devote so much attention to non-factual information, to depictions of events that never happened, and people and places that never existed, if it offered no benefit? Even more perplexing, why should we find the activity so enjoyable? Surely, so the reasoning goes, in the hostile environments of our ancestors, we should find 'truth-seeking' and 'falsehood-sensitive' traits that are preferred by natural selection over a drive to seek out the non-factual and fantastical. Those individuals preoccupied with information not rooted in reality would likely find themselves at a distinct disadvantage compared to those with a preference for truth. Taken together, these are said to suggest that there is some hidden utility to engagement with fictional worlds, such that we have evolved an 'aesthetic' designed to direct us to them, or an instinct to produce them.

While arguably a necessary condition, universality on its own is not a sufficient condition for the presence of an adaptation. While many universals might be adaptations, (Pinker, 2003), this is clearly not always the case. Cooking is an example of a practice and activity that is found in every culture, but it's not a practice we have evolved to perform. We don't come pre-programmed to cook. Rather, it's a learned response to a shared problem faced across cultures, like the existence of dangerous microbes in uncooked meat, or the benefits of increased digestive efficiency that cooking food brings (Gowlett & Wrangham, 2013). Cooking is a practice that, while undoubtedly improving our chances of survival, is transmitted via culture, not genes. The practice of assigning 'names' to individuals within a community is also a universal. Every culture uses specific linguistic markers to delineate and identify individuals within a group, but this too is a practice transmitted culturally, not arising out of innate drives or capacities. These are examples of cultural universals, found across all cultures, but they're acquired behaviours and traditions, not the product of genetic selection. Since there are many basic features of an environment that are shared across cultures, traits

and practices may emerge universally in response to shared problems, not just genetic similarity. The nature of the problems faced restrict the range of possible solutions to such an extent that they coalesce on independently adopted behaviours. Universality might suggest functionality, then, but not necessarily adaptation.

The fact that the imaginative arts are intrinsically rewarding, and that we spend so much time engaging with them without apparent utility, also tells us little about whether or not the reaction has arisen as an adaptation. Firstly, the question of why people would devote so much energy to an apparently useless activity is only a puzzle if we presume that most human behaviour is adaptive – driven by the need to maximise reproductive success. But modern society is replete with examples of human beings engaging in activities that are intrinsically rewarding, but apparently devoid of functional utility. Some people spend their lives deriving pleasure from building elaborate structures out of toothpicks, collecting stuffed toys, or driving aimlessly. More than simply a 'waste' of time, people often incur great personal cost in pursuing such hobbies, not only in opportunity costs, but in the material resources needed to sustain their activities.

The cognitive scientist and linguist Steven Pinker (Pinker, 2007) has famously suggested that the arts, including fiction, may be analogous to the use of recreational drugs. Human beings have developed the technical know-how to synthesise chemicals that can target the brain's reward system by flooding it with dopamine. Pinker suggests stories may serve a similar purpose. They may be designed to target motivational systems that reward us when exposed to informational stimuli correlated with adaptive outcomes, such as love, sex, and safety. Stories may be designed to deliver packets of this information, in its heroes and love stories, for example. Like 'cheesecake', which entices us by targeting a phylogenetically ancient need for sugars and fats, stories may essentially 'trick' the mind by picking the locks of other evolved cognitive mechanisms. Our desire for them, then, would be indirect, not an adaptation selected for by natural selection, but an evolutionary by-product, resulting from other traits that *are* adaptive. This kind of explanation could equally account for the two bases for suspecting fiction may be adaptive, namely their universality and the intrinsic pleasure we receive from them. Since, so the argument may go, human beings have evolved the same neurocognitive structures, with the same motivational systems, and stories are designed to target these, then all human beings should find them rewarding,

which may explain their overwhelming presence in all cultures, and the amount of time we devote to them en masse.

While I think there may be some truth to this kind of picture, there is, however, a sense in which it feels overly deflationary. It leaves out much of the richness of stories as a tradition, the central role they're given as cultural institutions that help establish identity, educate, communicate, and perhaps alter the way we see the world. If stories are merely a kind of 'cheesecake for the mind', then as a species we have grossly overestimated them, because stories throughout history and across cultures have commonly been endowed with moral and cultural authority, and been employed as a developmental tool for children (MacDonald, McDowell, Dégh, & Toelken, 1999).

There is, though, a distinct advantage a byproduct hypothesis has, in that it avoids the high threshold that any adaptive argument must meet. If the drive and capacity to engage in fictional worlds is an adaptation, then it must be strongly selected for, since it's a trait that is found in all humans. That is, it must confer some distinct advantage, or advantag*es*, such that not exhibiting the trait is highly disadvantageous, to the point of being almost entirely absent from the population. Weak selective forces, on the other hand, can sometimes explain multiple phenotypes within a population: if Phenotype A entails only a minor increase in fitness over Phenotype B, then a population can exhibit individual organisms with either Phenotype A or B (Wild & Traulsen, 2007), since the presence of Phenotype B incurs only a minor fitness cost and does not dramatically impede reproductive success. But if an 'aesthetic' for fiction was a case of weak selection, then we might expect to find many individuals who have no desire or appreciation for it. Since this is not the case, any adaptive account for fiction must be able to clearly delineate the reproductive benefits it provides, such that its function is unlikely to be adequately fulfilled by other mechanisms.

2.3 Functional benefits

There are a range of benefits that reading and engaging with fiction has been said to provide, everything from increased empathy (Bal & Veltkamp, 2013), mitigation against cognitive decline (James et al., 2013), to being correlated with overall longer life and wellbeing (Bavishi, Slade & Levy, 2016). But when it comes to providing a robust argument for fiction as an adaptation, it's not enough to simply point to the benefits fiction may or may not

provide. There are all sorts of activities we engage in that might be said to be beneficial. These must be linked with a clear picture of how they lead to reproductive success, and so genetic propagation throughout the population.

Adaptationist arguments attempt to provide such a link. While this thesis does not have the room to devote to a detailed analysis of each of the varied positions proffered by adaptationists, many of them place their emphasis on two main areas. This thesis will deal broadly with these[1]. Primarily, fiction is said to provide developmental benefits, driving the development of other important cognitive faculties and organising our cognitive and emotional processing; or it serves as a rich informational resource, offering up valuable experience and knowledge that we can draw on to help us navigate our social and physical worlds. These are not necessarily mutually exclusive, it may be that fiction has been selected for because it provides both developmental and instructional benefits, but both share a commitment to the capacity and drive to engage in fictional narratives as being genetically selected for.

2.3.2 Developmental benefits

The Evolutionary Psychologists Tooby and Cosmides (2001) agree with Pinker that stories are designed to stimulate adaptive cognitive mechanisms, and so elicit a 'pleasure response', but rather than simply empty calories, they argue such stimulation plays a fundamental role in the development and maturation of these systems. They suggest we might expect neuro-cognitive adaptations to have two modes, a functional mode, where the system is performing its evolved function, and an organisational mode, where the system in question engages in 'offline' organisation, essentially training itself by adjusting weightings, processing information and representations, without actually needing to engage directly in the function it is designed for. Much like children play fighting may be an activity that hones motor-coordination in a 'play state' (Symons, 1978), fiction may be a kind of 'cognitive play' (Boyd, 2010), honing other cognitive skills for their eventual application in the real world. Along these lines, Zunshine (2006) has argued that we read fiction because it exercises our innate capacity to attribute intentions and propositional attitudes to others, our so-called

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[1] Many of the authors cited here provide extensive accounts of the role fictional narratives play that extend beyond the Developmental and Instructional hypotheses. I have chosen to focus on these because they occur commonly throughout the literature, and discussion of adaptive benefits tend to place the bulk of their emphasis on some variation of the two.

Theory of Mind. The implication here is that fiction is an ideal way for neurocognitive systems to engage in offline organisation, and so we might expect to have also evolved an aesthetic desire to seek them out as sources of informational input to drive that organisation.

There's some empirical support for the developmental benefits fiction may have for important cognitive systems. A number of recent studies suggest a link between reading fiction and social cognition, particularly a capacity for empathy and theory of mind, the ability to attribute mental states and track the intentions and motivations of others (Mar, Oatley, & Peterson, 2009). These findings have also been replicated in television viewing, suggesting that the benefits lie in fictional narrative itself, rather than the medium through which it is delivered (Black & Barnes, 2015). Children whose mothers employ mental state language while reading picture-books to their children perform significantly better on false-belief tasks, a task that requires the ability to ascribe beliefs based on the perspective of another person (Adrian, Clemente, Villanueva, & Rieffe, 2005). The capacity to empathise with and track and predict the behaviour of members of one's species offers a distinct social advantage in the strategic manoeuvring to secure resources essential for survival, and in forming social bonds that enhance reproductive success (Seyfarth & Cheney, 2013).

One difficulty with a strictly developmental account of fiction, however, is that our engagement with it, rather than peaking during critical developmental periods and tapering off as we enter adulthood, like play for example (Hughes, 2009), continues throughout our entire lives (Barnes, Bernstein & Bloom, 2015). If we have evolved to seek out and appreciate fictional experiences because they provide important informational inputs to 'fine tune' cognitive mechanisms during their development, then we have little reason to continue to seek them out after said mechanisms have fully matured.

2.3.3 Instructional benefits

Another view, not inconsistent with the developmental hypothesis, is that stories also provide valuable adaptive information about our world (Dutton, 2010; Scalise Sugiyama, 2001), and safe spaces for the rehearsal of behaviours (Gottschall, 2013). While important during our highly impressionable developmental years, these benefits can potentially accrue well into adulthood. It's much safer to hear a story about a lion attack, and strategies for dealing with it, than it is to actually face a lion attack. Through stories we can also learn about the

motivations and desires of conspecifics, information that can give us an advantage in navigating our social worlds (Hernadi, 2002). Stories provide rich informational sources that can be drawn on to weight behavioural and emotional dispositions to experiences we have not yet had, such that should a time arise when we do have them, we will be better psychologically prepared to deal with them appropriately. Furthermore, through their depiction of the lives, desires, and motivations of their characters, they present a range of vastly different perspectives beyond our own, expanding and facilitating our understanding of our extended social milieu, and queuing us in to the norms and roles expected of us.

