Dream Pluralism:

A Philosophy of the Dreaming Mind

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Table of Contents

Chapter 2: Bizarreness and Metacognition in Dreams: the Pluralist View of Content and Cognition 61

Chapter 3: Rethinking the Received View: Anti-Experience and Narrative Fabrication 99

For Mum

Abstract

This thesis applies a cross-disciplinary, integrative approach to the study of dreams. I propose a pluralistic view of dreams which opposes reductive accounts, instead focusing on the variety of experiences that can occur during sleep. I begin, in Part I, by demonstrating that dreams are highly varied and involve a multitude of features. Some dreams contain a variety of bizarre elements and irrational cognition, whereas others are accurate representations of waking life and display waking levels of cognition. I then argue that reductive theories of dreaming do not account for all dreams. Reductive views include the anti-experience thesis, the imagination model and perceptual views of dreams. Dreams cannot be reduced to any of these particular elements: a dream can be either imaginative, or perceptual or contain elements of both.

In Part II, I apply a variety of dream phenomena to debates in modern philosophy, areas where dreams have received insufficient attention. Firstly, I analyse a type of dreaming that I refer to as "dreaming vicariously", in which the protagonist of the dream is not the same person as the dreamer. I argue that these types of dreams pose an interesting problem for philosophy of the self, because it is conceivable that one brain can contain multiple minds. I then discuss dreams and the extended mind. I argue that it is feasible that dreaming cognition could be extended into the external environment in the future if we develop wi-fi cognitive enhancement devices. However, dreaming usually involves only internal, isolated cognition and this provides a counter argument to the theory of extended consciousness. Finally, I demonstrate that dreams have interesting implications for philosophical theories of consciousness. Since dreaming is a pervasive conscious experience that occurs for most people multiple times every night, it is important that any theory of consciousness provides a plausible account of dreaming that is consistent with the current dream theory. I evaluate theories that as yet fail to provide convincing accounts of dreaming.

An integrative approach provides new insight into both the ontology of dreams and our understanding of the mind.

Declaration

I certify that the work in this thesis has not been submitted for a degree nor has it been submitted as part of requirement for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the presentation of the thesis itself has been acknowledged.

I certify that all information sources and literature used are indicated in the thesis.

Melanie Rosen

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Introduction

> We must, in the next place, investigate the subject of the dream, and first inquire to which of the faculties of the *psyche* it presents itself, i.e. whether the affection is one which pertains to the faculty of intelligence or to that of sense-perception; for these are the only faculties within us by which we acquire knowledge.
>
> -Aristotle *On Sleep and Dreams* translated 1996.

Dreams throughout history

Dreams are a phenomenon that have fascinated and perplexed us for millennia. When we are asleep and isolated from the external environment, dreams can create an immersive, realistic environment with which we interact with objects and individuals. Alternatively, dreams are at times bizarre and unusual, and yet we are usually unaware that we are dreaming. Thus dreams involve a variety of interesting cognitive features. Over the past 60 years, scientists have begun to understand the mechanisms behind dreaming, whilst philosophers have puzzled over the phenomenon for thousands of years. Many individuals outside the academic sphere are intrigued by their own dreams, and often seek explanations for their content and causes.

In the early days of philosophy, Aristotle raised important issues about whether dreams involve sense perception: a question that is still discussed by modern researchers. Descartes, in his famous sceptical argument, questioned the veracity of perceptual experience by showing that we can never be certain whether or not we are dreaming. Dreams were an integral part of Freud's psychological theory, and the discovery of rapid eye movement (REM) sleep in the 1950's was the first step towards the understanding of dream neurophysiology. Philosophers and scientists are now especially focusing on explaining the similarities and differences between dreaming and waking experience. Scientists and philosophers question whether dreams are irrational or rational, perceptual or imaginative, cognitively impaired or whether they are conscious experiences at all. My focus is on the more recent literature in the past 60 years, so I do not analyse the works of Aristotle, Descartes and Freud.

The 20th century saw a rise in scientific dream research, especially since the discovery of REM sleep. Philosophers have been less enthusiastic in taking up dreaming as a serious area of study, although interest has fluctuated over the past century with a surge in recent decades. Early discussion of dreams by Norman Malcolm and Daniel Dennett rejected the received view: that dreams are experiences that occur during sleep, and that are reported upon waking. These claims evoked heated discussion from philosophers and scientists alike. More recent work by Antti Revonsuo and Thomas Metzinger provides detailed analyses of the dream experience from a cross-disciplinary perspective, and theorists such as Jonathan Ichikawa, Owen Flanagan, Ernest Sosa and Eric Schwitzgebel have challenged our assumptions about what dreams are. However, many theorists of mind have paid insufficient attention to dreams and this is an unfortunate oversight which has led to the philosophy of dreams being a "severely underdeveloped area of study" (Sutton 2009). By focusing on modern debates in the philosophy and analysing the relevant empirical scientific data, I propose an integrative approach to the study of dreams. I refer to this approach as *dream pluralism*.

The pluralistic account of dreaming

The pluralistic view of dreaming focuses on the variety of experience that can occur during a dream. Theorists often attempt to set out the minimal conditions of dreaming, some claiming dreams are necessarily bizarre or irrational, whilst others disagree, claiming that dreams are convincing simulations of waking life. The cognitive features are described by some research groups as irrational and deficient, whilst others argue dreaming cognition is similar to waking. Philosophical views of dreams are highly varied and there is much conflict amongst theories. Certain theorists argue that dreams are imaginative as opposed to perceptual, whereas perceptual theorists describe dream experience as hallucinatory or as virtual reality. The most extreme view is proposed by 'anti-experience' theorists who argue that dreams do not involve conscious experience at all. This contradicts the 'received view' of dreams: that dreams are experiences that occur during sleep and can at times be reported accurately. However, throughout my study of the empirical literature and integrative analysis of philosophical theory, I have found that dreaming involves a truly wide variety of experiences and no reductive theory accounts for all of them. For this reason I argue that dreams are resistant to reduction.

The pluralistic view is not only a theory of dreaming, but also a strategy and research focus. Instead of attempting to derive a minimal set of conditions for dreaming, I attempt to describe just how various dreaming experience can be. The pluralistic account takes into account the variety of dreams, from imaginative to hallucinatory, from irrational to highly rational, from multimodal and immersive to simple and unimodal. I argue that dreams are resistant to reduction because reductive views cannot accurately describe all types of dream phenomena without arbitrarily omitting certain experiences from the study of dreaming. I now set out a broad definition of dreaming under the pluralistic view, and establish the limitations of my thesis.

In the following paragraphs I briefly distinguish dreams form other experiences, and outline the limits of my thesis. Dreaming occurs in sleep. This is a pre-theoretical and intuitive approach based on the use of the term "dreaming" in regular discourse. When we discuss dreams, we refer to mental events that occur during sleep. If we were to discover phenomena that were similar to dreaming in all respects except that they occurred during waking, we would use a different term. That is not to say that such phenomena would be unimportant for dream theorists: they would provide an important comparison, and may be valuable for other forms of research. Nonetheless, this is not what we mean when we say "dream".

Since it is implausible that we can make reports of 'unconscious' experience, I argue that dreams are experiences. In chapters 2 and 8, I discuss a variety of views which align dreaming with unconscious cognition, as well as Malcolm's view according to which dreams are logically dependent on reports as opposed to sleep experiences. I argue that it is improbable that we can have unconscious experience that we report upon waking. To support a strong anti-experience thesis such as Dennett's, there would need to be empirical evidence supporting the possibility of retrospective consciousness of unconscious experiences. Unconscious cognitive activity certainly occurs during sleep, however it is unlikely that such activity is reportable, and I argue that these should not be classified as dreaming. Conversely, there is good reason to think that we can report dreams that involve impaired consciousness. As I argue in chapter 8, dreaming provides a convincing example of phenomenal consciousness without access consciousness. It is more plausible that we can report a dream that lacked access but maintained phenomenal consciousness than to say that we can report unconscious dreams.

One topic that I do not broached in detail is whether dreams can give us valuable information about our psychology that we could not otherwise learn from waking analysis. I remain neutral on this subject, and do not weigh in on whether dream imagery carries symbolic meaning, or can be useful for psychoanalysis. In regards to the issue of dreams predicting the future, I agree with Hobson that there is no reason to think that a dream could predict any events beyond those which are easily predictable by the waking mind, or by coincidence. For example, if I have a mundane dream about events that happen most days, such as having breakfast in the morning, this could be seen as an accurate prediction about what will happen for most mornings in the future. Beyond this very loose sense, dreams do not predict the future.

Dream pluralism and philosophy

Dream pluralism is an interesting approach to dreaming in itself. It also has implication for other areas of philosophy of mind and the self. The broad diversity of experience that occurs in dreams needs to be taken into account by a variety of areas of philosophy. In this thesis I focus on the self, cognition and consciousness. Dreams are important phenomena to take into account in theories of personal identity because of the changes that an individual undergoes during sleep. A particularly interesting example is the case of dreams in which the protagonist of the dream is not the same person as the waking self. Questions arise about who this protagonist is, and if it is possible for multiple personalities to exist within one brain. Unfortunately there is very little discussion of dreaming in the literature on self and personal identity. Dreaming is also relevant to theories of the extended mind because dreaming is an isolated cognitive state in which the dreamer can consciously navigate an internally-generated dream world, and interact with dream objects using their dream body. What exactly this means for the theory of extended mind will depend on the nuances of the theory. Some theories of extended cognition are consistent with the possibility of experiencing full blown consciousness in a dream, whereas other theories require some alternative explanation. Finally, dreams are an important phenomenon for the study of consciousness because of the common sense view that dreams are conscious, but an altered state of consciousness from waking. A theory of consciousness must take into account all variety of conscious phenomena in order to provide a comprehensive theory. However, philosophers of consciousness in general fail to provide a convincing account of dreaming consciousness. In this thesis I hope to open up these areas for dreaming and begin the discussion that as of yet has been left aside.

Overview of chapters

This thesis is separated into two parts. Part I sets out the pluralistic view of dreams. I support a pluralistic view by arguing that reductive views of dreams do not account for all dream features, and thus that pluralism is the preferable model. I outline some empirical work on dreams and then highlight the main reductive views of dreaming. These include the received view, that dreams are reportable experiences that occur during sleep. Alternatives to the received view are the anti-experience thesis, according to which dreams are not experiences that occur during sleep, and my narrative fabrication thesis, that many dreams cannot be accurately reported. Other reductive views include the imagination model of dreaming, which states that dreams are imaginative, and perceptual views, which liken dreams to hallucinations or virtual realities. I argue that these views cannot describe all dream phenomena, but rather focus on particular types of dreams. In Part II I argue that dreams need to be taken into account in philosophy of mind and the self. I discuss theories of the self and personal identity, the extended mind theory, and theories of consciousness. Dreams should be taken into account when formulating a theory of the mind, because dreams are important and interesting conscious phenomena that contain an interesting array of similarities as well as differences from waking experience.

Chapter 1 overviews the relevant empirical data on dreaming that will be relevant to later chapters. I give an overview of the different stages of sleep and how they related to different types of dream content. I show that correlations made between dream reports and sleep behaviour have been tenuous, and that we cannot rely on sleep behaviour to confirm dream content. I briefly overview dream report collection methods and objective methods used to observe the brain and body during sleep and discuss the limitations of such methods. I then discuss the main theories of cognitive and neural features of dreams. There is disagreement about many of these features, such as the deactivation of the dorsolateral prefrontal cortex (DLPFC) and lack of rational abilities during sleep. I argue that the disagreements between theorists and discrepancies between the findings of different research groups suggest that brain activation can alter during the dream state, supporting a pluralistic view of cognition in dreams.

Chapter 2 focuses on debates regarding dream content and cognition, and I argue that dreams display a broad variety of both content and cognition. Dream content can range from bizarre and incomprehensible to accurate simulations of waking life, and dream cognition can be highly deficient or equivalent to waking cognition. By comparing the evidence of research groups, I argue that it is undeniable that many dreams are bizarre and unusual, and some are incomprehensible and difficult to report. However, some dreams are accurate representations of waking life from the first person perspective of the dreamer. The second section of the chapter focuses on metacognition in dreams. I argue that dream theorists should take into account both metacognitive accuracy, and the frequency of metacognitive thoughts, which include feelings of knowing (FOK) and judgments of learning (JOL) as well as the ability to assess the accuracy of one's own perceptions. I argue that dreams can at times display waking levels of metacogniton, whereas at other times metacognition is severely infrequent and inaccurate.

Chapter 3 assesses the anti-experience theses proposed by Norman Malcolm and Daniel Dennett. According to the received view of dreams, dreams are experiences that occur during sleep that can be accurately reported upon waking. I consider two methods of arguing against this view: either showing that dreams are not experiences, or demonstrating that some dreams are not reportable. I begin by discussing the anti-experience thesis of dream content, and arguing this type of scepticism is inconsistent with our current knowledge of dreams. However, there is reason to criticise the accuracy of dream reports, which tells against the reportability assumption of the received view. I argue that there are a multitude of ways that dream reports can be fabricated, rationalised, and restructured, and that narratives can be created by the waking mind, and I propose a narrative fabrication thesis of dreams. Dream reports are much more susceptible to such confabulation than waking reports, due to bizarre elements in dreams and poor dream recall. I conclude that although Malcolm and Dennett's rejection of experience during sleep is implausible, we should be sceptical of the accuracy of dream reports, and what they tell us about the true content of dreaming.

In chapter 4 I overview the imagination model of dreams proposed by Jonathan Ichikawa and Ernest Sosa. According to this model, dreams are imaginative, and do not involve perceptual elements. I argue that this view is overly reductive, and that dream can involve perceptual elements, however some dream may be better classed as imaginative. The following chapter 5 involves an evaluation of the opposing view, the perceptual models of dreams. According to these views, dreams should be classed as perceptual: either hallucinatory or akin to virtual reality. Drawing on discussion from chapter 4, I argue that views which state that dreams necessarily involve perceptual content are overly reductive. Dreams can be imaginative, perceptual, or involve elements of both.

Chapter 6, the first chapter in part II, applies dream phenomena to theories of the self. The chapter focuses on a type of dream I refer to as 'vicarious dreaming' in which the protagonist of the dream, who has the first person perspective in the dream, is a different individual from the waking self. I compare the dream case with Velleman's analysis of imagining that I am someone else, and conclude that the cases are not analogous. Therefore imagining I am someone else does not describe the dream scenario. I then concede that vicarious dreaming may be a genuine case in which an alternative personality shares my brain according to some views of personal identity. Dreams provide an even more plausible case of multiple personalities than the dissociative personality disorder (DID) which is better described as fractured selves as opposed to multiple selves.

In chapter 7 I discuss two views of the extended mind: extended cognition and extended consciousness, and argue that dreaming provides important test cases and thought experiments for these theories. Firstly, I argue that although dreaming is often a state which is isolated from the external environment, and thus a case of cognition which is not extended, there is the possibility that future technology could extend the dreaming mind. I argue that external memory devices that utilise wifi connections to the brain are a sci-fi thought experiment that demonstrates the possibility of extending the dreaming mind. I compare the wi-fi device with other current methods of enhancing cognition, and argue that the wi-fi device is a good candidate for extended cognition. However, in the second section I argue that dreams provide a convincing counter-argument to the extended consciousness view proposed by Alva Noë. Noë rejects dreaming as a counter-argument because he believes that dreams are not fully conscious experiences. However, I argue that his view is based on an implausibly reductive theory of dreams.

In the final chapter, I discuss dreaming and consciousness. I argue that dreams have been given insufficient attention by contemporary philosophers of consciousness, although any theory of consciousness requires a plausible account of dreaming. According to HOT theory, some dreams are 'unconscious' because they do not involve higher order thought. This is a counter intuitive outcome, and provides evidence against HOT theory. In contrast according to GW theory, dream are conscious. This is consistent with our intuitions and scientific research into dreams, but I will argue that certain dreams need to be distinguished from normal waking consciousness, and that it is unclear how GW theory could plausibly accomplish this task. Finally, I evaluate Block's access/ phenomenal (A/P). I argue that although Block rejects this view, there is evidence to support the possibility that some dreams are phenomenally consciousness but lack access consciousness. Of the views discussed, this is the most consistent with the pluralistic view of dreams. The A/P distinction allows that different dreams can display different types of consciousness. Some dreams are fully A- and P- consciousness, whereas others involve only impoverished consciousness that lacks access. This gives support for Block's A/P distinction.

I conclude that dreams are an interesting phenomenon that is resistant to reduction. The variety of cognitive and phenomenal attributes that occur during sleep is not only important for dream theorists to take into account, but also philosophers of mind and the self. Dreaming provides a rich array of thought experiments and evidence that can be used to support or weaken theories of the mind. In this thesis I hope to demonstrate just some of the applications of dreams to philosophy.

Part I

Dream Pluralism

1

The Empirical Study of Dreams: Discoveries and Disputes

> 9/3/1981 Red Car, Dream no. 16
>
> I am trying to organise a group for departure. I find one member at the foot of the hill, near some water... I urge him to go up the hill to a rendezvous point for departure. Suddenly, or perhaps always, he is in a red car, which runs along beside me up the hill. The peculiar thing is that the front of the car, including the driver, is underground. Yet its trajectory is smooth and the ground is unbroken! As we climb, the car moves ahead of me and I make a strong but vain effort to keep up with its progress. The car then crosses from left to right and runs- still half underground- into a wall, I wonder if the driver will have hurt his head in the crash (Hobson, 2002 p 24).

Sleep and dreams have been of particular interest to cognitive scientists and psychologists since the discovery of rapid eye movement (REM) sleep in 1953 (Dement & Kleitman, 1957a, 1957b). This new discovery prompted fresh interest in the neuropsychology of dreams and led to new innovations and methods of dream research. Improved dream report collection, better data analysis, and modern neuroimaging techniques have expanded our knowledge of sleep physiology, the dreaming brain, and the content of dream experience. Dream reports such as the one above are collected and analysed using these new methods. Interesting features, including bizarreness, such as a car moving whilst semi-submerged in the ground as well as unusual cognitive features, such as cognitive dysfunction, can be correlated with neural features, such as reduced activation in the dorsolateral prefrontal cortex (DLPFC). From this, valuable information about cognition and the brain is revealed. Still, there are many areas of contention which would benefit from a cross disciplinary, philosophical and scientific approach. In this chapter I discuss empirical dream research and highlight some of the divergence between theorists. In the following chapters of part 1, I argue that these discrepancies suggest that dream phenomena are multifarious and best described by a pluralistic theory of dreams.

Dream pluralism describes the highly diverse range of experiences that occur during sleep. I argue that this diversity is not adequately expressed by reductive theories that describe dreaming using a set of minimal, necessary conditions. For example, some theorists argue that dreams are akin to a specific form of waking experience, such as perception, whilst others argue dreams do not involve perception, but rather imagination. Some theorists describe dream content as either bizarre like the "red car dream" above, or similar to waking experience, whilst cognition is often described as either impaired *or* equivalent to waking. In contrast, according to pluralism, dream experience displays a wide range of phenomenal experience and cognitive attributes, depending on the particular dream. The empirical evidence is consistent with such an approach. The empirical literature on dreaming is broad, so in this chapter I overview that which is relevant to the following chapters. I will refer to this chapter when empirical support for a view is needed.

Dreams occur more frequently during rapid eye movement (REM) sleep, although they can be experienced during any sleep stage. Firstly I discuss the different stages of sleep and the types of dream experiences most often associated with each stage. Dreaming at different stages of sleep partly accounts for the wide variety of experience that occurs within dreams. Stages of sleep are distinguished by changes in the body and in brain wave activity. Then, in 1.2, I briefly set out the benefits and disadvantages of different methods of dream report collection. This will be relevant to my chapter 2 discussion of bizarreness in dreams, as some argue that bizarreness can be over or under reported depending on the report collection method. The technology used to measure bodily and neural activity along with the limits of such technologies is briefly discussed in section 1.3. I give a basic overview of the discoveries about sleeping brain activation and neuromodulation that neuroimaging has afforded us in 1.4, highlighting some of the disagreements between research groups. These discrepancies suggest that the dreaming brain can display a variety of features and changes, rather than constant deactivation in certain areas with heightened activation in others. Altered brain activation may effect the type of experience that can occur in a particular dream, but this does not support a reductive view, for example, that says all dreams are cognitively impaired. Finally I critically assess the findings of research on lucid dreams in 1.5, arguing that although there are many interesting possibilities for research into lucid dreaming, they are not necessarily indicative of the content or cognitive features of non-lucid dreams. Lucid dreaming merely shows, again, that dreaming is multifarious and resistant to reductive accounts. The cognitive abilities and vivid experiences that can occur during lucid dreams provide counter arguments to reductive views that I will discuss in the following chapters.

1.1 Stages of sleep

Aserinsky and Kleitman (1953) were the first to report that multiple times a night, sleeping subjects' eyes move rapidly beneath their eyelids. Aserinsky coined the term "rapid eye movement" or "REM" sleep after making the discovery serendipitously while researching sleep onset for his doctoral thesis. His initial intention was to confirm Lawson's (1950) observation of blinking during sleep onset. Using electroencephalography (EEG) and electrooculogram (EOG) technology to measure the electrical brain activity and eye movement of his son during sleep onset, Aserinsky also noticed unexpected rapid eye movements that occurred long after his son had fallen asleep (Aserinsky, 1996). After confirming that temporary awakenings did not explain the REMs, Aserinsky and his doctoral supervisor Kleitman also discovered that dreams are most frequently reported when subjects are awakened during REM sleep, while in contrast, very rarely during NREM (non-rapid eye movement) sleep. REM periods occur every 90 minutes occupying 20-25% of sleep time and 80%-90% of REM awakenings elicit dream reports (Domhoff, 2003).

This led to the mistaken view that dreaming occurs solely in REM sleep and the belief that REM sleep was the physiological cause of dreaming. Wamsley & Antrobus (2006) recall that "it seemed that all we needed to do was to study the physiology of REM sleep and its connection to dream reports, and we could unravel the mystery of what dreams were and how they came to be" (p 130). This proved not to be the case. Although REM dreams are frequently reported and tend to be vivid, dreams can occur in any stage (Foulkes, 1976, 1996). Nielsen (1999) has demonstrated that the average REM recall rate on waking from REM in a laboratory is 68.7%, compared to a rate of 21.0% when woken from NREM sleep. This suggests that we dream in most periods of REM sleep while less frequently during NREM sleep. Despite some initial misconceptions, this early research paved the way for modern dream study. The discovery of REM was followed by the discovery that there are multiple sleep stages which can be distinguished physiologically.

1.1.1 NREM sleep

NREM (non-rapid eye movement) sleep consists of four stages that exhibit distinct electrical brain activity readings on the EEG (electroencephalogram)[1]. It has been argued that NREM dreams are often repetitive, irrational and thought-like with little perceptual content such as worrying about an upcoming exam (Hobson 2002 p 7), yet vivid dreams can also occur in NREM sleep. Some theorists argue that dreams across the different stages of sleep generally display similar features (Antrobus, et al. 1995; Cicogna, et al. 1998). What is important for my thesis is that a wide variety of dream experience occurs across different stages of sleep. From the evidence it seems likely that a variety of experience can occur at any stage during sleep, but that certain experiences are more likely to occur during specific stages. For example, vivid dreams that involve complex scenarios are more likely to occur during REM sleep.

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[1] See section 1.3 for a discussion of EEG technology.

In light sleep stages 1 and 2, the sleeper is responsive to auditory stimuli and often experiences hypnagogic hallucinations, which are simple uni-modal sensations that often occur at sleep onset , such as the sensation of falling[2]. During stage 1 sleep onset, electrical brain activity is similar to waking brain activity, producing low amplitude beta waves with a high frequency between 12 and 30 Hz. During stage 1 of sleep, the eyes move slowly and muscle activity slows, although atonia, the paralytic cessation of muscle tone, does not occur until later stages. During stage 2 of sleep, eye movement stops and brain frequency lowers, occasionally interspersed with bursts of high frequency brain waves known as spindle activity (Hobson et al. 2000).

Stages 3 and 4 are known as the deep sleep stages, which exhibit predominantly delta brain waves (1-4 hertz), muscle atonia and no eye movement. This period is the most restorative while also the most harmful stage of which to be deprived. Extreme insomnia, such as fatal familial insomnia (FFI) in which the sufferer never experiences deep sleep again, causes waking hallucinations, irrational choices and actions ending in coma and death due to the brain being deprived of essential rest (Guilleminault, et al. 1994).

NREM sleep shows a decrease in global cerebral metabolism compared with REM sleep, which is similar to that of waking metabolism. Interestingly, many of the areas of the brain that are deactivated during NREM become active in REM (Braun et al. 1997; Maquet et al. 1996; Nofzinger et al. 1997). As Hobson notes "the regional pattern of deactivation in NREM [...] sharply contrasts with the regional *activation* of these same regions (i.e., thalamus, pontine brain stem, anterior cingulate cortex) in REM" (Hobson et al, 2000 p 811). This demonstrates that NREM and REM sleep can be distinguished by brain activation as well as physiological behaviour such as eye movements and changes in muscle tone. It is therefore surprising that some research groups have found similar dream content across different sleep stages (eg. Bosinelli 1995; Foulkes 1991;

[2] Some argue that these sensations should not be considered as dreams. In chapter 5 I will argue that according to my pluralistic view of dreaming, we should include hypnagogic hallucinations as dream phenomena.

1993; 1996; 1997; Moffitt1995), but this provides sufficient reason to reject the assumption that altered brain activity entails altered cognition, as I will discuss in 1.3.1.

1.1.2 REM sleep

REM sleep is also referred to as "paradoxical sleep" (Jouvet, 1999) due to its apparent paradoxical nature: high levels of brain activity similar to that of waking but reduced muscle tone causing paralysis. REM sleep has two stages: the phasic and tonic stage. These stages are most easily distinguished by the short bursts of rapid eye movement in the phasic stage, which are most highly correlated with dream reports, and the cessation of eye movement in the tonic states from which dream reports are less common. The brain is comparatively the most isolated from the external environment during the phasic stage whereas one can be highly responsive or more "open" to changes in auditory and other stimuli during the tonic stage (Sallinen et al. 1996 p 220). During this stage an external stimulus is most likely to either waken the dreamer or be incorporated into the dream[3]. Hobson (2000) notes that early dream scientists devoted an inordinate amount of time and energy trying to incorporate external stimuli into dreams, for example, waving perfume under a participant's nose in an attempt to make them dream of a certain odour. They found that it is possible but 'very, very difficult' to cause external stimuli to filter into a dream (Hobson 2000 p 37). This difficulty may be due to the fact that dreaming is more common in the phasic stage when the participant is not responsive to external stimuli. Some theorise that tonic stages of REM, which last longer than phasic stages, are an adaptation to reduce vulnerability to predators because this lessens the period of time in which the sleeper is unresponsive to alarming noises (Wehrle et al. 2007).

From this evidence, Sallinen et al. (1996) conclude that REM sleep itself involves a variety of microstates.

[3] I will discuss this in more detail in chapter 3, where these types of dreams will be relevant to the *cassette theory* of dreaming.

> REM sleep cannot be considered a homogeneous state in terms of the processing of external stimuli. In this sense, it is similar to NREM sleep that is known to be composed of various microstates, as indicated by various responses to an invariable stimulus (p 227).

REM sleep involves different stages that can be distinguished by the observation of physical changes in the body and brain. This view has replaced the *scanning hypothesis* of dreams (Foulkes 1996 p 612) according to which REMs are caused by the eyes scanning dream imagery.

1.1.3 The Scanning Hypothesis: an attempt to correlate eye movements with dream reports

The discovery of REM sleep led Dement and Kleitman (1957a, 1957b) to propose a *scanning hypothesis* of dreams: that rapid eye movements scan dream imagery, replicating the dream eye movements. Early experiments attempted to demonstrate that dream reports are highly correlated with eye movements, for example, dreams about throwing a basketball into a hoop correlate with vertical eye movements. However, these experiments were based on small sample sizes and the results have not been replicated in subsequent experiments. Doricchi et al. (2006) claim that "despite decades of research, the question of whether the rapid eye movements (REMs) of paradoxical sleep (PS) are equivalent to waking saccades and whether their direction is congruent with visual spatial events in the dream scene is still very controversial". According to Hobson and colleagues "further evidence would be required to confirm [the scanning] hypothesis" (Hobson et al, 2000). It is also clear that rapid eye movements are neither sufficient nor necessary for dreaming, since dreams do not occur during all REM sessions and can occur during NREM sleep.

Lucid dream experiments provide better evidence for correlations between eye movements and dream content. A dreamer can use their eye movements to signal that they have become lucid and there is evidence that indicates that these lucid dream eye movements correspond with real eye movements (Laberge 1980, 1985a, 1998, 2000)[4]. However, this only demonstrates that eye movements may at times correlate with dream reports under certain conditions, i.e. the scanning hypothesis may not be accurate for all non-lucid dreams. As I will discuss in more detail in section 1.5, lucid dreams do not exemplify all dreaming, and we can't presume that lucid dreams share all of the relevant features of non-lucid dreaming.

Other forms of sleep behaviour, such as sleep-talking and sleep-walking, tend to be unrelated to dream reports, since "most sleep talking originates during the microawakenings of from 10 to 20 seconds that occur several times per night in both children and adults" (Domhoff, 2003 p 135)[5]. Also, sleep-walking "starts in the deepest stages of NREM and usually does not lead to dream reports when awakened" (Domhoff 2003 p 163). Therefore it is likely that sleep-walking does not usually occur during dreams. There has been no clear, consistent correlation between sleep behaviour and dream reports.

The most convincing evidence for correlation between dream movements and real body movements occurs in sufferers of REM sleep behaviour disorder (RBD), a rare condition in which sufferers appear to act out their dreams during REM sleep. RBD is caused by brain lesions in areas which usually inhibit the spinal motor neurons during REM sleep, causing sleep atonia (Hobson 1999; Hobson et al. 2000; Mahowald and Schenck 1999; Revonsuo 1995; Schenck 2005; Schenck and Mahowald 1996; Windt & Metzinger 2007). This can lead to serious injury or death. RBD provides evidence for the correlation of body movements and dream reports and, some believe, a way for researchers to directly observe dream behaviour[6]. However, most correlations made between dream content and behaviour have been stereotypical. For example, violent movements can be correlated with reports of violent dream content. This may not be

[4] See 1.5 for further discussion of lucid dreams.
[5] There is some contention over the issue of sleep talking which I discuss in more detail in chapter 3, where I discuss evidence that supports the accuracy of dream reports.
[6] I discuss RBD in more detail in chapter 3. I discuss whether RBD is evidence for dreaming as an experience that occurs during sleep, and in chapter 4 as evidence against the imagination model of dreaming.

sufficient to conclude that behaviour indicates specific content: that the dreamer is *acting out* their dream. Secondly, RBD is a rare condition, so research into RBD is restricted by limited sample sizes. Thirdly, RBD may not be a good indicator of regular dream content, since it is caused by brain lesions which tragically may also cause a high level of aggressive dream content (Schenck et al. 1986). Researchers must focus on regular dream reports. However such research is restricted by limitations to which I now turn.

1.2 Dream reports

Dream research faces two main obstacles: firstly, unlike waking experiences, dreams cannot be reported *whilst* the dream is occurring, and secondly, dreams are often obscured by deficiencies in memory retention and recall. In this section I discuss methods used to obtain dream reports, and their associated benefits and disadvantages. There is some contention as to whether dream reports are most accurate when collected at home or in the sleep laboratory. Here I set out arguments from both sides and conclude that the method of recording dream reports is more important than where the sleep occurs.

Some research groups have found that in general, home dream reports tend to be more bizarre and interesting than lab dreams (Hobson, 2000, Foulkes 1996, 1999, Waterman et al. 1993). This discrepancy may be due to the expectations of the investigator, or to environmental factors. The investigator's expectations may bias dream report collection as they are more likely to prompt answers that they expect. For example, a parent questioning their child about their dreams might expect their dreams to be creative and interesting, or an experimenter in the lab who seeks evidential support for a theory might unintentionally alter what is reported. Environmental factors that could effect reporting include the familiarity of surroundings: a strange environment such as a dream lab could effect reports or even dream content. Similarly, control measures, such as waking the subject during different stages of sleep, or allowing them to report in the morning might affect results. Researchers disagree on whether the laboratory setting suppresses bizarreness, as argued by Hobson and colleagues, or whether the lack of controls in the home setting leads to interesting dreams being selectively remembered and reported.

1.2.1 The benefits of lab-based research

Foulkes (1996, 1999) argues that there are many benefits to lab-based over home-based research, since the dreamer can be woken from different stages of sleep to gain a direct report, reducing memory loss. Whilst studying dream reports of children as they grow up, Foulkes found that children's home dream reports are more bizarre than reports taken in the lab after an REM sleep awakening. Young children's lab dream reports tend to involve very simple imagery with little or no complex narrative structure, and include far fewer bizarre and creative elements than home-reported dreams. Foulkes argues that that children's home dreams are prone to memory loss, bias towards remembering interesting dreams, and pressure from their parents to make dream reports interesting. Parents in Western cultures often believe that creative dreams indicate that a child is creative and intelligent therefore parents tend to help the child elaborate on a dream. Foulkes found that parents may also suggest the types of narratives, objects or people that they think children are likely to dream about. Since children want to please their parents (usually), they will tell stories and create false dream reports, or elaborate to the extent that the dream report is no longer an accurate description of the dream content (Foulkes 1999 p 22).

According to Foulkes, dreams become more elaborate and gain a narrative structure as we get older but dream report elaboration is still a problem for adult dream research. He argues that "sleep laboratory research has shown that there are systematic differences in dream reports made during the night on REM-sleep awakenings and later accounts of the same dreams given the following mornings" (Foulkes 1999, p 26), suggesting that the delay between reports results in reporting errors. He argues "home dreams seem richer precisely because the home setting invariably allows selective recall of human dreamlife, recall biased in the direction of the emotional or unusual dream" (Foulkes 1996, p 615). We are more likely to remember bizarre or strange dreams and forget mundane, boring dreams. Mundane dreams are more likely to be reported if directly woken during REM, and thus lab reports give a more accurate sample of dream experience. Also, there is no way to determine during which stage of sleep the dream occurred if the report is made the morning after.

Williams and colleagues (1992) argue that morning reports are not always biased towards remembering bizarreness: rather bizarre experiences can be forgotten or rationalized.

> During a delay [between dreaming and reporting], the subjects have the opportunity to further organize and make sense out of their recall and produce a more coherent and edited narrative. As a result, much of the bizarreness in dreams (especially the discontinuity and uncertainty) could be lost by the time the subject described the experience (Williams et al. 1992 182).

Although Foulkes agrees that such rationalisation can occur, this would not explain why lab reports describe less bizarre elements than home reports. Rationalisation should make reports *less* bizarre[7].

Domhoff notes that "most of these differences [between home dreams and lab dreams] disappear when the proper controls are introduced" (Domhoff, 2007 p 9). If home dream reports are taken from sleep awakenings rather than morning reports, then the differences between sleep and lab reports are reduced[8], although there are still some content differences (Lloyd & Cartwright 1995; Weisz & Foulkes 1970). This suggests that memory loss and confabulation can be reduced in the home setting given appropriate controls, so other content differences are most likely due to settings, not controls.

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[7] To be discussed further in chapter 3.
[8] I discuss the issue of dream bizarreness in more detail in chapter 2.1.

1.2.2 The benefits of home-based research

J Allan Hobson, who has kept an extensive journal of his own dreams, argues that the best method of dream collection is to use devices to physiologically monitor reporting conditions in the home. The "nightcap" state detection system (Kahn, et al. 1997, Stickgold and Hobson, 1994), which detects head movements and eye movements using separate movement sensors, can solve the problem of morning wakeup bias, since the nightcap monitors which sleep stage the participant is in, and they can be woken up at any stage. According to Hobson this is preferable to lab awakenings, which suffer from two major drawbacks. Firstly, Domhoff & Kamiya (1964) found that there is usually a minimum 4 day period during which a participant adapts to the lab environment. During the first night, and then to a lesser extent the following few nights, aspects of the experimental situation are incorporated into the content of the dream report. For example, a subject might dream about being in a lab. Adaptation to the environment occurs after 4 or more days, although most studies do not last this long. Secondly, over 14 nights in the dream lab, "laboratory-fatigue" occurs (Hobson 2000 et al. p 803). Antrobus and colleagues (1991) found that over a period of time spent in the lab, NREM and REM reports begin to become more similar and REM dream reports become shorter and less "dreamlike". Hobson attributes this to motivational factors in dream reporting. Subjects become less motivated to report after spending a few nights in a lab, and this fatigue worsens over 14 days. This would suggest that the most accurate reports would occur between day 4 and day 14 of a trial. Foulkes uses studies in which children spend single nights in the lab, with multiple sessions over a long period of time instead of multiple nights in a row. Although this may avoid lab fatigue, Hobson might argue that the subjects would not have adapted to the lab environment in this time.

Foulkes, in contrast, argues that the laboratory setting is not problematic in the ways described above. When the same controls are set in both the home and lab, there are few differences in adult dreams, and practically *no* differences in children's dreams (Foulkes, 1999 p 32). Considering that groups have still found *some* minor differences in adult controlled studies (Lloyd & Cartwright 1991; Weisz & Foulkes 1970, Colace, 2010, Nielsen et al, 1991), these differences may be due to the difference in setting, but Foulkes does not accept this possibility. It is unclear how Foulkes accounts for these differences. Some studies show that dreams become longer, and more "dreamlike", i.e. more bizarre and irrational in the late morning (Wamsley and Antrobus, 2006, Wamsley et al., 2007; Antrobus, Kondo, & Reinsel, 1995) so the period of sleep when the dreams are collected might be relevant. Perhaps since morning awakenings elicit reports of late morning dreams, this might account for the difference.

Another possible benefit of home reporting is *delayed factual reminiscence* (DFR) in which memory of an event improves after a delay, often cued by some stimulus such as a sound or smell (Montangero 1996). For example, I once recalled a nightmare of being chased by dogs much later in the day when I heard a dog barking. If it is true that dreams can be remembered in *more* detail after a period of time has passed, this would weaken the argument that the best method of dream reporting is to wake a participant during sleep and have them report immediately. However, Foulkes argues that although accurate DFR may sometimes occur, "the far more common rule in delayed recall is selective forgetting and the assimilation of a particular event (or dream) to general assumptions about events (or dreams)" (Foulkes, 1999 p 26). According to Foulkes, DFR is not reliable, and less common than selective forgetting. DFR reports usually have little detail, and environmental cues do not bring back a detailed and vivid memory of a dream narrative in full: I couldn't recall any specifics about what the dogs looked like nor any other narrative features. Since the memory occurred long after waking, it is also difficult to ascertain in which stage of sleep the dream occurred, or which night, or even whether the memory is from a dream or a vaguely recalled waking event. This type of inability to distinguish between types of memory is demonstrated in the empirical research on source-monitoring.

Johnson and colleagues (1984) found that participants have difficulties with source monitoring dreams when asked to distinguish between a memory of a real dream and a made up dream after a period of time has passed. Dreams are sometimes difficult to distinguish from similar externally derived events, for example, it might be difficult for me to distinguish between my own dream memory about being chased by dogs and a memory of someone telling me about being chased by dogs. Individuals were tested on their ability to source-monitor dreams and other memories, such as memories about something imagined, and dream source monitoring was found to be comparatively inaccurate. Their explanation is that "real dreams are deficient in information about cognitive operations that help identify the self-generations we create when we are awake" (Johnson et al. 1984 p 333). Memories of imagining, for example, are more accurately source monitored, because the cognitive operations that go into imagining are also remembered: this helps us distinguish between memories of imagination and memories of events. However, the cognitive operations in dreaming are mostly unconscious and consequently do not help us distinguish between dreaming memories and waking memories.