In this way, our 'aesthetic preference' for fiction directs us to activities that help us develop a repertoire of flexible behavioural responses and social skills that can be employed in highly variable and changing environments. Those that exhibit a propensity to enjoy and engage in fiction reap the competitive advantages that come with an increased ability to navigate our social and physical worlds, standing a better chance of passing on the advantageous genes that underlie a drive and capacity for fictional engagement.

Both of these seem like plausible functions that stories might fill. Rather than merely "pleasurable experiences", stories across cultures and history have been used to instruct, to educate, and to inform our understanding of the world and our place within it. Such accounts do better justice to the rich and important role storytelling plays culturally. But less clear is how essential fiction is for fulfilling these functions. How essential is fiction to our development, or as informational resources, such that not being exposed to its inputs leads to a reproductive disadvantage? This is, of course, an extremely difficult question to answer empirically. But without some kind of reason for thinking that the advantages are significant, we also have little reason for thinking that nature has seen fit to preference an aesthetic for fiction based on those advantages, particularly in the 'strong' sense required for it to be a universal feature of human nature. It may be that engagement with fiction merely provides an incidental developmental benefit, like playing the piano increases finger strength and hand coordination.

There is a dearth of evidence to show that children raised in environments of 'fictional impoverishment' develop less effectively, or are ill equipped to deal with their physical and social environments, compared to those who have access to the abundant

benefits fictional narratives provide. Perhaps for this reason, proponents of an adaptionist account often point to other indirect developmental evidence in support of an underlying genetic selection for the capacity to engage in, or produce, fictional narratives. This evidence usually comes in the form of identifying specialised cognitive mechanisms that allow us to engage in fictional worlds, and a supposedly innate emerging preference for fictional narratives in childhood. These capacities, it's argued, exhibit consistent developmental trajectories in individuals across cultures. As discussed in Chapter 1, this is often presented as a feature of modular neurocognitive systems that are the result of natural selection. If it can be shown that they emerge in roughly the same way, within similar developmental timescales across cultures, then, so the argument goes, we have good reason for thinking that, rather than acquired, the human cognitive architecture comes 'pre-equipped' with the developmental script that drives their realisation.

2.4 Pretend Play

Adaptationists often point to children's 'pretend play' as underlying our engagement with fictional narratives (Dutton, 2010; Gottschall, 2013; Tooby & Cosmides, 2001; Steen & Owens, 2001.) Boyd has argued it's 'where art begins', and suggests it is evidence for fiction as innate (Boyd, 2010). At its broadest, play is an activity that features in the behaviour of many animals, emerges reliably and spontaneously in the developmental cycle, and is found consistently across the animal kingdom (Bekoff & Byers, 1998), suggesting it may be an innate trait that has been selected for. Human children across the world devote swathes of their time to engaging in play. These behaviours, like fiction, represent a puzzle for evolutionary theory, because they appear non-directed and costly. Playing runs the risk of incurring injury, or being distracted from predators, and it takes away time that could be spent in other productive endeavours, such as procuring food. This has led some to theorise on the adaptive benefits an activity like play might serve, many of which align with those we have mentioned so far in regard to fiction.

While play is found across species, pretend play is most likely unique to human beings[2]. Pretend play consists of activities characterised by an 'as-if' stance (Garvey, 1992),

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[2] Some research, however, suggests chimps have been observed treating sticks as 'dolls'. Kahlenberg, S., & Wrangham, R. (2010). Sex differences in chimpanzees' use of sticks as play objects resemble those of children. Current Biology, 20(24), R1067-R1068. http://dx.doi.org/10.1016/j.cub.2010.11.024

an ability to treat an object or situation 'as if' it were something other than how it is actually known to be. In pretend play, a distinction is made between the 'real world' and a 'projected imagination' that is knowingly applied to a real situation. By around the age of two (Leslie, 1994), children are able to engage in abstract object substitution, treating one object as another, and substituting their functions while maintaining an awareness that they are doing so, exhibiting a capacity for so called symbolic thought. They pour imaginary tea from empty cups, use blocks as cars, and sticks as swords. As they get older, they begin to weave complex narratives into their play activity, inventing story arcs, and characters that they and their friends can embody (Benson, 1993). All of this requires a subtle capacity to cordon off the 'play world' from the 'real world', to bracket out and sequester the 'facts' of a fictional world, a capacity Tooby and Cosmides have referred to as decoupled cognition (2010).

This ability for symbolic thought and to decouple the fictional from the factual is said to allow us to enter fictional worlds, to treat them as 'offline' representations. By decoupling fictional narratives from a 'reality' status, information from them can be processed by the neurocognitive systems of the human brain without contaminating real world knowledge. In the developmental sense, this capacity, it's argued, allows us to engage in fiction to stimulate and calibrate developing neurocognitive systems offline. Further, the ability to maintain the content of stories as 'truth contingent' means information from them can be mined, and inferences drawn about what may be useful (read adaptive), and what can be safely discarded. We might learn from a story, then, that poking a bear is dangerous and ill-advised in the real world, without also having to believe that the bear depicted in the story really existed at the time and place it is represented.

The apparent reliable emergence of pretend play is said to serve as evidence that it is innate, and so too, then, fictional engagement, since it relies on the same capacities. As discussed in Chapter 1, though, we should be careful about attributing early competence to innateness. Just like human babies are bombarded with facial stimuli from birth, they are also surrounded by members of a community who encourage and facilitate pretend play. From the earliest stages of a child's life, parents, siblings, extended family and community, all engage in 'play prompting', actions that direct a child's attentions towards objects and ways of interacting with them. Rather than innate, the capacities required for pretence may emerge out of other mechanisms, such as imitation, or guided education. Research by

Rakoczy, Tomasello and Striano, (2005), for example, suggests a capacity to view others as intentional agents, which they argue emerges around the age of nine months, may be all that's required to facilitate cultural imitation of symbolic behaviours, including pretence.

Even if we might concede that the capacities for symbolic thought and decoupled cognition themselves are innate, not acquired as Rakoczy, Tomasello and Striano suggest, this does not necessarily lead us to the position that pretend play, nor the fictional engagement that is said to stem from it, is also innate. These are capacities that are employed in a range of tasks and contexts. Decoupled cognition and symbolic thought have all sorts of potentially adaptive benefits, including in the use of language (Deacon, 2007), future planning (Smallwood et al., 2011), and counter-factual reasoning (Smallwood et al., 2013). All of these provide clear real-world benefits, such that an inability to perform them might serve as an enormous disadvantage to any individual unfortunate enough to be forced to exist, and reproduce, in a world that demands them. The link between their function and reproductive success can be clearly made out. The link between the practice of pretend play and reproductive success is not so clear. In a comprehensive descriptive analysis of studies exploring the relationship between pretend play and development, Lillard et al (2013) found weak and inconsistent evidence to support a direct causal role in relation to a range of cognitive and social skills, including Theory of Mind, reasoning, creativity, and emotion regulation. They suggest pretend play may instead be either epiphenomenal, a marker of other developments but playing no causal role in development itself, or 'non-crucial', weakly impacting development that is largely facilitated via other routes. This calls into question any 'strong' selection of a practice like pretend play, such that it is a universal feature of human development.

It's my hunch that the kinds of capacities employed in pretend play, and so too in the creation and engagement with fictional narratives, are most likely innate, capacities that draw on an ability for decoupled cognition and symbolic thought, like counter-factual reasoning, mental time travel, imagination, and so on. The practice of pretend play itself, however, and by extension our engagement with fictional narratives, may instead be an example of scaffolded learning. Scaffolding takes place when a child is guided by others in obtaining knowledge and skill competency they would be unable or unlikely to achieve on their own (Wood, Bruner & Ross, 1976). Children are more likely to use an object symbolically if

witnessing an adult doing so (Jackowitz & Watson, 1980), or when engaged in interactive play with mothers who provide verbal instructions directing the child to do so (Fiese, 1990). Haight and Miller (1993), in a longitudinal ethnographic study of nine middle-class families throughout Europe and America, found pretend play emerges as a profoundly social activity, one that is largely guided by the participation and direction of parents. Before the age of two, children's pretence with objects arises almost entirely from imitation of adults, who model behaviours and direct the child with verbal instructions (Striano et al., 2001).

If pretend play emerges as a result of scaffolded learning, we might expect there to be significant cultural variation in its quantity and content, as different cultures will provide different levels of emphasis on the practice, and the time and resources made available for it. Gaskins (2013) points out that outside of 'Euromerican' cultures, most of children's pretend play is derived from their real-world experiences, and focuses on developing skills they will need as adults, or knowledge of social roles and cultural norms, rather than inventions of the fantastical. Pretending that goes beyond the children's real-world experiences is rare, and in some cultures, pretend play is practically non-existent. Kisii boys in Western Kenya, for example, engage in very little pretend play, with Levine and Lloyd (1977) documenting only two examples throughout their extensive fieldwork, building a plough out of wood, and a house from reeds. Most play within traditional cultures rarely includes fantastic transformations, but instead closely mimics village life (Power, 1999). There are also socioeconomic differences. In a comparative study across five cultural groups in Brazil, Gosso, e Morais, and Otta (2007) found high socioeconomic children were significantly more likely to engage in pretend play, whereas those in lower socioeconomic groups engaged in play that more closely reflected real life, a finding supported elsewhere (Tudge, 2008).

The variation in the type and quantity of pretend play across cultures, and its contested developmental benefits, should lead us to question its status as an innate trait, strongly selected for genetically because it provides reproductive benefits. While the capacities it draws on may be innate, the externalisation of them in practices like pretend play, and so too engagement with fictional narratives, may instead result from scaffolded learning that extends their functionality into a new cultural domain. This is a fine distinction, but an important one, because we must be clear about what's being selected for here: the underlying capacities, or the practices of pretend play and fiction themselves. Adaptationists

tend to conflate the two, taking evidence of the former as evidence for the latter, but depending on how we answer the question we might be led to very different conclusions regarding the three aspects we must explain: the universality, function, and qualities of fiction.

Chapter 3: Fictional Competency As Exaptation

3.1 Recycle and Redeployment

As discussed in Chapter 1, evidence shows how the brain's plasticity allows for the reuse of neural structures that have been selected for other purposes. Anderson (2010) has suggested it is a fundamental principle of the organisation of the brain that neural circuits are routinely 'cannibalised', both through evolution, and throughout development, and put to new uses while retaining their original functions. None of the accounts of fiction as an adaptation mentioned so far have really taken seriously the neural plasticity hypothesis as it might relate to the emergence and acquisition of a desire for, and competence in, engaging in fictional narratives itself. If we take the extent of this plasticity seriously, then we must also entertain the possibility that fiction is a practice that is encultured throughout an extended childhood in which it is acquired as a novel behaviour.

Consistent with Anderson's reuse hypothesis, Stanislas Dehaene (2014) has argued that the human brain is able to recycle neurocognitive systems (and even individual neurons) for use in new and novel contexts. Focusing on reading, an activity which has emerged much too recently in human history to be considered a genetic adaptation, he makes the case that learning to engage in these cultural activities enables new connections in the organisation of the brain, sometimes cross-modally. Older cognitive systems that may have been selected for previously, such as those involved in vision and perception, are 'recruited' to a new task, as in reading and writing, and new neural structures are functionally established through practice, 'creating', rather than inheriting, a functional module capable of processing particular informational inputs. Dehaene argues that writing styles over time have been adapted to fit the constraints and biases of these older cognitive systems (the distinct right angles of letters and cuniform designed to 'mimic' corners and edges of objects, for example), to make them easier to learn and to process. In other words, it's not the brain that adapts phylogenetically to reading and writing, but the systems of writing, developed culturally, that have been adapted to our brains, evolving over time to serve as a good fit with the neural mechanisms they exploit.

All of this points to brains that exhibit a high degree of plasticity, able to be moulded and shaped by their environments, rather than distinct modules selected for in the EEA.

Menary (2014) has suggested fiction, similar to reading and writing, may also emerge as a scaffolded competency that alters the brain functionally and structurally, eliciting a new capability. While little research has been done on the way fiction may alter brains developmentally, I see this as a plausible alternative to an adaptationist account, and an interesting avenue for future research. This would situate fictional competence as a kind of exaptation, a co-opting of other neurocognitive systems, bringing them to bear in a new capacity.

There are two possibilities I see here, and it's these that I refer to when I use the term exaptation[3]. The first is similar to what Dehaene has suggested, that learning to engage with fiction elicits a structural and functional change in the brain, extending other systems to create a new competency. The second possibility is that the brain stays structurally and functionally the same, but capacities that serve other purposes are redeployed to a new task, as one might learn to ride a bike by marshalling skills like balance, motor-coordination, pathfinding, etc. Neither would require any specific selection for a fictional capacity, rather other capacities would be drawn on and moulded through practice and education.

Engagement with fictional narratives requires a range of cognitive skills. We have mentioned a couple of these so far, in symbolic thought, and the ability for decoupled cognition, but there is a raft of others: episodic memory, causal reasoning, social cognition, mental imagery, and so on. None of these are dedicated to processing information from fictional narratives, they all serve other vital purposes in allowing us to navigate our worlds, and so likely emerge out of multiple selection pressures. Take our capacity for imagination, for example. Imagination gives us the ability to form images, concepts, or sensations in the mind, without sensory input. While undoubtedly employed in engagement with fiction, it also allows us to recall memories, to engage in counter-factual reasoning, and plan future actions, all of which are likely to be highly adaptive (Asma, 2017).

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[3] The term exaptation has been used in a variety of ways in the literature. It can refer to the evolutionary process of adaptations building on prior adaptations to generate new capacities, and as phenotypes that have evolved for one reason serving as a fit for new selective pressures. The sense in which I am using it here, however, is a developmental one: cognitive capacities as being shaped and extended through a cultural practice, not as a result of selective pressures.

Research suggests that imagining the presence of a stimuli can evoke similar brain activations to actually experiencing the stimuli (Young, 2014; Martin, 2013). Essentially, then, when we 'imagine' we may be drawing on memories of prior experiences, piecing them together to model new counterfactual scenarios or to represent absent stimuli (Schacter, 2003). Indeed, the neural networks called on in memory, future planning, and imagination are likely the same. Severely amnesic patients with damage to the bilateral hippocampal region, for example, were also unable to imagine themselves in atemporal fictional scenarios, scenarios with neither past nor future connotations, and so to imagine new experiences (Hassabis, Kumaran, Vann & Maguire, 2007). Mullally and Maguire (2013) suggest the hippocampus may play a pivotal role in 'scene construction', being able to mentally visualise ourselves in scenarios as a way of reconstructing past memories, imagining new experiences, and projecting oneself into the future.

The ability to generate internal models and representations enables a remarkable flexibility that is invaluable in helping us survive and navigate our environments. But these same activations can also be elicited exogenously. Hearing the word 'orange', for example, elicits activation in the region of the brain associated with olfaction (Nijhof & Willems, 2015). Verb retrieval tasks have been shown to activate areas involved in motor control functions (Damasio, Grabowski, Tranel, Hichwa & Damasio, 1996), and mental imagery with visual processing (Ganis, Thompson & Kosslyn, 2004). Merely hearing or seeing words associated with sensory stimuli, then, may also trigger 'memories' of actual sensory experiences.

Dor argues that our imagination is intrinsically linked with language (Dor, 2017), that the whole point of language is to 'direct another's imagination' (see Chapter 4). While not all fictional narratives are linguistic, they are undoubtedly in the business of guiding our imaginations. A storyteller, through the use of language and plot devices, may skilfully elicit 'memory-like' responses in a reader/listener, to guide them in the construction of new scenarios, and transport them into these worlds. This wouldn't require any cognitive abilities specifically selected for because they allow for fictional engagement. By co-opting capacities usually employed in the internal generation of models or representations, employed in vital tasks like future planning and memory, a good storyteller can 'suck us in'

to *their* world. Much of the work, then, is being done outside of the skull, in the construction of the narratives themselves.

Recall Dehaene's claim that, through a process of cultural evolution, writing has adapted to fit the biases of pre-existing cognitive structures that it co-opts. Fictional narratives may also be constructed in such a way as to provide a 'better-fit' for the capacities it seeks to co-opt. We are not just attracted to any old stories. If stories co-opt systems selected for other reasons, then they should be constructed so as to, like Dehaene says, cater to the biases of those systems. Audiences have a preference for protagonists they can identify with, for example, and storytellers meticulously craft main characters that are both believable and relatable. Being able to 'see ourselves' in the character is correlated with greater levels of emotional and cognitive engagement and perceived realism (Green, 2004a).

One of the reasons for this may be that the brain distinguishes between 'reality' and 'fiction' by drawing on different memory systems. Using fMRI, researchers asked participants to make judgments about the possibility of certain scenarios, based on fictional or real characters, as being true. What they found was that areas of the brain associated with episodic memory retrieval and self-referential thinking were more active for real characters, and areas associated with semantic memory retrieval were more active when the scenarios involved fictional characters (Abraham, von Cramon & Schubotz, 2008). If fictional narratives are a way of tapping this kind of imaginative capacity for positing ourselves in hypothetical or counter-factual scenarios, then presentation of a character we are more likely to identify with, encouraging us to adopt the character's goals and point of view (Tal-Or & Cohen, 2010) may make the narrative more personally relevant, and so more believable. This would perhaps be an example of a narrative device shaped so as to co-opt other particular cognitive capacities.

An adequate defense of the above would require more attention than I have room for here, and more focused empirical research looking at a potential link between the features of narrative structure and the biases of the cognitive mechanisms engaged. I raise it here merely as an example of how an exaptation account may expand our explanatory power and generate alternative hypotheses. If natural selection is said to have favoured our engagement with fiction because of the developmental or informational benefits it provides, then we might

expect that we would be far less discriminating in the types of stories that we find engaging. Any story that meets the criteria of stimulating cognitive systems, like theory of mind, or that contains information about our environments, might be attractive on the adaptationist account, since this is the reason our aesthetic preferences for fiction are said to have been selected for. But at least as far back as Aristotle (Aristotle., Bywater & Murray, 2005), theorists and writers have been aware that fictional narratives should be of a certain kind and form, if we are to find them interesting. An exaptation account may be better situated to explain these preferences.

Like opportunity and resources for pretend play, children from birth are surrounded by fictional narratives. Many parents begin reading stories and picture books with infants, for example, well before the child begins to develop a capacity for language (Woolley & Cox, 2007). They engage in 'joint attention' with the child, directing its attention to the referential and symbolic nature of the pictures by pointing, evoking sounds, and naming them. The child in turn goes from 'acting on' the book, hitting, scratching, and grabbing at the pictures, to referential actions that show an increasing awareness of the symbolic nature of them, through imitation of the actions of their parent (Bus, Belsky, van Ijzendoom & Crnic, 1997). This scaffolded and guided education extends into the child's school years, where they are taught to understand and create increasingly complex fictional narratives for themselves, absorbing the tropes, archetypes, and norms of form and content of their culture's stories, and, at later ages, to understand the increasingly abstract symbolism of a text. Fictional competency may emerge ontogentically as a combination of scaffolded learning, and the specific construction of narratives so as to co-opt other innate capacities, extending them into a new domain. This would make it an acquired practice, rather than itself innate.