In summary, DFR suffers from 3 main problems. Firstly, DFR reports are usually vague and contain little detail. Secondly, they cannot be controlled for what stage of sleep or which night they occurred. Thirdly, there are difficulties in ascertaining whether a DFR is of a dream memory or another type of memory. Therefore, DFR reports are not very useful to dream research. I conclude that accurate dream report samples can be gained by controlled home awakenings, although I agree with Foulkes' arguments that home journals are not reliable if controls are not in place. The delay between the dream and report is problematic, and for the reasons mentioned above, DFR is not reliable. Although the differences between controlled home and lab reports are minor, Hobson gives some convincing explanations for these differences, such as laboratory-fatigue and the 4 day adaptation period. A a result I conclude that the most reliable method of collecting dream samples is from controlled home awakenings. However, sleeping in the lab is necessary for the use of some neuroimaging techniques and other technologies used to measure the physiology of the sleeping brain and body. In the next section I will outline these methods and discuss problems associated with these different technologies.

1.3 Measuring the physiology of the sleeping brain and body

An alternative method to gain information about a dreaming individual is by studying their physiology. Information about changes in the dreaming brain and body of a sleeping individual can be compared with dream reports so long as it can be determined what time a particular dream occurred. This is very difficult to determine with certainty, but waking a participant during high levels of brain activation, especially during REM, and attaining an immediate report is the method most commonly used. The participant is most likely to report a dream that occurred just before waking up. Physiological measures might be useful for research in two ways. Firstly, since dream reports are subject to forgetting and confabulation as discussed earlier, physiological measurements could help confirm the occurrence of a certain type of dream. For example, if the neural activation required for perception of visual imagery is determined, then a dream report involving intense imagery could be confirmed by neural activation indicating visual stimulation[9]. Secondly, comparisons between physiological data and dream reports might help determine the physiological mechanisms that underlie certain types of dream experiences.

Some progress has been made to discover the neural underpinnings of dreams and to correlate brain activity with dream content, and such goals are worthy of scientific inquiry, but there is still much disagreement as to whether the use of objective methods will ever succeed in these goals. Some theorists argue that objective measures are only useful for ascertaining how the brain is activated during different tasks, and afford little information about which cognitive processes are occurring. In this section I discuss a variety of methods for imaging the brain and measuring brain and bodily functions, highlighting their benefits and drawbacks. I argue that although we must acknowledge the limits of such methods, correlations between subjective and objective perspectives can be useful not as entailment relations between cognitive and brain processes, but as strong inductive relationships. For example, correlating a dream report involving irrational thoughts with brain activity that has been associated with waking irrationality gives evidences for the accuracy of the dream report. This is useful since dream reports are prone to confabulation and memory loss, so physiological data might give evidence to support the accuracy of a dream report. This data also provides evidence against reductive, anti-experience theories of dreams which I will discuss in chapter 3.

[9] I will discuss this further in chapter 2 in regards to confirming dream content and cognition.

1.3.1 Physiological measures: pros and cons

Dating back to 1928, EEG (electroencephalography) is one of the oldest methods of mapping brain activity. Initially used by German psychiatrist Adolf Berger for assessing brain activation in patients with epilepsy (Hobson, 2000 p 40), electrodes placed on the scalp amplify and record electrical brain activity. This is a method for detecting general areas of brain activation and can be used with other devices such as the electrooculogram (EOG), which uses electrodes to measure eye movements. EOG is particularly useful for determining sleep stages. The electrocardiogram (ECG) measures heart rate by placing electrodes on the chest. Changes in heart rate might indicate changes in emotional state, although an increased heart rate could also indicate a variety of emotional states such as fear or excitement. The electromyogram (EMG) measures muscle tone by placing electrodes on the skin over different parts of the body. It can detect which stages of sleep display atonia and has been used to try to correlate muscle twitches with dream reports. These methods have been important in the recent history of sleep research and have been used in interesting and ingenious ways. As previously mentioned, EOG played a key role in the discovery of REM sleep and EEG has been critical in distinguishing the different types of electrical brain activity that occur in different stages of sleep. In more recent examples, LaBerge and colleagues (1990) used vaginal EMG to correlate vaginal pulsing with reports of subjectively experienced dream orgasms. Schatzman and colleagues (1988) used EMG, EEG and EOG together to correlate lucid dream reports with body and eye movements[10].

Electrical monitoring has many benefits and a few drawbacks. It is in many ways less disruptive to sleep than other techniques, as it involves less noise and it is not essential for the sleeping participant to remain still. It is also relatively cheap and very safe so can be operated throughout the night and over many trials. Clare (1997) notes that the major drawback of EEG is that it uses electrodes on the scalp which may not represent the activity of the underlying cortex. Activity on the scalp itself can disrupt the electrical signal. Another drawback of EEG is that the spatial information obtained is very general and specific neural patterns cannot be detected. Although EEG and related methods are particularly well suited to dream studies, other methods which are less well

[10] I will discuss this in section 1.5.

suited such as fMRI as discussed below, are sometimes used nonetheless when high-resolution images of the sleeping brain are required.

Functional magnetic resonance imaging (fMRI) is a method not particularly well suited to dream studies because the machinery is very noisy and the participant must remain completely still, which is hard to control in sleep. However, the high resolution images fMRI produces have given researchers useful data about specific functions of the sleeping brain that could not be achieved by EEG. FMRI detects changes in neural blood flow and oxygenation over time at a rate of about one image per second. This method uses radio waves emitted through a strong magnetic field which leave traces that are picked up by sensors. The spatial resolution is the best of all neuroimaging methods: 3mm, in comparison to positron emission tomography (PET) which has the next highest resolution of 5mm. PET scanning is also much slower, taking 40 seconds or longer per image. However, FMRI studies face other disadvantages.

Although changes in blood flow and metabolism in the brain may be correlated with increased brain stimulation, there is not always a direct correlation with increased *neural activation*. Increased metabolism in an area can also indicate inhibition rather than excitation of neurons. Hobson notes that

> one must consider whether or not more efficient functioning of an area might result in less versus more observed metabolism or whether glucose or oxygen uptake by inhibitory interneurons may produce local maxima in areas that are, in fact, less active due to inhibition" (Hobson 2000 p 807).

If researchers confuse excitation with inhibition, the results would be completely inaccurate. As aforementioned, the noisy machinery can make it difficult for a participant to fall asleep or stay asleep. This may be somewhat remedied by earplugs (Redcay et al. 2007) or by playing soothing music through headphones, but neither remedy is ideal. Subjects must remain very still during fMRI, which is difficult to control during sleep; especially in children's studies. Redcay and colleagues (2007) note that "few studies have directly examined brain function in infants and young children with fMRI due to the difficulty in acquiring such data without motion artifact"(p 696).

Dehaene-Lambertz and colleagues (2002) managed to get 5 out of 20 infants aged 2-3 months to fall asleep in the fMRI, while sleeping brain images can also be attained from children who fall asleep during other studies, such as the 6-year old boy who fell asleep during a mapping study (Wilke et al, 2003). However, since the Dehaene-Lambertz experiment was focused on infants and the Wilke experiments were not designed with dream research in mind, dream reports were not collected. The scanned images were only useful for comparing sleeping and waking brain activity, not for correlating brain activity with dream reports.

Positron emission tomography (PET) illuminates changes in the density of chemicals, body compounds and metabolism in the brain. A small amount of radioactive compound called radiotracer is injected into the bloodstream and accumulates in areas where the target compound is most concentrated in the brain. For example, metabolism rates in different areas of the brain can be traced by using a specific radio-tracer that accumulates in areas that have the highest levels of glucose or oxygen being metabolised (Andersson et al 1995). The same can be shown for dopamine function and other neurochemistry. PET scanning does not require noisy machinery but it is unknown what the long-term effects of radiotracers could be. It is unlikely that researchers would use PET scanning on children or for long-term studies.

It is not fully understood how external stimuli or changes in sleeping conditions affect the activity of the sleeping brain. For example, the noise of an fMRI or the use of radiotracer accumulating in different parts of the brain might affect brain activity. It may be difficult to distinguish between neural activity generated naturally by sleep and that which is generated by external factors. Another limiting factor for researchers is that fMRI and PET scanning both use expensive machinery, therefore extensive funding is required to collect statistically significant sample sizes.

Aside from the limitations of particular empirical measures, some theorists argue that we cannot gain useful information about cognition from any type of neuroimaging. In the next section, I will argue that it is important to consider the limits of studying images of brain activity, however, neuroimaging is not as irrelevant to understanding cognition or psychological states as some theorists argue.

Klein notes that making inferences from images of brain function to psychological function can be problematic for many reasons. One problem is that the brain is a densely connected system and any cognitive task should cause increased activation all over the brain. FMRI imaging uses a threshold to distinguish between relevant and irrelevant activation, however the choice of threshold is an arbitrary decision made by the experimenter, and this choice can have theoretically important implications for the research (Klein 2010a). Secondly, inferences made about the psychological function of a type of brain activation are already biased towards the preconceived notions of the experimenter[11]. Klein argues that "neuroimages are theory-laden: the very same theories that are being tested are also the source of the contrasts that generate the neuroimages themselves" (Klein, 2010b p 191). A more extreme view proposed by Harley (2004) and Coltheart (2006), is that neuroimaging data is irrelevant to psychology because we do not yet have sufficiently precise theories about psychology relates to particular neural phenomena. Theories about how particular brain activity is related to psychology is required before neuroimaging can tell us anything about psychology, i.e. by giving predictions about psychological events. Yet once each theory is formulated and confirmed, "[neuroimaging] would have nothing of interest to contribute to psychology" (Klein, 2010b p 169) since all of the important information would already be known.

Although this is a very strong view, I agree that making a reverse inference from brain images to psychological states can be fallacious. Firstly, it is difficult to ascertain whether increased activity such as blood flow or metabolism correlate with neural excitation, as previously discussed. Secondly, although we may ascertain that a certain cognitive state X, for example, feeling fear, activates brain region Y, we cannot then conclude that whenever region Y is activated, a participant is feeling fear. (Klein, 2010b, p 190). Therefore we cannot conclude with certainty that a participant who is dreaming

[11] Examples of this are discussed by Fine (2011)- in which assumptions about the differences between male and female cognition are supported by evidence of small differences in brain activity- although whether such activity indicates differences in cognition is unknown.

and displays activation in brain region Y, is feeling fear[12]. The argument would be strengthened if the premise was that *cognitive state X is necessary and sufficient for activating brain region Y,* however this implies a *psychophysical invariant* (Cacioppo et al. 2007, 13–14), or one to one mapping of cognitive state and brain activation, and psychophysical invariants are very rare. Klein concedes that probabilistic variations of the argument are preferable; e.g. activation of brain region Y increases the probability that cognitive state X occurs, however these arguments are much weaker: sometimes too weak to be useful for research into cognition. For example, increased activation of the dorsolateral prefrontal cortex (DLPFC) may be strongly correlated with increased rational capacities, but not a psychophysical invariant. If a dreaming individual displays activation of the DLPFC, then it is *probable* that cognitive capacities are heightened during that dream. However, since the relationship is only probabilistic, we cannot infer with certainty that the particular cognitive process is occurring. If, for example, the participant reports lowered rational thought during the dream, the evidence from the report might be seen as more reliable than the neuroimaging data. In this case the neuroimaging data is not particularly useful. It may help corroborate a report, but such data may not be useful in the absence of, or if it contradict with a report.

A further complication for dream studies is that it is difficult to know at what point during sleep a particular dreamed event occurred, so it is difficult to correlate observed brain activity with specific reports. Kahan and Laberge (1994) note that

> the traditional psychophysiological approach has not been of much value for investigating hypothesized associations between physiology and dream phenomenology because of the difficulty of predicting what subjects will dream about and the difficulty of making precise time correlations between dreamed experience and physiological events (p 255).

Lab awakenings may allow a narrower margin of error for determining when a dreamed event occurred, however correlating neural activity with specific dream events, such as shifts in scenery, intense emotions or irrational decisions, remains problematic.

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[12] I discuss this sceptical view in more detail in chapter 3. Norman Malcolm is similarly sceptical of attempts to correlate subjective with objective data.

Although it is difficult to correlate brain activity with cognition during sleep, to deny the usefulness of brain imaging techniques entirely would be excessive. Brain activity produces evidence, but not incontrovertible proof, of cognitive process and this information may be useful if the correlation between brain activity and cognition is particularly strong. For example, strong evidence about the necessity of an area of the brain can be gained from brain-lesion imaging studies. It has been found that lesions in certain areas of the brain lead to non-visual dreaming (Solms 1997). These studies provide strong evidence for the necessity of the activation of a particular area for visual dreaming, so deactivation in the same area strongly suggests that a dreamer is not experiencing visual dreaming.

Research techniques require constant updating to reduce ambiguities and avoid interpretation errors, however such evidence will become stronger as more information is revealed about the functions of the brain. Although brain states do not entail cognitive states, I will conclude that scientists should aim for sufficiently strong probabilistic relations if they are to use neuroimaging as evidence for cognition in dreaming. In the following section I will discuss some of the main theories about the cognitive and neural features of the sleeping brain relevant to the central topics of this thesis.

1.4 Cognitive and neural features of sleep

In this section I discuss theories about cognitive features of the sleeping mind and their correlations with neural activity. I will focus on areas of contention although there is wide agreement on some issues, such as the importance of the pons brain stem in the generation of REM sleep.

According to some studies, the sleeping brain shows decreased activation in the frontal lobes, in particular the dorsolateral prefrontal cortex (DLPFC) and inferior parietal cortices, in contrast with the waking brain (Braun et al, 1997). These areas are associated with complex cognition such as rational thought and metacognition. This is "relevant to the cognitive deficits in self-reflective awareness, orientation, and memory" (Hobson et al. 2000 p 809) that are often reported in dreams, and is used as evidence by some theorists to support the theory that most dreams are irrational. There is some discrepancy between studies: Nofzinger et al. (1997) did not produce the same results[13], which is consistent with the possibility that not all dreams are lacking in cognitive functions. I will discuss this below using the example of lucid dreaming.

Another deficient cognitive attribute in dreaming is memory. Most dreams are hard to remember, and during a dream, dreamers usually have poor memory and awareness of their waking lives. This is exemplified by the discrepancy between high REM awakening and low morning awakening recall rates, as previously discussed. Hobson and colleagues (2000) attribute this forgetting to altered neuromodulation and decreased brain activation, and it is only when intense activation occurs during REM, or even more rarely at other stages, that dreams can sometimes be remembered and reported. As I will discuss below, poor memory recall is an attribute of many dreams, however there are exceptions.

Although frontal activation is frequently reduced, dreams often display strong activation in other brain areas, especially the visual cortex and areas associated with emotion, including the insular cortex (Hobson et al 2000). Sometimes activation in these areas is at higher levels when dreaming than during waking which is consistent with reports of intense visual and emotional content. Maquet and colleagues (1996), using PET scanning, found strong activation in right inferior parietal lobe which is activated in spatial imagery construction tasks. This is noteworthy since dream reports incorporate visual and spatial imagery, supporting the concept that dreaming involves multimodal experience.

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[13] To be discussed in detail in chapter 2.2.

Dang-Vu and colleagues attempt to correlate brain activation with reports of cognition in dreams. They argue:

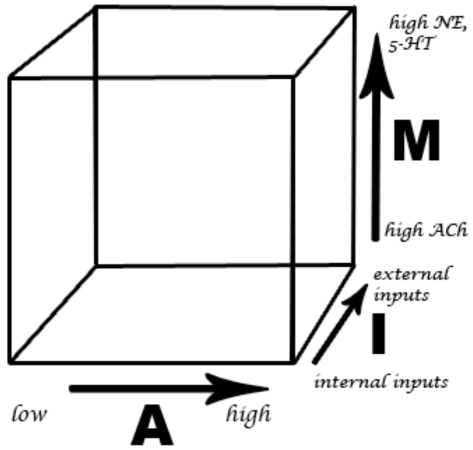
> Temporo-occipital activation [that occurs when subject are dreaming] is in keeping with visual dream imagery. Prefrontal deactivation is suggestive of the lack of orientational stability, the alteration in time perception, the delusional belief of being awake, the decrease in volitional control and the fragmented episodic memory recall. Inferior parietal deactivation may contribute to the lack of distinction between first and third-person perspectives (Dang Vu et al. 2005 p 415).

This is consistent with common features of dream cognition, such as lack of control, change of perspectives and poor memory recall[14]. Moreover, this provides some support for deficiency views of dream cognition to be discussed in chapter 2. It is important here to note that there are discrepancies between studies. Kubota and colleagues (2011) argue that studies are inconsistent on the activation of the DLPFC, and some have found activation of the DLPFC during REM sleep. This has been found using both PET and fMRI studies. As I will discuss in more detail in chapter 2, dreaming also involves a wide variety of cognitive features. This leads me to propose a pluralistic view of dreams, which attempts to take into account all of these features rather than ascertaining the minimal conditions for dreaming. I will develop this view over the course of the next few chapters. First I will describe Hobson and colleagues' model which accurately describes some of the experiences that occur in dreams. However, I will argue that this view is reductive and does not encapsulate all dreaming phenomena.

Hobson and colleagues (2000) note that some studies have led to the erroneous idea that the dreaming and waking brain functions are similar or identical, thus waking and dreaming cognition are similar or identical. However, many of these experiments use technology that only shows general brain function, whereas detailed information from modern neuroimaging techniques reveals the important differences in specific areas and neuronal populations (Braun et al. 1997; 1998; Maquet et al. 1996; Nofzinger et al. 1997). Hobson and colleagues argue that small neural changes can lead to highly altered cognition, both in sleeping and waking. This is demonstrated by small changes that lead to abnormal waking states. The specific "wake-like function of regional brain areas is

[14] Bizarreness in dreaming will be discussed in chapter 2.1 and dream cognition in 2.2.

preserved in many abnormal states such as focal motor activity during seizures (Adams et al. 1997) or the recruitment of visual association cortex during visual hallucinations (Ffytche et al. 1998; Silbersweig et al. 1995)" (Hobson 2000 p 808). Therefore detailed information is required to ascertain the similarities and differences between sleeping and waking. These changes are the basis for Hobson's model.



Model Factor	Psychological	Neurobiological
A- Activation: Level of energy processing capacity	• Word count • Cognitive complexity e.g. perceptual vividness, emotional intensity, narrative	• EEG activation • Firing level and synchrony of reticular, thalamic and cortical neuron
I- Information: Source internal or external	• Real world space, time and person referents and their stability • Real vs. imagined action	• Level of presynaptic and post synaptic inhibition • Excitability of sensorimotor pattern generators
M- Mode: Organisation of Data	• Internal consistency? • Physical possibility? • Linear Logic?	• Activity level of aminergic neuron

Figure 1. The Activation-Input Source-Neuromodulation model (AIM). Illustration of three dimensional state space and the psychological neurobiological correlates of each dimension. See Hobson (1990; 1992a; 1997a) (Adapted from Hobson et al 2000). Ach refers to the neurotransmitter, acetylcholine, present in cholinergic neuromodulation, whereas norepinephrine (NE) and serotonin (5-HT) are aminergic neurotransmitters.

Hobson's focus is to model the changes in the brain and correlate them with changes in cognition during sleep. This is described using a 3 dimensional state space model of the brain called AIM (Fig. 1). The three dimensions of the AIM model are activation (A) information flow (I) and mode, or neuromodulation (M).

> Each of these terms has meaning both at the cognitive and neurobiological levels. Roughly speaking, these dimensions are meant to capture respectively:
>
> (1) the information processing capacity of the system (activation);
>
> (2) the degree to which the information processed comes from the outside world and is or is not reflected in behavior (information flow); and
>
> (3) the way in which the information in the system is processed (mode) (Hobson et. al. 2000 p 793).

Activation (A) alters during sleep and waking in that certain areas of the sleeping brain, such as the DLPFC, are mostly inactive, which lowers the capacity for information processing. For example, memory storage and rational thought capacity are reduced (Hobson, 1999, 2000, Muzur, Pace-Schott & Hobson, 2002). In contrast, others areas, such as the visual cortex and motor cortex, are highly active, so dreamers retain ability to produce vivid visual and movement hallucinations, and other sensations (Nir and Tononi 2010).

Information flow (I) is primarily internal in sleep and external in waking. During sleep there is an "input and output blockade" (Hobson, 2000, 2002) which prevents most information from the external environment being received by the brain, and prevents the body interacting with the external environment due to sleep paralysis[15].

According to Hobson the waking brain is largely modulated (M) by serotonin and noradrenalin, but in contrast, during NREM sleep the production of these

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[15] Noteworthy exceptions such as RBD and responsive stages of sleep discussed earlier.

neurotransmitters is reduced by about a half, and production ceases during REM sleep. Hobson notes that it is the chemicals associated with "precisely those awake state functions (such as attention, memory and reflective thought) that are lost in dreaming" (Hobson 2002 p 63). Neuromodulation also shifts from aminergic in waking to cholinergic in REM sleep, so that "waking and dreaming are at opposite ends of an aminergic/cholinergic neuromodulatory continuum, with NREM sleep holding an intermediate position" (Hobson 2000 p 813). It has also been found that injecting cholinergic drugs into the pons[16] of cats causes them to fall asleep more quickly and have extended periods of REM sleep in comparison with regular, injection-free sleep (Hobson, 2002 p 68). Cholinergic modulation has been associated with increased emotion and decreased directed thought due to "selective activation of the subcortical and cortical limbic structures (which mediate emotion) and with relative inactivation of the lateral prefrontal cortex (which mediates directed thought)" (Hobson 2000 p 809). Changes in waking modulation can occur in times of stress, sleep deprivation or with drugs use. This can cause a shift along the continuum from aminergic to cholinergic similar to that of the sleeping brain. This leads to reduced prefrontal activation, and people affected by shifted modulation report lack of rational control of thought, and sometimes hallucinations.

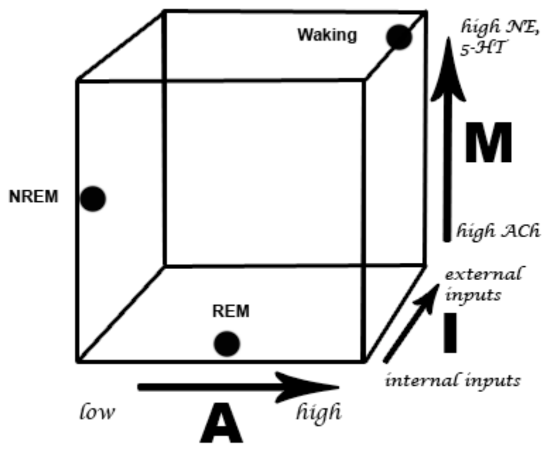

Figure 2. A representation of the changes within the 3D state space in waking, NREM and REM

Waking and sleeping states can be shown on the 3 dimensional state space of the aim model (Fig. 2). While awake, activation is high, the input source is external, and

[16] The area of the brain stem that theorists widely agree is responsible for the generation of REM sleep

neuromodulation is primarily aminergic. NREM sleep displays lowered activation, internal input source and intermediate neuromodulation between aminergic and cholinergic. REM sleep, in contrast, has high activation in sensory and emotional areas but lowered in the prefrontal rational thought and attention areas, internal input source and primarily cholinergic modulation.

Some theorists (Laberge 2000, Gottesmann 1999, 2000, Perry, et al. 1999, and Perry and Piggott 2000, Steriade, 2000, Domhoff, 2003), argue that Hobson's three dimensions are too simplistic, since they are in themselves multidimensional. Activation is complex, as there can be high levels of activation in some areas with simultaneous deactivation in other areas. Laberge (2000) queries, "from which brain area is "Activation" (A) measured? Obviously, A varies as a function of brain location. [...] The need for multiple A dimensions seems inescapable" (p 926). Input source is also multidimensional since there are multiple senses, and one sense can remain awake while others fall asleep (LaBerge 1990). During sleep, one is often able to hear external sounds but not smell smells. One can also confuse sensory with motor output. Mode of information processing (M) is a highly complex interplay between acetylcholine and dopamine along with an absence of serotonin and norepinephrine that modulates REM sleep. Modulation, according to Laberge, also requires multiple dimensions.

Since the AIM model is intended as a simplification of the neural processes of sleep, I will not criticise its simplicity. Hobson accepts that every dimension is in itself multidimensional. Rather, I see AIM as a useful generalised model of the changes between waking and sleeping brain activation. Although each state-space is itself complex, we can use a simplified model as a tool to describe major changes between the waking and dreaming brain. The "activation" dimension could take into account increased activation in the visual cortex and cessation of the DLPFC. Although the AIM model stresses the importance of aminergic and cholinergic modulation, Hobson also acknowledges the importance of the interplay between neurochemicals.

However, although the AIM model is a useful tool for describing changes in the brain, my main criticism is that Hobson's description of the dream experience as cognitively impaired and bizarre is overly reductive. Contrary to Hobson's description of the dream experience, not all dreams are bizarre and cognitively impaired. For example, lucid dreams, as I will discuss in the following section, often display high levels of cognitive ability. Lucid dreams in which the dreamer is aware they are dreaming, are an interesting subsection of the dream state. They exemplify the variety of dreamed experience possible, and provide reasons to reject a deficiency view for all dreaming. I will continue to discuss the variety of cognition in non-lucid dreams in more detail in chapter 2, and turn to further criticisms of Hobson's view in chapter 5.

1.5 Lucid dreamers in the dream lab

Lucid dreams are a remarkable range of phenomena in which the subject realises they are dreaming. LaBerge notes that "during such "lucid" dreams, one can reason clearly, remember the conditions of waking life, and act upon reflection or in accordance with plans decided upon before sleep" (LaBerge 2000 p 962). The realisation that one is dreaming is not always accompanied by such abilities as increased rationality, metacognition and memory. A dreamer may realise they are dreaming but still act in irrational ways and lack access to waking memory. Another ability that is often, although not always, gained in lucid dreams is an increase of volitional control over actions and the dream narrative. Attaining waking levels of rationality, self control and also narrative control may be seen as reaching "full lucidity" (LaBerge & DeGracia 2000 p 143). For my purposes, I will use 'lucid dreaming' broadly to refer to the realisation that one is dreaming, whether or not this realisation is accompanied by increases in other rational capacities.

Kahan and LaBerge (1994) note that attaining "full lucidity" is rare, but possible. The following dream report demonstrates increased memory capacity and the ability to control one's own actions and even the features of the dream scenario:

> […] I am standing on a sidewalk in a city. I recall a waking intent for the next lucid dream—to call a particular type of cat to me—the sort of cat I would want to have if cats were allowed in my building- a black tortie cat with cream and

> orange markings. Already I see a small black and white cat on some stone steps. I call 'Here kitty,' hoping to call the particular cat I was imagining to me. Soon I am surrounded by 7 or 8 cats, including the black and white cat. I see a tortie cat that is close but not exactly like my ideal and pick it up out of the group (p 258).

In this example, the dreamer can remember waking intentions. He gains control not only over his own actions but also of other elements of the dream; he can call a cat to him, although is unable to call or call up the exact type of cat he wishes. This demonstrates an impressive range of abilities, but also shows that gaining full control is extremely difficult; he realises his power to control the dream, however his control is not complete. Lucid dreaming often follows a prelucid stage in which the dreamer begins to question whether they are dreaming. This may be brought about if the dreamer notices something unusual or bizarre about their surroundings and becomes incredulous. This does not always lead to lucidity; the dreamer may confabulate an explanation and return to normal dreaming (Windt & Metzinger 2007, Spadafora & Hunt, 1990, LaBerge & Levitan 2004). The prelucid stage is an interesting phenomenon in itself as it demonstrates an exception to the norm that dreamers do not notice bizarre features in dreams nor question whether they are dreaming.

In a fascinating series of experiments lucid dreamers learned to indicate lucidity whilst dreaming by using specific eye movements which were recorded by EOG (LaBerge, 1980, 2000, 2010, Kahan & Laberge 2011). This means that researchers ascertain precisely when a dream occurs and during which stage of sleep. LaBerge (1985b) and colleagues (1981) and Schatzman and colleagues (1988) have shown a strong correlation between lucid dream reports and physiology recorded by EOG, EMG and EEG. In one example (Schatzman et al. 1988), an expert lucid dreamer carried out instructions to draw large numbers on the ground after lucidity onset. He indicated lucidity by performing a set of prearranged eye movements, then as he drew the numbers, tracked his arm movements with his eyes, signalling the completion of each number with eye flicks corresponding to the number drawn (one flick for number 1, two flicks for number 2 etc). All of these eye movements were recorded by EOG. The EMG strapped to his forearm picked up the tensing of his muscles which correlated with the writing movement. This raises the possibility of directly reporting dreams whilst dreaming. LaBerge (1994) notes that attempts were made to teach lucid dreamers to use sign language to convey dream content whilst they are asleep. This research paradigm used a sensor glove to attempt to record the movements. At the time of publication, existing technology was not sensitive enough to read the hand signals and to my knowledge, there have been no recent successful attempts to achieve this. Perhaps reduced muscle tone during sleep would make it unlikely for hand signals to be sufficiently strong for recording[17].

Lucid dreaming is rare but can be learned or induced by pre-sleep exercises. Practicing self-awareness exercises during waking, such as questioning one's current state (asking whether one is awake or dreaming) and then setting the intention to become lucid leads to higher levels of self-awareness during sleep. In one experiment, a group of subjects who practised lucidity exercises whilst awake increased the frequency of their lucid dreams in comparison with a control group who did not practice exercises (Kahan and LaBerge, 1994). This suggests that increased self-awareness in waking life increases self-awareness in dreams, which can lead to lucidity. Kahan and LaBerge note:

> a complicating factor is that dream psychology itself is divided on the question of whether lucid-control dreaming is an aberration of normal dreaming or represents one end of a continuum of cognitive abilities available in the dream state. In the first case, lucid dreaming would not be representative of normal human cognition, while from the latter perspective, lucid dreaming would be a significant capability within the range of human cognitive endowments(Kahan & LaBerge, 1994, p 253).

According to Kahan and LaBerge, since most individuals can be taught to lucid dream, lucid dreaming is on a spectrum of cognitive ability available to almost everyone in the dream state. I agree that lucid dreaming provides evidence that cognitive capacities are varied between dreams, and since one can be more or less lucid in a dream (compare realising one is dreaming with gaining full lucidity) this suggests that there is a spectrum of such abilities. However, the spectrum of cognitive abilities is not limited to lucidity; as I will discuss in chapter 2, some non-lucid dreams have cognitive features that are

[17] In their most recent paper, Kahan and Laberge (2011) overview the strong evidence in support of lucid dreaming, including eye signalling, but make no mention of any progress using the hand signalling method.

similar to what we might expect during similar waking circumstances. Yet lucid dreams in general show higher levels of cognitive ability than non-lucid dreams.

Lucid dreams provide a challenge to any view according to which *all* dreams are cognitively deficient. Although many dreams involve deficiencies such as lack of control over one's thoughts and lack of reflective awareness, this is not the case for all dreams. These abilities are associated with the dorsolateral prefrontal cortex (DLPFC) as aforementioned, which is relatively deactivated during most sessions of REM sleep.

> The delusional belief that we are awake, the lack of directed thought, the loss of self-reflective awareness, and the lack of insight about illogical and impossible dream experience are due to the combined and possibly related effects of aminergic demodulation and the selective inactivation of the dorsolateral prefrontal cortices (Kahn & Hobson, 2005 p 841).

According to this view, lucidity would correlate with increased activation of the DLPFC in comparison to regular, non-lucid dreams and potentially a shift in neuromodulation. The possibility of gaining lucidity or semi-lucidity might explain some of the discrepancies between findings mentioned earlier, and demonstrates that we should not consider cognitive deficiency to be an essential characteristic of all dreaming.

Although lucid dreaming is easier to verify and control than non-lucid dreaming, it is unlikely that lucid dreaming is indicative of normal dream processes. The higher levels of cognitive abilities that can occur during lucid dreams and increased control suggest they should be considered separately from non-lucid dreaming. I do not mean to argue that lucid dreams are an entirely separate phenomenon, just that certain features may not be shared with non-lucid dreaming, such as eye tracking. Therefore, even if the scanning hypothesis is empirically confirmed for lucid dreams, this may not be true for all dreams, and requires separate confirmation. Until this can be empirically shown, we have evidence only that a scanning hypothesis can be applied to lucid dreams. The fact that such a hypothesis has been difficult to verify suggests that scanning correlations might only occur in some dreams, and perhaps scanning is more common in lucid dreams. I will argue over the next few chapters that according to my pluralistic view, there are many distinct types of phenomena that can occur during dreaming. These phenomena require separate analyses as none are prima facie indicative of the others. Since lucid dreams are a subset of dreaming phenomena, experiments on lucid dreaming cannot be used as an indicator of the common features of ordinary, non-lucid dreaming.

Although lucid dreaming is a rare occurrence for most individuals and does not reflect common dream experience, it does highlight the variety of experiences possible in dreams. Dreams can display a wide variety of cognitive features from deficient cognition to waking level cognitive abilities which is consistent with a pluralistic approach to dream content. I will argue for this in more detail in the following chapters.

Conclusion

In this chapter I have set out some key aspects of the scientific study of dreaming, and discussed debates that have arisen since the discovery of REM. I noted that different research groups have found conflicting cognitive and neural features in dreams, such as different levels of reflective thought and memory, and there is disagreement as to the activation of the DLPFC and other brain areas. I have argued that this suggests that cognition and brain activation may be highly varied during dreaming. General areas of brain activation can alter from dream to dream, as they do in different stages of sleep. I will argue for this pluralistic account of dreaming in more detail in the following chapters. I have argued that lucid dreams deserve a separate analysis, and should not be seen as indicative of the content of non-lucid dreams. Therefore we cannot verify the scanning hypothesis for all dreams by showing that it is accurate for lucid dreams. However, lucid dreams demonstrate that dreaming cognition can be highly varied. There is much disagreement, and there are many areas of dream research that need to be further examined, but the difficulty in reaching agreement on the cognitive features of dreaming suggests that dreams are not defined by a specific set of cognitive features. Instead, dreaming consists of a wide variety of features and experiences. I will argue that theories of dreams which do not take this variety into account are overly reductive. In the following chapters I will argue for a pluralistic account of dreaming, and discuss the extent of dream diversity.

2

Bizarreness and Metacognition in Dreams: the Pluralist View of Content and Cognition

In this chapter I apply the pluralistic account of dreaming to explain the diversity of content and cognition in dreams. The nature of dream content and cognition is strongly disputed by dream theorists, however I argue that dream pluralism can encompass and explain these disagreements. In regards to content, there is disagreement as to whether dreams are bizarre and incoherent, or accurate simulations of waking life. Whereas in regards to cognition, some theorists argue that dream cognition is deficient in comparison to waking cognition, whereas others claim waking and dream cognition are similar. Firstly, in section 2.1 I discuss bizarreness in dream content and argue that dreams can fall anywhere on a spectrum from extremely bizarre and incoherent to the extent that they are difficult to report, to mundane and indistinguishable from waking life from a first person perspective. In section 2.2 I discuss metacognition, a form of cognition that is often assumed to be lacking in dreams. I argue that a pluralistic approach to dream cognition is supported by empirical evidence. Dreaming metacognition may be highly deficient in certain dreams or equal to waking cognition in others. However, here I note one limitation to my pluralistic account: that there is little evidence to support the possibility that dreaming cognition can be *superior* to waking levels.

It is important here to note that recently, theorists have begun to accept that bizarreness and metacognition in dreams occur to different extents in different dreams. Theorists who until recently have defined bizarreness and cognitive impairment as some of the "formal features of dreaming" (Hobson et al. 2002, p684) or as relatively accurate representations of the waking world with only occasional bizarre features (Domhoff 2003) have admitted that dreams are multifarious and individual differences do exist (Domhoff 2005, Hobson 2005a). There are discrepancies between research groups' claims as to the frequency which these features occur. Hobson (2005a) notes that these discrepancies may be due to the focus and aims of the research: whether the group aims to reveal the *similarities* or *differences* between waking and dreaming. The pluralistic approach instead focuses on the *variety* of experience that can be had during the dream state, and so I discuss the extent of this variety. This is a useful approach because it sets out the different varieties of dream experience for further analysis, and takes a neutral stance on the content of any particular dream. Dreams, according to the pluralistic view, should not be defined as intrinsically either bizarre or mundane, cognitively impaired or equivalent to waking, rather dreams are highly varied in regards to these attributes.

2.1 A pluralistic account of dream content

> Several terms have been used in the literature to describe bizarreness, for example: "distortion from reality", "metamorphosis", "implausibility", but many authors agree that the concept of bizarreness includes both (a) impossibility and (b) improbability and /or oddness compared to "common daily experiences" (Colace, 2010 p 109).

Hobson's "red car dream" report, with which I started chapter 1, describes a fantastic world in which the laws of nature do not apply. In dreams we can perform impossible feats, visit fantastical locations and meet fictional people. Dream narratives display incongruent shifts in scenery and story line, while characters can morph and change into other characters. According to some theorists, dreams are unlike waking and imagining: they are far more bizarre and incoherent. Others argue that dreams are, in general, less bizarre and unusual than common dream reports suggest: they are instead mostly convincing imitations of waking life and waking concerns. In this section I argue that we need not choose between these alternatives because both are, to an extent, correct. Current research supports a pluralistic account of dream content: dreams can be a wide variety of experiences, from bizarre and incoherent to mundane and similar to waking. I firstly discuss views which state dreams are bizarre and incoherent, and then compare this research with the view that dreams are accurate representations of waking life. I analyse both views and argue that different findings between research groups are due partly to the diverse content of dreams, and partly to the focus of the research groups, some who aim to demonstrate the similarities between waking and sleeping while others focus on the differences. I argue instead that certain dreams *are* accurate waking simulations while others are more bizarre and incoherent than either waking experience or daydreaming.

2.1.1 Bizarre and incoherent dreams

J Allan Hobson and his colleagues argue that bizarreness is one of the "formal" or "typical" features of dream content (Hobson 2000, 2002, Hobson et al 1987, 2002). Dreams display "such distinctive cognitive features as impossibility or improbability of time, place, person and actions" (Hobson, 2000 p 794). Hobson and colleagues use dream bizarreness scales to quantify and compare bizarre features.

Hobson and colleagues' (1987) scale has two separate categories. The first categorises content, and the second categorises bizarreness. The content category assigns letters to different types of content:

A Includes characters, actions, places, objects and time. For example, the Dalai Lama, playing soccer, Papua New Guinea, or 5pm are all type A.

B The dreamer's or dream character's thoughts. E.g. if the dreamer imagines playing soccer or thinks about having lunch.

C Feelings and emotions such as fear, elation, boredom and nostalgia

D Indicates inferences or explanations for events, characters and objects, for example, believing that the world is going to end because I can't find a matching pair of socks.

The second category assigns numeric values to different types of bizarre event:

1 Discontinuities,

2 Incongruities or mismatching features,

3 Uncertainties and vagueness.

So dreaming about *my mother having cat's eyes* would be rated A2 for a character with mismatching features. Discontinuity in emotional content, such as *I suddenly felt elated, then nostalgic,* would be given a C1. Bizarreness density can be calculated by dividing the number of bizarre items by the total number of items in the report. The bizarreness rating can then be compared with waking reports.

The following report is a "typical" REM dream report according to Hobson (2002), and displays bizarre features.

> I am perched on a steep mountaintop; the void falls away to the left. As the climbing party round the trail to the right, I am suddenly on a bicycle, which I steer through the group of climbers. It becomes clear that I make a complete circuit of the peak (at this level) by staying on the grass. There is, in fact, a manicured lawn surface continuing between the rocks and the crags (p 8).

Finding himself suddenly on a bicycle would be considered A1, discontinuity of objects. Steering a bicycle through a group of climbers on a steep mountain could be seen as an incongruous action (A2) and having manicured grass on a steep mountain is a mismatching object (A2). If we divide 3 bizarre features by the total number of features (perching on a mountaintop, void, climbing party, waking round a trail, etc) of which there are around 11, the bizarreness density is 0.27. Of course, this may not be completely accurate if one were to consider sitting on a mountain top as bizarre (perhaps the dreamer has never been on a mountain before) or if certain features, such as "perching" and "mountain top" should not be considered as separate features. To control for such problems, researchers use multiple judges to determine what is a bizarre feature, and there must be agreement between judges.