3.2 Fact or Fiction?

If fiction co-opts other capacities, then it would make sense that they may not serve as a perfect fit for the task. Take our example of the capacity to decouple fact from fiction. The Paradox of Fiction is a philosophical problem that points out an apparent tension between two facts relating to our experience of fiction: (1) we experience strong emotional reactions to characters and events we know to be fictitious, a reaction which suggests we think them to be real, but (2) we do not actually believe they are real (Radford & Weston, 1975). A number of solutions to this problem have been proposed, including denying that our

emotional reactions to fiction are of the same quality as 'real' emotional reactions (Walton, 1978), and arguing that they are, but that we engage in a kind of 'willing suspension of disbelief', one that enables us to treat the characters and events of a story as if they're real (Paskow, 2008).

Of these, I favour the latter, but I see the term 'willing suspension of disbelief' as perhaps somewhat misleading, because I think it is our disbelief that is willed, not the default. This perhaps makes sense when we think about the nature of the evolution of human cognition. The architecture of the human mind has evolved gradually, building on and adding to phylogenetically prior structures to create new capacities. Older parts of the brain evolved to deal with the world as it experienced it – to detect predators, manage emotions, etc. In short, to trust appearances and act, quickly and decisively, in response to them (Striedter, 2005). More recent cognitive structures, primarily the frontal lobes, are what allow us to reason and reflect on those experiences, to 'reality-check' them, and to monitor their source in order to detect potentially false information so that we do not act on it to our detriment (Mithen, 2002). Older systems are immediate and economical, while the newer systems are, comparatively speaking, slow and effortful (Kahneman, 2015).

We have discussed already the ability for language to elicit mental representations that the brain may treat as memories of prior sensory experiences. On some level, when we hear or read a story, or watch a movie, we may be simulating an experience of the events as if they are really occurring to us (Speer, Reynolds, Swallow & Zacks, 2009). Stories may provide visceral and arousing experiences because our default is, at lower levels of cognitive processing at least, to believe them. People jump in their seats during horror movies, they cover their eyes to escape distressing scenarios, and sometimes talk to characters on television as if they are really in the room with them (Dibble & Rosaen, 2011). By, as Pinker says, tapping in to phylogenetically ancient motivational systems, like our fears, desires, curiosity, etc., they may elicit a reaction to them as if they were real. But we are also aware of the nature of the source of the information being provided, because we have grown up in a culture that educates us about the role of stories in our social system, and what should be believed and what should be discarded. We're able to rationally monitor these psycho-physiological reactions and contextualise them.

And so the apparent paradox of fiction may really tap in to a mind that is torn between two judgements, the immediate visceral reaction to fiction as if it is an experience really occurring, and the postdictive judgment that the source of the information is not reliable. In reality, these two systems are not neatly separable, their processing likely occurs almost simultaneously. It seems obvious to us as rationally engaged agents that our experience of fiction is non-veridical, but to 'deeper' parts of our cognitive activity this may not be the case.

This may explain why, contrary to the assumptions of adaptationists, we are not particularly good at separating fact from fiction. Fiction has a way of 'leaking into' our stores of factual knowledge, and altering our beliefs and behaviours without us being consciously aware of it. People attribute a character's behaviour to the actor's personality, for instance, disregarding knowledge that the actor is merely performing lines from a script (Tal-Or & Papirman, 2007). We draw on fiction as a source of information about the world, often forgetting the nature of the source and attributing it to prior knowledge before being exposed to the story (Marsh, 2003), and even when explicitly told that the fictional stories in question are likely to contain misinformation (Marsh & Fazio, 2006). The likelihood of retaining these false beliefs seems to be stronger the more time has passed (Jensen, Bernat, Wilson & Goonewardene, 2011). Importantly, this is not a process of explicit inference, 'mining' stories for accurate information about the world but simply being mistaken about the truth status of a particular piece of information. In the Marsh and Fazio study, they were able to diminish the misinformation effect only by getting participants to actively press a button when they came across factually incorrect information in the story. Monitoring for truth/falsehood is effortful, our default is instead to believe. These effects are stronger depending on the level of what Green (2004b) calls 'transportation', the way an individual becomes cognitively and emotionally absorbed in a fictional narrative, suggesting that the monitoring of reality status is diminished, and critical faculties relaxed, perhaps in a kind of hypnotic or meditative state.

This makes fictional narratives not only a good way of changing beliefs, but for motivating behavioural change. A growing body of research shows fictional narratives are remarkably powerful tools for eliciting behavioural changes (Murphy, Frank, Chatterjee & Baezconde-Garbanati, 2013; Moyer-Gusé, Chung & Jain, 2011). Viewers of fictional

television shows that positively promote organ donation are more likely to themselves sign up to be donors (Morgan, Movius & Cody, 2009), and fictional narratives, when contrasted with the provision of purely factual information, are correlated with more altruistic behaviour as measured by charitable donations (Zack, 2015). In one study, Hakemulder (2000) showed that participants who read a novella about the fictional life of an Algerian woman, over those who read a straightforward non-fictional account of the struggle for women's rights in the country, were more likely to challenge the gender norms of the culture afterwards. Gaining insight into, and identifying with, the lives of others can be a profoundly moving educational and motivational experience, and the narrative devices specific to fiction make it well suited to the task. Elsewhere, Bandura (2004) has shown how telenovelas, or soap operas, can be used to instil norms and values within viewers, and change behaviour in areas like health and educational aspirations. The capacity for stories to engage us deeply and emotionally, and to encourage us to identify with the characters depicted in them, appears to make them capable of eliciting behavioural changes more readily than simply being presented with factual information.

3.3 Do children have a preference for fictional narratives?

Adaptationists assume that children seek out fictional narratives, that they are aesthetically driven to them, and that evolution has favoured this because of the benefits they provide. But there is little evidence that actually looks at whether children have a preference for fictional narratives over 'reality' narratives more broadly. The author is aware of only one study that looked directly at the question. Barnes, Bernstein and Bloom (2015) found that children aged 4 to 8, when given the choice, preferred 'true' stories over fiction, while adults had no preference. In a follow-up experiment, age effects were found on preference for fantastical stories over 'realistic' fiction. Children ages 4 to 5 preferred 'realistic' fiction, while those aged 6 to 8 slightly preferred fantastical stories. Interestingly, it was the adults who showed the greatest preference for fantastical stories over realistic stories.

This would seem to suggest that an aesthetic for fiction emerges late in development, which seems at odds with the intuitive notion that children prefer fiction, as evidenced by the plethora of fictional books and television shows targeted at children. One explanation for this may be that Western children in particular are born into a culture that simply assumes they prefer such narratives, and the kinds of resources and materials that they are provided with

reflect the expectations of adults, not the children themselves. Like pretend play, the amount of time they spend pursuing fiction may be a result of the affordances available to them, rather than an innate drive. It may also reflect the general mode of presentation, rather than any inherent benefits of fiction specifically. Fictional stories are often presented in exciting and interesting ways, tapping motivational systems to elicit arousal, while 'real life' stories may be presented in a less arousing manner.

What this may suggest is that children have a general drive to learn about their world, to soak up as much information as they can, from a range of sources, but not specifically for fiction itself. Recall that one of the aspects we are seeking to explain is the specific benefits of fiction over other narratives more broadly. It's not clear, then, whether the 'fiction' part is doing any of the work, in terms of an aesthetic that has been specifically selected for due to its reproductive benefits. It may be that through a scaffolded education, children come not only to have their capacities extended to allow them to engage with fictional narratives, but that their aesthetic preferences themselves are shaped over time by a guided and structured learning process that favours some narratives over others (Menary, 2004).

Chapter 4: The Fiction Niche

In Chapter 3 I sought to offer an alternative to the developmental picture offered by adaptationists, that fictional engagement emerges naturally out of an innate propensity and drive for pretend play, and fiction as an extension of it. I have instead argued that both pretend play and fictional engagement may be examples of scaffolded learning, that children acquire them as culturally mediated practices.

The adaptationist's developmental account results from a broad commitment to the Modern Synthesis, with its assumption that many of our capacities and behaviours are phylogenetically the result of genes adapted throughout the EEA to solve particular problems in the environments of our ancestors. The final chapter of this thesis will offer an alternative to this phylogeny. If fiction emerges developmentally as an acquired and scaffolded practice, then we may be led to different conclusions as to the reasons for its universality, its functions, and its unique properties. By applying the expanded conceptual apparatus of the Extended Synthesis, we can move beyond functional accounts limited to the individual, to look also at the group-wide benefits of storytelling, in particular their ability to modulate the cognition and behaviours of their members, and mobilise them in collective action. It's this function that I see as best accounting for the origin and ubiquity of storytelling.

4.1 The Sociocognitive Niche

The standard view of Evolutionary Psychology emphasises the role of natural selection acting on genes to instantiate dedicated cognitive mechanisms that have been selected for because they solved specific problems in the environments of our ancestors. As such, it is usually committed to an account that situates the causal nexus on the individual. It's the individual who passes on their genes to their progeny, and the individual who receives the reproductive benefits that receipt of said genes endows. The adaptationist accounts of fiction that we have discussed so far represent this view – they are framed in terms of the reproductive benefits an individual gains by being driven to, and capable of engaging with, fictional narratives. They seek to explain the ubiquity of fiction across cultures as emerging from a universal suite of capacities and aesthetic preferences coded for by the DNA of human beings. These cause an individual to seek out and process the inputs of fictional narratives to aid development, or as

informational resources that can be drawn on to determine optimal evolutionary strategies for surviving and reproducing in the world.