Williams and colleagues (1992) asked 12 students to record every dream they recalled upon waking during the night or in the morning. Using Hobson and colleagues' (1987) bizarreness scale, they found that 60 dream reports averaged a bizarreness density of 0.223, which is 1 bizarre element to every 4 or 5 elements. In comparison with waking perception this rating is very high considering that bizarre elements, such as discontinuities or incongruities, occur very rarely in waking perception. This supports both the common sense view that dreams are very bizarre compared to waking and Hobson's description that dreams are typically bizarre.

It is important to note that in my discussion, although thoughts and inferences can equally be rated for bizarreness and compared with waking cognition, I separate bizarre content, category A features, from cognitive features such as thoughts and inferences, categories B, C and D which I discuss in section 2.2. Perception and thought deserve a separate analysis, since what should be interpreted as bizarre perception may differ from what should be considered bizarre thought, as I discuss in more detail later. In this rating system, only items rated A refer to the dream content. This means that for my purposes, the density would be worked out by dividing all bizarre category A features by total numbers of category A features. This would not necessarily lower the bizarreness density, because the total number of category A features (the number which bizarre feature are divided by) is less than the total number of features.. For example, the rating of the mountaintop dream mentioned above would remain the same because it involves only a description of content, not thoughts or other features.

Hobson (2005) supports his theory of dreams as being typically bizarre by arguing that if waking and sleeping psychological life were continuous, it would be hard to explain the neurochemical changes that occur during sleep. He argues that "if dopamine and acetylcholine are available in rapid eye movement (REM) sleep but norepinephrine and serotonin are not, one might predict that mentation is quite different from waking. [It is unlikely] that such dramatic changes in brain function have no psychological consequences" (Hobson 2005a, p 22). Equating unusual neural events with unusual psychological features like bizarreness is not justified (Sutton 2009), because, as discussed in chapter 1, cognitive content, or what is represented, rarely map perfectly onto the vehicle, in other words the neural features that are doing the representing. However, according to Hobson it would be *unlikely* that waking and sleeping mental life could be psychologically continuous despite these differences in brain activity. When these changes occur during waking, they are associated with altered experience. Flanagan, in support of this argument, suggests that "bizarreness will increase the more control mechanisms are turned down" (Flanagan 2000 p 147). One such control mechanism is the dorsolateral prefrontal cortex, which is associated with focus and attention, and often displays a cessation of activity during sleep. Despite this, I will argue that bizarreness is not a *typical* feature of dreams, as described by Hobson (2002, p 9). Other experiments suggest that dreams can at times be convincing simulations of waking life.

2.1.2 Dreams are not particularly bizarre

Foulkes (1999), Domhoff (2005, 2007), Nielsen (1991) and Snyder (1968, 1970) argue that Hobson and colleagues have overrated dream bizarreness, and are erroneously describing dreams as typically bizarre. They argue that dreams generally reflect waking concerns and are "for the most part reasonable simulations of waking life that contain occasional unusual features" (Domhoff, 2007 p 180). This is supported by dream content analysis.

i) The Snyder and Domhoff studies

Snyder (1968, 1970), argues that dreaming consciousness is "a remarkably faithful replica of waking life" (Snyder, 1970, p. 133). In a collection of 635 lab-based dream reports bizarreness was calculated in regards to setting, characters, emotions and activities. Bizarre elements were rated either as "exotic" if they were unusual and out of the ordinary or "fantastic" if they were unrealistic experiences that would not occur in waking life. For example, in regards to dream setting (location, time, and nature of the setting) less than 1% were rated as "fantastic" and only 5% exotic, and the rest of the settings were judged to be ordinary. Overall, 50% of dreams were rated as having *no* bizarreness, and as little as 2% as having a high degree of bizarreness. 60-80% of events were rated as highly logically coherent, with only 5% low in coherence (Snyder, 1970, p. 145-146). Snyder suggests that dream reports are usually a "clear, coherent, and detailed account of a realistic situation involving the dreamer and other people caught up in very ordinary activities and preoccupations, and usually talking about them"(Snyder, 1970, p. 148) and that "90% would have been considered credible descriptions of everyday experience" (Snyder et al., 1968, p. 375). Most dream reports are indistinguishable from credible waking memories (Snyder et al, 1968).

Domhoff reports a much larger home-based study of 3118 reports from one woman, Barb Sanders (Domhoff, 2003, pp. 111-133). A blind analysis involved a comparison of her social interactions with family and friends with her dream reports to determine whether the dream content reflected her waking concerns and experiences. Information was gathered about her life from her friends and family as well as her own reports. The Hall-Van De Castle content analysis system, which codes a variety of content types such as characters social interactions and activities was used on a random sample of 250 dream reports. These were then compared to her waking experiences and concerns. The social interactions with family and friends in her dreams were judged as mostly "continuous with her waking thoughts and concerns in terms of the frequency of their appearance and the balance of aggressive and friendly interactions with them" (Domhoff, 2007 p 16). These results suggest that dreams are mostly accurate imitations of waking life with the occasional bizarre element, in contrast with Hobson's characterization of dreams as highly bizarre and distinct from waking life. However, Domhoff's assessment depends on a comparison between dream content and waking *concerns* instead of waking perceptual experiences. As I will argue later, perceptual dream experiences should instead be compared with perceptual waking experiences. Waking thoughts and concerns should be compared with dream thoughts and concerns.

ii) Foulkes and Colace: studies of children's dreams

Foulkes (1999), whose research focus is the development of dreaming and dream reporting from childhood to adulthood, argues that bizarreness in narrative reports has been overstated especially in children's dreams. As discussed in chapter 1, Foulkes found differences in content between controlled dream reports in which the dreamer was woken during sleep and uncontrolled reports in which the dreamer made the report after waking up in the morning. Foulkes argues that the tendency to remember only bizarre dreams in the morning accounts for the overrating of bizarreness from some groups. There are also differences between adult and children's dreams. Children's dreams are usually simple and without narrative. More complex narrative dreams develop with age. However, often parents urge children to elaborate on their reports, which can lead to bizarre or imaginative story telling that does not reflect dream content.

According to Foulkes (1982, 1985), dreams are an attempt by the conscious mind to organize information from the unconscious activation of memory units that occurs during sleep. Usually the conscious mind is quite successful in creating plausible narratives, however discontinuities occasionally arise when the conscious mind is unable to sensibly incorporate the data from hyper-activated areas in the brain. For Foulkes these discontinuities are an *exception* to regular dream production.

Young children aged 3-5 tend to dream of simple imagery rather than complex narratives, which develop between ages 5-9 (Foulkes 1999, chapters 4 & 5). Foulkes (1999) rated children's dreams based on the number of "character distortions" and "setting distortions", and found few such distortions. Dreams are "generally coherent and internally plausible images strung together over time as generally coherent and internally plausible narrative sequences. They are *not,* as the stereotype has it, illogical sequences of bizarre images" (p 8). Colace (2010) agrees that especially between the ages of 3 and 5, children's dreams are very simple, sometimes one scene or activity. The following two reports are from children aged 3 and 4:

> I have dreamed the tree near the house, where the garage is. There was a rose.
>
> I dreamed I was at school and I was drawing (Colace, 2010 p 105).

Three studies were conducted on children ages 3-5, two based on lab reports and the third based on home reports collected by parents upon waking up in the morning.

Colace rated 68% of dreams as "sensible, comprehensible and plausible", 17% as "clear, consistent and sensible but strange since their meaning is scarcely compatible with common daytime experiences" and 15% as "senseless, not comprehensible, bizarre and without meaning" (Colace 2010, p 117-118). Older children (ages 5-7) displayed more bizarre aspects, with 42% being sensible and comprehensible, 24% as sensible but not compatible with waking life and 34% as strange and bizarre. As children grow up, their dreams develop narrative complexity but remain predominantly sensible and comprehensible.

These findings display a discrepancy between different research groups. Hobson and colleagues found dreams contain many bizarre elements while Snyder and others found dreams to be continuous with waking experience except for a few bizarre elements. In the following section, I outline some possible explanations for this discrepancy.

2.1.3 Explanations of the conflicting results

i) Lab-based and home-based reports have different results

In chapter 1 I discussed the pros and cons of lab-based and home-based dream reports. Williams and colleagues' experiments discussed above rely on home based reports, whereas Foulkes and Colace use both home-based and lab-based studies while Snyder's studies involve lab awakenings. As discussed in chapter 1, it is possible that at home, bizarre and interesting dreams are more likely to be remembered than mundane dreams. Alternatively, the strange environment of the dream lab may repress bizarre content. I argued that the minor differences between controlled home and lab reports is insufficient to explain the discrepancy between research findings. I will argue that the relevant difference between research groups is the methods used to rate elements of the dream.

ii) Alternative bizarreness ratings, different results

In this section I will briefly discuss two ways in which rating bizarreness can affect research results. Firstly, I will argue that what is considered to be bizarre may differ depending on context. Secondly, I will argue that part of the discrepancy between research groups may be due to differences of bizarreness scales between groups.

Bizarreness to an extent is subjective and context-dependent. For example, around Christmas time, children see Santa Claus on every street corner, thus dreaming of Santa is continuous with waking life (Colace 2010), yet out of this context, the appearance of Santa in a dream seems bizarre. Although Colace focuses on ways in which context can reduce the number of bizarre items, I will instead argue that context can also *increase* bizarreness density. In the aforementioned mountaineering dream, I rated 3 elements as bizarre under the assumption that the dreamer is involved in mountaineering. However if it was revealed that the dreamer had a phobia of heights, the mountain setting should also be judged as bizarre. It is unusual for this particular dreamer choose to do mountaineering. It might be difficult for an experimenter to judge which items are bizarre relative to the perspective of the dreamer, and this might explain some different results. To overcome this problem, researchers need to take into account context-dependent items, and have some knowledge of what is considered a normal occurrence in the lives of the participants.

Another plausible explanation for the discrepancies between groups is that different bizarreness scales are used by different groups. Domhoff notes that some bizarreness scales are too general and that "much of the specific information in dream reports can be lost or unused with [these] rating scales" (Domhoff, 2003 p 59). For example, Foulkes' (1999) measure of bizarreness is more course-grained than Hobson and colleagues', measuring only character distortion and setting distortion. Foulkes' scale may not be sufficiently fine-grained to take into account all examples of bizarreness (Colace 2010). Snyder also used only two measures of bizarreness: exotic or fantastic (Snyder, 1970, p. 134). This could explain why research groups with more generalized scales report lower bizarreness densities. Although it might be the case that an overly course-grained bizarreness scale underestimates bizarreness, equally an overly complex system might overestimate bizarreness. Hobson's scale includes thoughts and emotions although these are separate from content. Bizarre thoughts in dreams should be compared with bizarre thoughts in waking, not with bizarre scenery, characters and such. Also, since Hobson's scale does not distinguish between unusual and highly bizarre or impossible elements, the bizarreness density for a dream with several slightly out of the ordinary elements could be very high, whereas a dream with one or two highly improbable or impossible events would be lower in regards to bizarreness density. The issue then is to decide which scales are the most appropriate, an issue that is beyond the scope of my thesis. Instead I highlight the variety of content that exists in dreams.

Dreams can be bizarre and incoherent, or accurate simulations of waking life, or involve a mixture of bizarre and mundane elements. During the course of one dream there can be a shift from mundane experience to bizarre, which accurately describes of most of Hobson's dream reports. Hobson (2005) notes that "all of the studies cited by Domhoff (2005) *do* report some strong emotion and some bizarreness in dreams." (Hobson 2005a, p 22). Even Snyder admits, as discussed earlier, some dreams are fantastic and incoherent. In contrast, some dreams involve *no* bizarre elements.

These findings show that dream content can be highly varied, both across dreams and within a single dream narrative. Although there is disagreement regarding the degree of bizarreness that occurs in dreams, it is hard to deny that dreams contain more bizarre elements than waking perception. Even if Snyder is correct in his assessment that 5% of dreams are incoherent, and less than 1% are fantastic, I am far less likely to report incoherent and fantastic experience in waking life. The disagreements here concern the degree of bizarreness displayed in dreaming, not that dreams can be, at times, highly bizarre or mundane. I conclude that it would be inaccurate to *define* dreams either as bizarre *or* as generally accurate simulations of waking life.

Contrary to this, some argue that we should compare dreams to waking fantasies and mind-wandering instead of waking perception. These theorists argue that given this comparison, dreams are not particularly bizarre. I evaluate this theory in the following section.

2.1.4 Dreams vs. fantasy reports

In this section I discuss the comparison of dream experience with waking thoughts and fantasies. I argue that this comparison is only relevant for certain elements, such as dream thoughts and fantasies. Dream perception, on the other hand, should be compared with waking perception because according to my pluralistic account of dreams, dreaming involves both imaginative and perceptual elements[18].

If we compare dreams to waking imagination or mind-wandering, the odd shifts in scenery, objects and narrative are less baffling. Our waking thoughts wander just as our dreaming minds do, so dreams are not as bizarre as Hobson and colleagues suggest. This view is taken up by a number of theorists (States, 2000; Klinger, 1999; Klinger & Cox, 1987-1988; Flanagan 2000; Domhoff 2007). I discuss two main issues: firstly, the conceptual issue of whether the comparison is appropriate, and secondly, the empirical issue of whether dreams are more bizarre than imagination. In regards to the first issue I argue that the comparison between dream thoughts and waking thoughts is appropriate, however dream perception should instead be compared with waking perception. Secondly I argue that some research groups have found dream thoughts to be more bizarre than waking thoughts, however bizarreness is not a characteristic of all sleep thought.

i) Should dreams be compared with daydreams?

Dreams display features common with relaxed thinking (Foulkes, 1975, States, 2000) or mind-wandering (Starker, 1974, Flanagan, 2000). If we compare dreaming with

[18] To be argued in detail in chapters 4 and 5.

thinking or mind-wandering instead of waking perception, then bizarre features, according to these theorists, are equivalent.

Flanagan (2000) argues that dream reports are often indistinguishable from reports of mind-wandering. The following report was shared with neurobiology students to gauge their reactions to the content.

> I saw the first bird of Autumn appear on the new feeder. My mind turned from the fleeting sighting of the finch to a dim image of a Turkish city (I have never been to Turkey). I felt happy as I imagined having lunch later with G., and then pictured a scene in which a TV sports announcer urinated out the window of a nightclub onto two plainclothes officers staking the club out for drug traffickers. This seemed funny. […] I put my remaining raspberry yoghurt on the dog's dry food, and drove off in a red Saab (Flanagan, 2000, p 58).

The students began judging the weird elements as if they were from a dream report, but contrary to what one first assumes, this example is a report of *waking thought*. Although Flanagan supports Hobson's AIM model, he disagrees with Hobson's treatment of dream bizarreness. Waking thoughts, like dreams, shift and change in odd ways and we can imagine random and bizarre images, like a sports announcer urinating on a police officer.

Flanagan suggests that his waking thought example is analogous to dreaming, however all of the elements of this report seem less bizarre when contextualised. He explains that his thoughts turned to Turkey because the friend he was meeting for lunch was from Turkey. In the report he only gives context when this makes the thought seem *more* bizarre, i.e. that he had never been to Turkey, which is biased. The journalist peeing on police officers was a story that he had just read in the newspaper, so it is not surprising that he began thinking of this humorous event. It seems odd that he put his yoghurt into the dog bowl, however he did this because the dog usually ate cottage cheese, but he had run out and decided to see whether the dog would eat yoghurt instead. Given context, *all* of these elements make narrative sense. If this example is analogous to dreaming, then there must *equally* be context which explains the odd shifts in dream scenery. As previously discussed in 2.1.3, context may explain some bizarre features but not all of them. Sometimes context can make an event seem *more* bizarre, such as mountaineering when you are afraid of heights. I often have dreams about participating in elaborate martial arts fights, which is not bizarre considering martial arts is one of my hobbies. In contrast, my dream being a spaceship engineer just seems bizarre. If Flanagan's example is analogous to dreaming, this dream should have some contextual explanation. Flanagan's example was set up to *seem* like a dream report, but if the context was included, it most likely would not have fooled the students. So I would argue that Flanagan's example is not convincing enough to show that dreaming experience is like waking thought. I don't deny that thought and imagination can be bizarre, however Flanagan's example is not convincing.

States (2000), in contrast to Flanagan, focuses on contextual analysis and argues that most dream bizarreness, like waking thought bizarreness, can be explained away given the context of "that reminds me syndrome" (p 183): the mind's tendency to go off in tangents when unrestricted by external stimuli. He argues that

> being reliable and efficient in a state of detachment from the world isn't something the brain does well—and for which benefit we can probably be thankful because *at least* half of the world's thinking gets done in the unreliable mode. In short, the only ground on which to compare dreams to anything would be [...] that of imaginative thought (States, 2000 p 185, see also 1998).

According to States, both the dreaming mind and the imaginative mind produce bizarre imagery because they are not restricted by external constraints. "That reminds me syndrome" derails focused thought towards the item the thinker was just reminded of. States argues that dream logic, like waking thought, can be constantly disrupted by other thoughts or memories and thus shift "in a series of "flits" from one thing to another, determined by the strongest mnemonic association aroused by the dream at any point" (States, 2001 p 106). Therefore dreaming is no more bizarre than mind-wandering.

One might argue that an important distinction is that mind-wandering does not involve hallucinogenic imagery nor a belief that the imaginary content is real. But Foulkes' (1975) mind-wandering study suggests otherwise. 16 female college students were placed in a dimly lit room and asked to report their experiences whilst relaxed but still awake. EEG and EOG confirmed that the subjects were in fact awake throughout the experiment. Of 74 arousals "24% yielded reports of imaginings which were described as visual, dramatic, and *hallucinatory"*. Subjects were first asked whether they saw visual stimuli or experienced other sensations and if they responded 'yes', were asked "at the time you sensed these things did you feel that they were really happening, or did you know at the time that these were just things that you were making up in your mind?" (p 67). If a subject reported that they felt the event was really happening, i.e. that they were not just imagining it, then it was judged as hallucinatory. In a second study of 20 subjects, 10 male and 10 female, with 115 arousals, endogenous imagery was reported in 78 cases (68% of arousals). Of these reports, 23 instances (27%) were reported as having a hallucinatory quality (p 68)[19]. Foulkes found that "relaxed waking thought is fairly susceptible to momentary intrusions of bizarre content or hallucination; [and] such qualities emerge in a variety of psychophysiological conditions and without any extraordinary induction techniques" (p 66). This suggests that the wandering mind can exhibit detachment from external stimuli, random associations and even hallucinations similar to dreaming.

Starker (1974, 1977) argues that individual styles of dreaming as described by Singer and Antrobus (1963, 1972) can be linked with styles of daydreaming, which demonstrates continuity between daydreaming and dreaming. The three daydreaming styles are:

1) conflictual or negative daydreaming which is dominated by guilts, fears, hostilities, and ambitions.

2) positive daydreaming which involves vivid imaginal experiences.

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[19] Foulkes found that of all reports, 38% maintained control over their thoughts with full awareness of being in a lab and participating in an experiment. 20% of thoughts were uncontrolled and wandered although the subject maintained awareness of being in an experiment (Foulkes refers to this as mind-wandering). 22% were "lost in thought" in that they for a time were unaware of being in a laboratory while their experiences were not hallucinatory. 15% reported no contact with reality and had hallucinatory experiences. The remaining 4% showed discrepant patterns in that they simultaneously believed their percepts to be true while simultaneously realizing they were still in a lab.

3) anxious, distractible daydreaming involving anxiety, absorption in frightening or bizarre fantasy, and poor attentional control. (Singer and Antrobus, 1963)

Most individuals display a tendency towards one of these specific daydreaming styles. Starker (1977) observed that similar styles are also apparent in dream reports and that often individuals have the same daydreaming and dreaming style, especially regarding affective quality and bizarreness. Starker argues that "dreams and day-dreams appear to be highly interrelated aspects of the fantasy process, sharing important affective and structural components" (Starker 1977, p 411). A positive daydreamer is most likely to dream enjoyable, vivid and imaginal dreams while the same continuity is displayed by conflictual and anxious daydreamers. This continuity gives additional reason to compare dreaming bizarreness with daydreaming bizarreness.

Despite the above findings, the comparison between dreaming and daydreaming or mind-wandering is not entirely justified. Dreaming involves both perceptual and imaginative elements[20], and although Foulkes' findings suggest that imagining can also involve hallucinatory experience, dreaming can involve greater multimodality, employ multiple senses, embodiment and immersion in a dream world. Dreams often involve failing to realize that the dream world is a dream, whereas although this may occasionally happen during mind-wandering, it is less common. Although one may forget one is imagining for a time, the imagined world is less likely to stand up to scrutiny than the dream world. For example, as discussed in chapter 1, the prelucid stage of dreaming often ends with the dreamer failing to realize that they are dreaming. There is no evidence to suggest that the imagined world could stand up to such scrutiny. Foulkes' experiment was designed to relax the mind of participants, so participants did not become skeptical of the imagined world. The dream world, but not the imagined world, can be a convincing world-model, one that can be mundane, involve some bizarre elements, or be incoherent and fantastic.

[20] As I will argue in more detail in chapters 4 and 5.

The multimodal nature of dreaming distinguishes dreams from imagining. However, I will briefly discuss the differences between dream and imagined content in the next section. I will compare the bizarreness of dreaming and imagining, and argue that dreaming, in some studies, has been shown to be more bizarre than imagining.

ii) Which is more bizarre?

Williams and colleagues (1992) also take up the challenge of comparing dream content to waking fantasies. They argue that dreams, like fantasies, can be bizarre or banal, but display a higher rating than fantasies on the bizarreness scale. In a comparison of 60 home-based dream reports with 60 waking fantasy reports taken from 12 college students, Williams et al found that "bizarreness was twice as prevalent in dream reports as in wake-state fantasy reports of the same subjects. Further analysis of the reports also showed differences in other features including the number of persona and remoteness of time and place" (p 172). Williams and colleagues (1992) found that the bizarreness density of dreams was 0.223, or 1 bizarre element for every 4 or 5 elements, whereas waking fantasies rated 0.089, which is only 1 bizarre element for every 11 or 12 elements.

In a Hobson et al. (1987) sample of 110 dream reports, A2 (incongruities of character or place) were the most commonly reported dream bizarreness items (44.5% of bizarre items), with A3/B3 (vague character or place and vague thoughts) occurring in 24.3% of cases of dream bizarreness, and A1 (discontinuous characters or place) accounting for 9.3%. These reports were then compared with fantasy reports, which were subjected to the same procedure of analysis. On average, Hobson et al. found that there are decreased levels of bizarreness in fantasies in comparison to dreams, especially A1 events.

In contrast, Domhoff (2007) argues that reports of increased dream bizarreness may partly be due to failure to take into account waking concerns. For example, in an early Hall (1953) dream study, a woman's dream involved bizarre elements such as a ripped wedding dress, her husband suffering from tuberculosis, and a missing stone from her wedding ring. These reports, taken from a series of dreams, reflected her concerns about her unhappy marriage, although not all items fit this theory. Domhoff reports:

> the results of detailed studies of unusual elements in the [dream journal] series suggest that some of them may well be expressions of figurative thinking, as the Freudians would expect, but that others are more likely due to cognitive defects in the dreaming state, just as activation-synthesis theorists would insist. The conclusion that some unusual elements probably have no figurative meaning is reinforced by the finding that there are more bizarre features in dream mentation at sleep onset (Domhoff 2007 p 19).

Domhoff appears to support a pluralistic view of dreams. Some bizarre elements can be explained given context, but others are due to cognitive deficits, and both can be displayed within the same dream report. I agree with this analysis. For example, my martial arts dreams may reflect some of my training sessions, thus are explained given context. However, it is bizarre that I fight what seem to be *real* battles, I often have super-human abilities and there are often bizarre, mismatching features. I think Domhoff's assessment that different features within a dream have different explanations is accurate. Pluralism applies across dreams, and also within individual dreams.

Dreams are not fundamentally bizarre and certain prima facie bizarre elements may be contextualised to make sense in reference to waking concerns. However, sometimes context *increases* bizarreness density. Similarly, "that reminds me syndrome" doesn't seem to account for all bizarre elements in dreams, although it might accurately describe some waking thought, as Flanagan's example suggests.

I agree with Hobson's (2005) assessment that discrepancies between the results of different research groups may be due to the interests of those research groups. Researchers such as Foulkes, Snyder and others study the ways that dreams are continuous with waking life, whereas Hobson and colleagues focus on highlighting the differences between waking and dreaming. However, a reductive view that defines dreams as either fundamentally bizarre or mostly waking simulations is not supported by the empirical evidence. I support a pluralistic view which focuses instead on the variety of dream experience. Dreams may be convincing replicas of waking life, bizarre and incoherent or anything in-between. The conflict between research groups boils down to disagreements about the ratio of bizarre to mundane dreams. In his later work, Hobson admits we should

> begin by agreeing that there are both similarities and differences between waking and dreaming mentation. We can argue until the cows come home about just how much of each there is, but that is not as interesting, to me at least, as getting on with the job of explaining the differences (Hobson 2005a p 23).

Although Hobson may argue that explaining the differences between dreaming and waking should be the focus of research, I think both differences and similarities between waking and dreaming are highly interesting. For example, dreams which are convincing replicas of waking life involving the self embodied within a dream world are fascinating because the dream world *and* the dream body are internally generated. It is remarkable that the sleeping brain can do this, as I will discuss in chapter 5. It is also astonishing that we usually fail to realise that we are dreaming, which I will discuss in the following section.

One of the most interesting aspects of dream bizarreness is how we respond to it: we often do not realise that an event is bizarre. This may be due to cognitive defects in dreams, but some researchers disagree with this analysis. In the next section I discuss dreaming cognition and its impairments, and argue that although we are cognitively impaired in some dreams, dream cognition is not fundamentally impaired. According to my pluralistic account, dream thought and cognition, like dream content, is highly varied. Dream cognition can be deficient or equivalent to waking cognition.

2.2 Cognition in dreams: deficient or equivalent?

Dreaming displays a variety of fascinating cognitive features. One of the most interesting aspects of dream cognition is the apparent relative diminution or cessation of metacognition, which is the ability to think about or assess our own cognitive abilities and functions. I begin with an overview of relevant literature on the study of metacognition in waking life. With a focus on the distinction between *frequency* and *accuracy* in metacognitive thought, I then discuss views which state that metacognition is impaired in dreaming, followed by a comparison with alternative views. I argue that both the frequency and the accuracy of metacognitive thoughts need to be assessed to determine metacognitive ability. After highlighting some of the methodological restrictions and challenges faced by the study of metacognitive accuracy and frequency in dreams, I argue that dreams display a variety of forms of metacognition, however metacognitive thoughts are demonstrably absent in many dreams. I propose a pluralist view of cognition in sleep: that metacognition is present at waking levels in some dreams, but severely deficient in others.

2.2.1 What is metacognition?

Metacognition, a term coined by Flavell (1979), was initially used to describe a learner's knowledge or *monitoring* of their own learning processes and *control* over their learning strategy., Metacognition generally refers to a wide range of cognitive activities including "thinking about one's own thinking" or "cognitions about cognitions" (Georghiades 2004, p 365). Metacognition also involves the ability to reflect upon and exert control over one's own internal processes, state of being and cognitive abilities. Koriat (2007) defines metacognition as concerning "what people know about cognition in general, and about their own cognitive and memory processes, in particular, and how they put that knowledge to use in regulating their information processing and behavior" (Koriat, 2007 p 219). Contemplating the reliability of my own perception or memory of events, and choosing to alter what I am thinking about are both metacognitive processes.

i) Object-level and meta-level

Koriat, (2007), Nelson and Narens (1990), Shimamura (2000) and others distinguish between two levels of cognition: the object-level and the meta-level. The object level refers to basic cognitive functions or information processing such as encoding, rehearsing and retrieving information. Studying for an exam involves object-level processes such as reiterating a fact to memorize it, or retrieving a fact that I have previously learned to answer a question on a practice test. The meta-level of cognition involves monitoring, overseeing, controlling and regulating the object level. Judging that I have memorised a fact is a meta-level judgment known as judgment-of-learning (JOL). Koriat explains that "the meta level is assumed to oversee object-level operations (monitoring) and return signals to regulate them actively in a top-down fashion (control)" (Koriat, 2007). The meta-level monitors the object level by simulating a "dynamic model" of the object level. This model is informed by the object level, monitoring either a change or no change in state (Nelson & Narens 1990 p 126). The meta-level exerts control over the object-level and can change the state of the object level by initiating an action, continuing an action or terminating an action. For example, during exam preparation, the meta-level forms a model of object-level processes such as study activities and reading repetition, then controls the object-level by initiating, continuing or terminating study based on the judgment of whether sufficient study has been completed. These judgments can cause *metacognitive feelings* (Flavell 1979), such as feelings-of-knowing (FOK): the phenomenal feel of having learnt something, and the tip-of-the-tongue phenomenon (TOT): the feeling of knowing without the ability to currently access the knowledge.

ii) Metacognitive processes

Metacognitive processes, according to Shimamura (2000) involve *selecting* a stimulus to focus on, *maintaining* information in the working memory, *updating* memories with new information and *rerouting* cognitive processes by inhibiting the current stimulus and reselecting (p 316). Similarly, Nelson & Narens (1990) distinguish between metacognitive tasks of initiating, maintaining, and terminating actions. For my purposes, metacognitive feelings such as FOK and TOT phenomena are also important because they indicate metacognition is occurring and can be judged on both accuracy and frequency. Desoete (2009) places more emphasis on such feelings, which, in his three-part distinction, are referred to as metacognitive *experiences* and these are judged on self-ratings. The other types of metacognition are metacognitive *knowledge* which is the understanding of our own cognitive processes where experiments are usually based on self-report questionnaires. Metacognitive *skills* are the control we exert over our cognitive processes, and are usually judged by observing behaviour or 'think aloud' protocols: discussing one's cognitive processes with a third party observer during set tasks (Desoete, 2008, 2009).

It is important to note that there are some limitations in our ability to research the metacognitive abilities of individuals. Each metacognitive process requires a specific testing paradigm, but Desoete notes that different tests alter results. "On the one hand, there seem to be various facets of metacognition to be assessed with different techniques. On the other hand, from mathematical problem-solving research, we know that how we test influences what we find" (Desoete, 2009, p 2). For example the delay between the metacognitive task and filling in a questionnaire might affect memory. Thinking aloud might require using separate cognitive faculties from the target metacognitive task. This could possibly lead to less accurate or slower cognition relevant to the target task[21].

iii) Accuracy vs. frequency

Another important distinction to note is that most experiments on metacognition focus on judging the *accuracy* of metacognitive thoughts rather than how *frequently* metacognitive thoughts occur. For example, the accuracy of a judgments of learning (JOL) could be evaluated by comparing judgment of ability with actual ability. Alternatively, research may focus on how frequently metacognitive thoughts occur. This is more difficult to ascertain, since it relies solely on subjective reporting and relies on memory. Asking a subject report the frequency of metacognitive thought will affect the

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[21] This is a widely debated topic. According to Ericsson and Simon (1993), think aloud protocols only affect the speed of cognition: my purpose here is to highlight some of the possible limits in the study of metacognition.

outcome since the task requires that the participant monitor metacognitive thinking, which is itself a metacognitive task. If I attempt to report every time I monitor my study progress, the reporting task may cause me to monitor more regularly since it is part of the task I am setting out to do. Experiments might involve more general reporting tasks not specific to metacognitive thought in order to avoid altering the frequency of metacognition, but metacognition is often not part of one's reporting schema (discussed in the following section), so it is often unreported. Finally, if monitoring whether to initiate, continue or terminate an action involves metacognitive control, it may be difficult to distinguish between separate metacognitive judgments and determine how often they occur (Nelson and Narens 1990). If 'no change in state' is a metacognitive judgment, it may be difficult to ascertain when one is *not* engaged in metacognition.

I have discussed some of the issues in the literature on metacognition and distinguished between measurements of metacognitive frequency and accuracy. Now I turn to metacognition in dreams and argue for a pluralistic view of dream cognition.

2.2.2 Metacognition in dreams

> Dream thought is both impoverished and non-logical. While some inferential reasoning is present in dreaming, many illogicalities that would demand cognitive attention during waking go unnoticed during sleep. (Hobson et al. 2011 p 1)

It is often argued (Flanagan 2001, Fosse et al. 2003, Hobson 2000, 2005, Hobson et al. 1987, 2011, Kahn & Hobson 2005a, Muzur et al, 2002) that cognitive capacity is severely diminished during dreams, evidenced by the lack of reflection or metacognition displayed in dream reports. Dreamers display a reduced ability to monitor and control their own thoughts and actions, are unreflective, and act irrationally. Kahn and Hobson (2005a) note that in dreams, a dreamer often lacks the ability to "step outside the scene in [their] dream to make a cognitive judgment about the veracity of the scene" (p 432). Bizarre events that occur during dreams are often not judged as being bizarre: rather they either go unnoticed or are accepted as normal, and this can lead to irrational behaviour and decisions. Failing to notice bizarre events suggests lowered metacognitive frequency since metacognitive thoughts would most likely be present in similar waking scenarios: we question the accuracy of our perception in bizarre scenarios when awake. Irrational explanations or acceptance of bizarre events in dreams suggests lowered metacognitive accuracy. I argue that our inability to question dream bizarreness indicates low metacognitive frequency. We realize the dream was bizarre only *after* waking up. However, I will argue that metacognitive failure is not apparent in all dreams.

Other theorists reject the cognitive deficiency view (LaBerge 1992, Laberge & Kahan 1994, McGinn 2004 and 2005, Sosa 2005, Ichikawa 2008, 2009). A finer grained analysis of metacognition is required to distinguish to what extent metacognition is lacking in dreams. I will argue that dream cognition can at times be either impoverished or equivalent to waking levels. Lucid dreams provide an example of high metacognitive accuracy and frequency, however realistic, dreams can also display normal, wake like cognition.

i) The Deficiency View of Dreams

According to Hobson and colleagues, dreaming cognition is deficient[22], and metacognition is often absent. He argues

> self-reflection in dreams is generally found to be absent (Rechtschaffen 1978) or greatly reduced (Bradley et al. 1992) relative to waking and, when present, often involves weak, post hoc, and logically flawed explanations of improbable or impossible events and plots (Hobson, 2000 p 799).

Our ability to reflect upon unusual perceptual experience is a type of metacognitive ability that is not commonly discussed in the metacognitive literature since it is not relevant to metamemory or learning. However, this is an important feature of dreaming, since our ability to reflect on unusual features is often impaired. Dreams can also be

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[22] I will refer to this as 'the deficiency view of dreams', as do Kahan, Laberge, Levitan & Zimbardo (1997).

assessed in regards to metamemory and learning monitoring. I begin by summarising evidence supporting the lack of ability to question bizarre events in dreams.

In a recent study of 26 subjects who submitted 178 dream reports over a 2 week period, subjects were asked:

> 1. Would your thinking when awake be the same as it was in the dream if the event that occurred in the dream occurred while awake? (Y, N, ?). Comments (how did dream thinking differ, if it did)?
>
> 2. Would your thinking when awake be the same as your thinking in the dream regarding the occurrence of the event itself? (Y, N, ?). Comments (how did thinking differ, if it did)? (Kahn & Hobson, 2005 p 431).

Participants judged that thinking when awake would mostly be the same as in a dream, however, for the second question, most judged that there *was* a clear difference between the dream thinking regarding the dreamed event and how they believed their thinking would be towards a similar waking occurrence. In the dream

> …we are unable to detect how outlandish or bizarre the dream event may really be because our ability to access knowledge about how the world works is impaired. When this kind of thinking is impaired one finds it very difficult to perceive bizarreness (p 435).

According to the deficiency view, ability to reflect on the plausibility of an event is greatly reduced.

This accurately describes many of my dreams. I recently dreamed of turning up to a conference to discuss an article (a real article that I had written several years ago). I could not remember the content of the paper, preparing the talk, or any of the details leading up to the event, and I experienced a sense of dread standing helpless in front of an academic audience with nothing to say. I had no knowledge of which conference I was attending, the identities of the other attendants, what events had led up to this moment, nor why I didn't have a copy of the paper or power point presentation prepared, while none of this seemed strange at the time. I lacked the ability to assess the implausibility of the situation. This suggests that certain monitoring thoughts in dreams occur less frequently than during waking. However, metacognition was not entirely absent from the dream, since there were feelings of not knowing which count as metacognitive experience, but metacognitive thoughts were less frequent and less accurate than a comparable waking scenario. I discuss this in more detail below.

According to deficiency theorists, the absence of metacognition in sleep can be explained by the deactivation of the dorsolateral prefrontal cortex during sleep (Hobson 2002 p 111). Muzur and colleagues (2002) used positron emission tomography (PET) and quantitative EEG studies and found that there is a relative deactivation of the prefrontal cortex during NREM and REM sleep compared with waking brain activity. During sleep there is reactivation of the neural pathways "responsible for the reactivation in REM sleep of the prefrontal limbic cortex but not of the DLPFC [dorsolateral prefrontal cortex], thus depriving dream mentation of logical reasoning capacities" (Ibid p 479). According to Muzur and colleagues, this explains the lack of metacognition. Shimamura (2000) notes that the frontal lobes of the brain contribute to the task of metacognition. The evidence that "impairments in metacognitive monitoring can be observed in patients with frontal lobe damage" (Shimamura, 2000 p314), has helped to establish the importance of the frontal lobes, although the specific mechanisms responsible for metacognition are as yet unknown.

As discussed in chapter 1, research groups studying the activation of the DLPFC in dreams have had varying results. Some experiments have shown there is frontal activation in REM sleep. It also is important to note that there is no one-to-one mapping between neural changes and cognitive changes. It is not clear exactly which neural pathways account for metacognition and so this leaves open the possibility that metacognition is not lacking in sleep, but rather there is some other explanation for the *ostensible* cognitive deficiency found in dream reports.

The deficiency view of cognition is intuitively appealing and consistent with our general assumptions about dreams, but Hobson and colleagues focus on a particular aspect of metacognition, namely the ability to judge whether a scenario is bizarre. I will discuss a broader range of metacognitive thought and the extent to which it occurs in sleep. First, I will discuss views which state that our failure to judge bizarre scenarios as bizarre is only an *ostensive* cognitive deficiency. Then I will discuss the view that metacognition in dreams is equivalent to waking metacognition, and argue that a pluralistic approach to dream cognition most accurately captures the variety of cognitive functions and dysfunctions.

ii) Ostensive cognitive deficiency

In this section I discuss theories according to which there are alternative explanations for the apparent dysfunctions of cognition in dreams.

The imagination model posits that dreams are imaginative rather than perceptual. Jonathan Ichikawa (2008, 2009) argues that dreams contain neither *percepts* such as sensations, nor *beliefs* that dream content is true[23]. If I imagine fighting a dragon, I do not *believe* this is really happening nor worry about getting burnt. I needn't question whether fighting dragons is bizarre, unusual or impossible since imagination is often bizarre or unusual compared with reality. Imagination does not present itself as reality, requires no reality checking and can be creative or unusual. In contrast, I once saw an advertisement painted on the turf of a sports field that appeared to be three dimensional, sticking up out of the middle of the field. Clearly no 3D billboard should have been there since it would disrupt the game, so I thought it must be an optical illusion. This was confirmed when a player ran over the image. However, if I had only *imagined* a billboard sticking out of the field, there would be no need to reflect on whether it was really there since I often imagine unusual things. According to the imagination model it is not surprising that metacognitive thoughts in dreams are infrequent since dreams, like imagination, involve no beliefs about the truth of their content.

[23] I give a more detailed exposition of this view in chapter 4.