In a recent article, Brian Boyd (2017), a member of the adaptationist camp, has revised his position somewhat away from the individualist picture. Boyd now argues that a drive and capacity for fictional narratives should be seen not just as natural selection acting on random mutations to generate adaptive cognitive mechanisms, but as an example of niche construction and gene-culture co-evolution. As discussed in Chapter 1, proponents of the Extended Synthesis argue that culture itself can drive adaptive changes, that we can alter our environments in persistent ways that shape our evolutionary trajectory. The invention of dairy farming, for example, is a constructed cultural niche that is said to have created a selective pressure for the selection of lactose tolerance in particular subpopulations (Laland, Odling-Smee & Feldman, 2001).

Similarly, the Social Intelligence Hypothesis (SIH) is a claim that the development of larger groups in the distant past of our ancestors may have led to selection pressures for increased cognitive capacity, particularly in the form of social cognition (Holekamp, 2007). Ecological pressures in the EEA, such as threats from predators, and the ever-present need to secure food and resources, would likely have favoured individuals banding together to form collectives. Groups reap benefits like shared defense against predators, division of labour, cooperative hunting, and the opportunity for the sharing of cultural artefacts and knowledge that increases chances of survival. But increases in group sizes brings with it its own set of selection pressures. Members need to keep track of increasingly complex social worlds, the social status and inter-relationships of members beyond their local communities, some of whom they will have little or no direct interaction with (Dunbar, 1996). The increasing reliance on cultural knowledge is also likely to have favoured adaptive mechanisms facilitating an individual's ability to learn from their conspecifics, and cultural institutions designed to impart such knowledge. Sterelny (2014) has argued that we became 'evolved apprentices', adapted in ways that make us cultural sponges, capable of soaking up the stores of valuable knowledge in our social environments, and responding to sophisticated pedagogical practices designed to pass on mastery of competencies like fire-making, tool use/making, and hunting techniques. All of this points to human beings as evolving a high

degree of cognitive plasticity, finely tuned to learn from, and be shaped by, our peers and elders.

To enable the large-scale coordination and cooperation that the maintenance of this 'sociocognitive niche' might require, humans also needed to develop complex systems of communication. While the origins of language remains a complicated and hotly debated topic, one line of argument is that it was this interdependence that helped drive its development. Early forms of communication would have likely consisted of experimental-mimesis: grunts, pointing, and the acting out of proto-narratives using gestures (Donald, 1993). As increased cooperation allowed for larger groups to form, and they began to take advantage of features like division of labour that a sociocognitive niche allowed for, there would have been further pressure for the development of forms of communication that were capable of conveying states of affairs and experiences beyond the 'here-and-now'.

Dor (2017) argues that this likely led to the invention of formalised systems of mimetic communication, and eventually language. One of the benefits that linguistic communication brings over other, simpler, forms of communication, like gestures for example, is the ability to share internal states of experience inaccessible to other individuals, and to recount events that have either happened beyond the experience of another, or are predicted to happen, through narrative (Dor, ibid). We've seen how words can trigger 'memory-like' responses in individuals. Essentially, then, communicators do not simply convey messages via language, but use verbal queues to instruct their interlocutor in the imagination of the experiences themselves. As Dor says, this enables the sharing of something, i.e. an experience, that cannot be pointed or gestured towards. It allows for the bridging of the 'experiential gap'.

As these increasingly complex linguistic systems began to pervade our social worlds, and we came to rely on them more and more, the demands they placed on individuals who needed to navigate those social worlds would have increased too, selecting for those better capable of their production and comprehension. This essentially represents a feedback loop. The cultural invention of language established selection pressures for biological changes that allowed for the generation of more complex forms of linguistic communication, including narratives, which further ramped up the selection pressures.

4.2 The Origin of Fiction

Boyd sees fiction as emerging out of the link between imagination and language, coupled with an innate propensity for pretend play. As such, he still relies on a drive and capacity to engage in fictional narratives as innate, selected for genetically because of its reproductive benefits, albeit ultimately the result of a social niche that led to the capacities that helped get it off the ground in the first place. For Boyd, we 'crave' fictional narratives because of the instructional benefits they bring. Insofar as this still rests on the claims of the instructional hypothesis, then, it is subject to the same criticisms that have been levelled at it so far. While the link between the development of language - and more broadly narrative - and reproductive success is perhaps clear, the link between fictional engagement and reproductive success is less clear. As we have seen in Chapter 2, there is some reason to doubt that the practice of pretend play - rather than merely the capacities it draws on - is innate. Its developmental benefits are contested, and I have instead argued that it may emerge out of scaffolded learning, a process of guided education that externalises capacities selected for other reasons.

Furthermore, factual narratives would appear to be capable of providing the same instructional benefits. We are still left with the question, then, of what it is specifically about *fictional* narratives, over narratives more broadly, that gives individuals driven to engage with them an advantage over those who are not. On this front, Boyd appears to offer only one solution: fiction expands our repertoire of narratives and experience. Factual narratives can serve the same instructional benefits, but they require those who create the stories to have actually had the experiences in question, meaning a commitment to factuality drastically reduces the number and types of stories we can tell. The flexibility of language allows for the construction of scenarios outside of experience, increasing the breadth of their instructional benefits.

I think this flexibility is an important feature of fiction, and I will have more to say on this later, but it's unlikely to be the *reason* we have evolved to find them attractive[4]. What is

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[4] In fairness, this is not Boyd's claim. But if, as I have argued, pretend play is unlikely to be the basis for the innateness of fictional engagement, then the only unique role left for fiction to be subject to selective pressures is the expanded instructional benefits it provides.

useful in fictional stories, from an instructional point of view, is only useful insofar as its content accurately reflects the problems of the real-world. Fiction may be a valuable source for such information, but it's not the fiction part that we must have evolved to seek out. Perhaps, as Boyd also alludes to, we have developed an innate desire to share our experiences, and to tap in to the experiences of others. But while this may be in part what makes fiction appealing, it's also what makes factual narratives appealing. In other words, what is specific to fiction, its non-factuality, may not be what is doing the work, in terms of an instilled aesthetic designed to direct us to its inputs. This would make an aesthetic for fiction a byproduct, not selected for itself. We don't 'crave' fiction, per se, we crave narrative communication, and we do so because narratives are a useful way for learning about the world beyond our experience – and communicating those experiences to others.

4.2.2 Lies, Damned Lies, and Storytellers

Rather than emerging out of pretend play, I want to suggest another more plausible link between language, narrative, and fiction. The upshot of language, favoured in the sociocognitive niche, that gives us the flexibility to represent aspects of the world to those who may not have been present to experience them first-hand, is that it also allows us to either wilfully or unintentionally misrepresent it. Once representations can be decoupled from the things they represent, embedded in language that can be used to trigger these representations in others, then they can be recombined and presented in ways that do not accurately reflect the real world. While one side of the coin is the increased ability to use narratives to communicate valuable information about the world, helping foster cooperation, the flip side is that we can also use them to deceive each other. Throughout the animal kingdom, deception is a successful strategy for organisms to secure resources and reproductive success (Mitchell & Thompson, 1986). The flexibility of language, and in particular narratives, makes it a handy tool to employ in the deceit of others.

Humans are prolific liars (Feldman, Forrest & Happ, 2002). Children begin to lie around the age of two, and increase rapidly in proficiency over the next few years (Evans & Lee, 2013). As adults, we lie to boost our self-image, to get jobs, to coax sexual partners into bed, and to rationalise away our own flaws. Unlike pretend play, the link between the ability and desire to misrepresent the world to others, and reproductive success, is more clearly made out. In the sociocognitive niche, with its emphasis on increased cooperation and inter-

dependence, lying emerges as an advantageous social strategy (McNally & Jackson, 2013). Individuals can exploit the cooperation of others, and those who do so successfully, avoiding detection, are rewarded. But not all lying is done for individual gain. We tell white lies to spare the feelings of others, smile when we might not feel like it, and engage in all sorts of social niceties when we might not mean them. While 'damned' lies, the kinds of lies that are meant to result in personal gain at a cost to others, are socially condemned, lying is a natural part of our day to day lives (DePaulo, 2009), and in many ways serves to smooth our interactions with others – arguably just the kind of social lubricant required for individuals in extended groups to co-exist peacefully. As such, I see it as getting us closer to a more robust link between factual narratives and the emergence of fiction. First, we learned to communicate to cooperate, then we learned to lie to take advantage of a sociocognitive niche that relies on that cooperation, whether to exploit it, or to facilitate it.

Gottschall (2003) argues that lying makes us natural storytellers. But lying and fiction are not the same thing, although there is undoubtedly a great deal of overlap. Both a lie and a story can be narrative driven. Both can be told in an engaging way, inventing characters, and story arcs, and recounting exciting events in a dramatic fashion. Both draw on the same capacity for flexible communication that allow for the wilful or unintentional misrepresentation of the world. And yet while we are driven to seek out and engage with fiction, rewarding those who skilfully tell stories, we avoid and punish the lie and the liar. We don't seek out 'narrative lies' to engage with, regardless of what elements of truth they might contain. The difference here is, of course, the intention. The liar seeks to deceive for their own gain. The storyteller, on the other hand, has made the non-factual nature of their narrative explicit. What separates a liar from a storyteller are the cultural norms that make one acceptable, and the other a pariah. It's the cultural context that determines whether we have a desire to engage with and seek out one narrative over the other.

4.2.3 The Fiction Niche

To get from lies to fiction, then, we need one more piece of the puzzle. As discussed already, every culture has its own storytelling traditions. These include not only the stories that are passed down from generation to generation, but the conventions of form and content that serve to shape the development of those stories. Tropes, archetypes, plot devices – each new storyteller is born into a body of existing narrative devices that constrain the form of any new

stories they may create. Each member of a community arrives into a world already populated by a backlog of stories that have been crafted out of these narrative norms, and has their expectations for what *counts* as a story, and what counts as a *good* story, shaped by their exposure to those storytelling traditions. These are embedded within a body of institutions and practices that dictate what kinds of stories are appropriate to tell to whom, who can tell them, how they should be told, and where they can and should be told, whether by campfire at night (Wiessner, 2014), or in the packed cinemas of the modern world.

Along with the pedagogical practices designed to scaffold engagement with fictional narratives, this is what I collectively refer to as the 'fiction niche'. Without such a niche, it's my claim that there is no *natural* distinction between fiction and a lie. The boundaries that demarcate fiction from lying are culturally constructed, and part of what it means to be inducted into the niche is to learn to identify the cultural markers that alert one to the status of a particular narrative as 'fictional', as opposed to a fact or lie, and to employ those same markers to alert others, in the construction of one's own stories. This knowledge is acquired, it is a form of non-genetic inheritance. Individuals are born into an already constructed niche, are given the conceptual tools required to understand its features, and have aesthetic preferences and cognitive capacities shaped and moulded to allow them to engage with it.

This is a strong claim, and requires much further elaboration and defense, but for the purposes of my thesis it gives us what I argue is the missing link from biology - through language, narratives, and lying - to fiction. We haven't evolved to seek out fiction's inputs, any more than we have evolved to seek out lies. We find fictional stories aesthetically pleasing because we find narratives aesthetically pleasing, because stories represent particularly well-constructed narratives designed to target phylogenetically ancient motivational systems, and because we have absorbed the expectations of what counts as a (good) story through exposure to our culture's stories. We haven't evolved to tell stories, either. We have evolved to misrepresent the world, both to ourselves and others, for personal advantage and to 'smooth over' our broader social interactions. It's only through the culturally constructed niche that fiction takes form, as a kind of sanctioned lie. To extend our previous chain, then: first we learned to communicate to cooperate, then we learned to lie to exploit/facilitate cooperation, then we developed institutions to focus our ability to lie in culturally acceptable ways.

Why, then, have cultures developed norms and institutions designed to 'sanction' particular forms of lying? While I have argued that we cannot have evolved to specifically seek out fictional narratives due to their instructional benefits, this is undoubtedly a part of the picture. Stories are used by cultures to educate children about potential dangers, to teach them about the social roles of their community, and to communicate its norms and values. These undoubtedly have benefits for the individual in navigating their environment. But because we are no longer wedded to the individualist picture that an account of genetic selection must rely on, I suggest there is a more fruitful way of looking at the role stories play, such that cultures have invented the kinds of institutions that moderate and facilitate their production. While space is limited, and there is much to be said on the potential functions storytelling might serve within a culture, I want to briefly outline three areas I believe may help explain why institutions emerged culturally to structure and mediate fictional narratives. All of these rest within the broader category of Mindshaping, and all emphasise the 'fictional' aspect, over narratives more broadly, as essential to the role they play.

4.3 Mindshaping

As we have already discussed, once situated in the sociocognitive niche, we likely faced selection pressures that favoured sensitivity to our social environments, rewarding those able to soak up the stores of knowledge and the behaviours of conspecifics. Human beings, more than any other species, are finely tuned to our social worlds. Young children are 'overimitators', they appear to be intrinsically motivated to imitate the behaviours of adults, adopting even superfluous steps that are unrelated to their goals or success achieving them (Whiten, McGuigan, Marshall-Pescini & Hopper, 2009). From an evolutionary standpoint, this evolved plasticity makes sense (see section 1.4). Individuals with a propensity to imitate other members of their social group are able to adopt successful practices and skills vital to survival and reproductive success. This kind of information can be transmitted vertically, from parent to child, horizontally, from peer group to child, and obliquely, from respected members of the community, extended family, experts, teachers, etc. (Boyd & Richerson, 2005), meaning children are born into a world rich in models, information, and resources that shape their development. The ability to learn from conspecifics allows for extraordinary behavioural flexibility.

But it can't be that we have evolved to merely be rampant indiscriminate imitators. Such a strategy could potentially be disastrous, as it would mean we would not only mimic the successful behaviours and practices of our conspecifics, but also the maladaptive ones. Henrich and Boyd (1998) argue that natural selection is likely to have favoured psychological mechanisms that facilitate a number of biases that selectively focus imitation in advantageous ways. A conformist bias, for example, may be adopted by individuals in relatively stable environments, serving to identify traits and behaviours that are more frequent among conspecifics in a population as adaptive. If traits are possessed by a majority of one's social group, then their ubiquity may be strongly suggestive of success, and imitating them increases the chances that an individual will also achieve such success. If this were the only bias, though, then cultures would be susceptible to stagnation, incapable of innovating and changing over time as a majority bias simply continued to ramp up established practices and behaviours. Luckily, we also appear to exhibit a prestige bias. Children as young as three are able to identify successful and prestigious members of a community, and seek to emulate them (Chudek, Heller, Birch & Henrich, 2012). This means that particularly skilful or successful members of the group can transmit new, innovative, and refined modifications to existing practices, that they can be adopted readily by other members, passing them on for future generations to further modify and improve. This is one of the defining features of human culture: unlike other species, ours is cumulative (Tomasello, 1999).

Zawidzki (2013) argues that biased imitation and pedagogy, along with a number of other behaviours, like normative judgment, norm enforcement, and self-constituting narratives, are also mechanisms by which groups are able to 'shape' the minds of new members in ways that facilitate cooperation. While there isn't the room here to do justice to Mindshaping as a theory, what's important for our account is the way a propensity for rampant imitation makes individuals sensitive to the norms of their social environments. The point of Mindshaping is that groups can present models as referents for imitation, and in doing so bring the dispositions of their members in to line with them. This has the effect of normalising dispositions across a population, homogenising behaviour, and essentially shaping people in ways that make them more predictable to each other. When members of a group have been subjected to the same enculturation of norms, values, beliefs, and behaviours, etc., then each member can reasonably expect another to act roughly in line with

these shared reference points. In the sociocognitive niche, where members of an extended group are likely to have little direct contact with many of their fellow members, Mindshaping can help facilitate cooperation and interactions by establishing an overarching system of values, norms, and beliefs that one can reasonably expect even strangers to share.

Along with a robust innate drive to punish norm violators, Mindshaping also serves to mitigate against transmission of behaviours and attitudes that violate these norms. Individuals within any group have available to them a range of behavioural strategies for navigating their social networks. One of the difficulties that arises here is the problem of free-riders and the problem of defectors (Sauermann & Glassmann, 2014). That is, it may be individually advantageous to violate the norms of the group, to pursue a strategy that foregoes the shared commitment to its values, or to reap the benefits of group cooperation without contributing. This brings with it a number of problems. It threatens to undermine the trust that facilitates interactions between members of the group by eroding the expectations of 'fairness' that they bring to those interactions. Furthermore, any successful defectors potentially present themselves as models for imitation – that is other members of the group may identify their behaviour as successful, and seek to adopt it for themselves. The vertical and horizontal transmission of information from parents and peers to offspring also means these strategies always stand a chance of being passed on, and so deviant behaviours run the risk of propagating throughout a population through cultural transmission. When the broader group is able to influence and shape the minds of individuals, by exploiting a propensity for biased imitation and through guided pedagogy, such oblique transmission can mitigate against the transmission of defector strategies by ensuring behaviours in line with its shared system of values and norms are adopted instead, and those who would breach them are punished.

4.3.2 Stories as shaping dispositions

We've seen already how stories may serve as good candidates for Mindshaping, in the way they're able to invade our stores of factual knowledge, to enculturate beliefs and norms, and influence behaviours. Fiction also serves as a powerful medium for the presentation of models for imitation. We are encouraged to identify with the protagonist, to shun the antagonist, and we're given clear signals about the kinds of benefits that are to accrue to the protagonist. Flawed characters are often depicted in journeys of redemption – they come to

realise their flaws, or overcome them, and they are rewarded for doing so, or punished if they do not. These rewards often come in the form of reproductive benefits – the protagonist gets the partner in the end, achieves social status, wealth, etc., while the antagonist is rejected and punished by the community. These are clear markers for prestige.

We also assign a sort of general truth to our stories. Even knowing that stories do not refer to any specific time, place, events, or characters, we still assign to them a meta-representational value – that is we see them as representing the general reality of our worlds. Viewing of violent television, for example, has been found to be correlated with stronger beliefs in a 'mean and scary world', and an over-estimation of crime related statistics that don't accurately reflect the real world (Gerbner, Gross, Morgan, Signorielli & Shanahan, 2002). Appel (2008) found this effect on perception of reality to be mediated by the genres of media that an individual is exposed to. More exposure to infotainment and non-fiction programs correlated with a belief in a 'mean' world, while those with greater exposure to fictional narratives exhibited stronger 'just world' beliefs, essentially the belief that the good get what they deserve, and the bad get their comeuppance. Stories across cultures are often structured in this way, they setup likeable protagonists, unlikeable antagonists, and some conflict or tension which, by the end of the story, is resolved. This often takes the form of 'justice' being administered or restored – the good character gets what they deserve, and the bad gets what they deserve too, usually in the form of punishment, or perhaps even death.