McGinn supports a similar view to the imagination model: dream cognition involves suspension of disbelief similar to watching an engaging movie or fiction:

> watching a movie is like being in a dream [...] The images of the dream [...] are not "realistic" but we become *fictionally immersed* in the story being told. In my theory this is akin to the hypnotic state—a state of heightened suggestibility in which we come to believe what there is no real evidence for (McGinn, 2005 p 69).

We become immersed in the dream in the same way we become immersed in a captivating fictional story. Immersion requires suspension of disbelief and can lead to affective response. A movie can make us cry, laugh, jump in fear; the effects of a good horror film can last after the movie is finished, making us feel paranoid about murderers or intruders. This does not mean that we believe in the veracity of the content, rather we become engaged in the story[24]. According to McGinn, engagement in a fiction is a good analogy for dreaming, so dream cognition is similar to cognition whilst watching a film.

States (2000) argues that regular questioning of bizarre events in dreams should not be expected, because the dream world has different rules from the waking world, moreover it is natural for us to accept whichever world in which we are immersed as the real world. We very rarely question the existence of the world around us, whether we are awake or dreaming. Dream logic, like film logic, makes sense within the context of the narrative. Since dreams are generated by the mind, being reminded of something might explain a strange scenario shift. For example, a dream about painting might subconsciously remind the dreamer of their former girlfriend, so the scenery shifts to the girlfriend's house. As with inner speech, the dream narrative does not need to be well formed since we already know the causal links and background of what we are thinking.

[24] There is a wide literature on affective response to fictions. See Walton, 1990, 2003.

Lucid dreams provide a distinction between dreams in which we lack reflection and dreams which have high levels of reflection. However States argues that lucid dreams do not disprove his view because "one can never tell whether the awareness-of-dreaming within the dream was not programmed into the dream as part of the dream incentive, rather than being an independent in-sleep discovery that somehow rises above the curtain of sleep—*during* sleep" (States, 2000 p 189). Lucidity itself may be part of the context of the dream rather than insight gained whilst asleep.

I will argue that the imagination model, fiction view and immersion theory of dreams are not sufficient to explain the full variety of dream phenomena[25], which also include such cases as false awakenings and realistic nightmares. There is good evidence to support the view that dreamers often fail to realise they are dreaming, which conflicts with the imagination model and fiction view. Since we do not mistake fictions or imagination for reality, dreams are in this way unlike fictions and imagination. We appear to be convinced that dreams are real when they occur; not merely as suspension of disbelief.

I disagree with States' view for a number of reasons. I sometimes *do* question the veracity of my perceptual experience, which is evidence against his assertion that we always accept the world we are immersed in as real. I can question my mode of existence right now and perform some simple experiments to ascertain if this is a dream e.g. pinch myself, turn the light on and off, study text to see if it changes, try to levitate and so on (see Laberge 2000) and conclude this is not a dream. The same can be done whilst dreaming. We *sometimes* realise a dream scenario is bizarre. Some dreamers can learn to indicate lucidity with eye flicks, which strongly suggests that States' assessment of lucid dreaming is inaccurate. If we can learn to indicate lucidity, this is reason to believe that lucidity is not part of the context of the dream: it involves learning the eye flicks *whilst awake* and then performing them whilst dreaming. A third problem for States' view is that when we wake up the dream imagery *does* seem to be bizarre to us despite being convinced it was reality during the dream. If dream experience is like internal speech, the act of waking up should not cause the dreamer to suddenly realize

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[25] I will discuss these views in more detail in chapter 3.

that the dreamed event was bizarre. This does not usually occur when we reflect on our waking internal speech.

I have briefly argued that some of the alternative explanations for the apparent lack of metacognition in dreams are unconvincing. Now I turn to arguments which state that metacognition is apparent in dreams at greater frequency and accuracy than the deficiency model suggests.

iii) Metacognition occurs in lucid and non-lucid dreams

Laberge (1992) and colleagues (Kahan & Laberge 1994, 2011, Laberge & Gackenbach 2000) have carried out extensive research into the types of experiences that occur during dreams. They argue that metacognition is present in most dreams, both lucid and non-lucid and occurs at higher levels than the deficiency view suggests.

Lucid dreams are an example of exceptionally high levels of metacognition during sleep and disprove any theory which states that all dreams lack metacognition. Kahan & Laberge, (1994) argue "attaining lucidity in dreams requires evaluation of experiences as they happen in the dream, a process termed as "metacognitive monitoring" in the cognitive psychology literature" (p 251). Lucid dreams are often preceded by a pre-lucid stage in which one questions the nature of their experience of reality. This involves complex metacognitive thinking, demonstrating that dream cognition can equal waking cognition.

Kahan and Laberge (2011) argue that metacognition is frequent also in non-lucid dreams. In an experiment testing the frequency of metacognitive, affective and cognitive experience (MACE) in dreams (p 229), they found that participants displayed:

> the same range of cognitive skills for their dreaming and waking experiences, including the high-order skills of choice, planning, and focused attention. [...]

> Dreaming and waking possessed comparable levels of internal commentary, sudden attention, thwarted intentions, focused attention, public self-consciousness, emotion and self-reflection (p 244).

For example, choosing to walk down the street in a dream demonstrates simple control over actions. Dreams about going to school wearing only underwear display public self-consciousness, thwarted intentions (intending to sit the exam but being unable), rational emotion (embarrassment) and focused attention. Realising you have not studied sufficiently for an exam is a common dream JOL. According to Kahan and Laberge, statistical analysis reveals that metacognitive thoughts about being a good learner or having better maths skills than our friends are almost as common in dreams as during waking (Kahan & LaBerge, 1996, 2000, 2011**).**

Kahan and Laberge (1996) argue that the common belief that metacognition is absent in dreams partly comes from the difficulty in assessing how common metacognitive thoughts are in general. Most metacognitive processing goes either unnoticed or unreported in both waking and sleeping experience because we are more likely to report details about events than about cognitive processes. If I report finishing my exam 10 minutes early, I probably won't describe the cognitive processes that lead to my decision to stop writing, JOLs, or FOKs; these are not part of my reporting schema. I might occasionally judge such monitoring thoughts as relevant or interesting, such as the time I mistook the silhouette of two people sitting in the park for a large bird, and pondered what I was really seeing. This error in judgment was unusual, so I remembered the metacognitive aspect of the experience. Reporting metacognitive thoughts is uncommon both in dream and waking reports. Laberge (1996) argues that "metacognition [is] less likely to be included in a spontaneous narrative report, partly because these "processes" are typically not part of one's recollection "schema" or "agenda"" (Laberge 1996, p 237). Metacognition simply is not part of our reporting tendencies, and therefore there is little evidence of metacognition either in reports of dreaming or waking experience.

I agree that there are several obstacles to the study of metacognition in sleep, both in regards to the *accuracy* of our metacognitive judgments and the *frequency* of their occurrence. When asked how often in the last few minutes I had metacognitive thoughts, I might be unable to judge accurately, however this would be especially difficult to judge had I just woken from a dream. A comparison between dreaming and waking cognition is difficult because dreaming is restricted to subjective reports after the fact and is susceptible to rapid memory loss. Also we lack the ability to control conditions during sleep; a dreaming person cannot be asked to perform tasks or think aloud protocols, and can only fill out questionnaires after waking up.

Questionnaires and self-ratings are meant to evoke metacognitive thoughts and rate them on accuracy (Desoete 2009). My waking judgment about being a good learner can be rated for accuracy based on my learning performance in subsequent tests. The evaluation of accuracy during dreams is more difficult since my problem solving skills may be impaired whilst dreaming, and it is difficult to discern to what extent they become impaired. Similarly, 'I am better at maths than my friends' may be true while I am awake, but I may be terrible at maths during the dream, and make terrible inferences from flawed dream logic. So it is more difficult to assess metacognitive accuracy when dreaming[26]. Experimenting on lucid dreamers can overcome some of these difficulties, however as previously argued, lucid dreams are not a good indicator of average dream cognition.

Laberge and colleagues argue that although dreamers rarely question whether or not they are dreaming, this can equally be said about waking cognition. Experiments which compare dream reflection with how someone *believes* they would think in a similar scenario whilst awake, such as Kahn and Hobson's (2005) study, rely on speculative reports made by test subjects which are not sufficient to show clear distinctions between dreaming and waking cognition (Kahan and Laberge 1994). I can only speculate that if I saw a flying pig, dragon, or other inexplicable object whilst awake I would question whether or not I am dreaming, but perhaps I would merely be amazed and unreflective.

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[26] Another issues is that our reporting schema or agenda in dream reports may differ from that of waking reports. For example, we might be more likely to report metacognition in waking reports than in dreams. But this is difficult to confirm or disprove.

Laberge and colleagues conclude that metacognition is apparent in dream reports, and the deficiency view of cognition is based on weak speculation. Metacognition is apparent in both lucid and non-lucid dreaming.

iv) Examples of impoverished metacognition

In opposition to Laberge and colleagues' view that speculative reports are not useful, I think such speculation *can* be a good indicator of similarities and differences between waking and sleeping cognition. It may be difficult to judge how I would respond to really bizarre events such as seeing a flying pig or dragon whilst awake since this has never happened, however I can compare some dreamed events with how I responded to similar bizarre waking events. When I see illusion in waking life, I am surprised and curious and seek explanations for the strange experience. I usually do find an explanation for the event, so do not question whether I am dreaming, nonetheless in similar dream scenarios I am far less critical of unusual perceptual experience.

Despite the infrequency of reports of metacognition in both waking and dreaming, people often report *lack* of metacognition in dreams. If I dream of showing up to school wearing only underwear, I may exhibit public self-consciousness as Kahan and Laberge (2011) describe, but fail to notice bizarreness, such as the fact that I am back in school, that I don't know what the exam is about, or how I got there. Although, as I have discussed, there are several problems in judging the frequency of metacognitive thoughts in dreams we can reliably compare notable cases where metacognition is lacking. At times, metacognition becomes part of our reporting "schema". After waking, we are surprised that we didn't notice the bizarre imagery and this type of metacognitive failure, unlike most monitoring, control or inhibition of cognitive processes, is out of the ordinary. An example in which metacognitive failure becomes noticeable during waking is if there is a large discrepancy between my FOK and actual ability. If I feel I know (FOK) the names of all the capital cities in Europe, but can only report two of them, this discrepancy might become part of my reporting schema because it is unusual. In comparison, I may believe in my dream that I have a great memory, whereas when I wake up I realize my memory was poor. In waking life it is not common to realise that an event was bizarre after it occurred, whereas this is highly common in dreams. This is the clearest distinction between dreaming and waking metacognition, which I will now analyse in more detail.

Arriving unprepared for an exam is a common nightmare (LaBerge & H. Rheingold, 1990, see chapter 10). Depending on the circumstances of the dream, a variety of metacognitive features may be present. The feeling of being insufficiently prepared is a JOL, which may be accompanied by a feeling of not knowing (FOK). So to this extent, the dreamer is making metacognitive judgments. The accuracy of such judgments depends on context. The dream exam may be one you have studied for in waking life, but either you have forgotten what you learned, which is an object-level memory deficiency, or you have a feeling of not knowing the course material, which is an inaccurate metacognitive judgment: you only *believe* that you have forgotten it. Either way, your failure to realize that this is not a real exam is an example of low metacognitive frequency.

In my conference nightmare FOKs were inaccurate, since I believed that I[27] had no knowledge of the contents of the paper, whereas upon waking I had a strong FOK about the paper's contents. In the dream I either lack access to these memories (object-level) or my ability to monitor my knowledge was reduced. A lack of frequency of executive control is demonstrated by my inability to exert control over my actions: if a similar situation occurred in waking life I might make an excuse and leave or search for a copy of my paper. My inability to assess the plausibility of the scenario suggests lowered metacognitive frequency: if the same situation occurred in waking life, I would think it strange to show up to a conference unprepared with no knowledge of how I got there. I might start to question my sanity. Although Laberge argues that this is merely speculation, after waking we are surprised by our lack of dreaming inquisitiveness and this strongly suggests that we are more likely to question bizarre waking circumstances.

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[27] A further issue here is whether the "I" in the dream is the same person as my waking self. I will discuss this issue in chapter 6.

Although lucid dreams and the prelucid stage are examples of high levels of metacognition, such dreams can also demonstrate metacognitive failure. For example, the prelucid stage, in which the dreamer questions whether they are dreaming, can lead to a confabulated explanation of the bizarre scenario experienced, as discussed in chapter 1. I might realise that it is strange to have turned up to school in my underwear, but then rationalise that my brother stole my clothes as a prank. The dreamer can slip back into non-lucid dreaming without achieving lucidity, which demonstrates metacognitive inaccuracy. From the lucid stage a dreamer may also slip back into non-lucid dreaming or not fully realise the implications of being in a dream. For example:

> Wandering about again, I see some money on a table--a big stack, with a $1 bill on top. A minute later, it's a smaller stack with a $20 bill on top. I pocket it. Around this time the light flashes (DreamLight) and I reflect that it doesn't matter what I do 'cause it's a dream. But it doesn't sink in yet, and I'm a bit worried about being caught (Levitan and Laberge, 2007 p 39).

Although the dreamer gains lucidity they worry about being caught taking the money, which is irrational considering they know that they are dreaming. This demonstrates lowered metacognitive frequency. Even in lucid dreams, waking levels of rationality and metacognitive ability are not always achieved.

Although some dreams are cognitively deficient, I agree with Laberge's contention that metacognition can exist even in non-lucid dreams at equal levels to waking. Some non-lucid dreams are a convincing model of the waking world and may give the dreamer no *reason* to question their surroundings. In realistic false awakening I believe I have woken up, but in reality I am still asleep. There may be little evidence that one's cognition is much different from that during a similar waking scenario. The dreamer exhibits intentions and acts on those intentions similar to when awake. I have experienced false awakenings relatively regularly, and I usually sit up in bed and think about having breakfast or other ordinary morning thoughts. The room may be a convincing replica of my real room, and my cognitive processes are quite normal. Deficiency view theorists might say that such dreams are an aberration, but the evidence suggests that dream cognition can be anywhere from demonstrably lacking, to equivalent with waking as I have described in the previous examples. Dreams display a wide range of cognitive abilities and dysfunctions: thus dreaming as a whole should not be defined as a state of cognitive deficiency nor cognitive equivalence. A pluralistic account of cognition in dreams accurately captures this variety.

I have argued that there are methodological difficulties in assessing metacognition, and these difficulties are exacerbated by poor dream recall and our inability to directly report dreams. Metacognition does occur in dreams and this can be at levels similar to waking, however there are clear cases in which dreaming metacognition is reduced. The most salient aspect of metacognitive failure in dreaming is the inability to judge bizarre dream experiences, which demonstrates lowered metacognitive frequency. Prelucid dreams which revert to non-lucid dreaming demonstrate metacognitive inaccuracy, and full rationality is not always gained in lucid dreams. We would expect more frequent and accurate metacognition in similar waking scenarios which demonstrates that some dream cognition can be reduced in comparison to waking. In contrast, metacognition does occur in dreams at a variety of levels in both lucid dreams, where the realisation that one is dreaming is an impressive metacognitive judgment, and non-lucid dreams, especially the highly realistic variety. This supports a pluralistic view of dream cognition: dreams maybe on a scale anywhere from waking levels of cognition, to severely impoverished metacognition.

Conclusion

I have argued that a pluralistic approach to dreaming content and cognition provides the most plausible account of the variety of experiences that occur in dreams. Dreams are neither typically bizarre and incoherent nor mundane and coherent. Although some dreams display some lack in metacognition, others may be cognitively equivalent to waking. Dreams can display a variety of realistic or bizarre features, irrational or rational thoughts. Pluralism focuses on the variety of the dream experience, as opposed to attempting to isolate the minimal conditions of dreaming. In the following chapters I continue to discuss the implications of the pluralistic view of dreaming and how far pluralism extends. First I will discuss a highly contentious view of dreaming: that dreams are not experiences we have during sleep, rather that they are the tendency to tell stories upon waking. I will discuss the extent to which we should be cautious of the accuracy of dream reports while arguing that the views of Norman Malcolm and Daniel Dennett are overly reductive and we have good reason to believe that experience does occur during sleep.

3

Rethinking the Received View: Anti-Experience and Narrative Fabrication

Introduction

The 'received view' of dreams is that dreams are conscious experiences we have during sleep which are sometimes reported upon waking. This can be separated into two views: 1) dreams are experiences that occur during sleep and 2) dreams are reported upon waking. This view is not only widely accepted in the literature[28], but it is also the common sense view, supported by the experiences of anyone who has remembered a dream. Challenges to this view rarely surface. However in this chapter, I discuss two views according to which dreams are not experiences that we have during sleep. I call these *anti-experience* views. I argue that it is implausible to outright deny that conscious experience occurs during sleep. Such a view is overly reductive and is not consistent with strong evidence to the contrary. Yet the received view of dreams does not explain certain empirical findings. I will argue that a plausible limit to my pluralistic account of dreaming is that dreams *are* experiences we have during sleep, so we should reject the strong anti-experience thesis. However, my contention is with the second part of the received view: that dreams are accurately reported upon waking. There is reason to be cautious of the accuracy of dream reports. Dream reports are particularly problematic compared to waking reports in a variety of ways that I highlight in this chapter. I propose that 'dream reports' are not always reports of experiences we have during sleep, but rather are often confabulated narratives created by the waking mind. I will refer to

[28] Hobson, Metzinger, Revonsuo, Jouvet, and Flanagan, to name a few, support the received view.

this as the narrative fabrication thesis. This type of confabulation is itself an interesting phenomenon worthy of detailed analysis. Although it is possible for some dreams to be accurately reported, it can never be guaranteed that any particular dream report is an accurate representation of the dream content, and there is no fail-safe method to ensure accuracy.

Norman Malcolm and Daniel Dennett reject the received view of dreams. In 3.1 I discuss Malcolm's argument that that dreams are *logically dependent* on dream reports. He thinks we cannot verify that experiences occur during sleep. He makes no claim as to what dreams *are;* all that we know about dreams is that we have the tendency to make certain kinds of reports upon waking. His focus is on epistemological questions concerning the nature and justification of our beliefs concerning the phenomenon of dreaming and not on the *ontological* status of dream events. Dennett, as discussed in 3.2, proposes an alternative to the received view: the *cassette theory* of dreams, in which dreams are stored memories that, like cassettes, are replayed upon waking. He argues that given our current knowledge of consciousness and sleep, the cassette theory is a plausible rival to the received view. There is some empirical evidence supporting this rival theory, and since both theories cannot be true, the "received view might simply turn out to be false" (Dennett 1976 p 158).

In response to Malcolm and Dennett I argue that there is now convincing evidence that experiences do occur during sleep. After a critical evaluation of Malcolm and Dennett's views in sections 3.1 and 3.2 respectively, I go on to instead propose two challenges to the received view's contention that dreams are sometimes reportable. In section 3.3, I argue that narrative fabrication occurs in dream reports, more so than most waking reports. I argue that dream narratives may at times be composed upon waking, because sleeping experiences are often incoherent. I propose that the waking brain often composes dream content into a coherent narrative. In 3.3.1 I discuss bizarre dream content which is rationalised into normal experience, and then I focus on memory loss and confabulation in 3.3.2. In 3.3.3 I discuss the thought experiment proposed by Nagel (1974) and use this as an analogy for altered consciousness in dream states. I suggest that we cannot specify the accuracy of dream reports in general since dreams can be more or less accurate, but there is reason to believe dream reports are generally less accurate than waking reports. We therefore need to find ways to investigate how often, and under what conditions, different forms of narrative fabrication on waking are more likely to occur. Philosophical progress is made, one might suggest, when apparently conceptual disputes between opposing views can be turned into tractable, empirically-accessible questions. So the rest of the chapter addresses the issue of the extent to which dreams are fabricated. In section 3.4 I discuss individual differences in narrative confabulation. Imagination inflation, which affects some subjects more than others, is a problematic issue for the study of memory in general. However, it is even more problematic regarding dreaming memory, as I discuss in 3.4.1. In 3.4.2 I argue that since imagination inflation differs from individual to individual, it is difficult to estimate the amount of confabulation that occurs in dream reports. However we have reason to suspect that poor memory and cognitive defects that occur in many dreams lead to report confabulation in all individuals. Although cognitive deficiency does not occur in all dream, so not all dreams reports are fabricated, there is no way to control for such cognitive features.

Finally I introduce objections to narrative fabrication views in section 3.5, and respond by arguing that although evidence supports the existence of experience which occurs during sleep, confabulation of dream narratives is a common occurrence that is difficult to control for. Because of this, we have reason to be cautious of the accuracy of dreams reports. According to the received view of dreams, we should accept dream reports as accurate representations of dream experience. but often this is not the case.

3.1 Malcolm on dreaming

Malcolm (1959) challenges the received view by arguing that dreams are logically dependent on *dream reports* as opposed to experiences we have during sleep. The *received view* states that

> dreaming is a real experience. And since dreams can be remembered, they must be conscious experiences. Just as it is correct to say that a dreamer really dreams

> and does not merely dream that he dreams, so it is correct to say that a dreamer is really aware of the contents of his dream and does not merely dream that he is aware of them (Yost & Kalish, 1955 p 118, quoted in Malcolm, 1959, p 4).

In opposition to this assessment, Malcolm argues that dream reports told upon waking are the sole criteria of dreams, and that dreams are logically dependent on such reports. According to Malcolm, "the concept of dreaming is derived, not from dreaming, but from descriptions of dreams, i.e. from the familiar phenomenon that we call 'telling a dream'" (Malcolm 1959 p 55). Although Malcolm does not deny the metaphysical possibility of having experiences during sleep, some theorists, for example Daniel Dennett (1976), interpret this as an implication of Malcolm's argument. I distinguish two methods of rejecting the received view: firstly Malcolm's weaker, epistemological thesis, that dreaming is logically dependent on a tendency to make dream reports upon waking, and secondly (in 3.2 below), a stronger metaphysical view discussed by Dennett, the view that experiences do not occur during sleep. In this section I review Malcolm's arguments, seeking to give his counter-intuitive views a fair exposition, before setting out some empirical evidence that conflicts with his strict verificationism.

3.1.1 Dreams and verification

Malcolm (1959) does not argue for a metaphysical conclusion regarding conscious experience during sleep. Rather he argues that we cannot verify whether experiences occur during sleep.

> I am not trying to maintain that a dream *is* the waking impression that one dreamt. This would be self-contradictory. Indeed I am not trying to say what dreaming *is:* I do not understand what it would mean to do that. I merely set forth the reminder that in our daily discourse about dreams what we take as determining beyond question that a man dreamt is that in sincerity he should tell a dream or say he had one (p 49).

Dreaming, understood as an experience that occurs during sleep, is unverifiable according to Malcolm since it is not possible to assert or judge that one is dreaming. To *assert* that one is asleep is to show that one is *not* asleep. We require testimony or behaviour to gain information about a person's internal states, but if I ask someone if they are sleeping, I expect them either to say 'no' or not reply at all. Answering 'yes, I am asleep' could only be sarcastic. This inability to make a true, noncontradictory statement 'I am asleep', means we cannot learn the appropriate way in which to judge that we are asleep. Neither is it possible for an outside observer to verify that one is dreaming, since any observable behaviour would indicate that an individual is not asleep. I elaborate on these arguments in the following sections.

i) Sound asleep

For sleep to fall under "the normal criteria... in the ordinary sense" (Malcolm, 1959 p 30), a sleeping individual must be *prone*, *unaware* of their surroundings and *unresponsive* to stimuli; if someone responds to the question 'are you asleep?', any response would be evidence that they are *awake*. Malcolm notes that one might argue that someone *can* respond during sleep, so long as it is in a way that suggests they are not fully awake; with an altered tone of voice or slow response. Common sleep behaviour also includes sleep talking; viz., saying odd and nonsensical things whilst asleep, and sleep walking; getting up and walking around whilst asleep. For Malcolm, these are not cases of being genuinely "sound asleep", i.e. inert and unresponsive, but rather they involve "qualified assertions" (p 29) about non-stereotypical sleeping states. Malcolm also allows that there are some states which lie within a "border region between being fully asleep and not being fully asleep" (Malcolm, 1959 p 99), for example, when someone believes they are suffocating in a dream, but wakes up to find they are having an asthma attack (as discussed in Yost & Kalish, 1955). The dreamer believed the suffocating occurred in the dream, although they were suffocating in reality. According to Malcolm, to assert that something occurred in a dream is to assert that it did not *really* happen[29]. To assert that one's suffocation was a dream wouldn't be entirely correct. The suffocation really did occur, and should be described as

> …partly dreamt and partly real. Because there is a criterion in the present behaviour for this feeling of suffocation it does not belong to the content of a

[29] Sosa (2005) similarly argues that anything that occurs within a dream occurs under an 'in the dream' operator, which entails that the event, including thoughts, beliefs and other mental events did not *in fact* occur. I discuss this in chapter 4

dream, in that pure sense of 'dream' that has as its sole criterion the testimony of the awakened person (p 99).

If the dreamer is experiencing bodily stimuli, or responding to the external environment, this indicates they are not fully asleep. The asthma sufferer behaves as if they are suffocating, so the outside observer can confirm that suffocation is occurring, but because being *sound* asleep requires no outward behaviour, an external observer cannot verify that an individual is dreaming. I later argue that this criterion for being sound asleep does not accurately describe sleep behaviour.

ii) Judging that I am asleep

Given that the normal criteria for sleep are inertness and unresponsiveness, according to Malcolm experience during sleep is unverifiable. Malcolm begins with the premise that I cannot *assert* that I am sleep. Asserting anything indicates that I am not sound asleep. From this premise Malcolm infers that I cannot *judge* that I am asleep. As a result of his verificationism, Malcolm argues that to be able to judge what state I am in, I must first be given a definition of the phrase 'I am in this state', and learn how to appropriately apply the phrase. "No one will think that a sleeping person might be given an ostensive definition [of the phrase 'I am asleep']. An ostensive definition that was given to him when awake might teach him how to use '*he* is asleep', but not '*I* am asleep'" (Malcolm 1959 p 9). Malcolm is a strong supporter of Wittgenstein's view that the concepts expressed by language must not be derived from purely subjective experience. It is the intersubjective practice of discourse during waking life that gives intelligibility to language, and this includes dream reports. Since the phrase 'I am dreaming' cannot be held to be true whilst awake, the phrase lacks an ostensive definition.

Malcolm agrees with Wittgenstein that "if language is to be a means of communication there must be agreement not only in definitions but also [...] in judgments" (Wittgenstein 1958 p 242). To understand the meaning of the phrase 'he is asleep' involves being able to apply the phrase in the appropriate situation during discourse: for example, saying 'I think he has fallen asleep' when a friend appears to be inert and unresponsive. The phrase 'I am asleep' cannot be used in regular discourse since I would have to be inert and unresponsive whilst asserting that I am asleep, which is contradictory. I cannot be alert and aware of saying 'I am asleep' *and* use it correctly. Malcolm argues that I could not learn what it means to judge 'I am asleep' by asking an observer whether I had just been asleep and then thinking back to what it felt like then, because it is unclear what condition I should be remembering. It is neither a condition of my body because if I am aware of my body then I am not asleep[30], nor a condition of my experience because being asleep is not a type of experience. So, "having some conscious experience or other, no matter what, is not what is meant by being asleep, i.e. the statement 'Jones is asleep' is not false because there is some experience or other that Jones does *not* have" (Malcolm 1959 p 12). Since we cannot correctly use 'I am asleep' in discourse, we cannot judge the truth or falsity of the statement, therefore we cannot use the statement to correctly express a judgment. It is important to note here that although sleep itself is not an experience, this does not rule out the possibility that experience can occur during sleep, or that dreams are experiences. I argue below that lucid dreamers who learn to indicate they are dreaming demonstrate that it is possible appropriately use the phrase 'I am asleep'.

Malcolm notes that "the main source of information about people's thoughts, feelings and impressions are their own reports, and that this is exclusively so in respect to their dreams" (Ibid p 52). When an individual is awake, we can rely on their reports as well as their behaviour to indicate what state they are in, for example, experiencing in pain and exhibiting pain-related behaviour. If an individual is *sound asleep,* we rely only on their report after waking to determine whether experience occurred. They can neither testify that they are currently dreaming nor behave as if they are dreaming, because people who are sound asleep display no behaviour. The report alone does not confirm whether the impression is a memory from a sleeping experience or merely an impression. Judging 'I was dreaming' relies on a waking inference about a previous state. This contrasts with waking memory. The phrase 'I was in pain' following appropriate pain behaviour demonstrates the sufferer understands the appropriate use of the phrase. We cannot guarantee that a dreamer's judgment 'I had a dream' refers to a sleeping experience as there was no behaviour at the time Since we are unable to judge

[30] Malcolm doesn't acknowledge the possibility of being aware of a dream body, which is an interesting phenomenona I discuss in more detail in chapter 4

when we are asleep, and unable to judge when another is dreaming, Malcolm concludes that sleep experiences are unverifiable. Although I disagree that we cannot judge 'I was dreaming', I argue in the following section iii that Malcolm is correct to distinguish dream memory from waking memory, although I have different reasons for doing so. Dream memory is often highly unreliable compared to normal waking memory. Later in section 3.3 I argue that dream reports often do not accurately describe dream experiences.

iii) Testimony and behaviour

Observers judge others' internal states based on testimony and behaviour. In some situations behaviour and testimony conflict, and the observer must decide whether to trust testimony *or* behaviour. If a person denies they are in pain but displays pain behaviour, we might disregard their testimony. If someone pretends to be asleep but later proves that they were awake the whole time by recounting all of the events that occurred during that time, we would believe their testimony. For dreaming we rely on testimony alone, since behaviour does not occur when one is sound asleep. If a person claims to have made a judgment whilst they were asleep, there is no outward behaviour and they could not judge 'I am asleep' whilst sleeping. Malcolm claims it is therefore impossible to verify whether the judgement took place *whilst* asleep or *before* falling asleep. We derive our concept of dreaming not from experiences that occur during sleep, but from the reports we make upon waking. This does not mean that dreams are *identical* to reports we make upon waking, rather that we cannot *know* whether any experience occurs during sleep. Unlike the case of pretending to be asleep mentioned above, reporting a dream does not verify that an experience occurred whilst sleeping since dreams are experienced only by the dreamer.

According to Malcolm, when I wake with an impression of having just experienced a event, I find my impression is not of a real event. For example, if I wake with the impression of having just failed my exam, I realise that the event *hasn't* really occurred[31]. I then infer that the event was a dream, not reality. Malcolm suggests that perhaps *all* dreams are inferential in this way. There may be some cases where it is unclear whether the impression is from a dream or whether it really occurred, for example, if I wake with the impression that I had a sore leg last night. I might be able to verify the occurrence by asking my housemates if they heard any groans or noticed my pain behaviour last night. If none of this occurred, but it was merely an impression I had upon waking, I conclude that the event didn't really happen. We can only verify that the individual had an impression upon waking, not that the event actually occurred.

> When someone says he dreamt so and so, he does not imply that while he was sleeping he was aware of being asleep or was aware of dreaming. When he says 'I dreamt so and so' he implies, first, that it seemed to him on waking up as if the so and so had occurred and, second, that the so and so did not occur. There is simply no place here for an implication or assumption that he was aware of anything at all while asleep. His testimony that he had a dream does not involve that nonsensical consequence (Ibid p 66).

Such waking impressions are distinct from hallucination, since dreamers do not say 'last night, it seemed to me as if…' According to Malcolm dream reports imply having a waking impression, not a *hallucinatory* experience. If the individual sat up in bed, gestured and acted as if an event was occurring we could conclude that he had a hallucination, *not* a dream[32]. Malcolm reasons that since we rely solely on the impression we have upon waking, dreams have a similar status to imagining. We require no *proof* that one has dreamed or imagined since external evidence of dreams and imagination are not possible. However, unlike dreams, the phrase 'I am imagining' can be used in normal discourse, so the judgment 'I was imagining' has a stronger epistemic status.

A theory aligning dreams with REM sleep was gaining popularity when Malcolm's *Dreaming* (1959) was written. Malcolm rejects this evidence, arguing that if eye

[31] Perhaps I really did fail my exam yesterday, but my impression of having failed my exam a few minutes ago (before waking) proves to be false when I realise I have just woken.

[32] In 3.1.2, I argue that REM sleep behaviour disorder provides evidence which refutes this point. I discuss arguments for a 'hallucination model' of dreaming in chapter 5.

movements during REM sleep became the criterion of dreaming, there would be counterintuitive outcomes. Malcolm finds it absurd that "people would have to be *informed* on waking up that they had dreamt or not - instead of their informing us, as it now is" (Ibid p 80). There *may* be interesting correlations between eye movements and dream reports but this presupposes that the eye movements themselves are not used as a criterion for dreaming: we must also have dream reports to make such correlations. According to Malcolm, this is insufficient evidence to conclude that experiences occur during sleep[33]. This is a reasonable point, as eye movements have never replaced dream reports as evidence for dreaming. When eye movements and dream reports do not correlate[34], reports are taken to be primary evidence of dreaming, not eye movements.

Experience that occurs during sleep is unverifiable, according to Malcolm since reports are the only criteria of dreaming, but dream reports do not prove that experience occurred during sleep. Hence Malcolm concludes that "dreams and waking impressions are two different things: but not two logically independent things" (Ibid p 60). Dreams are logically dependent on waking reports, however dreams are not *defined* as waking reports. Malcolm remains agnostic on the metaphysics of dreaming: "the question about the 'real existence' of dreams, i.e. whether dreams take place in logical independence of waking impressions, and whether the latter correspond or not to the dreams, is a purely metaphysical question that does not arise in the ordinary commerce of life and language" (Ibid p 84). Whether dreams occur during sleep is irrelevant to our usage of the term 'dreaming'. Sleep experience is outside the scope of verifiable knowledge, thus dream discourse refers only to the impressions we have upon waking.

Many theorists find this view implausible, as it contradicts both our common sense view that waking impressions are memories of experiences we had whilst asleep and current empirical evidence. I discussed aspects of our empirical knowledge of dreams in chapter 1, and now I evaluate the implications of this data for Malcolm's views.

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[33] As argued in chapter 1, Malcolm was correct to reject the scanning hypothesis.

[34] In chapter 1 I noted that the scanning hypothesis was rejected because of insufficient correlations between eye movements and dream reports.

3.1.2 Evidence against Malcolm

In this section I bring together arguments and empirical evidence against Malcolm's scepticism towards experience that occurs during sleep. However, I will also note that Malcolm raises some important points about caution towards the veracity of dream reports.

Dreams have been defined as an "altered state" or "paradoxical" state of consciousness (Jouvet, 1999). Despite our usually inert and unresponsive state of paralysis during REM sleep, the conscious mind is active. This conflicts with Malcolm's views. In this section I present and assess three challenges to Malcolm's view: that his definition of sleep is outmoded, that sleep behaviours provide evidence for sleeping experiences, and that neuroimaging data supports the received view. I argue that Malcolm's contention that behaviour indicates an individual is not *sound asleep* is not empirically accurate. Malcolm's rejection of all behavioural evidence supporting the received view is misguided. Although reports are necessary for establishing what we know about dream content, other evidence can corroborate dream reports. Modern research methods *have* verified that experience does occur in sleep, however I argue that dream reports are often inaccurate indicators of dream content. Firstly, I argue that Malcolm's definition of 'sound asleep' is not accurate given current neurophysiology of dreaming. Secondly, I discuss sleep behaviour, which provides evidence against Malcolm's definition of "sound asleep": however I concede that correlations between sleep behaviour and dream reports have been tenuous. The strongest evidence against Malcolm's view is that lucid dreamers can signal that they are dreaming, which verifies that experience does occur during sleep. Finally, I argue that although some scepticism towards neuroimaging is justified, Malcolm's extreme scepticism towards correlations between brain activity and experience is excessive. I conclude that although Malcolm raises some convincing points, there is strong evidence establishing that experience occurs in sleep.

i) Sleep as defined by neuropsychology

Revonsuo (1995) contends that Malcolm's argument fails due to its reliance on faulty assumptions about sleep. Malcolm's criteria for being sound asleep are not supported by current scientific theory. Stages of sleep are defined by *neuropsychology*: different stages of sleep are classified according to *brain activity* rather than behaviour or lack thereof[35]. Although REM sleep typically causes paralysis to the body, abnormalities such as REM sleep behaviour disorder (RBD) can occur (Windt & Metzinger 2007 p 5) in which the dreamer appears to act out their dreams. Experiments have correlated dream reports with RBD behaviour (Schenck et al. 1987). Scientists consider abnormal cases such as RBD to be under the criterion of REM sleep[36]. Malcolm argues that if someone sat up in bed and acted as if they were hallucinating, this would not be regarded as dreaming. However his criterion for being sound asleep is not consistent with the current scientific definition of sleep. An individual is asleep if they exhibit the neurophysiology of a sleeping person, i.e. the brain activation, electrical activity and so on as outlined in chapter 1, regardless of their behaviour. As discussed in chapter 1, during certain states of sleep, external stimulus can filter into a dream. So Malcolm's assessment of the man with asthma is incorrect. He may be fully asleep but still experience suffocation. Malcolm's argument relies on the claim that if we report a dream, then the reported event did not occur, but a neuropsychological verification will determine that the individual was asleep whilst their physical body suffered from asthma. From this I conclude that we should reject Malcolm's definition of being sound asleep.

ii) Sleep behaviours

Certain behaviours, such as eye movements and muscle twitches, are characteristic of different stages of sleep, and early theorists attempted to correlate such behaviour with dream reports. The scanning hypothesis of REM sleep discussed in chapter 1, that eye movements track dream imagery, was unverified since early experiments supporting the theory were unreproducible. Therefore this evidence does not support the received view.

Other early evidence from Arkin and colleagues (Arkin et al 1966, 1970a and 1970b), showed significant overlap between dream reports and sleep talk that occurred during REM sleep. Arkin and colleagues (1966) examined the dream reports and sleep talk of a

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[35] See chapter 1 for further discussion on stages of sleep.
[36] I later discuss counter arguments to this evidence.

habitual sleep talker (S) to find correlations between the two. Arkin and colleagues found that higher rates of sleep talk could be invoked by hypnotising S before he fell asleep. They used post-hypnotic suggestion (PHS): "tonight you will sleep normally and naturally and talk in your sleep in the same manner as you do at home, but more abundantly" (p 295). EOG and EEG were used to compare eye movements and brain activity to verify during which sleep stages the talking occurred. Dream reports were recorded upon waking. The content of the sleep talking sessions, according to Arkin and colleagues, correlated strongly with the content of the dream reports. For example, the sleep talk:

> Now viewing a film of past experiences in gallery for small admission charge.

correlated with the dream report:

> Uh-[pause]-there's a theatre that you pay admission charge and they run films of your life-that's all I remember except that I was in one of those theatres a minute ago (p Ibid p 305).

Arkin and colleagues found that most aspects of hypnotised sleep replicate that of non-hypnotised sleep, with similar brain activity on the EEG and similar but somewhat gentler eye movements on the EOG. Therefore the correlation between hypnotised sleep speech and reports is a good indication that non-hypnotised sleep speech is also associated with dream content. However there are some concerns regarding these studies. Firstly, correlations between reports and sleep talk in their study were often vague. As I describe in more detail in section 3.3.2, the similarities between reports and sleep talk are often insufficient to verify the report. Unclear, mumbled words are often assumed to be words that correlate with the report, but this is not always justified. Secondly, it is not clear whether hypnotism affects the content of dreams or the quality of the report. For example, memory reports involving hypnotism are subject to increased confabulation. For example, Ofshe (1992) found that hypnotism can cause a subject to be susceptible to suggestion, and can hence lead a subject to entertain false memories. Therefore, dream memories after hypnotism may also be false. This evidence does not strongly verify dream reports.

According to Foulkes (1999), sleep behaviour such as sleep walking rarely corresponds to dream reports and "there is a somewhat better, but still imperfect, relation between sleep speech and dream speech" (p 10). Although I reject Malcolm's assertion that behaviour discounts the possibility that an individual is sound asleep, most sleep behaviour does not verify the content of specific dream reports. The best correlations made to date are from lucid dream experience, as discussed in chapter 1. Lucid dreamers can carry out specific, prearranged tasks during a lucid dream, and signal whilst they are performing these tasks. This is very strong evidence to support a metaphysical claim about experience occurring during sleep. However, as I discuss in section 3.5, lucid dreaming is not indicative of all sleep phenomena, and it is difficult to verify non-lucid dreams. Although lucid dreaming in particular provides strong evidence that experience does occur during sleep, I argue that we have reason to be doubt of the accuracy of most dream reports.

iii) Neural activity

In this section I argue that distrust of correlations between brain activity and experiential states is supported by some modern theorists, but that Malcolm's scepticism is extreme. I contend that although neuroimaging cannot confirm whether a subject is having experiences, correlations with reports provide some evidence that experience does occur during sleep. On the other hand, neuroimaging cannot produce strong evidence to determine the specific type of experience.

Neuroimaging provides information about activity in the brain whilst asleep (see chapter 1). Data about the activation of specific brain regions that are responsible for certain cognitive processes can then be correlated with reports. Hobson and colleagues (2000) and other theorists use neuroimaging data to correlate dream reports with neural activation under the assumption that neuroimaging data can help verify the content of dream reports. Malcolm rejects this assumption. According to Malcolm (1959), we cannot infer experience from brain activation. He states:

> If it were established, for example, that whenever a person makes a judgment the electrical output of a certain region of his brain rises or falls in some

> characteristic way, the occurrence of this electrical phenomenon in a sleeping person would not provide any probability that the sleeper was making a judgment. The imagined correlation would, of necessity, have been established only for the case of people who were awake, since the criteria for saying some person made a judgment could not be fulfilled when he was asleep. This attempt to extend the inductive reasoning to the case of sleeping persons would yield a conclusion that was logically incapable of confirmation. It would be impossible to know whether this conclusion was true or false (p 43).

Malcolm argues that we cannot verify whether similar brain activation between waking and sleep indicates similar experience.

Malcolm's scepticism is somewhat excessive. If an individual both reports an experience such as fear during sleep, and whilst sleeping displays neural activity that correlates with fear in waking individuals, then this seems strong evidence that they experienced fear whilst asleep. In chapter 1 I noted the scepticism of theorists such as Coltheart (2006) and Harley (2004) who argue that neuroimages do not provide useful information about psychological states, which supports Malcolm's view. However I argued that we should not deny the usefulness of studying the brain's physiology for dream research. Reports correlated with multiple methods of neuroimaging can verify general dream experience, although not specific dream content. To this extent Malcolm's scepticism isn't justified.

A further problem for research is that brain activation alone cannot yet determine whether an individual is conscious. An example of this is highlighted in the study of persistent vegetative states (PVS); it is still unclear to practitioners whether some unresponsive patients have experience (Carey, 2006, Hopkin, 2006, Laureys, 2005. Neil Levy 2006*)*. Levy (2006) notes that experiments using instruction probes, where a PVS patient is asked to imagine playing tennis, and corresponding brain activity is then measured, have been interpreted as good evidence that some PVS patients are in fact conscious, despite displaying no other behaviour. However, Levy argues that neuroimaging is not sufficient evidence to prove that conscious experience is occurring.

Most cognitive processes occur unconsciously. For example, unconscious patients exhibit brain behaviour suggesting that they can distinguish between sentences with congruent and incongruent endings. If such tasks can be carried out unconsciously, perhaps certain neural patterns are activated while unconscious when an experimenter sets a task. Neural imaging alone cannot confirm whether a person in a PVS is conscious, and the same can be said for a sleeping individual. Nonetheless, if someone could be instructed to have a lucid dream in which they played tennis, and neural images could *also* be correlated with dream reports, this may be good evidence of consciousness during sleep. However, there are alternative possibilities, which I describe in the following section. Daniel Dennett adopts a metaphysical anti-experience thesis which states that experience does not occur during sleep, but rather we only experience a dream upon waking.

I have highlighted some of the weaknesses of Malcolm's arguments, but also noted some reasons to be intrigued by such a sceptical position. I argued that Malcolm's characterisation of 'sound asleep' is inaccurate, but Malcolm's scepticism towards sleep behaviour as providing evidence for experience during sleep has been justified by recent experiments. Correlations between sleep behaviour and non-lucid dream reports have been very difficult to achieve, so it is unlikely that sleep behaviour can verify specific dream content. Malcolm's scepticism towards correlating brain activity with experience is supported by recent theorists, but I have argued that Malcolm's scepticism in this case goes too far. I think it is possible to verify experience that occurs during sleep although this may not be the case for specific dream content.

In the following section I discuss Dennett's metaphysical view which denies that experience occurs during sleep. Then I briefly discuss arguments that deny dreams as conscious experience, with the intention of highlighting this view for further analysis in chapter 8.

3.2 Metaphysical anti-experience theses

In contrast to Malcolm, who does not wish to engage in dream metaphysics, Daniel Dennett (1976) proposes an explanation for dream reports in the absence of experience during sleep. Although he regards Malcolm's verificationist approach as "too drastic" (p 159), Dennett also argues that the received view is problematic and describes some of its potential rivals, supporting Malcolm's intent to "undermine the authority of the received view of dreams" (p 151). One such rival is the *cassette view,* that dreams are memories that are inserted like cassettes upon waking up. Dennett sets out what evidence would be required to verify this theory, and argues that it is a plausible rival to the received view.

3.2.1 The cassette view

One of the rivals to the received view is that dream narratives are experienced only upon waking as opposed to during sleep. Malcolm rejects this view because, as he argues, it is also unverifiable, but Dennett considers some of the reasons one might make such a conjecture. One such reason is the *suspense dream,* during which suspense builds up to an event that coincides with some sensory stimulus from the external world. It is likely in this case that the stimulus has filtered into the dream, causing the dream event, however this does not explain why there was build-up towards this event. He describes several anecdotal examples as well as reports from dream experiments. One anecdotal example is a dream set in an old-fashioned saloon. The dreamer is challenged to a duel and the shooting coincides with a car backfiring in the external world. Dennett himself has experienced such dreams.

> In a recent dream of mine I searched long and far for a neighbor's goat; when at last I found her she bleated baa-a-a-and I awoke to find her bleat merging perfectly with the buzz of an electric alarm clock I had not used or heard for months. Many people, I find, have anecdotes like this to relate (Dennett 1976, p 157).

Another example comes from an experiment in which different stimuli were used to waken the dreamers.

> One subject was wakened by dripping cold water on his back. He related a dream in which he was singing in an opera. Suddenly he heard and saw that the soprano had been struck by water falling from above; he ran to her and as he bent over her, felt water dripping on his back (p 158).

The key element is that the stimulus is incorporated *seamlessly* into the dream narrative. In both examples, the external stimulus does not disrupt the narrative of the dream, but instead fits into the narrative. A dreamer hearing a bang and turning around to see that a gun went off isn't problematic for the received view since the external stimulus simply disrupts the narrative. However if there is suspense building up to the gunshot, and if the received view is correct, Dennett argues that we must attribute some type of prescience to the dreamer. It appears as if the dreamer was expecting the stimulus to occur, but this is highly improbable.

Dennett does not reject outright the received view, rather he discusses alternative views that could explain suspense dreams while being consistent with other empirical dreams data. The dream could be composed quickly between the perception of the external sounds and waking, so that that the narrative is created to fit the stimulus. Or the dream could be composed backwards: starting with the shooting, and then returning to the saloon, but is remembered the other way round. Finally, instead of having experiences *whilst* asleep, memories could be inserted into consciousness upon awakening. This is the view Dennett explores in more detail. The memories are stored in our minds like a library of undreamed dreams and have various endings that can be replayed in response to relevant external stimulus, such as the sound of a car backfiring or the feeling of water dripping. When we wake up, we simply *replay* these memory "cassettes" as if remembering something that had just occurred whilst asleep. Dennett notes that of the three options, the cassette theory is the most contradictory to the received view and our pretheoretic intuitions about dreams although it is nonetheless consistent with current empirical evidence. Rather than argue that the cassette view is true theory of dreams, he sets out evidence in support of the view. REM sleep is a good candidate for when the unconscious process of generating these "cassettes" could occur. This would explain the increased activation in the brain during REM sleep. Complex unconscious processing occurs during REM sleep to create a dream narrative which is only experienced upon waking. This possibility is supported by Levy's (2006) example discussed above, where the vegetative patient displays complex unconscious processing of tasks such as language comprehension. Long cassettes take longer to compose, which is why dream report length correlates with REM length. Dennett notes that cassette generation is difficult to explain, yet there has been no widely accepted explanation of dream generation according to the received view, either. This is still true today.

Cassette generation also explains why there is no sleep behaviour, which according to Dennett, is not explained by the received view. He uses the following analogy. Late one afternoon a man spontaneously reports seeing a ghost earlier at 11am. However, at 11am that day, he showed no fear, surprise or any other indication of seeing a ghost. Most observers would conclude that his memory in the afternoon of seeing a ghost at 11 am is false, perhaps caused by some brain disturbance. In this case, his lack of behaviour at 11am is strong evidence that he did not see a ghost, and the afternoon report is insufficient evidence against it. This is analogous with dreaming. A report that wild hallucinations, emotions and bizarre scenarios occurred during sleep is insufficient evidence if there was no observable behaviour during sleep. It is more likely that the memory of having a dream is a false memory. The cassette theory is a possible explanation as to how such a false memory upon waking could occur.

Occasionally we are able consciously to manipulate the narrative generation process, and this, according to Dennett, is what some researchers refer to as a lucid dream. Under the cassette theory, a lucid dream is not a dream in which we are aware we are dreaming; rather it is a sense when we wake up that the generation of the 'cassette' had an element of conscious intention.

Dennett notes that the main distinction between this view and the received view is the method of presentation. In both cases the dream is composed whilst we are asleep, however according to the cassette view, dreams are experienced as a false memory upon waking, not during sleep. I now discuss arguments against the cassette theory.

3.2.2 Arguments against the cassette view

Firstly, the cassette theory is counter-intuitive. It goes against our waking impressions that our dream memories are about an experience that has occurred during sleep. Nir and Tononi (2010) note that

> although such a claim [that dreams are fabricated upon waking] is hard to refute conclusively (just as it is hard to prove conclusively that one is not a zombie when awake), it seems implausible; when one has just experienced a vivid dream, it seems hard to believe that it was made up in a flash during an awakening (Nir & Tononi 2010 p 89).

This captures our intuition that a dream report refers to an experience we had whilst sleeping, not an impression experienced upon waking. Aside from these intuitions, empirical evidence also support aspects of the received view.

i) Signalling that one is dreaming

Experiments on lucid dreamers are problematic for both Dennett's and Malcolm's views, since lucid dreamers can learn to signal that they are dreaming by performing a series of learned eye movements (Laberge, 1981)[37]. This is convincing evidence that experience occurs during sleep. Dennett's explanation of lucid dreams is insufficient to explain lucid dream signalling. If lucidity is merely a sense of agency over cassette generation, it is unclear how an individual could gain sufficient self-awareness whilst asleep to carry out pre-learned eye movements. One could argue that the eye movements are an automatic response after they had been learned and rehearsed sufficiently. However this seems implausible since they correlate only with lucid dream reports, not with non-lucid dreams. An automatic response could occur during any session of REM sleep. Given this evidence it is highly probable that lucid dreamers are aware of dreaming whilst they are asleep. This strongly suggests that at least *some* experience occurs during sleep, although lucid dream signalling is not indicative of all dream phenomena.

[37] See chapter 1 section 1.5 on lucid dreaming for further discussion.

ii) Paralysis in sleep

According to Dennett, one could not accept the received view without some explanation for the lack of behaviour during dreams. Sleep paralysis could be such an explanation:

> if it turns out that sleep, or at least that portion of sleep during which dreaming occurs, is a state of more or less peripheral paralysis or inactivity; if it turns out that most of the functional areas that are critical to the governance of our wide awake activity are in operation, then there will be good reason for drawing the lines around experience so that dreams are included. If not, there will be good reason to deny that dreams are experiences (Dennett 1976, p 169).

Recent discoveries in dream research *do* provide such evidence. Windt and Metzinger (2007) note that we enter a state of near paralysis due to "post-synaptic inhibition of the motor neurons in the brain stem and the spinal cord" (p 5), which Hobson and colleagues (2000) refer to as the "output blockade" (see chapter 1). Apart from occasional external stimulus filtering into our consciousness, we are mostly isolated from external stimuli. Hobson and colleagues (2000) refers to this as an "input blockade". Sufferers of REM sleep behaviour disorder (RBD) who act out their dreams are examples of what occurs when sleep paralysis fails[38]. The cassette view cannot explain why some individuals suffer from RBD.

Dennett admits that most reports of suspense dreams are anecdotal, and not well documented. To my knowledge, there is no discussion of such dreams outside Dennett's article. If they occur statistically rarely, the suspense element could be due to coincidence, or perhaps dream narratives are sufficiently flexible to seamlessly incorporate a variety of external stimuli. Both explanations are consistent with the received view. Another plausible explanation is that confabulation occurs when we remember and report dreams. Although experience does occur during sleep, the dream narrative is structured by the waking mind, which composes a reportable story. In section 3.3 I argue that dream reports are often inaccurate portrayals of dream content.

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[38] See chapter 1.1 for discussions on the input/output blockade and RBD.

3.2.3 Consciousness requires recognition or clout

Another theory that might support a metaphysical anti-experience view is that consciousness requires "clout", integration with other cognitive processes or recognition to be conscious. From this it can be argued that dreams lack the requirements of consciousness.

For a cognitive process to achieve sufficient clout or recognition, it must retained in memory long enough to be *recognised*. For example, if my pain is forgotten before I recognise that I am in pain, there is no feeling of pain in the first place. This may occur in most dreams, since they are often forgotten immediately, and cannot be reported.

Dennett (1978) discusses a thought experiment in which a drug *curare* is used to fully paralyse patients so they cannot move but are fully awake and aware during operations. A drug called amnestic that causes complete amnesia is used in conjunction with the curare. The patient can never report their experience, and there are no visible signs of pain or discomfort during the operation, so the experience of pain cannot be verified. The amnestic causes

> continuous amnesia of the specious present. Such a 'forgetting' of each passing moment would cause a complete disability of perceptual analysis and ultimate recognition, and, so goes the theory, a pain not recognized is no pain at all (Dennett 1978 p 437).

Since the experience is forgotten before it can be perceptually analysed, it is not conscious. An experience is only conscious if it is recognised.

Like the amnestic patient, dreamers are paralysed and often immediately forget their dreams. If experiences require recognition as Dennett proposes, and this involves integration into memory, then most dreams should not be considered as 'experiences' in this sense. This would lead to the conclusion that only those dreams which are remembered and in principle reportable are recognised as experiences. Dennett (2001) describes consciousness as a competition for influence, in which neural processes fight to have their time in the spotlight. He argues that "consciousness is not a momentary condition, nor a purely dispositional state, but rather a matter of actual influence over time" (p 221). Dreaming may lack sufficient influence over time to be conscious.

In contrast, most would deny that the curare and amnestic truly eliminate pain; for example, O'Brien and Opie who argue that

> instantaneous consciousness is not a single, monolithic state, but a complex amalgam of distinct and relatively independent phenomenal elements [...] phenomenal consciousness is not an emergent product of complex information processing, nor of sufficiently rich and widespread information-processing relations; rather, consciousness is the mechanism whereby information is explicitly encoded in the brain, and hence is a fundamental feature of cognition (O'Brien & Opie, 1999 p 146).

O'Brien and Opie would not discount the curare-amnestic patient as experiencing pain, since we can have phenomenal consciousness of pain even if we instantly forget it; consciousness is a mechanism of encoding, and a sensation would not be rendered unconscious by the introduction of an amnesia pill.

Because some dreams are remembered, we could not claim that all dreaming is unconscious according to Dennett's view, however consciousness during sleep is a complex issue I will discuss in more detail in chapter 8. I argue that the concept of unconscious dreaming is supported by certain theories of consciousness, such as higher order thought (HOT) theory. However, rather than provide support for the anti-experience thesis of dream, I will suggest there that this instead provides reason to reject HOT theory.

3.3 Narrative fabrication in dream reports

The received view of dreams does not explain why correlations between eye movements and dream reports are so tenuous, or why sleep behaviour and sleep talk are so rarely correlated with dream reports (see chapter 1.1). Neither does it explain suspense dreams. These issues and others lead me to believe that Malcolm and Dennett's mistrust of dream reports as accurate indicators of sleeping experience should be assessed in greater detail. A further analysis of the accuracy of dream reports is justified. I propose an alternative view which explains the inconsistencies of the received view whilst being consistent with current scientific data. According to this view, dream reports are often confabulated so that the narrative reported is not accurate of the dream experience itself. Although certain reporting conditions can help to minimise confabulation, the frequency of confabulation cannot be entirely known. I discuss my views on how to approach this epistemic issue in section 3.5. I focus on two arguments that should lead us to believe that dream reports are particularly prone to fabrication compared with other memory reports. First, bizarreness in dreams leads to rationalisation of bizarre content. An extreme version of this view I will discuss is that some dream experiences are so unlike waking they are incomprehensible to the waking mind. Second, poor memory leads to confabulation so that the waking mind creates the narrative of the dream report. I will refer to this as the narrative fabrication thesis of dreams.

3.3.1 Rationalisation of strange content

In this section I argue that dream narratives often are confabulated upon waking because of the nonsensical content of dream experiences. The waking mind often constructs the experience in a coherent narrative, and this may happen as we try to remember and report the dream. Studies show that reports are rationalised over time. I argue that we cannot know to what extent a dream has been rationalised even if the dreamer is woken directly from REM sleep. There are no failsafe conditions to guarantee that a dream report will be accurate, although certain conditions will increase the probability of an accurate report.

i) Dreams as 'noise'

Owen Flanagan considers the possibility that dreams are "simply noise left over from the work a mind designed for a day job continues to make on the night shift" (Flanagan, 2001 p 40.). This noise is interpreted into narratives by the conscious sleeping mind. Foulkes (1982, 1985) similarly describes dreams as the sleeping conscious mind's attempt to organise unconscious activation of memory units, According to Foulkes the conscious mind does a good job of composing a realistic narrative. This is why lab-based reports are only occasionally unrealistic and contain bizarre features. However, contrary to these findings, as discussed in chapter 2.1, dream reports *are* often bizarre and confusing, but rarely entirely nonsensical or fantastical. Flanagan and Foulkes suggest that the sleeping mind creates the narrative of the dream. Another possibility is that although experience occurs during sleep, the narrative of the dream is created by the waking mind.

The narrative of a dream may be composed partially or entirely upon waking. There is reason to suspect that many dreams themselves have some narrative structure. If dreams were only disordered phenomenal sensations without narrative, all dream reports should be like hypnagogic hallucination reports, i.e. sensations that lack narrative. However even bizarre dream reports are distinct from hypnagogic hallucinations in that they have some narrative structure. Utterly chaotic sensations during sleep would be difficult to report; the best you could do is explain an analogous feeling, such as 'last night I saw blue light, and then it felt as if I was falling and I heard a tinkling sound'. Although hypnagogic hallucination reports are often simple sensation, REM dream reports are rarely like this; as discussed in chapter 2.1 incongruity and uncertainty is much more common than complete discontinuity. According to the received view of dreaming, dreams are not chaotic sensations but are complex narratives that we describe when we wake up. Some evidence indicates that dreams are convincing simulations of waking life and waking concerns (Snyder, 1970, p. 127; Snyder et al. 1968, Domhoff 2007) but there is reason to believe that the waking mind contributes to the creation of the dream narrative. Although the dream itself may involve some narrative structure, the waking mind often contributes to this by ordering, rationalising and simplifying the dream experience. There is also evidence supporting the possibility that dream reports are more likely to be confabulated than waking memory reports. Thus there is reason to be cautious in assessing the accuracy of dream reports.

I argue that although it is unclear to what extent dream reports are confabulated, evidence shows that confabulation does occur. This is exacerbated by the possibility that individuals confabulate to different degrees, as I discuss in section 3.4, and there are a variety of causes of confabulation. Such causes include not only rationalisation of bizarre content, as I discuss in the following section ii, but also increased memory loss (see 3.3.2). If confabulation occurs extensively, the content of the dream itself would be distinct from the dream report, contradicting the second part of the received view, which claims that dreams reports are reliable. This type of scepticism shares similarities with Malcolm's thesis, but is more consistent with empirical findings.

As discussed in chapter 2, dreams often have elements of randomness such as characters changing sex or morphing into other characters as well as odd juxtapositions of items and events. These bizarre elements occur more frequently in dream reports than in reports of waking imagination. I argue that bizarre experiences are subject to greater confabulation than mundane experiences. Depending on the bizarreness or incoherence of a dream, reporting such an experience may require interpretation or fabrication into coherent or memorable narratives. The process of confabulation may occur without awareness, perhaps subconsciously as we are waking up, or after waking. On the other hand, we may have some awareness of this process. I now discuss evidence that such fabrication occurs through the rationalisation of unusual events.

ii) Rationalisation of unusual content

In this section I discuss the extent to which the waking mind attempts to rationalise nonsensical events in dreams. Although it is not possible to compare reports with dream experience directly, we can test the extent to which dream reports change over time. I then argue that we cannot fully control for confabulation, even in laboratory settings.

Foulkes (1979, 1999) observed that several forms of selectivity occur in dream reporting when the dreamer has time to confabulate. Foulkes (1979) compared REM and NREM lab awakenings with natural morning awakenings in the same subject, and found that in the morning reports, there is a tendency to rationalise dreams, as subjects assume that they would make rational decisions and that outcomes would be rational. Foulkes notes that

> there can be, during dreaming, a remarkable dissociation, by waking standards, of feeling and action. One commits atrocities, with no remorse. One stands naked, with no guilt or shame. What may happen in [morning] recall is that waking rationalization supervenes and imposes feelings on events wherein none were in fact experienced: "Because I did this, or because this happened to me, I must have felt this" (1979, p 246).

In one example, during an REM awakening a subject initially reported a dream of being chased but feeling no fear during the dream. In the later morning report of the same dream they describe the dream as being scary (Foulkes, 1999, p 26). Foulkes suggests that the waking mind of the subject rationalised that the dream should have been scary, so misremembered it thus. Dreams lack appropriate *binding* of multiple sensory modalities (Revonsuo 1995b) i.e. the subconscious process of joining together multiple aspects into a single, coherent experience. For example, a stimulus may evoke an inappropriate emotion, or the face of a stranger may be recognised as one's mother. The waking mind may rationalise these mismatching modalities to form a more coherent narrative.

Evidence for the rationalisation of ordinary waking memory content is demonstrated by Bartlett's (1932) work, in which subjects were asked to remember a story called 'The War of the Ghosts'. The story involved many supernatural elements, such as a Native American man becoming involved in a battle with a group of ghosts, a ghostly arrow injuring his spirit and the spirit leaving his body as he dies. Bartlett notes that when asked to recall the story, many subjects left out most or all reference to supernatural occurrences, despite the salience of these occurrences to the narrative. Instead of ghosts, participant remembered living warriors; the spirit injury was remembered as a physical injury, and the soul leaving the body is often left out entirely. Elements of the story were replaced with more familiar cultural symbols or behaviours. One subject mentioned that the dying man's face turned white, which is not mentioned in the original story, but a common description used in western culture. In an influential paper, Alba and Hasher (1983) describe this as a schematic process in which the memory is selected, abstracted, interpreted and integrated. They describe these four forms of construction in memory thus:

> selection—a process that chooses only some of all incoming stimuli for representation; abstraction— a process that stores the meaning of a message without reference to the original syntactic and lexical content; interpretation—a process by which relevant prior knowledge is generated to aid comprehension; and integration—a process by which a single, holistic memory representation is formed from the products of the previous three operations (Alba & Hasher 1983, p 203).

Therefore, rationalisation of unusual elements occurs in waking narratives. If dream narratives involve many bizarre elements, rationalisation would occur, although since we can't compare the report with the original dream experience, it is unclear to what extent.

This analogy between the war of the ghosts and dreaming is not perfect, since months passed between the reading of the story and the report, whereas dreams are usually reported directly after waking. However, as I discuss in the following section, memory loss for dreaming is generally far more rapid than for waking memories, so there is reason to suspect that even REM awakenings might elicit confabulated reports.

Since we cannot directly report dreams as they happen, we cannot know the extent to which reports from REM sleep-awakenings have already been rationalised. Poor memory during sleep may exacerbate confabulation, as I discuss in the following section.

3.3.2 Confabulation and memory loss

Memory loss is an important complicating factor in the collection of dream reports. As discussed in chapter 1, upon waking, memory of dreams is highly reduced: such memory deficits can lead to confabulation of reports.

i) Piecing together memories

Many sleep experiences fade completely upon waking. Frequently, one is left with very poor or no recollection of dreaming. For most dreams to be remembered, mental effort is required. Upon waking, we attempt to retain residual impressions of the experience, and during that process we assemble impressions into a coherent narrative. Think back to the last dream you remember. As you wake up, the memory usually begins to fade, requiring elements of the experience to be pieced together. Training and practising remembering dreams and making dream reports may improve your ability to make an accurate report, but it is not clear to what extent. Arkin and colleagues (1966) attempted to improve dream recall and cause sleep talk to verify reports by hypnotising subjects before sleep. But there is evidence that even these reports are often pieced together as the dreamer attempts to remember the specifics of the experience. Here is an example of such a report:

> Uh-uhm-uh-gee I- something about- yeah- a hat- belonging to you know- one of those old sheep herder hats- I don't remember what it was all about though.

This report was correlated with sleep speech:

> Mm- mmm- how about this hat (?) from India where- where it was made by camel driver- damn thing [pause] pretty little bugger. (The (?) indicates a word which was unclear) (Arkin et al. 1966 p 205).

This report was made after an REM sleep awakening: nonetheless the details are very vague, and much of the dream forgotten. The sleep talk is quite different from the report. The report does not mention a camel driver, or that the hat was pretty, or India. In the sleep talk it is unclear whether he is talking about a hat at all, since the researchers assumed that an unintelligible word was 'hat', and he doesn't mention a sheepherder. This demonstrates that even direct REM sleep awakening reports are subject to rapid memory loss, in contrast with Foulkes' view that REM sleep awakenings elicit accurate reports. Although waking directly from a dream *may* increase the accuracy of the report, an accurate report is never guaranteed.

Reporting and rehearsing a memory can affect what is remembered. Rehearsing causes certain salient parts of the event to be remembered in detail whilst other parts of the event are forgotten. In a study of 56 participants by Horton (2011), the test group rehearsed their dream reports, and the control group did not rehearse. It was found that rehearsal did not increase the richness of detail of memory, but rather caused the dream to be remembered in precisely the same way as it was initially reported, whereas the group that did not rehearse the dream reported different elements of the dream at different times. This suggests that when a report is rehearsed, the report is remembered as opposed to the dream itself. Horton concludes

> while rehearsal may not increase the amount that is subsequently recalled, it alters the phenomenology of what is recalled, such that precisely the same information is brought to mind, in precisely the same structure. These data demonstrate how covert rehearsal may influence which qualities of autobiographical memories are subsequently recalled. This shows that the effect of rehearsal can limit what is later recalled, as well as enhance it. What is recalled is the report, rather than the original dream or event itself (Horton 2011 p 12).

The memories of the dream may be altered by rehearsal of the report, and we cannot rely on rehearsal to improve the accuracy of a dream report.

One might argue that all memory faces such problems, not just dream reports. In response, I argue that dream memory is distinctively problematic.

ii) Comparison with waking memory.

Memory is not like a notebook in which information is stored for later retrieval; rather it is complex and involves multiple events entwining, often with forgotten items filled in by unrelated events and an element of confabulation. Sutton (1998) describes memories as being “blended, not laid down independently once and for all, and […] reconstructed rather than reproduced” (p 2). Memory of a particular event may be reconstructed with elements of many separate events. When details of an event are forgotten, this can lead to 'filling in the blanks' and blending memories together.

Schechtman (1994) argues that

> it is precisely insofar as our memories smooth over the boundaries between the different moments of our lives, interpreting and reinterpreting individual experiences in the context of the whole, that we are able to produce a coherent life history. It is by summarizing, condensing, and conflating the different temporal portions of our lives in memory that we are able to see them as part of an integrated whole, and this integration blurs the distinction between different moment of our lives (p 13).

Sutton (2003) notes that this reconstruction process does not necessarily render memories *false,* rather that all memories, both veridical and false, are constructed. Remembering isn't replaying the event in one's mind exactly the way it was, but rather interpreting and integrating memory traces. One example of memory that is veridical but reconstructed differently from the initial experience is when the observer switches perspectives, viewing the event from an angle which they did not perceive initially (Rice and Rubin 2009), e.g. from a bird's eye view. The original perspective is not represented accurately, but the events portrayed in the memory are often accurate. Reinterpretation, argues Sutton, is the norm, not the exception. One might argue from this that reinterpreted dreams are't necessarily false memories, but I argue that confabulation occurs more frequently in dream reports, thus they are less reliable.

Memories of dreams fade much more quickly and are more difficult to retain than memories of waking events. Most dreams are forgotten instantly, especially if we do not wake during the appropriate stage of sleep. As Hobson (2005) remarks,

> memory for dreams in subsequent waking is notoriously poor. [...] I am a relatively good dream recaller, and I consistently record those that I remember. My collection of reports is on the order of 400 entries in a journal that I have kept for 30 years. That is just a bit more than 1 a month! If we assume that I had

> as few as 5 dreams a night (which is conservative), my recall rate is 400/54,000, or less than 1%. If I were that amnestic in waking, I would be in a mental hospital (p 27).

Perhaps a well trained or motivated individual could report a dream every morning, but still, most of their dreams are forgotten since multiple sessions of REM sleep occur every night and dreaming occurs in most of these sessions. 80-90% of REM sleep awakenings lead to reports (Domhoff, 2003 p 17), but individuals rarely report more than one dream upon waking in the morning. So even those who remember a dream every morning forget most of their dreams. Reduced memory capacity can lead to greater confabulation when attempting to recall events. Memory retention is far worse for dreamed events than waking, so we should expect less accuracy in dream reports.

Another difference between dream and waking memory reports is that other observers can verify waking memories. Waking memory can be easily discredited when stories conflict with external evidence. In contrast, the dream environment is internally generated, so, as Malcolm argues, the dream content cannot be externally verified.

3.3.3 Altered states of consciousness and what it's like to be a bat.

I now discuss further reasons why dream reports may not be accurate reports of dream experiences: some dreams involve altered states of consciousness that cannot be reported accurately.

During REM sleep, the brain at times exhibits increased activation in sensorimotor areas, visual areas and emotional centres in the brain, whilst there is decreased activation in the dorsolateral prefrontal cortex (DLPFC) and memory storage and access areas (Hobson, et al. 2000, see chapter 1). With an altered neuromodulatory system and changes in activation in the brain, we may lack some abilities associated with normal functioning consciousness. The experience that occurs in this altered state might be difficult for the waking mind to comprehend.

Nagel (1974) argues that humans are incapable of comprehending what it is like to be a bat; to understand we would have to experience being a bat. However if we could experience being a bat for a day, and resume being a human the next day, would we then know what it was like to be a bat? Would I then understand what it is like for a bat to 'see' using sonar[39] and enjoy the taste of insects caught on the fly? It is unclear that a mind like mine could ever comprehend the mind of a bat, or that I could retain awareness of my day as a bat after I had shifted back to my normal self. Perhaps I could only comprehend what it's like to be a bat *whilst* I was a bat, or perhaps I couldn't be a bat and still be *me*[40]; the experience is incomprehensible for my human mind. I would like to draw on this as an analogy for the dreaming mind.

i) Altered states of consciousness

The bat case is analogous to the dream case. Some dream states are altered states of consciousness; significant alteration in mental state may mean that the experiences occurring in that state are incomprehensible to the normal waking mind. If the dream experience is sufficiently different to our waking experiences, the waking brain might need to confabulate to make the experience reportable. Perhaps a fully functioning waking mind cannot comprehend the altered state. In chapter 6 I argue that the dream self may not even retain my identity. The waking mind may try to rationalise the experience so it can be reported in a meaningful way. Comprehension of such states, let alone accurate reporting, may be impossible; the waking mind may only be able to report analogous waking experiences. The rationalisation process goes far deeper than the confabulation of a few bizarre elements; rather the entire narrative is a fabrication. In the following section ii, I consider some evidence which conflicts with the aforementioned strong version of the narrative fabrication thesis: that dreams are incomprehensible and thus the entire report is fabricated.

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[39] Some research into human echolocation has shown that humans can 'see' using sound (Kish 2009, Bower et al, 2011), but whether this is akin to the way a bat uses echolocation is a separate matter.
[40] I discuss the possibility that the dreaming self is not the same person as the waking self in chapter 6.

ii) Carry-over from REM sleep to waking

Some recent evidence suggests that there is a carry-over state after waking in which some of the attributes of the brain in REM sleep persist. Most have experienced this state directly after waking; feeling confused and disoriented and failing to realise they were just dreaming (Balkin et al. 1999 and Reinsel & Antrobus 1992). Some argue that dreams that are reported directly after waking from REM sleep can have higher accuracy since the carry-over effect allows for the mind to remain in an altered state. This may also explain why 80%-90% of REM awakenings elicit reports whereas morning reports have a lower frequency. However it is unclear whether this waking stage retains the altered state of REM sleep, or whether it is an in-between state. Neurophysiological evidence of the shift between states is one indication, but not a conclusive indicator of mental states. A carryover state does not necessarily elicit clear and coherent dream reports either. If an individual who has just woken is confused and disoriented they are likely to report inaccurately, as was the case with the Arkin and colleagues (1966) example above. The participant mumbles something about a hat and a camel driver in a barely coherent way. From this report the narrative remains quite unclear.

The issue of confabulation of dream reports is complicated by the possibilities that certain types of experience are more likely to be confabulated than others, and that certain individuals are more susceptible to fabrication. I will argue that we should adopt a pluralistic account of dreaming: dreaming can be a highly altered state of consciousness, or similar to that of waking. This means that some dreams can be reported accurately, but we can never know to what extent any particular dream has been. However, as I argue, it is difficult to know in what particular cases reports are confabulated, and to what extent.

3.4 Individual differences in dream fabrication

An important question remains: to what extent do we fabricate dreams? I suggested that this may be linked with the extent to which the dream is incoherent, how difficult it is to remember a particular dream and whether a dream is an altered state of consciousness. In this section I argue that although certain individuals are more prone to confabulation than others, dreams are often the type of experience that everyone confabulates.

3.4.1 Imagination inflation

Certain experiences are more likely to be confabulated than others. Garry and colleagues (1996) demonstrate that if someone *imagines* an event, they are more likely to later believe that it occurred than events they had not imagined. Garry and colleagues coined the term *imagination inflation* to refer to the tendency in adult subjects to judge childhood events that they had imagined as more likely to have occurred than events they did not imagine. It was also shown that imagination inflation occurs when subjects imagine *future* events, and judge whether the event is likely to occur (Carroll, 1978, Gregory et al. 1982). This is consistent with the theory that remembering is *goal driven* as opposed to solely accuracy driven (Conway, 2005, Sutton et al. 2010). According to this view, memory involves principles of both *correspondence:* accurate representation of real events, and *coherence:* the maintenance of narrative coherence of events over time that make sense to the individual. There are multiple functions of memory, of which accurate portrayal of past events is only one (Boyer, et al. 2009). Garry and colleagues' (1996) results suggest that imagination affects memory and predictions, and this may also be the case for dreams; if someone imagines dreaming the event, they are more likely to later believe they *have* dreamt it. Although it has not been tested, dreams may be even more prone to imagination inflation since, as I discuss in chapter 4, dreaming itself involves imaginative elements, and some dream events may be difficult to distinguish from other imagined events. Here I argue that dreaming is subject to a higher degree of imagination inflation due to poor memory, bizarreness of dreams, and because we are unable to assess the likelihood that a dream even occurred by judging its plausibility.

3.4.2 Individual differences

Heaps and Nash (1999) discovered that there are individual differences in imagination inflation. They found that some individuals are more likely to mistake imagination for real childhood events than others. These individuals are also more likely to respond to hypnotic suggestion and experience *dissociativity*, which I explain in the following section. I suggest that this research highlights the difficulties in distinguishing a dreamed event from an imagined event.

i) Heaps and Nash's experiments

Heaps and Nash (1999) explain that while hypnosis is sometimes used for recovering lost memories, certain individuals are more prone to report false memories under hypnosis due to suggestions from the hypnotizer. For example, Ofshe (1992) reports the case of Paul Ingram, a man who began to report false memories after hypnosis. After rape allegations made by his adult daughters, hypnosis was used to attempt to reveal suppressed memories. He began to report events suggested to him by the hypnotiser, however some of these events could not have happened. This gives further reason to be wary of aforementioned experiments of Arkin and colleagues (1966, 1970a and 1970b), who attempted to elicit sleep talk and better dream recall through the use of hypnotism. Heaps and Nash used the Gudjonsson Suggestibility Scale (GSS; Gudjonsson, 1984) to identify interrogative suggestibility (susceptibility to the influence of an authoritative questioning source) and hypnotic suggestibility (susceptibility to influence under hypnosis) in test subject. They found that individuals who are prone to hypnotic suggestion are also more prone to imagination inflation, i.e. to mistake imagination for memory. This is linked with *dissociativity,* defined as failure to "distinguish and integrate memories, fantasies, motivations, and actions in awareness (Spiegel, 1995, Whalen & Nash, 1996)" (Heaps & Nash 1999 p 314). Dissociative individuals experience disrupted memory and confuse real events with fantasy. Dissociative individuals are more likely to mistake imagination for memory.

Heaps and Nash (1999) interviewed subjects on how likely it was that they had experienced certain events before the age of 10, such as whether they had broken a window with their hand. Two weeks later they were asked to perform the same interview again under the pretence that the initial responses had been lost. They found that people who are dissociative or prone to hypnotic suggestion were more likely to report in the second interview that they *had* broken a window with their hand despite initially denying remembering the experience. Heaps and Nash suggest that because dissociative individuals are unable to distinguish and integrate memories and fantasies, they rely less on their memories and more on inferences and external evidence. Normal, waking individuals also demonstrate such reliance, but to a lesser extent. French and Richards (1993) asked participants to draw a Roman numeral clock. The participants almost all drew the 4 in the clock as 'IV' despite the fact that Roman numeral clocks represent the 4 as 'IIII'. French and Richards explain that individuals rely on their schematic knowledge of the way numerals are represented rather than their memory of the clock. This commonly occurs in cases where normal participants cannot rely on their memories, however dissociative patients, who suffer from greater memory deficits, are forced to rely more heavily on such schematic knowledge. Heaps and Nash explain that "dissociative subjects experience frequent disruptions in episodic memory, often finding external evidence or confirmation of events that are not remembered [...] such subjects may consequently adopt a lower criterion for accepting memories as real" (Heaps & Nash, 1999 p 317). I argue that although dissociative individuals may be more prone to confabulate dream reports than others, the nature of the dream experience is often dissociative. Therefore we are *all* prone to confabulate dreams more so than waking memory since we lack the ability to integrate memories and reality monitor.

ii) Individual differences in dream reporting

Individuals who are prone to hypnotic suggestion or dissociation and who find it harder to distinguish between memories of experienced events and semantic memories or imagination may be less able to distinguish between a dreams and other memories. For example, they may find it hard to distinguish between fantasising that occurred before falling asleep, and the content of their dreams. If dissociative individuals find it hard to distinguish between imagination and waking memory, it might be even more difficult to distinguish between dreams and imagination, since dreaming involves imaginative elements (as I discuss in chapter 4). Screening research samples for those who are more likely to confabulate might be necessary for accurate dream research, although a separate experiment may be required to ascertain whether the same individuals are more prone to confabulate dream reports. This hypothesis may be difficult to test empirically due to limits in our abilities to verify dream content.