Because stories have a way of being seen as abstracted representations of reality, they take on a normative quality – they serve as fertile models for a majority bias, since they depict 'meta-messages' about the general realities of the broader social worlds an individual inhabits, and a prestige bias, signalling markers of success in those characters who exhibit the right kinds of traits and behaviours. In this way, they can help set the expectations for the kind of 'world' that individuals inhabit, and encourage them to bring their own behaviour and beliefs in to line accordingly. These meta-messages can be easily stored and shared across large groups in the form of its stories, codified in the archetypes, tropes, and narrative devices of a culture's storytelling traditions, and passed on across generations to impart group wisdom, and tried and tested norms in engaging and captivating ways.

The 'utility' of fiction, then, rather than just its ability to represent a greater repertoire of valuable experiences and information that nevertheless still accurately reflect the world, lies precisely in its ability to *inaccurately* represent the world. Idealised characters can be depicted as exhibiting the right kinds of qualities, in such combinations as are unlikely to exist in real human beings. Free-riders and defectors can be represented as usually being caught and punished, even if they often go unpunished. The meta-representational value we place in stories, combined with our propensity for biased imitation, means they serve as a powerful top-down moderating force for shaping the dispositions of individuals within a group. They are a shared cultural reference point, a weathervane for an individual to gauge the conformity of their own dispositions with their extended group, and align them accordingly.

In this way, the kinds of dispositions required to facilitate cooperation in the extended groups of a sociocognitive niche, one that is trusting, honest, hard-working, cooperative etc., can be modelled as the norm – idealised and presented for imitation. In a cross-cultural comparison across seven different hunter-gatherer societies, Smith et al. (2017) found that 70 per cent of stories told in these groups included content focused on social behaviour, in particular prescribing social norms and coordinating behavioural expectations. They also conducted an analysis of storyteller competency within 18 hunter-gatherer groups and levels of cooperation. What they found was that groups with a higher proportion of skilled storytellers were more cooperative on an assigned resource allocation task, suggesting a correlation between the effectiveness of a group's stories and their levels of cooperation. While not all stories exhibit this focus on social behaviour, the high degree of such content found across cultures is strongly suggestive of functionality.

4.3.3 Imagined Communities

The ability for stories to homogenise behaviour and beliefs among group members, to serve as a shared cultural reference that can be drawn on in predicting the dispositions of other members too, can also help establish an over-arching shared identity, through the creation of what Benedict Anderson calls 'imagined communities' (Anderson, 1991)[5]. Through the

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[5] Anderson believes these 'imagined communities' emerged out of print-capitalism, as the mass-production of books in common language made them widely accessible to the public. I believe, however, that many of his insights may be fruitfully applied to storytelling prior to the invention of writing.

dissemination of images, including stereotypes, members of a group are given a socially constructed identity that they can align themselves with, an identity that comes to include members they will never meet or interact with. These images, and the traits and behaviours they identify as being indicative of membership to an 'imagined community', can serve as in-group markers, and so also define the outgroup as those who do not share these markers. Identification of cultural markers in individuals beyond one's immediate social group are a quick way to indicate who can be trusted, who is likely to adhere to the shared values and norms of the group in their interactions (Plötner, Over, Carpenter & Tomasello, 2015).

By representing members of this shared social identity as exhibiting particular traits and dispositions, they can also motivate behaviours that are maladaptive at the individual level, but serve the interests of the group. Think of war stories and films that depict heroes as sacrificing their lives for the 'imagined community' of their nation state, an act that undoubtedly runs counter to the adaptive interests of the individual. In the wake of the release of the movie Top Gun, for example, a film which depicts idealised heroic fighter pilots in combat with an unnamed Communist enemy, the US Navy reportedly saw a 500 per cent increase in recruits looking to become Navy Aviator pilots (Robb, 2004). In this way, stories can not only mitigate against the transmission of defector strategies, but can enculturate attitudes and beliefs that are aligned at group level interests, rather than the interests of the individual.

4.3.4 Motivating group responses

Through the creation of meta-representations of shared identity, and motivation of traits and behaviours that serve its interests, stories can also facilitate collective action in response to non-immediate or intangible threats. Because they are neither bound by time nor place, and because of their ability to generate life-like visceral representations that lower levels of cognitive activity may not distinguish as entirely false, they can bring us face to face with the potential consequences of external threats, making them salient even if we have never - or are never likely to - experienced them first hand.

Myths about natural disasters, which none in the group may have ever faced themselves, can be passed down across generations, helping to maintain the *potential* threat as immediate, discouraging freeloaders, and encouraging a stronger work ethic in the

securing of resources in the present (Nunn, 2003; Kaplan, 2015). Distant enemies that groups may have had little or no exposure to can be made tangible and immediate, keeping members alert for potential attack, or motivating their own aggressive actions. The ability for fiction to present hypothetical scenarios with a degree of realism allows for cultures to process their potential, better preparing them to deal with oncoming radical changes to their ecologies or social worlds and the problems they might bring. This provides a powerful way for cultures to present counter-factual and hypothetical scenarios that help motivate action, preparing for the onset of such events should they actually occur, or motivating collective action to pre-emptively address them so they do not.

By depicting successful protagonists as those who a) adopt the appropriate attitude towards a threat, and b) act successfully in ways that mitigate it, they can provide an impetus for their viewers and listeners to adapt their own beliefs and behaviours accordingly, and to reward others who do likewise. Their ability to define these as threats faced by a shared imagined community means they can appeal to the joint interests of its members, encouraging them to forego individual or short-term gain, for longer term strategic action.

Notice that this is similar to claims made by the instructional hypothesis, that fiction serves as a safe offline space for the rehearsal and preparation of behaviours. But my claim here is that it is not only individuals who can use fiction for this end, but groups – the meta-representational power of fiction allows for collective engagement and processing of hypothetical scenarios, and the motivation of joint action.

4.4 Why fiction?

I've suggested that adaptionist accounts struggle to explain why specifically fictional narratives, as distinct from narratives more broadly, are uniquely situated to provide the benefits that have seen it selected for genetically. A niche account that emphasises Mindshaping fares better on this front. Fiction can present the world as it *should* be, or as it *might* be, regardless of how it *is*, and because stories serve as such a powerful medium for enculturation, they can help construct the very worlds they represent by setting the expectations that group members bring to their interactions. Furthermore, because they are not bound to events that have really occurred, they can present hypothetical scenarios, making intangible threats salient and real, and motivating collective action to deal with them.

All of these are likely to have had enormous benefits in the kinds of extended groups that are a feature of the sociocognitive niche, as they allow for complex coordination of values, norms, behaviours, and joint action, binding together individuals who may have little or no contact with distant members of the group, in to a shared identity.

Because fiction is a form of culturally sanctioned lying, it is endowed with a measure of authority and prestige. While we are unlikely to place much store in the value of a story presented by a known liar, storytellers are usually respected members of a community, and stories are seen as providing valuable insights and important messages that we are encouraged and taught to take seriously. Part of what it means to be inducted into the fiction niche, then, is to learn to navigate this paradox – that stories are to be viewed as at once non-factual, but also representative of the world.

4.5 Maladaptive information

One of the criticisms here may be that while stories are a valuable medium for the enculturation of pro-social dispositions that may foster social cohesion, they may also equally transmit anti-social or maladaptive information. In fact, because stories are unburdened by a need to accurately reflect the world 'how it really is', they may be particularly susceptible to wittingly or unwittingly doing so. I think stories do propagate sometimes harmful and socially destabilising beliefs, such as racial stereotypes, sexist and violent attitudes, etc. But the niche itself goes some way to mitigating this. All cultures have norms that dictate the kinds of stories that are considered appropriate. Children's stories often contain clear unambiguous messages, while stories aimed at adults may include more complex themes and morally ambiguous plot lines, and this likely represents a gradation in both the perceived capabilities, and the moral maturity, of the group members. In the modern era we have publishers, distributors, production companies, and government regulations that serve as the gatekeepers for the kind of content that is appropriate for our stories. These are both informed by, and inform, the attitudes and expectations of the broader public. In traditional cultures, these gatekeepers were likely the village elders and the storytellers themselves, who were charged with remembering and disseminating a culture's stories to the rest of the group.

These institutions also make up what I have referred to thus far as the 'fiction niche', and they are charged with ensuring that our stories, as a general rule, communicate the right

kinds of information for their target audiences. The kinds of stories that are adopted and passed on by a culture are mediated by the expectations of that culture, and the institutions that help set those expectations, which are inherited across generations. This means stories themselves may be seen as a unit of cultural selection – those stories (or the tropes and archetypes that populate them) that adequately reflect the right (or important) kinds of values and representations of the world are passed on, endorsed by the broader culture and its institutions, while those which aren't, are more likely to die out and be forgotten.

4.6 Modifying the Niche

While niches can solve particular problems in the environments of a species, they may also create new problems that need to be solved (see 4.1). I have argued that the development of a 'fiction niche' addresses some of the problems faced by the extended groups of the broader sociocognitive niche, problems of social cohesion, cooperation, and coordination of joint action. If a culture's storytelling institutions can be considered a niche, then it too, while solving problems, may create others. The ability for stories to facilitate social cohesion by providing clear markers for in group and out group identification, for example, may have been highly adaptive in the past, leading to stronger groups united against competing groups. But in a modern age of mass migration and multicultural communities, the kinds of stereotypes of foreigners that were once - and continue to be - propagated throughout a culture's stories quickly become maladaptive, as 'in-group' members find themselves living side by side with those traditionally represented as the 'out-group'.

This highlights, however, a strength of the niche, that it can be modified to rapidly adapt to changing environments and circumstances, altering behaviour and beliefs on a mass scale much faster than genetic adaptation. Calls for Hollywood to recognise increasing diversity in its films, and greater sensitivity to the depiction of characters from other cultures, represents not just a shifting tide of broader public attitudes, but also a shift in demands for the way those attitudes should be *enculturated*. The group is able to mobilise its storytelling institutions rapidly to address a growing problem that threatens to destabilise it, namely hostile attitudes to racial groups within the community. Old stories can be modified, retold, and new stories created, to better enculturate values, behaviours, and attitudes that are appropriate to a changing ecology, with new threats and problems to be solved. While the

niche is persistent, transmitted reliably across generations, it is subject to refinement and can itself evolve to meet the changing needs of its community.