Although individual differences may exist, a further problem is that when dreaming *in general* any individual might be more prone to imagination inflation: in many dreams it is difficult to distinguish and integrate memories, fantasies, motivations and actions in awareness due to decreased memory and other cognitive capacities.

iii) Dissociative dreaming

Heaps and Nash's (1999) description of disruptions in episodic memory leading in turn to difficulties distinguishing between real and imagined events is an accurate description of many dream states. Barrett (1995) argues that many of the cognitive features of dreaming are similar to those of dissociative states. This is supported by experiments carried out by Johnson and colleagues (1984) who found that subjects generally have difficulty discriminating between their own dreams and reports of others' dreams. Johnson and colleagues argue that this is not simply an issue of poor memory, but that dreams are "deficient in conscious cognitive operations that help identify the origin of information generated in a waking state" (p 329). Since dreams are generated unconsciously, they often lack important cues that assist in distinguishing imagined from experienced events.

Another reason to suspect that dreams are often hard to integrate into and distinguish from other mental states is that dreams contain imaginative elements (see chapter 4). The imaginative elements of dreams may be difficult to distinguish from waking imagining. We cannot 'reality test' to distinguish between imagination and dreams. Waking memory can be judged as plausible if it is consistent with other waking events. This is not so for dream memories, since a dream can be either a plausible representation of waking life *or* a bizarre impossible event. Since neither dreams nor imaginings need to be plausible events, we cannot reality test to determine whether it is plausible that I dreamed or imagined something.

I have highlighted some reasons why dream reports are more prone to fabrication than waking memories, sometimes to the extent that we cannot be sure whether the dream report is an accurate representation of the dream content. Now I discuss some objections to this narrative fabrication theory.

3.5 Evidence against dream narrative fabrication

In this section I discuss arguments against the narrative fabrication thesis. I show that these arguments can be accounted for by the pluralistic view of dreams, and do not discount the likelihood of narrative fabrication.

3.5.1) Lucid dreams and RBD

In chapter 1 I discussed the evidence that lucid dreamers can be taught to signal that they are dreaming *while* they are dreaming using pre-learned eye movements. This is a strong indication that experience does occur during sleep. As I have argued, Dennett and Malcolm's attempts to explain lucid dreams do not explain why some people can signal that they are dreaming. However this counter argument only provides evidence against anti-experience view, and not the narrative fabrication thesis. On my view, we have reason to suspect that fabrication of dream content is a common occurrence, but lucid dreaming often displays higher metacognitive and rational abilities and more accurate memory that non-lucid dreaming, which would mean lucid dreams are less prone to confabulation. This is consistent with my pluralistic approach:

Although all dreams are prone to some confabulation, the best way to control for this may be to set up lucid dreaming tasks in which a lucid dreamer performs activities such as drawing letters, and signalling when the activity is complete. This is not to say that such an experiment would failsafe against any confabulation. It may confirm a specific activity, however it would not give evidence for other dream elements. For example, a strange setting may still confabulated in the report because of its unusual nature. So even lucid dream reports may still involve confabulation. A second issue, as discussed in chapter 1, is that lucid dreams may not be representative of other dreams. Researchers who focus on non-lucid dreams cannot study lucid dreams under the assumption that they are similar in all relevant aspects. Therefore lucid dreams cannot replace non-lucid dreams in research for the purpose of minimising report confabulation.

REM sleep behaviour disorder (RBD) as discussed earlier provides another example in which dreams can be corroborated with sleep behaviour. However, it is important to note that RBD is caused by neurological disorders which can also affect the content of dreams (Schenck et al. 1987). For example, RBD sufferers experience a higher frequency of violence in dreams, so they should not be seen as indicative of all dreaming. Secondly, although RBD gives some evidence that experience is occurring during sleep, such behaviour only provides vague evidence of general dream content. Schenck and colleagues (1987) note a case in which a sleeping man who was throwing punches woke up to report that he was having a dream of fighting a squirrel in the attic. Mahowald and colleagues (2005) report a case of a man who killed his girlfriend while dreaming of fending off an intruder. Although violent behaviour can be correlated with reports of violent dreams, the behaviour does not inform an outside observer of the specifics of the dream content. We cannot judge from behaviour alone that the first man was attacking squirrels in his dream, or that the second was fending off an intruder, so the behaviour only gives a vague indication of the content of the dream. Also, it is unclear if the reported dream correlated with that particular session of behaviour, or if it was a previous dream. Perhaps the reported dream and the behaviour were not from the same session. So RBD behaviour does not verify dream content, and does not safeguard against narrative fabrication.

3.5.2 Dream A vs. dream B: accurate lab reports

In contrast to the narrative fabrication thesis, some theorists argue that the accuracy of dream reports depends on the reporting conditions. I argue that although reporting conditions increase the likelihood of an accurate report, fabrication can never be entirely controlled for.

I have argued that dream reports are not always accurate reports of dream content, moreover that there is no failsafe control against confabulation. In contrast, although Foulkes has recorded many cases in which dream memory goes awry (see 2.3.1), he argues that dreams *can* be accurately reported given appropriate conditions. Although I agree that these conditions increase the likelihood of an accurate report, we cannot guarantee that any particular report is accurate.

Foulkes suggests that given appropriate conditions, dream reports can be accurate. Foulkes (1999) distinguishes two types of dream phenomena; dream A and dream B. Dream A is an "involuntary conscious experience of mentation during sleep and some other states, most often in the form of momentary and if sequential narrative imagery" whereas dream B is "a person's everyday account of an experience described with greater or lesser accuracy and with greater or lesser conviction, as having occurred during sleep" (p 36). Morning dream B reports are responsive to the waking, personal and social situation of dreamer e.g., you may be inclined not to report embarrassing dreams. Also, as previously discussed, morning reports occur after a longer period in which interpretation of the initial memory impression can occur. Memories alter over time, as in Foulkes' chase dream example (discussed in 3.3.1 ii above), although the initial experience was not scary, a waking mind may rationalise that they must have been scared. Controlled lab settings improve the chances of gaining an accurate dream A report according to Foulkes and accurate reports are attained from REM sleep awakenings so long as impartial experimenters collect the reports. As previously argued, the highly controlled lucid dreaming experiments are likely to evoke the most accurate dream reports, and some dream elements can be confirmed by outward behaviour such as eye signalling.

I agree with Foulkes' scepticism about delayed reports, but disagree with his sharp distinction between REM sleep awakening and morning dream reports; it is unclear to what extent any reports made directly upon waking are accurate. Foulkes believes confabulation does not occur if the subject is woken up to report immediately after the dream. However as I have argued, there is reason to believe that reports made at any time are subject to greater confabulation, confusion with imagination, rationalisation and rapid memory loss than waking memory reports. We are unable to compare reports with dream experiences, so the accuracy of REM sleep awakening reports cannot be determined. Therefore, although I agree that REM awakenings are more likely to elicit accurate reports, and some dreams are accurately reported. However, an experimenter can never guarantee that a dream has been reported accurately, because there is no failsafe method of gaining an accurate report. Certain dreams are more likely to be accurately reported, and scientists can use this as a method to reduce narrative fabrication. As discussed above, bizarre dreams and cognitively deficient dreams are more likely to be confabulated. As discussed in chapter 2, not all dreams suffer from memory and cognitive deficits, so these dreams are the most likely to be reported accurately. If REM awakenings are used to gain reports, and the dreamer had not suffered from cognitive deficits during the episode, then an accurate report is more likely. However, since narrative fabrication cannot be controlled, this is not guaranteed.

Conclusion

Malcolm's verificationist criteria for dreaming is in many ways implausible given the current scientific evidence. I have argued that the anti-experience theses of Malcolm and Dennett should be rejected. There is strong evidence that experiences occur during sleep. The first part of the received view of dreaming is thus correct. However, I have argued against the assumption that dream reports are in general accurate. Dream reports are not as reliable evidence for dream experience as waking reports are for waking experience. It is implausible to deny outright that experiences *do* occur during sleep: but dream reports are often confabulated because of poor memory, confusion of bizarre dream content and changes in cognition. In these cases, dreams are difficult to remember and report, so confabulation and inference-making occur.

It is well documented that narratives can be confabulated between initial REM sleep awakenings and subsequent reports and I argue that we have reason to suspect that fabrication occurs in the original report as well. Evidence for this is the tendency to rationalise strange elements in narratives. Subjects tend to leave out supernatural or bizarre elements when reporting waking memories of stories, as exemplified in Bartlett's War of the Ghosts. Confabulation is exacerbated in dreams by rapid memory loss and bizarre dream content. Waking memory is a process of reconstruction and blending of elements, but unlike waking memory, we cannot reality test for dream memories. Dream experiences involve imaginative elements, and dream content cannot be verified with external evidence. In summary, dream reports suffer from diminished memory, bizarre content, and source confusion, and cannot be verified with external evidence. I have argued that although RBD and lucid dreaming provide verification of conscious experience during sleep, we cannot verify the specific content of dreams, nor rule out with certainty that a report has been fabricated.

I do not argue that all dream reports are inaccurate or that all dreams are cognitively impoverished. Reports of dreams that involve higher cognitive functions, logical inferences and rationality are more likely to be reliable than cognitively deficient dreams. However, in this chapter I have raised two main issues. Firstly, dream reports are generally less accurate than waking reports, and secondly, we can never confirm the extent to which dream reports are confabulated.

4

Dreaming as Imagination

In this chapter I discuss the imagination model of dreaming, an alternative to the more commonly accepted perceptual view which is closely related to the 'received view' of dreams. Ernest Sosa and Jonathan Ichikawa reject the standard view that dreams and waking perception are "intrinsically alike, though different in their causes and effects" (Sosa, 2005 p 7), and argue instead that dreams are intrinsically like imagining. The imagination model states that dreams are analogous to waking imagination or daydreaming: "to dream is to imagine, not to hallucinate" (Sosa, 2005, p 7). Firstly I set out Sosa's and Ichikawa's arguments for the imagination model. I demonstrate that this is a *reductive* model according to which dreaming does not contain perceptual elements. I then argue that this model of dreams should be rejected. A pluralist view of dream content, involving both perceptual and imaginative elements, is more plausible. Although certain elements of dream experience are similar to imagination, others are analogous to perception. Dream experience can fall anywhere along a spectrum from perceptual to imaginative, though most dreams involve a variety of experiences, some of which are imaginative and some perceptual. A pluralist view is preferable to a reductive view as it more effectively explains the wide variety of reported sleep experiences.

4.1 The imagination model of dreaming

Many supporters of the received view of dreams describe the dream experience as perceptual: we perceive the dream world similarly to the way we perceive the waking world. This is also the common sense view. Sometimes we cannot distinguish between dreaming and waking, as we often mistake our dreams for reality. A noteworthy alternative to this theory is the *imagination model* of dreaming, according to which dreams are more like vivid daydreams or imagination than like waking perceptual life. This is not an anti-experience thesis akin to Malcolm or Dennett, rather "although dreams do involve experiences, they do not involve percepts -the kinds of sensory experiences we experience when engaging with the world around us" (Ichikawa 2009 p 105). Ichikawa and Sosa contend that dreams *do not involve percepts*. According to this view, dreams *only* involve non-perceptual experience such as imagination, and not hallucination. It is therefore a reductive view excluding the possibility of any perceptual content in dreams. According to Ichikawa and Sosa, unlike perceiving, "dreaming is an imaginative activity; when one dreams that he is being chased by a lion, he is *imagining* that he is being chased by a lion, while still tacitly believing himself to be safe in bed" (Ichikawa & Sosa, 2009). Sosa (2005) argues that it is implausible that a dreamer could actually believe they are being chased by a lion given that they still tacitly believe that they are still in bed. Ichikawa, in agreement, argues that dream experiences are not like perceptual experiences at all, but rather resemble the experiences we have when we daydream. Ichikawa denies both that dreams are perceptual *and* that they contain beliefs about dream content. Sosa and Ichikawa clearly intend to argue that perception does not occur in dreams to any extent; that dreams involve imagination alone. In this section I summarise the evidence given by Sosa and Ichikawa in support of the imagination model.

4.1.1 Believing in dreams

Individuals normally believe what they see. If I appear to be sitting in bed, then I usually believe that I am sitting in bed. Believing what I see is an indicator that my experience is perceptual rather than imaginative[41]. Sometimes I may decide my perception is wrong: I heard a high-pitched buzzing sound, but conclude that this is caused by ear damage from listening to loud music. Perception is subject to such reality-testing, however we usually believe that the perceived world is an accurate representation of the real world. In contrast, imagination is not subject to reality testing in the same way, as imagination is not presented as reality. Imagination is an internally

[41] There are cases in which imagination can entail such beliefs, but this is less common, as I discuss later.

generated experience and is usually experienced as such, so it does not require correspondence with reality. Perceptual model theorists think that during dreams we believe that the dream world is the real world. Hobson (1988, 2000), Flanagan (2000), Domhoff (2003), Solms (2000), Solms & Turnbull (2002) and others support this view (see chapter 1). They argue that dreaming of walking down the street is, from the dreamer's perspective, like being awake and walking down the street. When I dream of walking down the street, I *believe* I am walking down the street. Sosa disagrees, arguing that when we dream, we *do not* believe that the dream is reality.

If I believe that I am walking down the street, this would require that I also believe that I am not in bed. Sosa argues that since most beliefs at any time remain latent or unconscious, there is reason to think that latent beliefs, such as the belief that I am currently in bed, carry over into dreams. Latency does not entail that I cease maintaining such beliefs. Take, for example, my belief that 'eating a polar bear liver will kill you'. I do not actively entertain this particular belief often; it remains latent, but can be accessed and recalled in the rare instances when it is relevant to a conversation or something I am thinking about. When I go to sleep, I may entertain the beliefs 'I am in bed' and 'I left my shoes next to the bed', which become latent beliefs. When I fall asleep, I might dream about walking down the street, but this experience conflicts with my latent belief that I am in bed. Sosa argues that "it is hard to see how one could then concurrently believe that one is being chased by a lion, rather than lying in bed, with the shoes a certain distance and direction from where one lies" (Sosa, 2005 p 9). If our waking beliefs remain tacit, then we must entertain conflicting beliefs whilst we dream.

It is more plausible according to Sosa that I do not really believe I am walking down the street, since it is unlikely that I can maintain this alongside the conflicting belief that I am in bed. Contradictory beliefs in waking life are relatively common. I could entertain the belief that sexism and racism is unjustified, but simultaneously hold sexist or racist beliefs such as 'women do not make good CEOs' or 'Asian people are bad drivers'. However unlike such waking contradictions, dreams would require a sudden, wide-scale shift to *multiple* contradictory beliefs. Ichikawa mentions that "what we do while dreaming does not seem to fit the model of, for example, instances of self-deception in which subjects might be said to have contradictory beliefs" (2009 p 112). Although he doesn't argue for this point, he places the burden of proof on orthodox theorists who need to explain this apparent wholesale acceptance of contradictory beliefs. In contrast, it is not contradictory to imagine being chased by a lion whilst sitting in bed. However I argue that dreaming cognition can often be delusional, so contradictory beliefs are more common in dreaming than waking.

Ichikawa argues that it is implausible that we forget our waking beliefs, since beliefs are usually gained or rejected gradually, not wholesale as would be the case in dreams. It is unlikely that we can suddenly reject a large number of tacit beliefs and instantaneously replace them with a set of different beliefs.

> If dream beliefs are beliefs, and contradictory longstanding beliefs temporarily disappear, then we have nightly cases of belief revision that are wildly different from the standard models we encounter in waking life; the orthodox theorist owes us an explanation for such unusual patterns (Ichikawa, 2009 p 113).

According to Ichikawa, orthodox theorists have not yet provided such an explanation. I disagree, and will later argue that perceptual theorists offer a reasonable explanation for wholesale memory loss.

4.1.2 The 'in the dream' operator

Sosa argues that any thoughts, beliefs, actions and sensations that occur whilst dreaming fall under the 'in the dream' operator, which entails that said thought, belief or action did not really occur. If I woke from a dream in which I was being chased by a lion, I would conclude that I was not *really* being chased by a lion: it was only a dream. Some might argue that this applies to actions but not beliefs or thoughts, for example, if in a dream I thought about going to work, this does not entail that I did not *really* have a thought. However for Sosa, the 'in the dream' operator equally applies to any dream activity.

> With my hand in view, I may ask: Do I now *think* I see a hand? Well, might it not be just a dream? Might I not be only *dreaming* that I think I see a hand? If I am only dreaming, then I do not *really* think I see a hand, after all (Sosa, 2005 p 11).

Ichikawa (2009), in agreement, argues that:

> believing something in a dream] does not entail *beliefs*; all parties grant that *in the dream* I believe these things; in dispute is whether *in fact* I believe them. The *in the dream* operator should be thought of as analogous to the *in the fiction* operator that is used to explain truths about fictional events[42] (p 111).

If I only *dream* that I am asserting 'I see a lion' or believing 'I see a lion', or even thinking 'I see a lion', then I am not really asserting or believing or thinking 'I see a lion'. To be asserting, believing or thinking something (as opposed to just dreaming that I am asserting, believing or thinking something), I must be awake. The 'in the dream' operator over 'I am doing X' implies that you are not really doing X, for any X. Any affirmation in a dream is only a "quasi-affirmation" (Ichikawa 2008 p 523) in which affirmation implies belief. This supports the idea that we do not believe the content of dreams to be true whilst dreaming, because 'in the dream, I believed the dream was reality' does not imply 'I *really* believed the dream was reality'. In Ichikawa's view, dreams involve imagination alone, and do not involve "misleading sensations and false beliefs". Sosa contends that dreaming involves imagining, not perceiving. Hence I consider this to be a reductive view that denies any perceptual content in dreams.

4.1.3 Six phenomena: support for the imagination model?

Ichikawa (2009) presents six phenomena that support dream experience as *imagery* as

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[42] As I discussed in chapter section 2.2.2, McGinn (2004, 2005) supports a fiction model of dreams. According to this model, when we dream we suspend disbelief in the same way as when we watch engaging movies or read fictional stories. "I hold that watching a movie is like being in a dream; that is, the state of consciousness of being absorbed in a movie resembles and draws upon the state of consciousness of the dreamer. The images of the dream function like the images on the screen: they are not "realistic" but we become *fictionally immersed* in the story being told. In my theory this is akin to the hypnotic state—a state of heightened suggestibility in which we come to believe what there is no real evidence for. Mere images command our belief, because we have entered a state of hyper-suggestibility" (McGinn, 2005). I briefly argued against this view in chapter 2.

opposed to *perception*. They are not intended to provide deductively valid proofs that dreams consist of *imagery* alone, "but collectively, I take them to suggest a preponderance of evidence in favor of *imagery* over *percept*" (p 108). Ichikawa intends that taken together and along with his rejection of beliefs in dreams, a strong case with empirical support is made for the imagination model of dreaming. Later I argue that, even together, these phenomena do not support a reductive imagination model, rather, they are consistent with my pluralistic view.

i) We are not morally culpable for actions performed in dreams.

Ichikawa, in agreement with Augustine, argues that we are not morally responsible for the actions we carry out in a dream since dreaming is too different from waking. Augustine argues

> You commanded me not to commit fornication ... You gave me the grace and I did your bidding… But in my memory... the images of things imprinted upon it by my former habits still linger on. […] When I dream, they not only give me pleasure but are very much like acquiescence in the act […] Yet the difference between waking and sleeping is so great that even when, during sleep, it happens otherwise, […] I was not responsible for the act, although I am sorry that by some means or other it happened in me (Augustine, 1961 233-234).

According to Ichikawa, there are two main reasons to believe that we are not culpable for dream actions. Firstly, dream acts have no consequences. Secondly, dream acts or intentions occur under the 'in the dream' operator, so they are not real acts or intentions. This suggests that to dream is to imagine, since if I murder or even intend to murder someone, this is morally wrong, whereas if I imagine murdering or imagine intending to murder someone, I am not morally culpable.

ii) Dream content is causally inefficacious.

When we are asleep, a loud noise from the external environment will most likely wake us up. This, according to Ichikawa, demonstrates the causal power of a percept. On the other hand, a loud noise experienced within a dream is unlikely to wake us up. The dream experience does not have the same causal power as external stimuli. The perceptual theorist might argue that the sound hitting our ears is what wakes up a sleeping person rather than a difference in the type of auditory experience, but according to Ichikawa we have no reason to believe this is true. In this way, dreams are more similar to imagination. Hearing a loud noise might make us jump or look around, whereas imagining hearing a loud noise does not have any causal power.

Another reason given by Ichikawa to think that dream beliefs are causally inefficacious is that

> dream beliefs do not appear to play many of the same functional roles as do prototypical beliefs. They are not connected with perceptual experience in the way that typical beliefs are, and they do not seem to motivate action in the way that typical beliefs do (Ichikawa, 2009 p 114).

Real beliefs are causally efficacious, whereas imaginary 'beliefs' are not. For example, if I imagined what it would be like to believe in God, the imagined belief has little causal power, whereas if I actually believed in God, the belief might have the causal power to send me to church and pray before going to bed. This is another way, according to Ichikawa, that dreaming is more like imagining.

iii) We used to think that dreams were in black and white.

Eric Schwitzgebel (2002, 2006, 2011) notes that during the 1940's and 1950's people reported that dream imagery was in black and white. Theorists began to suspect that this was true for all dreams. Both before and after this period, yet dreams were in general reported as being in colour. Schwitzgebel sets out three possible explanations for this phenomenon. Firstly, that the predominance of black and white media changed the content of dreams during this period of time. However this is unlikely since *most* of our experience is of coloured objects, e.g. those objects we see on a regular basis such as houses and trees and so on. It is unlikely that the media would have a stronger effect on dream content than common perception. Another option is that the media altered the way dreams were reported whilst the content of dreams remained unchanged. This possibility requires explanation and evidence as to why our reporting would change in this way if the experience remained the same. Schwitzgebel's preferred theory is that dream content is *indeterminate* in colour.

> If you find yourself disinclined to think that novels, or the images evoked by novels, are properly described as being either in black and white or in full color, then you might likewise find yourself hesitant to apply the terms 'black and white' or 'colored' to dreams. Perhaps dream-objects and dream-events are similar to fictional objects and events, or to the images evoked by fiction, in having, typically, a certain indeterminacy of color, neither cerise nor taupe nor burnt umber, nor gray either (Schwitzgebel, 2002 p 756).

Ichikawa argues that if dreams involve visual percepts rather than images, dreams could not be of indeterminate colour. On the other hand, *imagination* can be indeterminate in colour. According to Ichikawa,

> if our actual experiences in dreams are of indeterminate color, much as the experiences we often experience while imagining fictions are, then it shouldn't perhaps be too surprising if, after the fact, we turn to our common experiences with visual experience in fiction-based, imaginative contexts, to describe our experiences. Those of us who are used to imagining along with color stories, because we see them on television and film, will describe our dreams as colored. [...]. So the imagination model may provide the best explanation for disagreement about color sensation in dreams (Ichikawa, 2009 p 109).

If indeterminate colour in dreams is the most plausible account of why dream reports have altered over time, then according to Ichikawa, the imagination model is the best description of dream phenomenology.

iv) Dreaming ability develops alongside imaginative ability.

Foulkes (1999) argues that children learn to dream as they learn to imagine spatial imagery. This could mean that imagining and dreaming require the same mechanisms. There is also a correlation between the ability to dream and imagine in adults, since "performance in waking imagery tests is a good predictor [...] of dream frequency in adults" (Ichikawa 2009 p 109). According to Ichikawa, Foulkes' conclusion that "imagination must be a critical skill in dream-making" (Foulkes, 1999, p. 90) is "very friendly" to the imagination model. If imagining and dreaming require the same cognitive mechanisms, this is evidence that dreaming is a type of imagining.

v) Daydreaming can seamlessly shift into dreaming.

Ichikawa describes how when we fall asleep whilst daydreaming, the narrative of the daydream can continue into a dream. Since daydreams are a type of imagining, and "there is a smooth experiential transition between the waking daydream and the sleeping dream" (Ichikawa 2009 p 115), this gives evidence that dreams are like imagining. It is unlikely that we can have such a seamless transition from imagining to perceiving. It is more likely that dreaming is a type of imagining, and that when this phenomenon occurs, we simply shift from one type of imagining to another.

vi) Dreaming, like imagining, is subject to the will.

Ichikawa (2009) argues that dreaming, like imagination, is subject to the will, and in this way dreams are distinct from perception. Ichikawa agrees with McGinn's (2004), argument that imagination is subject to the will whereas perception is not[43]. According to this view, we can consciously choose what we imagine, whereas although we have some limited control over what we perceive (e.g. we can close our eyes, look in another direction and so on), it does not make sense to consciously try to see a red object as blue,

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[43] McGinn and Ichikawa's views differ in regards to the nature of the dreaming experience. McGinn argues that dreams involve a type of pretence or suspension of disbelief that also occurs when watching a film, whereas according Ichikawa, dreams need not involve such pretence as they are simply a form of imagination. However, both theorists agree that dreams are subject to the will.

or choose to feel pleasure instead of pain. Conversely, it makes perfect sense to choose to imagine an object is red instead of blue, or to imagine pleasure instead of pain. According to Ichikawa, although we do not have complete control over dreams, "it is possible for something to be subject to the will, and not yet under voluntary control" (p 116). For example, it makes sense to *try* to dream about a blue instead of red object, although one might not succeed in doing so. Dreams, according to Ichikawa, are analogous to annoying songs stuck in our heads: they are both involuntary and subject to the will. It makes sense to *attempt* to banish the annoying song from our thoughts, and sometimes we might succeed although this is not always possible. Dreams are *potentially* subject to voluntary control: this is demonstrated in *lucid dreams* where we gain control of the dream environment. Nonetheless, even in non-lucid dreams we are "unconsciously authoring our dreams; authoring is an active notion" (Ichikawa 2009 p 117). According to Ichikawa we create our own dreams without realising our agency.

Our ability to wake up and then consciously decide to re-enter dreams, although a rare phenomenon, is also reason to suspect that dreams are subject to the will. "When such attempts [at re-entering a dream] are successful, there is often a consciously introspectable transitional period in which one experiences the dream with more reflective access than is typical; such experiences can be much like waking imagination" (Ibid p 115). This is related to phenomenon v) described above, that imagination can shift seamlessly into dreaming. This also suggests that dreaming, like imagining, is subject to the will. This is another way that dreams are more like imagining than perceiving according to Ichikawa.

I argue that these phenomena do not validate a reductive imagination model of dreaming. Certain dream phenomena are clearly perceptual, and there is reason to think that many dream experiences contain both imaginative and perceptual elements.

4.2 Counter-arguments to the imagination model

The imagination model of dreaming is overly reductive and does not take into account dream phenomena that are clearly perceptual. Perception and imagination, I suggest, in certain respects lie on a spectrum, despite their differences in other respects. There are a variety of phenomena, such as hallucinations, mind-wandering (a type of imagining) and dreaming that display some imaginative features and some perceptual features. I argue that dream experiences vary along the spectrum depending on the type of dream that is experienced, and that a single dream can involve both imaginative and perceptual features. The imagination model cannot account for the wide variety of experiences possible in dreams. In 4.2.1 I argue that there is a spectrum between imagining and perceiving, noting that imagination can involve perceptual elements, and perception can involve imaginative elements. Then in 4.2.2 I provide counter-arguments to Sosa and Ichikawa's imagination model, and respond to the six phenomena that Ichikawa believes support the imagination model.

4.2.1 The Spectrum between imagining and perceiving

Imagining and perceiving can be distinguished by a variety of factors, some of which have previously been discussed, such as being subject to the will and having beliefs about one's state. Phenomenal vividness as an indicator of perception is rejected by Ichikawa since strong images can be more vivid than weak percepts. Ichikawa (2009) argues that imagination *simulates* non-imaginative states, and these can be more or less vivid. However, generally speaking, I contend that perception is more vivid. Ichikawa thinks that being subject to the will is a better indicator than vividness, but this is not a phenomenal difference. A phenomenal indicator, I argue, is our ability to distinguish between image and percept[44]. In normal cases, my imagination and perception are easy to distinguish; this may not be due to the vividness of the experience, but perhaps to some other phenomenal quality, which I will not attempt to describe here. When I imagine something, I usually realise that I am imagining, not perceiving, and vice versa.

[44] A complicating factor is whether this discussion is about one's subjective belief about whether they are imagining or perceiving, or the nature of the experience itself. However, these two issues are not easily separable, since perception and hallucination are subjective experiences. Belief that one is perceiving and not imagining does not entail that one is perceiving, however it is a strong indicator.

However I argue that imagining can at times involve perceptual elements, such as being a convincing replica of reality, as well as similar phenomenal features, and being less subject to the will. Therefore in some cases it becomes difficult to distinguish imagining from hallucinating. From this I argue that dreaming can be anywhere along the spectrum between imagining and perceiving.

i) Perceptual imagining

The distinctions between dreaming, relaxed thinking, mind-wandering and hallucinating can at times be unclear. Foulkes (1975) discovered that when left in a dimly lit room and allowed to mind-wander, subjects would often report bizarre imagery with hallucinatory content: the imagery was vivid and sometimes subjects forgot they were in a lab[45]. Foulkes found that in 15% of the 118 reports, subjects stated that they forgot that they were in a lab altogether whilst experiencing vivid hallucinatory imagery. Another 4% "represented discrepant patterns such as the subject believing in the reality of his percept, but also knowing that he is in the laboratory" (Ibid p 69). This contrasts with 38% of subjects who retained full reality contact and thought control with no hallucinatory experience, 20% who did not control their thoughts but retained awareness that they were in a lab and did not experience hallucinations, and 22% who did not experience hallucinations but lost awareness of being in a laboratory. Although hallucinating whilst mind-wandering is not the norm, these experiments suggest that it is relatively common in certain settings. Foulkes' work indicates that mind-wandering can involve vivid hallucination-like experience that is less subject to the will. This suggests there is not a clear distinction between mind-wandering and perceiving, under the assumption that hallucinating is a type of perceiving[46].

Another example in which the distinction between imagination and perception is unclear is the case of auditory verbal hallucinations (AVH). This is when a subject believes

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[45] See chapter 2.1 for further discussion on mind-wandering.
[46] This is the common view of hallucinating, which I will not discuss here. If the distinction between perception and imagination is merely that the experience is caused by an external stimulus, this is theoretically problematic (see Siegel 2005) and would arbitrarily discount dreams as perceptual experience.

someone is talking to them, but the stimulus is hallucinated. Research into AVH has been carried out using subjects with schizophrenia (Brasic, 1998) but AVH can occur also in non-sufferers. One of the most influential explanations is that AVH is caused by impairment to one's abilities to monitor internal speech, which is then misidentified as external sound (Frith & Done, 1989; Frith, 1992). Langdon and colleagues (2009) found that in individuals suffering from AVH, "the self-monitoring of inner speech is defective, but that inner speech per se need not be unusual" (p 662). At least in some cases, although inner speech is phenomenally similar to that of non-sufferers, the simple misattribution of the speech to an external source distinguishes between internal thought and hallucination. If this explanation is accurate, the distinction between imagination and hallucination can be as slight as one's *belief* about whether the stimulus is internally or externally generated. Since hallucinations are often described as perceptual, and internal thoughts as imaginative, this demonstrates that there is only a fine distinction between imagination and perception.

ii) Imaginative perceiving

Alternatively, perception may also shift along the scale towards imagination. Hobson (2000 p 835) hypothesises that waking perception can be divided into several sub-states, some of which can be induced with psychoactive drugs, sleep deprivation or hypnosis. Sufferers from sleep deprivation often experience the world as having a surreal quality, or being less vivid. This exemplifies perception that has certain characteristics in common with imagination. When psychoactive drugs induce hallucination, subjects can often distinguish between what is real and what is hallucinated. The hallucinations, although perceived as external, lack realism, which is an indication that hallucinations can fall along the spectrum between perception and imagination. It is even possible to consciously influence hallucinations. Even individuals in a normal, alert waking state can perceive an object without believing that it is real: a bizarre event occurs and the perceiver can't believe their eyes. They could mistake a perceived object as imagination.

Although perception and imagination are distinct, there are some unclear cases that share elements of both. In light of this evidence I argue that from a first person perspective, imagining and perceiving can at times be difficult to distinguish, and this suggests that there is a continuum between experience that is imaginative or perceptual. Perceiving tends to be more vivid, realistic, less subject to the will and experienced as externally generated. Whilst imagining is usually faint, unrealistic and perceived as internal, the above examples show that this does not always apply. Although perception and imagination may be ontologically distinct, there are a variety of in-between states, and some experiences can shift between the two, such as inner speech shifting to auditory verbal hallucination.

4.2.2 Reply to Sosa and Ichikawa's arguments

In this section I discuss Ichikawa and Sosa's arguments in turn and argue that they are insufficient to support a reductive view of dreaming experience which involves images alone and not percepts or beliefs. Instead, the phenomena discussed by Ichikawa can be interpreted as evidence in favour of a pluralistic account of dream experience; that dreams involve both perceptual and imaginative elements.

i) Latent beliefs [X-4.1.1]

Sosa and Ichikawa argue that it is implausible either that during dreams we simultaneously believe we are lying in bed and being chased by a lion or that we forget our waking beliefs. However, there are two convincing reasons to accept that dream beliefs are actual beliefs. Firstly, dreams are delusional, so dreamers can entertain implausible beliefs such as the belief that they are being chased by a lion. Secondly, dreams are amnesic, so it is plausible that I forget my waking beliefs during sleep. I will begin with a discussion of the delusional thoughts in dreams, and compare them with specific waking delusions.

Some dream beliefs can be classified as *delusional* beliefs as opposed to quasi-beliefs or make believe. Hobson (2000) argues that "dreams are delusional; we are consistently duped into believing that we are awake unless we cultivate lucidity" (p 799) while Solms describes the main characteristics of dreaming as 'hallucination, delusion, disorientation, negative affect, attenuated volition, and confabulatory paramnesia' (Solms 2000, p. 848). Liao and Gendler (2011) roughly characterise delusions as

> belief- like mental representations that manifest an unusual degree of disconnectedness from reality. Delusions are problematic to categorize because they seem to exhibit features of both belief and imagination. [...] [While a person with] Capgras delusion might act differently toward their friends and family as a result (the delusion thus can motivate like belief), she might not draw all the inferences on her overall worldview that her delusional thoughts demand (the delusion thus is circumscribed like imagination) (Liao & Gendler 2011, p 87).

While we dream we often entertain beliefs that are inconsistent with our waking beliefs just as a delusional patient entertains inconsistent or irrational beliefs.

Dreams often share attributes with specific waking delusions, as discussed by Schwartz and colleagues (2005). For example, a common bizarre feature of dreams is the appearance of an individual who looks like a stranger you have never seen before, but is identified as someone familiar, say a friend, or even as multiple individuals. This "delusional misidentification or hyperidentification for people [that occurs in dreams] corresponds to a well-known neurological condition, called Frégoli syndrome, whereby an unknown person's face is erroneously recognised as a familiar person, despite the lack of any obvious physical resemblance" (p 435). The following is taken from a dream report: "ah yes, exactly, I had a talk with your colleague, but she looked differently, much younger, like someone I went to school with, perhaps a 13-year-old girl" (p 434). Similarly, the opposite can occur, a familiar face, such as the face of the dreamer's mother could be identified as a stranger. This is similar to *Capgras delusion* in which a sufferer believes their friends and family are strangers or replaced by imposters.

Patients with Frégoli syndrome suffer from lesions in the right ventral temporal areas and prefrontal regions of the brain. This leads to impaired experience of inputs; a change in affective response towards their relatives, partners or close friends. Such injury might lead to a disconnection between face recognition and emotional response areas of the brain (Anderson, 1988). Schwartz and colleagues (2005) note that Frégoli-like symptoms in dreams "might relate to an activation of the FFA and temporal areas in the absence of selective reciprocal constraints between these regions and in the absence of monitoring from prefrontal areas (that are deactivated during human sleep as revealed by PET studies), accompanied by an activation of the amygdala providing a feeling of familiarity" (p 435). So in opposition with the imagination model, areas of deactivation in the prefrontal cortices can explain irrational beliefs that conflict with waking beliefs that distinguish between acquaintances and strangers.

Similarly, Capgras delusion may be caused by brain lesions caused by injury or drug use (Corlett, 2010). Although dreamers who undergo deactivation in the same areas of the dreaming brain may gain the delusional belief that someone who looks exactly like their mother isn't in fact their mother. The deactivation of the dorsolateral prefrontal cortex which is implicated in the ability to make rational inferences and evaluate our perception, and the lack of binding in dreams (see chapter 3.3.1) may contribute to this delusion-like experience.

Max Coltheart (2005) supports a two-factor approach to explain such waking delusions. According to this approach,

> there is a first neuropsychological impairment that presents the patient with new (and false) data, and the delusional belief formed is one which, if true, would explain these data. [...] There is a second neuropsychological impairment, of a belief evaluation system, which prevents the patient from rejecting the newly formed belief even though there is much evidence against it (p 154).

According to this theory, delusions are caused by firstly, experiencing false data, and secondly, the inability to evaluate the new data for plausibility and reject new false beliefs caused by the false data. For example, patients with Capgras delusion. have a neuropsychological impairment which causes a lack of affective response towards familiar people. This impaired cognition leads to an irrational explanation of the data. Capgras suffers may infer, for example, that their mother has been replaced by a robot or clone. As discussed in chapter 1, dreams play the part of the first factor, causing unusual experiences such as seeing your mother but having no affective response, and the lowered cognitive capacity during dreams plays the second factor.

Another common attribute of dreaming cognition is the misidentification of places. Places appear familiar but bear no similarity with the identified location, for example, if I identified a house as my own house despite having never seen it before. This attribute is in common with "delusional misidentification syndromes or "reduplicative paramnesia" for places" (Schwartz et al. 2005 p 435) in which sufferers misidentify locations when awake. Dream's can also involve the experience of being someone else. This is comparable to *reverse intermetamorphosis*, which is "the belief that there has been a physical and psychological change of oneself into another person" (Breen, et al. 2000, p. 75). Patients with this disorder believe they are someone else, and when confronted with a mirror may describe features entirely different to their own. For example, Breen and colleagues (2000) report of a female patient in her 40's who believed she was her 60 year-old father. When confronted with a mirror, she described herself as being a man with a beard. Some dream reports contain similar features, such as identifying with someone other than the dreamers waking self. This is an interesting aspect of dreaming that I discuss in chapter 7.

Dream delusions are often consistent with Coltheart's two- factor approach. For example if RZ dreams about being her father, when confronted with a mirror in a dream, the reflection might reveal that she *does* look like her father. So the dream account for the first factor. However, this may differ from what she sees in the mirror when she is awake. It is unclear whether she actually sees a person with a beard in the mirror, or if they is some other explanation for her belief. So Coltheart's first factor may apply better to the dream case than the reverse intermetamorphosis case. Waking delusions are highly "immune to rational revision" (Metzinger 2003, p 380); despite evidence that the delusional belief is false, the patient cannot be convinced to change their belief. For example, RZ has relatives who try to convince her that she is not her father. Reduced cognitive capacity often plays this role in dreams. However, as discussed in chapter 2.2, not all dreams are delusional. Some dreams are mundane, consistent with waking life, and the dream scenario provides convincing evidence that one is awake. All evidence may be consistent with the delusion.

The two-factor approach to delusions provides a plausible explanation for some dream experience. This is consistent with a pluralistic view of dreams, and inconsistent with Ichikawa and Sosa's imagination model. Imagination is not analogous to delusion as dreams are. The first factor involves the experience of false data: in dreams this is generated internally by the dreaming brain. This stimulus can be bizarre and unusual, such as the experience of someone who looks like a stranger, but who acts like their mother. When we imagine, we do not experience false data, because our imaginations are not presented as information about the external world. The second factor involves making irrational inferences which then cannot be evaluated for plausibility because of decreased evaluative skills. The imagining mind may display similar reduced cognitive capacities when an individual engages in relaxed mind-wandering (see chapter 2.1.4) however in most cases, as Ichikawa suggests, imagination does not involve irrational inference making. The two-factor approach[47] provides a plausible explanations for how we can hold dream beliefs that conflict with our waking beliefs.

In contrast with Ichikawa's view, it is plausible that dream beliefs can be delusional. Secondly, I also disagree with Sosa's argument that it is unlikely that we forget our latent beliefs during sleep. Evidence shows that dreamers suffer from memory deficits and other cognitive deficits during sleep (see 2.2). If this is the case, there is reason to believe that can we forget our latent beliefs in sleep. The dreamer may suffer from temporary amnesia. Ichikawa argues that this is implausible because it isn't the usual way memories are forgotten and replaced, although the dream state does not necessarily emulate 'usual' wake states. Dreaming can involve changes in cognition which gives reason to bite the bullet on this. I would go so far as to say that I can truly believe I am being chased by a lion in sleep despite the fact that this is bizarre and contradicts with

[47] Not all theorists accept the two-factor approach to delusions, since not all people with delusions suffer from a "global deficit in reasoning abilities" (Kunnert, Nora & Hoff, 2007, p 197). However the two factor approach remains an influential theory to explain many, if not all, delusions, and provides a plausible explanation for dream experience.

my (forgotten) waking belief that I am in bed. In chapter 2.2 I discussed how cognitive deficits can lead to the acceptance of such unusual scenarios, but it is important to note that we aren't always entertaining such unusual beliefs when dreaming. Mundane dreams about walking down the street are more common than dreams about being chased by lions. One can also have a false awakening in which I believe I have woken up in bed, which would not contradict any of my waking beliefs.

From this I conclude that amnesia and memory revision does occur in some dreams, and delusion-like beliefs also occur in dreams. Together, these arguments provide a plausible explanation as to why dream beliefs can contradict waking beliefs.

ii) The 'in the dream' operator [X-4.1.2]

Contrary to Sosa and Ichikawa's arguments, I argue that not all propositions which fall under the 'in the dream' operator are consequently false. Action statements, belief statements and thought statements require separate analyses. For example the proposition 'if I dreamed I was doing X, then I was not in fact doing X' does not support the conclusion 'if I dreamed I was thinking of X, then I was not in fact thinking of X'. I agree with Sosa and Ichikawa that 'in the dream I was flying unaided' does not imply 'I was flying unaided'. However cases of *believing* and *thinking* in dreams are not obviously analogous to cases of acting.

A clear case in which the 'in the dream' operator is consistent with X *really* occurring is if X is a thought. If 'in the dream, I thought about Descartes' *Meditations*', and I woke up and remembered thinking about the *Meditations*, it would appear that I am remembering thinking. It is counterintuitive to say that 'I was only *dreaming* about thinking, therefore I was not *really* thinking at all. We could compare this to 'in the virtual reality I thought about Descartes' *Meditations*', which I argue is analogous to 'in the dream I thought about Descartes' *Meditations*'. Does the 'in the virtual reality' operator imply that you don't really have a thought? My intuition is *no:* if I am thinking about Descartes' *Meditations*, then I am *really* thinking, regardless of whether I am in a virtual reality at the time. The 'in the dream' operator, like the 'in the virtual reality' operator doesn't imply that one does not *in fact* think. Rather, if one thinks X, whether in a dream, in a virtual reality or awake in the real world, one really does think X. To claim that any thinking that occurs whilst asleep is not *really* thinking seems implausible. Compare this to the case of *imagining* thinking about X. If I imagine thinking about pink elephants, then I am actually thinking about pink elephants as well. There are some cases when this is not necessarily true, for example if I imagine thinking of a sound proof against the existence of god; I can't think about this actual proof, I can only imagine thinking about it. The same could be applied to dreams, but nonetheless, it seems in many cases, when thinking about something in a dream, I really am thinking.

I could have a dream in which I remember thinking about the *Meditations* two weeks ago when I had not actually been thinking about Descartes at that time. However this is analogous to a waking false memory of thinking about Descartes two weeks ago. Another reason to reject this distinction between real thoughts and dream thoughts comes from one of Ichikawa's own arguments. If I can be daydreaming and seamlessly transition into a dream, it is plausible that I continue to think throughout. If in my day dream I was thinking about Descartes, and continued this line of thought into the dream, there would need to be some arbitrary transition from *real* thought to dream thought solely because I had fallen asleep. It is unclear why this should be the case. There is no reason to think that a thought that occurs during a dream episode is not a 'real' thought.

Beliefs are more complicated. One could say that dream beliefs refer to the dream world instead of the real world. Since the dream world is not a real world, perhaps dream beliefs are not real beliefs either. 'In my dream I believed that Descartes did not write the *Meditations*' may refer to a dream world in which Descartes did not write the *Meditations*. In contrast, I can have waking beliefs about the dream world, e.g. that in my dream last night, Descartes had not written the *Meditations* instead his mother wrote them. These are still beliefs even if they are about the content of a separate world. So whether or not dream beliefs are about the real world or the dream world, this should not be sufficient to say they are not "real" beliefs. If, during my dream, I believe

Descartes did not write the *Meditations* in the real world, when I wake up I would realise that my dream belief was false. This does not imply that I did not entertain the belief, rather just that it was a false belief. This contrasts with waking up from a dream about flying and realising I was not flying at all. The truth or falsity of a belief held during a dream may be context-dependent in regards to which world the belief refers, but whether or not I *hold* the belief is a separate issue. I argue that in dreams I can hold beliefs that can be either false or true however what makes a proposition a belief (not just a quasi-assertion) is whether it has certain functional relationships with other activities in mind. Being asleep is insufficient to entail that any propositions entertained cannot be beliefs.

In a lucid dream, I come to believe that I am dreaming. I argue that this is not only an *actual* belief, but also a *true* belief. Sosa argues, "if one *is* only dreaming, then one cannot be pondering any such question as whether one might be only dreaming" (Sosa 2005 p 18). If Sosa is right, it is hard to explain lucid dreamers who can signal that they are dreaming (see chapter 1), or pre-lucid dreams in which, during a dream, one considers whether one might be dreaming (Windt & Metzinger, 2006 p 46). Neither Sosa nor Ichikawa discuss lucid dreams in this connection. Ichikawa argues that lucid dreams support the imagination model in terms of *agency;* they demonstrate that dreams are potentially subject to voluntary control, but he does not discuss whether believing that one is dreaming is an *actual* belief or not. Perhaps since the thought 'I am dreaming' falls under the 'in the dream' operator, I do not *really* believe that I am dreaming. However if my decisions to control the dream also fall under the 'in the dream' operator, it is unclear whether this is *real* agency, or only quasi-agency. It seems that Ichikawa is trying to have it both ways by denying actual beliefs but accepting actual choices. Either actual beliefs occur, which supports my previous argument, or actual decisions do not occur, which is evidence against the argument that dreams are subject to the will.

There are three main reasons to accept that the belief 'I am dreaming' during a dream is an *actual* belief. Firstly, as I discussed in chapter 1, the realisation that I am dreaming during a dream is often an inference I made based on performing a variety of reality tests. This may include trying to levitate, watching the words on a page morph, noticing a bizarre event and so on. This is a true, justified belief that is attained through rational thinking, similar to the way some beliefs are adopted during waking. The burden of proof lies with those who wish to deny that such a belief is an actual belief. Secondly, in a lucid dream, a thought can carry over from the dream to waking. For example, after realising that I am dreaming, I might wake up and think 'I was dreaming'. There is little reason to think that the first belief is a quasi-belief, and the second an actual belief. Sosa and Ichikawa might argue that a lucid dream quasi-belief becomes an actual belief upon waking. However, this is implausible, especially considering, as Ichikawa notes "from an internal point of view, for the dreamer *quasi*-affirmation is importantly like affirmation and indistinguishable from it". (Ichikawa, 2008 p 523). The only thing that distinguishes quasi-belief from belief is that quasi-beliefs occur whilst dreaming. Thirdly, lucid dreamers who can signal that they are dreaming using pre-learned eye movements seem to be affirming to the outside observer that they realise they are dreaming. The belief is not only true and justified, but also causally efficacious in that it can cause them to knowingly signal to external observers. For these three reasons, it is hard to deny that actual beliefs occur during sleep.

Finally, if dreams are a type of imagining, both dreaming and imagining should involve quasi-beliefs and not actual beliefs. When I imagine fighting a dragon, I believe I am imagining fighting a dragon, but not that I am fighting a dragon. However, it is not clear that I quasi-believe I am fighting a dragon. This may accurately describe some imagining in which I lose touch with reality[48], but a more simple explanation is that losing touch with reality causes me to have false beliefs as opposed to quasi-beliefs. From these arguments, I conclude that dream beliefs are not quasi-beliefs.

iii) Arguments against Ichikawa's six phenomena [X-4.1.3]

We are not morally culpable for actions performed in dreams. [X-i]

Ichikawa's argument that we are not morally culpable for dream behaviour is contentious. He argues that since dreams and imagination are not subject to moral

[48] See chapter 2 discussion of Foulkes.

judgment, whereas other thoughts and actions are, dreams are more like imagining than perception. However, I argue that this is an unconvincing argument considering we can be morally culpable for actions that we dream *and* that we imagine. Matthews (1981) argues that our moral responsibility is judged primarily on whether we have agency or control over a thought or action. My thought can be immoral if I have agency over it and derive pleasure from it. If I intentionally imagine something evil; if I gleefully imagine torturing my boss, gaining enjoyment from such a thought is a moral wrong. Matthews uses an example from Jesus' sermon on the Mount "whosoever looks at a woman to lust after her, has already committed adultery with her in his heart" (Ibid p 50). If this is the case, dreaming, imagining and acting are all subject to ethical assessment. If I was to intentionally torture someone in a dream and I gained pleasure from the dream, then my dream-actions would be considered immoral. As argued in previous chapters, many dream actions are not subject to voluntary control, but this is not necessarily the case for all dream actions. Ichikawa contends that dreams are subject to the will, in that they are also subject to moral assessment. If we can be morally culpable for waking action, dreaming *and* imagining, then there is no convincing argument supporting the imagination view.

Dream content is causally inefficacious. [X-ii]

Contrary to Ichikawa's argument that dreaming, like imagining, is causally inefficacious, I argue that dream content *can* have causal power. Ichikawa's first reason for denying the causal efficacy of dream content is that sounds within the dream do not wake us up, and hence they are not causally effective, whereas an external noise will often wake us from the dream. I argue that causal inefficacy is not the best explanation for this. Although dream sounds *usually* do not wake us up, this is not always the case. We can be woken up by scary or surprising sounds in nightmares, and also by surprising imagery or intense emotions. In contrast, external sounds are only likely to wake us up in certain stages of sleep (see chapter 1.1). Arousal thresholds alter depending on the stage of sleep and the age of the subject. For example, sounds are more likely to wake us up as we age, and our arousal threshold to sound is higher in stage 4 NREM sleep than in REM sleep (Busby, Mercier & Pivik, 1994). This indicates that dream and external sounds can be more or less causally efficacious.

The fact that dream sounds are experienced *within* the dream and are part of the dream narrative may explain why they don't often wake us up. A loud noise in the dream would cause us to turn towards the sound, or react in some way within the dream. Dream sounds are causally efficacious *within* the dream. External sounds are, on the other hand, causally effective in the external world. They cause us to wake up because they emanate from the external environment. Although these sounds can sometimes be incorporated into the dream narrative without waking us up, a sound that cannot be incorporated into the narrative may cause a jarring effect. This could explain why dream content can *sometimes* wake us up when it shocks or startles us, but not often, since the sounds are usually consistent with the narrative. My suggestion is that external sounds are more difficult to incorporate into the dream narrative than internal sounds. This doesn't mean that they are more causally efficacious.

Ichikawa's second argument, that dreams do not motivate behaviour, also faces difficulties. Firstly, they *can* motivate action *within* the dream. Sosa and Ichikawa disregard the possibility of action within a dream because any act under the 'in the dream' operator does not count as an *actual* act, so I will leave this disagreement aside. It is true that we do not usually continue to act out our dreams after waking since upon waking, we realize we were dreaming. In most cases it would make no sense to continue behaving as if you are in the dream after waking. However, strongly emotional dreams can have lasting effects after waking, such as continuing to feel fear after waking from a nightmare. Also, there can be a short period of time after waking before one *realizes* they were dreaming. Dreams can also cause our waking bodies to sweat and move around in response to a perceived threat, which is a case of dreams causing behaviour in the waking world outside of the "in the dream" operator. A more extreme example of sleep behaviour is REM sleep behaviour disorder (RBD) in which sufferers act out their dreams (see chapter 2). In these situations dream beliefs can have similar causal power in the real world to waking beliefs. There have been cases in which a person with RBD carries out murder whilst asleep (for examples, see Mahowald, et al. 2005). Imagination and make-believe *can* have an affective response; we cry or laugh when reading a fictional tale, although Walton (1990) refers to such emotions as quasi-emotions. The case of RBD demonstrates a stronger case of causal efficacy.

Another line of argument that might support Ichikawa's view is that dream intentions are inefficacious because it is the *dream self* who intends; the dream self is sufficiently different from the waking self, and the dream scenario may be sufficiently different from real life that the waking self never forms an intention at all. We could even consider the dreaming self to be a different person with different intentions than the waking self. Although I support this view in chapter 6, I argue that this is not the case for all dreams: not all dreams involve what I refer to as 'vicarious protagonists'; i.e. dream characters that are not psychologically linked to the waking person.

Intentions and beliefs formed in dreams *can* be carried through to waking life. For example, some artists claim to be influenced by their dreams: Salvador Dali was inspired by his dreams to paint, Mary Shelley's 'Frankenstein' were inspired by dreams while Otto Loewi's medical discovery that led to a Nobel prize was attributed to an idea he had in a dream. Dream intentions can be causally efficacious in the waking world. As a side issue, it is not clear why Ichikawa thinks that imagination itself is causally inefficacious. Imagination may play an important role in forming intentions: my imagination may inspire me to achieve my goals, and I may mentally rehearse my actions to help improve my performance (Carruthers 2006). Moreover, imagination certainly plays an important role when I try to predict future events, and these predictions cause me to alter my behaviour. From this I conclude that Ichikawa's argument is not persuasive.

We used to think that dreams were in black and white. [X-iii]

Ichikawa's argument for the indeterminacy of dream colour does not give strong support for the imagination model. If dreaming and imagining are indeterminate in colour, both dreaming *and* imagining should have been reported in black and white in the 40's and 50's. If we dream and imagine in an indeterminate colour, and watching TV only affects how we report dreams, not imagination, we require some explanation of why this occurs. Was imagining ever reported as being black and white? This is unclear. It is also possible that *perceiving* can be of an indeterminate colour. Noë, Pessoa and

Thompson (2000) note that, despite our beliefs about colour perception, we only perceive colour across a small area of our visual focus. The illusion of colour in the peripheries of our vision is created by our previous experiences and inferences about how it should look, not by colour stimulus. However perhaps we experience indeterminate peripheral colour: it feels like we see colour, in the same way we think we experience dreams in colour. If this is the case, it is another commonality between perceiving, dreaming and imagining. This does not provide evidence for the imagination model.

Dreaming ability develops alongside imaginative ability. [X-iv]

The development of dreaming along with the ability to imagine spatially is not a strong argument for the imagination model of dreaming, since the ability to conjure a multi-modal space without input from the external environment requires complex cognitive abilities. Foulkes, who argues that dream experience is "imaginal", notes that "you have to be able, in your mind's eye, to simulate, at first momentarily and later in more extended episodes, a conscious reality that is not supported by current sense data and that you've never even experienced before" (1999 p. 117). The simulation of a novel "reality" requires complex cognitive processes which may develop along with our ability to perceive and comprehend the external environment as well as with our ability to remember or imagine an external environment. Blindness occurring before the age of 5 to 7 causes an absence of visual dreams as well as the inability to visualise imagery, whereas blindness after this stage does not prevent visualisation or visual dreaming. There is clearly a link between the processes of dreaming, perceiving and imagining. However if all capacities develop together, then this provides no support either for imaginative or perceptual theories. There have been studies demonstrating that when an expert tool user imagines using their tools, similar neural mechanisms fire as when that tool is being used (Théoret and Pascual-Leone 2002). Therefore we cannot rely on evidence of neural mechanisms to define whether phenomenal content is *imaginative* or *perceptual* since we do not know the distinct neural correlates of perceiving or imagining. This evidence is neutral on the issue of whether dreaming is imaginative or perceptual, rather it only shows that mechanisms for perceiving, imagining and dreaming develop together.

Daydreaming can seamlessly shift into dreaming. [X-v]

Ichikawa's theory that imagining can shift seamlessly into dreaming is anecdotal. Firstly, the most immersive types of dream typically occur in REM sleep (see chapter 1), which is preceded by other sleep stages, so it is unlikely that daydreaming can seamlessly shift into a full-blown immersive REM dream. Hypnagogic hallucinations and sleep thoughts usually occur during sleep onset. It is more likely that a daydream would develop into a sleep-onset type dream than an REM dream (Hobson, 2002). Secondly, as I have previously discussed in chapter 3, daydreams can contain hallucinatory elements, so a hallucinatory daydream could equally develop seamlessly and gradually into a perceptual dream. There may be a seamless shift from imagery to perception. I later argue that this supports a pluralistic view in which dreams can contain perceptual and imaginative elements- a dream can shift between imaginative and perceptual in the same way imagination can become hallucinatory in the case of auditory verbal hallucinations discussed previously. The above discussion suggests that dreams can involve imaginative and perceptual elements; sleep onset dreams may be more imaginative, whereas REM dreams are more perceptual.

Dreaming, like imagining, is subject to the will. [X-vi]

According to Ichikawa, dreams and imagination are subject to the will, whereas perception is not. The distinction between being 'subject to the will' and being 'voluntary' is a difficult matter. Smallwood and Schooler (2006) argue that "mind wandering is a situation in which executive control shifts away from a primary task to the processing of personal goals" (p 946). So executive control is not involved in such cases of mind-wandering, rather automatic, goal-driven processes lead the mind away from the task at hand towards more general life goals. Since these processes are automatic and unconscious, such mind-wandering is not voluntary, but it might be 'subject to the will'. I would argue that some cases of imagining, for example, those in which people suffer from *thought intrusion* which can be caused by post-traumatic stress, are neither voluntary nor subject to the will. Like having a song stuck in your head, sufferers of thought intrusion can experience a sense of lacking agency over their thoughts, but in extreme cases, individuals known as "voice hearers" (David, 2010) form the delusional belief that their thoughts come from an external source. Ichikawa defines an experience as be subject to the will if it makes sense to attempt to exert one's will over it. However for 'voice hearers' it may not make sense to attempt to control the voices. Many of our unconscious mechanisms are not subject to the will. In contrast, some percepts *can* be controlled; you can choose to see the duck/rabbit illusion as either a duck or a rabbit. Similarly dreams may be more or less voluntary; there is reason to think that some dreams are not subject to the will. If we lack a sense of agency over such dreams, it might not make any sense to try to control them. Lucid dreams are a type of dream where one usually does have voluntary control, but these are a rare type of dream, as discussed in chapter 1. Assuming that non-lucid dreams are subject to the will because unconscious processes internally generate them seems question begging. As I have argued, not all cognitive processes are subject to the will. Unconscious cognitive processes are often involuntary.

I have attempted to show that a reductive imaginative model of dreams is not well founded. Now I argue that a pluralistic account according to which dreams contain both imaginative and perceptual elements is a more plausible theory of dream experience.

4.3 The pluralistic account: both perceptual and imaginative

A non-reductive, pluralistic conception of dream content captures a greater variety of dream phenomena than a reductive imagination model. Dreaming can be imaginative or perceptual, yet often contains elements of both. I begin with a description of dream phenomena which clearly exemplify perceptual qualities. Then I describe a variety of dream phenomena that are imaginative.

4.3.1 Dreams which are perception-like or hallucinatory

Hypnagogic hallucinations are the sensations we have upon falling asleep. These usually consist of vestibular sensations: the sensation of the body moving in space. For example, many hypnagogic hallucinations involve the feeling of falling or rocking. Such sensations are not associated with a dream narrative, but can be sufficiently intense to wake the dreamer up. Hobson, (2002) describes a report in which "as soon as I fell asleep I could feel myself moving just the way the sea moved our boat when I was out fishing today" (p 7). The sensation of falling has caused me to wake up many times. Vestibular sensations are also a commonly reported element of REM sleep dreams. If these sensations feel so real that they can cause a dreamer to wake up with a start, it is plausible that they are similar to perception and involve aspects of hallucination. This also demonstrates the causal power of dreams. As previously mentioned, Ichikawa argues that dreams are without causal efficacy, although this is certainly not the case for realistic REM dreams and hypnagogic hallucinations.

Equally compelling are *false awakenings* in which, during a dream, you believe you have woken up. Metzinger notes (2007) that false awakenings can be "a near perfect facsimile of the dreamer's actual sleeping environment" (Metzinger 2007 p 61). A dreamer may realise that they were dreaming *before* the current episode, but not realise that they are *still* dreaming. Metzinger refers to this as "postlucidity" (Ibid p 63). Although mind-wandering can be quite realistic, it is unlikely to have the same level of causal power. Unlike imagining, when you really *do* wake up from a false awakening, it can be hard to discern if it was a dream. I recall a false awakening in which I was 'woken' by a text message from a friend. I could not tell the difference between the dream room and my real room. It was so convincing that when I actually woke up, I checked my phone for the message. An empty message box confirmed that the event was a false awakening. This exemplifies both the causal power of dreams, and the possibility that a dream belief can carry over into waking life which contradicts Ichikawa's argument that dreams do not contain beliefs, and that they have no causal efficacy in the waking world.

Since, according to the imagination model, all dreamed events fall under the 'in the dream' operator, this would also apply to false awakenings. According to Ichikawa I would only have a quasi-belief that I had woken up. However, as I have argued, I can wake up (for real) and continue to believe that a false awakening was a real awakening. This means I now have the *actual* belief (at least temporarily) that the dream was real. Imagination model theorists must explain how a quasi-belief can become an actual (but false) belief upon waking. The best explanation is that I *continue* to have a false belief, not that my quasi-belief morphs into a false-belief.

Hypnagogic hallucinations and false awakenings are not the only examples of hallucinatory dreaming, in fact most dreams involve perceptual elements. The most common type of dream that is reported occurs in REM sleep. These dreams also usually involve perception-like experiences, such as vestibular and proprioceptive sensations as well as visual and auditory hallucinations. As with auditory verbal hallucinations, speech from dream characters is often experienced as being externally generated. Lucid dreams provide further evidence for perception in dreams. Lucid dreamers often report that, upon gaining lucidity, they were surprised by the vividness and realistic nature of the dream. Lucid dream aficionados often perform experiments in their lucid dreams to see what will happen in certain conditions. Jouvet (1999) discusses a lucid dream report taken by van Eeden (1913) at the turn of the century:

> I dreamed that I was standing in front of a table near a window. Various objects were lying on the table. I was fully aware that I was dreaming, and I thought about the experiments I could perform. [...] I took a fine crystal glass from the table and gripped it in my fist as hard as I could, thinking all the time how dangerous it would be to do that while awake. The glass did not break, but when I looked at it later, it was broken! It had broken as it should have, but a little late, like an actor missing his cue! This gave me the very curious impression of being in a fake world, very well faked, but with small mistakes... (In Jouvet, 1999 p 77)

The description of the sensation of being *in* a fake world is more indicative of a *virtual reality* i.e. a perceptual experience of being in a world as opposed to *imagination*, a distinction I discuss in chapter 5. Dreams are multimodal, immersive experiences involving both imaginative and perceptual elements similar to being in a virtual reality.

I have outlined the most compelling examples of dream elements that are perception-like. However, certain elements of dreaming are accurately described as imagination-like. Now I discuss dream phenomena which are better described as imaginative, and argue that a pluralistic view of dream experience that describes both imaginative and perceptual features of dreaming is the most plausible model.

4.3.2 Dream imagination

Some dreams are not particularly vivid, and consist primarily of thoughts and simple images. Hobson (2002) gives an example of a *sleep percept*: one in which the sleeping mind wanders, often reflecting on waking concerns. For example,

> I kept thinking about my upcoming exam and about the subject matter that it will contain (Hobson 2002 p 7).

This example is similar to imagination or mind-wandering (Foulkes.1975). According to Hobson, these experiences do not fit the criteria of dream phenomena. However according to my pluralist model, phenomena that do not fit a standard model should not be disregarded. Rather, sleep thoughts and sleep mind-wandering are part of the wide variety of dream phenomena, despite being without perceptual content. Jouvet (1999) also gives examples of imagination-like dreams that were reported after slow wave sleep awakenings. They display thought-like mentation and simple imagery. "I had been dreaming about getting ready to take some kind of an exam. It had been a very short dream. That's just about all that it contained. I don't think I was worried about it" (Jouvet 1999 p 66). This type of dream according to Jouvet "is closer to *thinking* than *dreaming,* less vivid, less visual, more conceptual, subject to greater voluntary control, more related to everyday life, and it occurs during lighter sleep. The content is less emotional, even pleasant" (ibid p 66). Hobson explains that this type of dream can be explained "simply in terms of brain activation that reflects, in sleep, the dreamer's [...] concerns about the future (anxiety about the exam). The residual brain activation of sleep onset and early night sleep is enough to reproduce faithfully a very small part of waking experience" (Hobson 2002 p 10). I define these as purely imaginative dreams.

Another example of dream imagination is imagination that occurs within or as part of a perceptual dream. During a dream, one can imagine an event that is *not occurring* in the dream. Dream imagining is common especially in lucid dream reports where the lucid dreamer experiments with their surroundings by imagining an event in the hope of causing the imagined event to occur. For example:

> While swimming with dolphins, I visualize scooping water with my hands. I think the streaks of bubbles might entertain them. The imagined movement

> becomes very vivid as my visual field is suddenly filled with bands of shimmering water... (Keelin 2007 p 50).

This is an example of an imagined movement which becomes vividly experienced like a hallucination. In this example, the imagined event *becomes* perceptual, and I suspect this is true for many dream elements. There is a constant shift between perception and imagination. The imaginative mind consciously or unconsciously leads to the perception of what has been imagined. The same could be true for drug induced hallucinations, where imagination can affect the perceived hallucination.

LaBerge and Rheingold (1990) report a case of sleep onset in which the dreamer attempts to maintain control over their sleep experience. As sleep onset begins, the dreamer pays close attention to the sensations experienced, and imagines events in the hope of causing them to happen.

> As I relaxed more deeply, I felt my entire body become paralyzed although I could still seem to feel its position in bed. I reasoned that this feeling was most likely a memory image and that actual sensory input was cut off just as much as motor output. I was, in short, asleep. At this point, I imagined raising my arm and experienced this imagined movement as if I had separated an equally real arm from the physical one I knew to be paralyzed. Then with a similar imagined movement I, as it were, "rolled out of my physical body entirely." I was now, according to my understanding, wholly in a dream body in a dream of my bedroom (p 87).

These examples demonstrate that the dreaming individual is capable of imagining events that are not part of the dream world, although the imagined event can subsequently occur. Although it may be the case that a level of lucidity is required for the dreamer to use their imagination to consciously guide the dream narrative, imagining could still occur during a non-lucid dream. This also demonstrates the shift between imagination-like experience and perception-like experiences in a dream. The experience can be more or less vivid and hallucinatory depending on the dream.

McGinn rejects the possibility that one can imagine whilst dreaming. He argues that the dream completely holds our attention so the mind can't wander or imagine events external to the dream.

> The dream holds the mind in a vice-like grip, with no possibility of the mind wandering. While you are dreaming about swimming in mud, say, you cannot find yourself contemplating other things, such as what to do about the sagging gutter in your roof. But, of course, in real life you can easily be swimming in mud (well, water) and be thinking about your gutter problem: your mind can wander from what you are currently perceiving and you can still be perceiving it. (McGinn 2005, p 138-139).

Dreaming, according to McGinn, is like watching an engaging film: our attention is rapt and unable to stray to other topics of interest. Therefore mind-wandering cannot be an element of dream experience.

It is unclear what McGinn would make of the previous lucid dream reports. If the dream world *necessarily* captures our attention in such a way, it should not be possible to perform experiments in dreams, gain lucidity or imagine events. Although I argued in chapter 1 that lucid dreams should not be seen as representative of all dreams, it is quite possible that such imagining can occur in non-lucid dreams as well. McGinn argues that when we dream, we *pretend* to believe the dream content and become engaged in the experience as we do when watching movies or reading fictional stories, by suspending our disbelief (McGinn, 2004, 2005b, see chapter 2). I would argue that lucid dreams could be described as pretence, since after gaining lucidity, we realise that the dream world isn't real, but still go about navigating through and interacting with it. Yet this doesn't seem to accurately describe all dreams. As I have previously argued, false awakenings, REM sleep behaviour disorder and hypnagogic hallucinations provide good evidence that not all dreams are pretence. From this it seems highly unlikely that all dreams are accurately described by McGinn's theory. Dreams can at times be engaging, and at times be like pretence, but these are not necessary attributes of all dreaming. McGinn's view, like the imagination model, is overly reductive, and my pluralistic account more accurately describes the wide variety of dream experience.

Conclusion

I have argued that the imagination model of dreams presented by Ichikawa and Sosa, that to dream is to imagine and not to have perceptual hallucinations is overly reductive and should be rejected. There is strong evidence of perception-like elements in dreams, especially false awakenings and hypnagogic hallucinations. REM sleep behaviour disorder and lucid dreaming provide further evidence against such a reductive view. However not all dream experience is perception-like. Dreams contain both imagination-like and perception-like elements. Firstly, I argued that although ontologically distinct, perception and imagination exist on a spectrum, and there are many in-between cases. Evidence for this is that mind-wandering, a form of imagining, can contain vivid hallucinatory content which is similar in respects to perception, whilst perception can contain unrealistic and non-vivid content. Secondly, dream elements can fall anywhere on the spectrum between imagination-like and perception-like, and a single dream can contain a variety of perceptual and imaginative elements. Examples of imaginative elements in dreaming are slow wave sleep dreams which involve thought-like and less vivid mentation, and imagination that occurs *during* a perceptual dream. Elements that are clearly perception-like are vestibular sensations that have the causal efficacy to wake the dreamer up. The variety of experience that can occur during sleep supports the view that dreaming is a multifaceted phenomenon, and a pluralistic account is required to describe these perceptual and imaginative elements.

5

Perceptual Views of Dreams

In this chapter I analyse views according to which dreams are perceptual as opposed to imaginative. The category of perception, in broad sense I use in this chapter, includes not only to the perception of physical objects, but also abnormal types of perception such as hallucinations and virtual realities. According to perceptual theorists, when I dream that I am walking down a street, I perceive that I am walking down the street. Revonsuo and Metzinger refer to this perception as perception of a "virtual world", whereas Hobson and Windt describe dream perception as similar to a waking hallucination. Dream perception, according to this theory, is not a form of imagination[49]. In this chapter I discuss views which describe dreams as analogous to other perceptual phenomena, and argue that some dreams are very convincing simulations of waking experience while others are similar to waking hallucinations. However, I argue that perception is not a necessary aspect of dreaming. In 5.1 I argue that dream experience can involve a dream body that is a convincing replica of the waking body, with both body schema and body image. Although body schema is not itself perceptual, it contributes to our waking perceptual experience in important ways that I will highlight. This provides strong evidence that some dreams are perceptual. However, a reductive perceptual model, according to which dreams are *necessarily* perceptual, is implausible. I review several models that attempt to describe dream experience as altered perceptual consciousness, arguing that these views are overly reductive. In section 5.2 I compare dreams with waking hallucinations, waking perceptual experiences that are internally

[49] As stated by the imagination model, see chapter 4.

generated. I argue that hallucination is a good description of many dream elements, but it is not plausible to define all dream phenomena as hallucinatory. Hallucination models are convincing descriptions of many, but not all dream experiences. In section 5.3 I discuss virtual reality models of dreams. According to the virtual reality models of Revonsuo and Metzinger, dreams involve the perception of virtual worlds generated by the dreaming mind. I argue that the virtual reality model plausibly describes a wide variety dream phenomena, but it still discounts certain important dream phenomena. I argue that imagination-like dreams and hypnagogic hallucinations should be included in a theory of dreams.

I begin by arguing that some dreams provide a convincing simulation of the waking experience of the body. Dreams can involve both body image and body schema, which both contribute to the realistic nature of the simulation. However, there are certain types of dreams that are unlike waking experience, where the dream body is an entirely different body.

5.1 Immersive dreams: the dream body image and schema

According to my pluralistic view, realistic dream worlds can replicate waking experience to the extent that a dream self can navigate the dream world in a body that has both body image and body schema. Immersive dreams involve coordination of a dream body that can feel like a real, waking body. I argue that the dream body can be conceived as a *phantom body* akin to a phantom limb, which occurs when a limb is perceived where no physical limb is present. The incorporation of the phantom limb into the body schema, although is itself not perceptual, contributes to the realistic experience of the limb. In this section I also discuss the variety of body representations that can occur in dreams that are unlike waking experience.

5.1.1 Dream bodies and disembodied dreaming

Firstly, consider this early example of bodily awareness in dreams reported by Frederik van Eeden, which displays the extent to which the dreamed body can feel like the waking body. Van Eeden, who coined the term "lucid dreaming" and kept a long and detailed dream journal, notes an interesting example of the shift between the dream body and the waking body during a lucid dream.

> I dreamt that I was lying in the garden before the windows of my study, and saw the eyes of my dog through the glass pane. I was lying on my chest and observing the dog very keenly. At the same time, however, I knew with perfect certainty that I was dreaming and lying on my back in my bed. And then I resolved to wake up slowly and carefully and observe how my sensation of lying on my chest would change into the sensation of lying on my back. And so I did, slowly and deliberately, and the transition--which I have since undergone many times--is most wonderful. It is like the feeling of slipping from one body into another, and there is distinctly a double recollection of the two bodies (Van Eeden, 1913, p 443).

Van Eeden concludes from this that the experience of the dream body accurately replicates the experience of a waking body. Even in a lucid dream, the dream body can still *feel like* a real body, and van Eeden describes shifting from dreaming to waking as slipping from *one body to another* which is analogous to full-scale reduplicative out of body experiences (OBEs) (Brugger et al 2006). Out of body experiences involve the waking perception of inhabiting a body that is detached from the physical body. The dream body is so convincing to van Eeden that it feels similar to the real body even in direct comparison. When van Eeden introspects about the feeling of lying on his chest while remembering that he is asleep and lying on his front, he has an odd experience of double memory, or double sense of self. From this first person perspective, the dreaming self does have a body. However, this is not the case in all dreams.

Occhionero and colleagues (2005, 2011) note that there are many ways the dream body can be represented: not all dream selves inhabit a body similar to their waking body. There are reported cases in which the dreamer did not have a human body, or a body at all. For example, "I was inside a gigantic photocopying machine; I knew I was inside, as an abstract entity, as a mind, I was the machine, so I couldn't see myself" (Occhionero, 2005 p 80). Occhionero notes that in dreams we can be a "presence of Self as a pure thinking agent" (2011, p 1012). In other cases a dreamer can be represented in two bodies, or can shift between different bodies. These are good reasons to consider the dream body as not always an accurate representation of the waking body. These cases of alternative body representation are relatively uncommon, although they provide reason to adopt a pluralistic view of how the body can be represented in dreams.

The phenomenology of these cases is also an interesting area of enquiry, although for my purposes in this chapter, I argue that the dream body can replicate the experience of the waking body. The dream body, like the waking body, is represented by image and schema.

5.1.2 The dream body image and schema

The perception of the body in dreams provides strong support for a perceptual view of some dream content. In this section I argue that the experience of the dream body has features that are more akin to the perception of the waking body than an imagined body. Dreams may involve both *body image* and *body schema*, which suggest that the dream body can be a convincing simulation of the waking body. However, this may not be the case for all dream experience. At times we may have body image alone, and thus a pluralistic view of the experience of the dream body is most appropriate.

Perception and knowledge of the body during wakefulness involves interaction between the limbs, the central nervous system and the brain, as well as bodily interaction with external, physical space. In a dream, the physical body does not interact with the brain since the input blockade prevents stimuli from the body reaching the brain. However, in dreams we have a body that can interact with the dream environment. Clark (2004) argues that only in a futuristic virtual reality system could the felt body be like "a real body, realized in the non-standard medium of bits of information" (Clark, 2004 p 179).

However, I argue that the dream body does feel real. By this I mean that like the waking body, the dream body involves both image and schema. Body image and schema are necessary for normal waking experience.

i) Body schema and body image

According to Preester and Knockeart (2005) the body schema is distinguished from the body image in that the schema is an unconscious coordination of multiple sensorimotor action spaces "anchored on a geotropically oriented postural frame" (p 98) while the body image is a consciously experienced map of the body's state. Gallagher and Meltzoff argue that without this distinction, theorists mischaracterise bodily functions. Body image is our representation of body perception, which involves conscious awareness of how our bodies look, occupy space, move and function. Body schema involves the integration of processes that allow for the maintenance of posture and movement and is generally thought to be unconscious, but without which our conscious experience would be very different. Gallagher and Meltzoff (1996) explain that

> we can characterize the body image as involving perceptions, mental representations, beliefs, and attitudes where the intentional object of such perceptions, beliefs, etc. (that which they are directed towards or that which they are about) is one's own body. The body schema, in contrast, involves certain motor capacities, abilities, and habits that enable movement and the maintenance of posture. It continues to operate, and in many cases operates best, when the intentional object of perception is something other than one's own body. So the difference between body image and body schema is like the difference between a perception (or analysis or monitoring) of movement and the actual accomplishment of movement (p 217).

Without both a body schema and a body image, our sense of embodiment would be much different; imagine having no conscious awareness of the body in space, or conversely, not being able to maintain posture and movement unconsciously. For example, Cole and Montero (2007) report the case of Ian Waterman, who suffered from a loss of his sense of touch and bodily position. He managed to relearn to move by visual supervision, but this required constant conscious control over his bodily movements.

Cole and Montero argue that it was not only the ability to unconsciously maintain bodily movements and posture that Waterman lost, but also the joy of carefree movement. So although body schema is not itself a perceptual experience of the body, it is necessary for the type of perception we have when we are awake and contributes to our enjoyment of movement. Waking experiences without body schema, like Ian Waterman's, would be much different. I argue that both body schema and body image furnish the experience of our dream body, and this demonstrates how the dream body can be a convincing replica of the waking body.

The solution to the issue of whether the dream body involves schema or image may be an empirical matter depending on the way the brain is activated during sleep. If we could isolate the neural activation of body schema as distinct from body image, we could test whether similar activation occurs during sleep. However, such neural correlations have not yet been made, and I have argued previously that we should not assume neural activity is the best indication of phenomenal experience. I argue that such correlations are not necessary to establish body schema and image in dreams. I instead offer evidence of dream body schema and image in the absence of a physical body: the phantom limb case. I then argue that the dream body is in many ways analogous to phantom limb phenomena, and that there is good evidence for body image and schema in some dreams.