4.7 Between technology and byproduct

It's important to say something here about what the fiction niche is not. It's not simply a technology, in the way that the use of hammers, or computers, might be considered a technology. Davies classifies a technology as essentially a cultural practice that is acquired, relying on biological traits and capacities only indirectly, capacities not specifically selected for the practice in question (Davies, 2013), and subject to means-ends reasoning. It's the product that we value, the process involved in realising that product is incidental. Here he gives the example of fire. The actions that produce fire are incidental to the end product – we can get it by finding a tree struck by lightning, by rubbing two sticks together, or by using a lighter. It doesn't matter how we produce fire, because it's not the act of producing fire that we value, but merely the product. Art, on the other hand, and Davies specifically focuses on music, is something we find intrinsically valuable, not subject to the means-ends reasoning of fire use. We don't reflect on any benefits it might provide – it is the benefits that are incidental to our enjoyment of it. Davies says this is suggestive of art as more along the lines of a byproduct, or an adaptation, not a technology.

While I have argued that fiction is a culturally acquired competency that co-opts capacities selected for other reasons, our experience and enjoyment of it is also intrinsic to it, not subject to means-ends reasoning. We don't consume fiction *because* it shapes our minds in ways that helps foster cooperation and social cohesion. We consume it because we enjoy the act of listening, reading, or viewing a story itself. I have argued, however, that this is not the result of adaptation. Like a byproduct, it draws on capacities selected for other purposes, but like a technology, the *reason* for its transmission as a niche is that it addresses particular coordination problems that groups face. It is not *merely* an inconsequential offshoot of other evolved traits. As such, a niche account sits somewhere between a byproduct and a technology.

Through cultural evolution, practices that address specific problems can be transmitted across generations without the awareness of those who adopt them and continue to propagate them. The preparation of food is a good example of the ways in which practices

that have specific benefits can be culturally transmitted without members of the community necessarily being aware of those benefits. Countries with hotter climates use more spices in their food on average than countries in colder climates, with Thailand, Philippines, India and Malaysia at the top of the hot climate/spicy food list, while Sweden, Finland and Norway are at the bottom (Sherman & Billing, 1999). There are a number of reasons why this might be the case – it's thought that spices are used as a way to cool down by inducing sweating, or that the use of certain spices, like cooking, are a way of reducing the spoilage of food and eliminating dangerous pathogens found in warmer climates.

It's possible this represents an example of gene-culture co-evolution, where spices were originally used for the aforementioned reasons, and those who exhibited genetic dispositions to them were healthier and had more offspring, and so a preference for these spices has been selected for (Sherman & Billing, 1999). There are, though, no shortage of people from cooler climates and cultures who traditionally use few spices, who nevertheless enjoy them, or acquire a taste for them. It is arguably more plausible that cultures, through a process of purely cultural evolution, have developed better and better recipes that employ the use of spices in appealing ways, which have been passed down and transmitted to future generations. The tolerance and appeal for them may also be a process of enculturation. Mexican parents, for example, often provide packets of chilli powder mixed with sugar to children, exposure which serves to deaden the nerve endings and increase tolerance for the spice.

If this is the case, then people don't enjoy or use spices *because* of the benefits they provide, through means-ends reasoning, they enjoy them because they elicit a pleasurable experience, whether because their usage has been crafted to target innate preferences, or because they become accustomed to them from an early age. Nonetheless, the benefits continue to be realised. The point here is that we can come to implicitly enjoy the act of producing and consuming the products of a practice for reasons other than which it originated and continues to be employed. Fiction may serve as a similar case. Through the development of fictional narrative devices, and their transmission and modification across generations, stories may have culturally evolved to be better able to co-opt and target cognitive capacities and motivational systems, increasing their intrinsic appeal. Furthermore,

the 'niche' itself may be transmitted with little or no awareness of the stabilising role it plays socially.

4.8 Universality

There is a question looming here regarding my account of the fiction niche, and that is whether it can be considered adaptive at the group level. Multi-level selection is the claim that natural selection operates at different levels, not just at the level of genes (Wilson & Sober, 1994). Groups that exhibit advantageous properties, such as more members with prosocial attitudes, or institutions and technologies that enable them to more effectively secure resources, outcompete those groups that do not exhibit such properties. This essentially means group-level properties are selected for, as it's those groups who adopt or exhibit them that survive, while those who do not find themselves unable to compete. Zawidski certainly sees Mindshaping as enabling group selection, and sees such selection as central to explaining the development of the sociocognitive niche.

This is an interesting and complex topic, one that is beyond the scope of this thesis, and may provide an avenue for future exploration. If biased imitation and pedagogy diminishes within group variance and maximises between group differences (Boyd & Richerson, 2005), then those groups that have good binding stories that maximise social cohesion and clearly define the outgroup may be at an advantage when competing for resources, or in warfare, compared to other groups who do not. This would be one way to explain the ubiquity of fiction across cultures, as only those cultures who have developed robust storytelling traditions may achieve the levels of social cohesion required to transmit cultural knowledge successfully and secure enough resources to maintain themselves.

Nevertheless, I don't think an account of the fiction niche that I have given here is necessarily committed to the group selection hypothesis. This is because the desire to impart knowledge, to represent the world to others, and share wisdom across generations, arguably already is a human universal. Mindshaping is an intrinsic feature of what it means to be human. Note that this is not the same as saying fiction is embedded in our genes, but rather that a more general drive for expression and cultural transmission is, which can take many forms. Human beings are not only driven to soak up the information from their social worlds, they are driven to share their own perspectives and experiences with others, and to

influence the minds of others. Fiction as a medium, because of its flexibility, serves as an ideal candidate for this kind of cultural transmission. Members of the community are inducted in to the niche and given the tools to employ it in the service of this expression and communication. That fictional narratives should emerge out of factual narratives, and be used to transmit norms and values across generations, and that institutions will form to control those narratives in ways that may beneficially serve group stability, may simply be a natural organisational principle that arises as an inevitable result of groups, similar to how hierarchical political structures can emerge in response to pressures associated with increases in population levels (Tuzin, 1976). Since all groups face similar coordination problems, and I have argued that fictional narratives provide a unique solution to those problems, universality may be the result of a 'good cultural fit', rather than necessarily being 'selected for', in the strong sense, at the group level.

Conclusion

In the opening chapter of this thesis, I sought to outline what I argue are two very different approaches to the question of the evolution of human cognition. One, exemplified in Evolutionary Psychology and its commitments to the Modern Synthesis, emphasises the evolution of dedicated cognitive mechanisms and traits through genetic selection. This sees culture as mostly a product of, and input in to, human cognition. In contrast, an Extended Synthesis emphasises the plasticity of human brains, able to be shaped and moulded by their environment, including culture, and so non-genetic inheritance and niche construction as playing a fundamental role in the development and evolution of human traits.

These two very different ways of looking at the intersection between evolution, culture, and cognition contain starting assumptions that are likely to shape our hypotheses about the nature of human traits and the features of our social worlds. Adaptionists argue that the human brain comes hardwired to seek out and engage with fictional narratives, selected for as a trait that favours the genes of those who exhibit it. The adaptationist's commitment to the MS leads us to a necessarily individualist account: the universality of fiction arises out of genetic similarity, dedicated cognitive systems selected for that allow us, and entice us, to engage with fictional narratives. Fiction's function, then, is to increase the fitness of the individual. I have argued that the evidence commonly provided in support of such an

account is weak, and that it fails to adequately identify features specific to fiction, over narratives more broadly, that make it a good candidate for such selection.

In contrast, I have sought to provide what I see as a more plausible account, one that is not bound to the same assumptions. If we accept the importance of cognitive plasticity and non-genetic inheritance that proponents of an Extended Synthesis emphasise, then we should entertain the possibility that fictional competency may arise as an exaptation. Through a process of scaffolded learning, individuals may have their aesthetic preferences and cognitive capacities shaped and moulded into a new cultural domain. On my account, the universality of fiction emerges from a set of shared problems that all extended groups face: that is, how to coordinate and align beliefs, values, and behaviours such that they foster the pervasive cooperation that is a necessary feature of large groups[6]. The ability to *inaccurately* represent the world is what makes fiction a unique fit for the job. I have argued, then, that fiction should be seen as a culturally constructed niche, inherited across generations because it serves as an effective means of addressing these problems.

This thesis has merely sought to provide a rough sketch of what a niche account of fiction may look like. Future work would seek to expand on this, and respond in detail to further objections that might be raised. There is a lot more to be said about the ways in which fiction may act on cognition, and facilitate cooperation and collective action in groups. But by adopting the emphasis on plasticity and niche construction of the Extended Synthesis, we open up new ways for thinking about the role of a culture's storytelling practices, across developmental, historical, and evolutionary time. Rather than simply informational resources for modular brains, or tools for cognitive development, we can incorporate analysis that looks at the way stories shape the minds of individuals, and our social systems. This is to take a broader systems view, in contrast to what I believe to be a restricted individualist account of adaptionist theories, an upshot of their reliance on the Modern Synthesis. As such, I believe it can do greater justice to the cultural importance of fiction as a medium that allows us to shape each other, and the world we live in.

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[6] Some of the adaptationists discussed in this thesis do point out a role for fiction in fostering social cohesion and cooperation. However, because they are committed to genetic selection, their account must always come back to the individual benefits this cohesion provides. A niche account differs to this in that its emphasis is on the group benefits as explaining the ongoing transmission and function of the niche.

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