If the physical body is required for the body schema or image, then there could be no body schema or image in dreams since the input blockade prevents the physical body from being involved. As I argue in the following section, a straightforward case can be made for the dream-body image. Body image occurs even for an imagined body, although body schema in a dream is less obvious. Without a physical body, postural monitoring is not required. Whilst awake, the body schema usually involves a causal relationship between stimuli to the limbs, the conveying of information along the central nervous system. Then, processing in the brain involves the somatosensory cortex, which is the primary area involved with sensory data, the motor cortex, and other neural processes. Proprioception and the maintenance of posture involve feedback between the limbs and brain. Some might argue that the body partially *constitutes the* body schema so is a necessary condition for body schema. A common sense view might be to say that the dream body is represented by image but not schema, since one can have an image of a body without a real body present by imagining a body. I argue instead that the dream body can be represented with both image and schema.

ii) Evidence for the dream body-image

Since the body image involves mental representations, beliefs and attitudes about the body and we can conceive of a dreaming person having such attitudes and beliefs about their dream body, it is plausible to say that the dreaming person experiences a dream-body image. We may dream of being on a beach, have a mental representation of the body reclining on a towel, have certain attitudes about the way the body looks in beachwear, feel the sand between the toes and so on. The body represented need not be the waking body, yet the dream body often reflects the waking body. Our waking body image may not accurately represent the waking body, as we can see with cases of body dysmorphia, the distortion of body image, and the belief that one's limb does not belong to them, often causing the desire to amputate (First, 2005). Another example of inaccurate body representation is phantom limb syndrome, as I will discuss in section iii below. Therefore, body image need not map perfectly onto a physical body. In comparison, we can also *imagine* being on a beach, and knowledge of this imagined body is represented as a body image. The dream-body image is even consistent with an imagination model of dreaming (see chapter 4).

When we imagine, there is no unconscious monitoring of the imagined body's posture and movement so there is no body schema experienced for the imagined body. It is not necessary to monitor an imagined body in such a way, as we don't experience the imagined body interacting with an environment in the same way we experience the waking body. However I argue that there is evidence to suggest that the dream body does at times involve such monitoring.

iii) Evidence for the dream body schema

In this section I argue that the body schema can exist in the absence of physical limbs. This is supported by evidence from phantom limb research.

Damage to either the limbs, CNS or brain can lead to problems with the formation of the body schema. For example brain injury in the form of lesions or inheritable conditions including dysfunctions in the dopiminergic system that lead to Parkinson's disease (Wilkerson, 2003) can affect the body schema by disrupting the body's ability to maintain posture and cause the body to shake uncontrollably. The loss of a limb can affect the body schema in unusual ways. In most cases, a lost limb is incorporated into both the body image and body schema, although in some cases, the patient feels as if the missing limb is still present. This is known as phantom limb syndrome. Gallagher and Meltzoff (1996) maintain that phantom limbs are examples of absent limbs being represented by the body schema.

Gallagher and Meltzoff (1996) argue firstly that patients can incorporate phantom limbs as part of their body *image*, since the "descriptions supplied in [Weinstein and Sersen's (1961)] case studies of aplasic phantoms, for example, descriptions of the appearance of the phantom--long, short, wrinkled, etc.--also indicate an image-based phenomenon" (p 220). Descriptions of a limb's appearance lends itself to the theory that phantom limbs can be incorporated into the body image, but this leaves open the question of body schema. One reason in favour of the body schema including phantom limbs is that people who experience phantom limb phenomena often forget that the amputated limb is no longer present, and continue to function as if the phantom limb were a real limb. Gallagher and Meltzoff 1996) explain that

> "the phenomenon of forgetting suggests that the missing limb continues for a time to function schematically in a normal way in motor behavior. Such normal functioning, however, does not depend on a vivid representation or percept of the missing limb. Rather, forgetting is possible precisely because motor behavior does not ordinarily require that my limbs be the object of perceptual attention.

So, in incidents of forgetting, missing (phantom) parts of the body remain operative within a motor schema" (p 222).

The attention of the individual is drawn to the fact that they are missing a limb only when they fail to accomplish a task. This may involve dropping an item because they have forgotten that their thumb is missing. Only when they fail to pick up the item do they remember they are missing a thumb. If the limb 'functions' as part of the body schema in this way without attentive awareness, this is a good reason to consider the phantom as part of the body schema. I argue that the dream body is analogous to the phantom limb in that it functions in the same way, so this is evidence for a dream body schema.

If the dream body is analogous to phantom limb phenomena; then perhaps the dream body is really a 'phantom body'[50]. Firstly, the dream body can exist as a duplicate of the waking body when the waking body is absent from experience, in the same way a phantom limb replaces the amputated limb which is now absent from experience. We experience the phantom limb where the real limb no longer exists in the same way that we experience the dream body when the physical body is no longer accessible during a dream. We can experience sensations, proprioception and movement of the dream body despite absence of the actual body. Secondly, according to Metzinger, the phantom limb is created as part of a bodily self-model, and "is based on a subpersonal, automatic process of binding features together, of achieving coherence" (Metzinger 2010, p 34). The experience of the phantom limb is due to unconscious, incorrect predictions about the location of a limb that is no longer attached. I argue that the dream body is 'phantom-like'. It is felt in the absence of physical limbs, although we also monitor the dream body unconsciously for posture and movement. The dream body is immersed in a dream world which involves predictions of bodily posture and movement, and we 'forget' that the dream body is not the real body.

[50] Brugger (2006) and Brugger et al (2006) suggest that certain kinds of heautoscopy, the experience of one's double, or out of body experience, may be considered as a type of "phantom of the body" (Brugger 2006, p 666).

In waking life, the phantom limb usually comes into existence due to the removal of a body part, and in the dream, the physical body has been removed through input blockade. There have been reports of aplasic phantom limbs in children born with congenital absence of limbs (Poeck, 1964; Saadah & Melzack, 1994; Weinstein & Sersen, 1961, and Weinstein et al., 1964), and even phantom limbs where most humans do not grow limbs, such as a third arm known as "supernumerary phantom limbs" (Halligan, et al. 1993). These rare cases are analogous to the experience of dream bodies which are unlike one's waking body, such as the examples given earlier by Occhionero (2011). Conceivably, a dream body could have 3 arms, analogous to the supernumerary phantom limb case.

Forgetting about the absence of a limb also applies to the dream case since in most dreams the dreamer does not realize that the dream body isn't real. In a dream I may reach for a cup with my dream arm, failing to realise that the dream arm is not my real arm. However, I might succeed in picking up the dream cup, all the while unaware that the arm is only a 'phantom'. In most dreams, the dreamer forgets that they are sleep, and loses awareness of their physical body. We realise that the dream body is only a model in lucid dreams, although lucid dreams are rare. Lucid awareness is less common than a phantom limb sufferer being reminded that the limb is not real. The real world would remind an amputee that their limb is missing as soon as they go to use it. In contrast, the dream world prevents such realisation from commonly occurring, because we can use our dream bodies to interact with other dream objects. Cognitive impairments further our belief in the reality of the dream body, as we are less likely to deduce that the body is not real even when evidence is apparent. So the dream body is a more convincing phantom than the phantom limb, as the experience is more realistic and we believe the dream body is a real body. In contrast, such beliefs about phantom limbs, when they occur, are short lived. The existence of the dream world supports our belief that we have a body during a dream, whereas the real world does not continue to support the temporary belief that the phantom limb is a real limb. It seems if this type of "forgetting" in dreaming support the theory of a dream body schema. Since, as Gallagher and Meltzoff (1996) argue, 'forgetting' is good evidence that the phantom limb is incorporated into the body schema, such 'forgetting' is also good evidence for a dream body schema.

The dream body, unlike the phantom limb, involves multimodal experience; we can see, touch and manipulate the dream body, whereas the phantom limb is usually restricted to touch. To the dreamer, the dream body seems to be real, and this belief is supported by the fact that all of the senses are available to the dream body; our dream eyes can see, dream hands can grasp objects and dream ears can hear. Although a person may sometimes forget that their phantom limb isn't real, such "forgetting" is the standard mode of experience for the dreamer. However these distinctions between the phantom limb and dream body are not sufficient to discard the possibility of a dream body schema. In fact, they strengthen my argument.

Further support for the dream body schema is that dreams can display similar automatic reassessing of posture common to waking movements. I will give two examples. The second example provides stronger support for the conclusion that dreams can involve body schema. Consider the types of common sensations and behavioural responses that occur in sleep onset known as hypnogogic hallucinations. I often have the sensation of falling off a bicycle during sleep onset. My dream arms automatically position to break my fall. Occasionally the sensation is vivid enough to wake me and I sometimes throw my real arms in front of my face as if to break the fall. Only then do I realize I was only dreaming. The automatic action of my arms is suggestive of body schema: that despite not being a real physical body, my dream body can react to stimuli in such automatic ways as a response to regain balance and posture. One interpretation is that the real body reacts when the output blockade is abruptly broken upon waking. This suggests that the dreaming brain does create a dream body schema. Another interpretation is that vestibular sensations are generated by the physical body, reinterpreted by the dreaming brain and recontextualised, so these are *illusions* rather than *hallucinations*. Schönhammer (2005) explains that the sensation of flying in dreams, for example, may be due to vestibular illusions originating in the brain stem caused by a "reduction of peripheral sensual afferences (functional deafferentiation)" (p 25). The brain reinterprets the sensation of disconnection from the senses of the physical body as a sensation of floating. If this were the case, the body schema of the dream body is dependent on the waking body. However it is unlikely that this explains all dream body experience.

It is hard to conceive of how physical body sensations account for my sense that I am walking down the street in a dream. When I walk down the street, postural alignment occurs for my dream limbs, and I can have a sense of loss of balance when I trip which causes my body to automatically realign and rebalance. In the aforementioned case, Van Eeden felt as if, upon waking, the orientation of his body shifted by sliding from one body to another, which suggests also that the sensations of the body are not necessarily illusions of the physical body sensations. Therefore the dream body schema would be separate from the waking body schema.

Proprioceptive awareness, or awareness of where one's limbs are in space, furnishes body image while awake. To what extent proprioceptive awareness exists in dreams as separate from illusions of the physical body might be difficult to tell. When you close your dream eyes, do you have a sense of where your dream limbs are? Cole and Montero (2007) note that

> it is possible that the sensory pathways for affective proprioception include the same large fibre sensory afferents that conduct information elaborated into movement and position sense. This information is likely to feed to the many subconscious motor programming areas including the cerebellum, and the sensorimotor cortex, as well as to areas which are involved in attention (p 302).

Whether these complex systems can be active during sleep may be a difficult empirical matter. Due to the fact that most dream reports are vision-centric, consisting mainly of reports of visual stimuli, it might be difficult to study proprioceptive awareness based on dream reports. We are unlikely to see such experiences as salient and less likely to report them. To solve this issue it might be useful to analyse blind people's dreams.

The dreams of people who go blind before the ages of 5-7 do not consist of visual input (Kerr and Domhoff 2004), so must be furnished non-visually. Since descriptions of blind dreams are not vision-centric, they are more likely to report other sensations experienced in the dream than a sighted person. A blind dreamer might be better able to compare sensations of walking in dreams with walking while awake. Similarly, the previously mentioned example by van Eeden displays particular attention to the sensation of his bodily orientation and sense of proprioception. This example suggests that when the dream body is directly compared with the waking body, the represented body can be convincing. Although body schema itself is unconscious, it is important for the experience of waking life. Without body schema, our experience would be much different, as we can see from the aforementioned Ian Waterman case. Cole and Montero (2007) argue that body schema contributes to the joy of movement, which also supports the theory of dream body schema. Ian Waterman lacked the enjoyment of movement, however, in dreams movement can be very enjoyable, especially the feeling of flying, and it doesn't require constant conscious visual positioning and postural alignment as IW does.

There is much scope for empirical work comparing the waking body and dream body schema and image. My conclusion from the above discussion is that we have good reason to consider that at times we can have both dream body image and schema. At other times, sensations in dreams might be illusory (Schonhammer 2005). Furthermore, some dreams that are more akin to imagination (see chapter 3) and do not involve body schema. This supports a pluralistic view of dreaming; that dreams represent a wide variety of phenomena.

I argue for a pluralistic view of dreams that involves both perceptual and imaginative elements, neither of which are *necessary* for dream experience. However, most perceptual views of dream are more reductive, and claim that perception is a necessary attribute of dream experience. In the following section, I will discuss hallucination models of dreams, according to which hallucination is a defining characteristic of dreaming. I will argue that this view is overly reductive, as not every dream involves hallucination.

5.2 Dreams as hallucinations

Since dreamed percepts do not involve stimuli from the external environment, some perceptual theorists argue that dreams should be considered as hallucinations. Crane (2005) defines a hallucination as "an experience which seems exactly like a perception of a real, mind-independent object, but where there is no mind-independent object of the relevant kind being perceived" (Crane 2005). In this section I review the theories of Hobson and colleagues (2000) and Hobson (2002) and Windt (2010) who describe dreams as hallucinations that occur during sleep when "input blockade" (Hobson et al. 2000 p 825) causes the senses to be offline. Dreaming and waking hallucinations share common phenomenological features. I discuss these features and then highlight dreams which should not be considered hallucinations. I argue that many dream elements can be appropriately described as hallucinations, but that this view does not take into account all dream phenomena.

5.2.1 Hobson's hallucinations

Hobson (2002) and Hobson and colleagues (2000) propose a theory according to which dreams are best described as hallucinations that occur during sleep. Like waking hallucinations, dreams consist of internally generated imagery and other sensory modalities such as touch and sound. However during waking hallucinations we are not entirely isolated from external stimuli as we are when we sleep[51]. Hobson argues that "dreams contain formed hallucinatory perceptions, especially visual and motoric, but occasionally in any and all sensory modalities (Hobson 1988, McCarley & Hoffman 1981, Snyder 1970; Zadra et al. 1998)" (Hobson et al 2000, p 799). Hallucinogenic phenomenal properties along with delusional thinking suggest dreaming is a delirious state. According to Kahn and Hobson (2005), "during dreaming we are unaware that we are hallucinating, we cannot step back and reflect on the hallucination. This inability to step back and reflect is similar to what happens in waking during delirium (Hobson, 1997, Hunt, 1989) and by some psychotic patients. This component of thinking in dreaming is akin to delirium" (Kahn & Hobson 2005 p 436). According to Hobson, the

[51] For a fuller discussion of Hobson's AIM hypothesis as a description of the neural and cognitive changes that occur during sleep, see chapter 1.

hallucinogenic nature of dreams is consistent with empirical findings which show that "regional brain autoactivation of the limbic and association cortex [...] is at the root of the hallucinosis and emotional intensification while demodulation of the frontal cortex is at the root of the cognitive defects" (Hobson 2005a, p 4). In short, when we dream, we experience vivid hallucinations while simultaneously suffering from cognitive defects and rational capacity. Thus dreaming is a type of delirious hallucination.

Jacobson and Trulson (1979) note that there are phenomenological similarities in dreamed and hallucinated experiences, namely the vividness and perceptual properties of the experiences. They hypothesise that a decrease in serotonin reception and increase in brain dopamine function that occur both during hallucinogenic drug use and REM sleep are partial causes of the phenomenological similarities between dreaming and waking hallucinations.

> ...certain aspects of hallucinogenic drug action, dreams, and amphetamine psychosis share phenomenological effects which are, in part, directly attributable to decreased central serotonergic neurotransmission. This is manifest primarily as changes in visual perception and affect. Additionally, an activation of brain dopamine function may also be involved, either directly or indirectly (as a result of decreased inhibitory control over dopamine-containing neurons) (p 279).

This suggests that dreams are more like waking hallucinations than normal waking perception. However, I argue, a pluralist account better describes the more varied nature of dream phenomenology.

I have previously argued that it is important not to let brain activity be the deciding factor as to whether two cognitive states are of the same type. Dreams and hallucinations may have similar underlying neural mechanisms, however there are overlapping mechanisms between dreams, waking experience and imagining, as discussed in chapter 4. Dreams are in general more multifarious than hallucinations in that they can be multimodal, contain elements of delusional thinking coupled with bizarre imagery, or they can be realistic simulations of reality. Hobson denies the possibility that dreams can be accurate waking simulations. Hobson argues that theories which state that "dreaming (D) = waking (W) – afferent input (I)" are incorrect because altered neuromodulation, during sleep leads to a highly altered state of consciousness from waking. Hobson argues that "our brains are activated and fed internally generated data but we lack important cognitive capacities because our brain is aminergically demodulated. No wonder we can't think straight in our dreams and can't remember them later" (Hobson 2005a p 4). In contrast with Hobson's view, I argue that hallucination and delirium describe aspects of dreaming, however not all dreams involve hallucination and delirium. For example, some dreams are realistic, and others are imaginative. So a hallucination model does not accurately describe all aspects of dreaming. I will argue for my pluralistic view in detail in the following section.

Dreams, unlike most waking hallucinations, are *immersive* and can be highly realistic. The description of hallucinogenic delirium does not describe highly convincing, realistic dreams, as discussed in chapter 2. With a focus on the immersive nature of dreams, Windt argues for an alternative to Hobson's delirium account: the immersive spatiotemporal hallucination model. However, I will note that this view also omits a variety of dream phenomena.

5.2.2 The immersive spatiotemporal hallucination model

Windt (2010) describes dreams as *immersive spatiotemporal hallucinations*. This view focuses on the *phenomenological core* of dreaming, in contrast with the pluralistic view of dreams, which focuses on dream variety. Windt argues that many properties that are exhibited in some dreams, such as bizarreness, intense emotional responses, vivid imagery and low cognitive capacity, are not exhibited in all dreams, which is consistent with the pluralistic view.

> Dreaming is a notoriously heterogeneous and variable phenomenon (Hunt 1989; Nielsen 2000a). It certainly can be characterized in terms of its stereotypical features (i.e., multimodal imagery, which is predominately visual, and frequently auditory and kinesthetic, strong emotions, cognitive deficiencies, and bizarreness; for details, see Hobson et al. 2000). Nonetheless, certain types of dreaming differ systematically from this description (Windt 2010 p 295).

Windt argues for a "minimal definition of dreaming" which is a set of "necessary and sufficient conditions for dreaming to arise, i.e., these conditions would be constitutive of dreaming in the metaphysical sense" (p 296). These are separate from occasional or common features, such as bizarreness, specific types of sensory experience and reduced cognitive capacity, but rather, are the defining features of dreams. For example, the experience of visual perception, although highly common in dreams, is not a necessary attribute since lesions on the occipital-temporal area can cause loss of visual dreaming and those who are blind from an early age do not dream visually (Kerr and Domhoff 2004). The replication of waking life is not an essential feature of dreaming, though may also be a common feature as discussed in chapter 1.2. Not all dreams replicate waking reality, since many dreams are bizarre, and some dreams lack a dream body (Occhionero 2011).

According to Windt (2010), a necessary feature of dreams is that they involve a *self* in a *world* whether or not that self has a body. The self can be represented in a variety of ways "ranging from the absence of a self, to passive observation, to active participation, and to a double representation of the self" (p 300). I interpret absence of a self as the absence of a bodily representation. Unlike waking perception, the dreamer may not be presented as an active agent in the dream, but instead a bodiless perspective.

> I suggest that the crucial factor that distinguishes dreaming from non-dreaming sleep experiences is precisely the sense of spatial and temporal presence in the dream. In a very basic sense, there is a hallucinatory scene that is organized around an internal, spatiotemporal first- person perspective (1PP) as well as a sense of spatiotemporal self-location, i.e., the sense of occupying a space (even a point will be extended in a minimal sense), plus an experienced "now" and the experience of duration (p 303).

Windt proposes that dreams have three main attributes. Firstly, dreams are perceptual experiences of immersion in a hallucinated space involving temporal duration. The experience need not be in a *specific* mode, such as visual, however the experience is hallucinatory, immersive and spatiotemporal. Secondly, dreams occur during sleep, and thirdly, given appropriate conditions, dreams can be reported with accuracy. Windt admits the possibility that the second and third attributes are not *necessary* attributes if, for example, it could be shown that dreams can occur during waking, or that some dreams cannot be reported with accuracy[52]. The first attribute, that dreams are *immersive spatiotemporal hallucinations* (ISTH), is the most important, so I leave the second and third criteria aside and focus on the ISTH thesis.

It is helpful first to distinguish hallucinations from illusions. Illusions are misperceptions of the properties of mind-independent objects. For example, a stick half submerged in a pond looks bent, and this is a misperception of the properties of the stick. In contrast, it would be a hallucination to see a stick where no stick existed. Therefore dreams fit a hallucination model as opposed to an illusion model. Dreams, like hallucinations, are mind-dependent perceptions of objects that exist independently of physical objects, although dreams may sometimes involve illusions when stimuli from the external world filter into their dreams. An example of this is that hospitalised burn victims feel pain from their injuries in their dreams (Nielsen et al. 1993; Raymond et al. 2002). These sensations can be distorted and experienced during the dream, and are thus illusions as opposed to hallucinations. However illusions are only an occasional feature of dreams. So according to Windt, hallucinations are part of the minimal requirements of dreaming, not illusions.

According to Windt, the dream experience minimally consists of a first person perspective within an environment; the locus of the self involves a "core body" present even in "selfless" or disembodied dreams. The core body is underdetermined; not determined specifically by visual representation or felt presence of a body but rather consists of a feeling of spatial presence; being located somewhere within a space. This phenomenological property of "being located at" does not require any specific sensory data, such as visual or auditory data: rather it involves a sense of occupying space. This, according to Windt, is true even for selfless or disembodied dreams. Also, this does not require a stable location, as location can shift abruptly in dreams. Dreams can be a "bare

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[52] As I argued in chapter 3.

feeling of spatiotemporal presence" (p 304) but this is rarely reported, either because it is less commonly experienced or that the experience is more likely to be forgotten[53].

According to Windt (2010), all dreams involve a sense of spatiotemporal presence (p 303). This distinguishes dreams from non-dreaming sleep, and excludes hypnagogic hallucinations, internal percepts and sleep thoughts (as discussed in chapter 1) from being classed as dreams. Theorists often disregard hypnagogic hallucinations as dreams (Hobson et al. 2000, Mavromatis 1987). Windt agrees, noting that hypnagogia should be classified instead as "sleep-wake transitions".

> A minimal definition should help distinguish dreaming from types of conscious experiences during sleep or sleep–wake transitions that are typically considered as non-dreaming. Residual perceptions and sleep thinking, which are often thought to occur during NREM sleep, are an example of the former (see Hobson et al. 2000), hypnagogic or hypnopompic imagery occurring at sleep onset or upon awakening, from now on referred to as "hypnagogia," is an example of the latter (Mavromatis 1987) (p 296).

Hypnagogia, unlike dreams, often involve the sense of looking *at* some visual pattern, or feeling a simple sensation rather than being immersed *in* the dream, and hypnagogia are often snapshots like representations as opposed to multimodal experiences.

The immersive aspect of the ISTH thesis is a convincing description of a wide range of dream phenomena, I argue that dreams are resistant even to Windt's (2010) minimal conditions. Windt notes the multifarious nature of dreaming, however, her minimal conditions for dreaming provide an arbitrary boundary between similar sleep experiences, such as simplistic dreams and hypnagogia. I argue that hallucination and sense of spatiotemporal presence are not necessary attributes of all dream experience,.

[53] See chapter 2 for a discussion of how unusual or incoherent elements in dreams are likely to be forgotten.

5.2.3 Hallucination as a contingent aspect of dreaming

According to my pluralistic view, the minimal requirements proposed by Windt (2010) do not accurately define dreaming phenomena. The immersive spatio-temporal hallucination theory omits certain phenomena which should be included as dreaming phenomena, particularly 'imaginative' dreams. In chapter 3 I discussed types of dreaming that are closer to imagination than perception, especially slow-wave sleep dreams and imaginative-like sleep onset dreams. Also, at times REM dreams are more imaginative that perceptual. I also believe that hypnagogic hallucinations should be included as dream phenomena. Hypnagogia exist on a spectrum rather than as a distinct phenomenon from other types of dreaming. Dreams can be more or less complex, involving single or multiple modalities; for example one could have a sleep onset hypnagogic hallucination about falling off a bicycle, which is more complex than the feeling of merely falling. It is unclear where a theorist should draw the line between simple dreaming and hypnagogic hallucination. It is plausible for hypnagogia to be considered as simple dreams. Windt (2010) notes that

> though more closely associated with hypnagogia, sleep onset can also give rise to full-fledged and complex dreams, and hypnagogia can gradually shade into dreaming. While the precise moment of transition from hypnagogia to dreaming may be hard to pinpoint in some cases, [the ISTH model] nonetheless provides a conceptual distinction and empirically testable hypotheses (p 308).

Distinguishing between dreams and hypnagogic hallucinations presumes a definition of dreaming in which experience of space is necessary. Nir and Tononi (2010) note that hypnagogic hallucinations are different from "typical" dreams (p 95) although do not specify that they are not a type of dream. Rejection of hypnagogia requires the presumption that dreams require spatiotemporal experience.

Another reason that 'hallucination' as part of the minimal definition of dreaming should be rejected is that children's dreams are described more as imaginative than perceptual. As discussed by Foulkes (1999) children's dreams are often simple, snapshot like visual experiences (see chapter 2). The rejection of "snapshot like phenomena" as dreaming would mean that children's dreams would be rejected as dreams altogether. It is more plausible that children's dreams be considered as imaginative dreams, just as other imaginative sleep experience should also be classed as dreams (see chapter 4).

Windt (2010) notes that some dreams can involve the integration of mind-independent stimuli, such as the sound of a car backfiring, or flashes of light from a "dreamlight", as discussed in section 5.1. These phenomena are better classed as illusions rather than hallucinations. Schönhammer (2005) reasons that some dream sensations, such as the sensation of falling, may be distorted sensations of the paralysed sleeping body. If this is the case, it is conceivable that some dreams are purely illusory as opposed to hallucinatory, involving only sensations from the external world that have been misperceived, and without object-independent hallucinatory experiences. For example, if I fall asleep in a car, I might misperceive the rocking of the car as the rocking of a boat, the sound of cars passing as insects buzzing, and the light hitting my eyes as a torch being shone in my face. Although this type of illusory dream is not a regular occurrence, possibility alone weakens the definition of dreaming as hallucination; dreams are often hallucinatory, however non-hallucinatory dreams can conceivably occur. This highlights the difficulty of discerning a minimal set of necessary conditions for dreaming, and strengthens a pluralistic approach to dream phenomena.

In the following section I discuss virtual reality models of dreaming. These views are consistent with ISTH in that they stress the importance of immersion, but describe dreams as a *virtual reality* as opposed to a hallucination. According to the views of Metzinger (2009) and Revonsuo (1995b), the distinction between mind-dependent and independent objects is unclear, and we should instead consider both dreams *and* waking experience to be virtual realities. Dreams are merely virtual realities which are not restricted by external stimuli.

5.3 The dream world; the virtual reality of sleep

In this section I discuss views according to which dreams are defined as virtual realities. In 5.3.1 I discuss the views of Metzinger and Revonuo, who argue that dreams are a perceptual experience of an internally generated virtual model. This virtual world model is similar in many ways to the experience of the waking world. In 5.3.2 I contrast this view with the views of Clark, who argues that dreams are not virtual realities. Contrary to Clark, I argue that the VR model accurately describes a wide variety of dream phenomena, however there are certain dream experiences that should not be classed as virtual realities.

According to Metzinger (2009) dreams are distinct from waking hallucinations as they are more multimodal and complex. Dreaming, for Metzinger

> not only contains the appearance of a world but also (in most cases) creates a fully embodied, spatially extended self moving around in a spatially extended environment. The virtual self thus born is an exclusively internal phenomenon in an even stronger sense than that of the waking self (p 135).

In contrast, waking hallucinations are "typically restricted to an isolated type of phenomenal content in one or two of the sensory modalities" (Windt & Metzinger, 2007). Dreams consist of a three-dimensional virtual world model. Dreams are, firstly, a *global* model of reality; we experience dreams as a world as opposed to simple images or other stimuli. Second, the model is integrated into a virtual window of presence; similar to waking, we experience the dream world from a first person perspective as if it were directly presented to us. Thirdly, most dreams, like waking experiences, are *transparent*: we do not see the dream world as a model of a world, rather we experience a dream as if it were reality. A notable exception according to Metzinger (2003) is lucid dreaming, in which the dream world is experienced as a model of reality, not as reality itself.

The distinction between the waking and dreaming world models is that the waking world model is restricted by external stimuli. Nonetheless, waking experience also consists of a world-model that is not a direct experience of the world around us, but rather a model composed by our senses and experienced transparently. Similarly, Revonsuo (1995b) argues that "the ontology of all the phenomenological worlds we enjoy- whether those of dreams, computer-generated models or waking "reality"- is basically the same: the realities experienced are always "virtual"" (p 50). Experience of the external world is "virtual" because the mind pieces together input to create a world-model. Waking experience is largely composed of inferences and predictions about the body and its place in the world, a view which strongly opposes naive realism. The dream world-model is instead composed of internally generated stimuli which are not restricted by sense-data. In the next sections I discuss these views and argue that the pluralistic view of dreams, which imposes fewer constraints on a theory of dreams than a virtual reality view, accounts for a wider variety of dream phenomena.

5.3.1 The phenomenal self-model

According to Metzinger (2009), dreams are a wide variety of conscious experiences that satisfy a certain set of constraints as opposed to an "all or nothing affair" (Metzinger, 2009 p 2). To this extent his view is consistent with my pluralistic thesis. However our views differ regarding the constraints. According to Metzinger, dreaming involves the experience of a *phenomenal self-model* (PSM) that interacts with an environment (world model). Metzinger defines this interaction as a "continuous and self-directed process tracking global properties of the organism" (Metzinger 2010 p 42). The dream world model is internally generated while the waking world model is constrained by external stimuli. However despite different constraints, both worlds are virtual models. The virtual model consists of representations of the self in a world, and our interactions with the environment are processed by the "processing system" (Ibid p 29) in the brain. The processing system consists of conscious and unconscious processes which compose our model of the spatial environment around us. The world model is created by complex data processing and sensorimotor integration, and our first person perspective is the mode of processing in which we determine the self (PSM) as being the perceiver of the environment (world model). According to Metzinger, "a genuinely conscious self emerges at exactly the moment when the system is no longer able to recognize the self-model it is currently generating as a model on the level of conscious experience" (Metzinger 2010 p 42). Both dreams and waking experience consist of a PSM navigating through a world model, although dreams consist primarily of internally generated data.

The dream world model, like the waking world model, is *transparent.* The processes which create the model are not apparent to the dreamer. The model is not experienced as a model; we do not experience the properties of the vehicle, those properties that generate the model. Rather we experience as *naïve realists,* as if we are *directly* experiencing an external reality. When we look at a sunset, we do not experience all of the processing that occurs to form a model of the sunset; we do not see the sunset model as a model, instead view the sunset as if we directly view a sunset. In contrast, when we lucid dream, we lose this transparency and sense of naïve realism we experience both in non-lucid dreaming and in waking life. The lucid dreamer becomes aware of the fact that they are dreaming, and so the sense of being in direct contact with reality disappears. The sense of reality is replaced with the knowledge that one is in a virtual reality which is "simulational" and "misrepresentational": "the conscious model of reality is suddenly experienced *as* a model" (Metzinger 2003, section 7.2.5). Lucid dreaming may be the only state in which transparency is lost to such an extent.

Our model of the waking world is created not only by processing sensory data but also by subconsciously forming predictions and inferences about the world which can be generated more quickly than stimuli can be processed. Such data is often sufficiently accurate to be useful for navigating through the world, however, this is not always the case. Our world model often includes misrepresentational aspects, exemplified by the rubber hand illusion (Botvinick & Cohen, 1998). Metzinger (2007 p 4) replicated the experiment. His arm was hidden from view, and a rubber hand placed in front of him. Both hands were simultaneously stroked with a probe, and after around 60 to 90 seconds, Metzinger began to feel as if the rubber hand was his own hand. Such illusions can shift our sense of "mineness" over our own bodies (Ibid p 5), and our sense of self can extend to incorporate objects that are not physically part of our bodies. In the rubber hand illusion, this occurs because visual stimuli from our real hand are absent. By correlating sense of touch with the concurrent visual appearance of a hand-shaped object being stroked, our self-model shifts to incorporate the rubber hand. Another example of pervasive misrepresentation in perceptual experience is the illusion that our entire field of vision is in colour. In reality we can only see colour near the focal point. We unconsciously infer colour in our peripheral vision, however the illusion of colour is so convincing that most will deny peripheral colour-blindness. However, this colour blindness can be demonstrated by displaying a colour card to your peripheral vision. You will not be able to discern the colour until it is brought almost to your area of focus.

The phenomenal self-model also involves predictions about the interactions of our bodies in space. Predictions are required since the integration of stimuli into the world model is restricted and can take a long time, whereas predictions are usually accurate and more rapidly integrated. The phantom limb syndrome is a case in which these predictions go wrong; a patient continues to feel as if they are receiving stimuli from the limb despite it having being amputated. This false stimulus is a prediction about how the limb should be situated in space where the phenomenal self-model continues to form a model of the missing limb (see 5.1).

Dreaming and waking both involve the phenomenal experience of internally generated world models, however waking models are restricted by external input. Revonsuo (2006) argues that since dreaming is not in this way restricted, dreaming consciousness can be seen as a "pure" form of consciousness. Since dreaming demonstrates that external stimuli are neither sufficient nor necessary for conscious experience, the minimal conditions for consciousness do not include external stimuli. According to this view, dreaming is the barest form of consciousness and it involves the experience of the "self in a world". Therefore the minimal definition of consciousness is the experience of a self in a world. Consciousness is a *subjective virtual reality*; at the phenomenal level.

I argue that the phenomenal self-model represented as immersed within a world model is applicable to many, but not all dreams. In the following section I discuss a counter argument by Clark who argues that dreams are not like virtual realities. I disagree, arguing that some dreams are best described as virtual realities, however this is not accurate for all dreams.

5.3.2 Dreams are not the matrix

In this section I compare dreams to science fiction descriptions of virtual realities and highlight the distinctions between dreams and VR. I briefly discuss the views of theorists who reject the VR model of dreams, and argue against Clark's view that rejects the possibility that dreaming can be a virtual reality. I argue that a PSM and world model is a feature of many, but not all dream experiences.

Modern technology is not at the stage where a realistic, immersive VR program could convince a user that they were immersed in the real world, so we must rely on sci-fi examples as a comparison for dreaming. Current VR games are experienced as world models, and do not have the transparency of dreams as Metzinger describes. In contrast, sci-fi examples such as *The Matrix* (1999) or *Existenz* (1999) are scenarios in which computer-generated world models are experienced transparently as if they are the real world. Participants navigate through the world model unaware that they are in a VR. In *Existenz*, the characters continually tap in to virtual realities that exist *within* the main VR system, similar to the dreams within a dream scenario described in *Inception* (2010). In both scenarios, the system is so realistic the characters are never sure whether they have escaped the system, or simply moved to another level of the virtual world. The dream scenario is known as false awakening: feeling you have woken up, however still being in a dream. In *The Matrix*, the characters are unaware that they are in a virtual reality until they are enlightened by other characters who have discovered the truth. In the movie *Inception* the dream world is depicted as a virtual reality in which the mind generates the dream world instead of a computer. It is even possible to enter another person's dream, so the virtual reality in which you are immersed is created by the mind of another. For Metzinger and Revonsuo, we are constantly within such a virtual world, when dreaming and when awake. Both involve a PSM embedded in a world model, but we never experience them as models. The distinction between the three cases, dreaming, waking, and virtual program, are the restrictions imposed. The VR system is restricted by the rules of the computer program, the waking world by external stimuli, however the dream world is not restricted by any external source.

Contrary to this idea of indistinguishability of states, Flanagan (2001 p 168) and Sosa (2005)[54] note that there are reliable indicators that we are not asleep. When we are awake we have connections between events that are often disrupted in dreams. Due to our dysfunctional cognitive capacities when dreaming, we cannot usually tell we are dreaming *when* we are dreaming, however it is after waking up that we can distinguish between waking and dreaming. If this were an accurate description, then dreams are not a convincing world model such as *Existenz* or *The Matrix*, rather we cannot tell the difference because of cognitive impairment. Clark (2004) agrees with this point.

Unlike the scenarios of *The Matrix* or *Existenz*, the tendency in dreams is to believe in even bizarre occurrences; if they occurred in real life we would question whether our perceptions were correct. In the Matrix, when 'glitches' occur, or failures in the programming that inhabitants of the program experience as 'déjà vu', these experiences are seen as odd. When the inhabitants see Neo accomplish impossible feats, they are amazed. They can be convinced that what they experience is not real as is the case with Neo, Morpheus and other main characters in the movie that find out the Matrix is not reality. As Clark notes, "Neo's flying is seen by everyone as something remarkable, as proof of superhuman prowess, and is not simply accommodated courtesy of dampened critical and executive processing" (2004, p 17). If we contrast this with a dream, bizarre events in dreams can often go unnoticed by the dampened critical and executive processing of the dreamer. If the characters of the Matrix were in a dream and experienced déjà vu or a flying Neo, this may be experienced as unremarkable. It is only when pre-lucidity is achieved that the dreamer questions whether something is odd or bizarre. So a pre-lucid dream may be more like a Matrix scenario, where the dreamer has the ability to question their surroundings. Unlike within a virtual reality, lucidity in dreams is difficult to achieve, and as discussed in chapter 1, a lucid dreamer may slip back into unreflective, non-lucid dreaming after a short period. So, Flanagan and Clark argue, dreams are not convincing world models like VRs, dreamers fail to question their surroundings due to cognitive defects.

[54] See chapter 4 for further discussion.

Clark (2004) argues that dreams are not virtual realities because unlike VR, dreams do not emulate the waking world. He discusses a variety of reasons for this. Firstly, waking reality and VR involve controlled interactions with external objects, however, this is not accurate for dreams.

> In our dreams, we are not in control. Real dreaming, unlike many popular philosophers' fictions, is an altered state, closely related to the states induced by chemical manipulations such as the use of (certain) medical or recreational drugs. The dreaming brain is not like the wakeful brain. Normal sensory input is blocked, attentional capacities are impaired or lost, memory is distorted, reasoning and logic are weakened, narratives run wild, self-reflection is dampened or destroyed, emotion and instinct are hyperstimulated, and forms of 'top-down' willed control and decision-making diluted and easily overwhelmed.

Secondly, Clark cites Hobson (2001), noting that the dreamer undergoes distinct changes in neural activity and modulation that shifts between waking and dreaming. In a VR, the waking and sleeping cycles may be preserved so that an individual can fall asleep within the VR. Sleep cycles are necessary for maintaining regular neural functioning. As discussed in chapter 1, sleep is necessary for survival, so even in a VR circadian rhythms need to be maintained. Within the VR, an individual may still fall asleep and dream. The multiple layers of false awakenings described in *Inception* are all still sleeping states with sleeping neural activity. Thirdly, Clark notes that the inhabitants of the Matrix come into contact with other people who are trapped in the Matrix. In contrast, dream characters are created by the dreamer's own sub-personal processes.

I disagree with Clark's arguments that dreams are not virtual realities. His first argument relies on a reductive view of dreams in which dream experience is characterised by lack of control and reduced cognitive capacity. However, as I discussed in chapter 2, this is not the case for all dreams. Some dream cognition equals waking cognition.

In response to his second argument, although neural activity can be used to distinguish different stages of waking and sleep, we should not allow changes in brain states to be the deciding factor for whether conscious states are similar, as discussed in chapter 1. We should instead focus on the phenomenal aspects of the dream in comparison with the VR scenario. Secondly, brain activation and modulation can alter during waking or during sleep, so although, for example, the waking brain is more often aminergically modulated[55], it can shift to cholinergic modulation whilst awake, and the dreaming brain also shifts in modulation and activation. I have noted in previous chapters that deactivation of areas in the brain such as the dorsolateral prefrontal cortex may occur at times, but is not consistent throughout REM sleep. Although it is possible to fall asleep and dream whilst one is in a VR, that does not discount said dream as a VR within a VR.

In regards to his third argument, since in a dream we don't know that the characters are not real, there may be no difference from a first person perspective. The characters may be generated by sub-personal processes of which we have no awareness nor control over. In chapter 6 I discuss the possibility that the dream protagonist is not the same person as the waking self. So there is a sense in which characters in dreams are separate identities from my waking self.

Whilst awake, we use external objects to offload cognitive processes, for example we may solve a jigsaw puzzle by moving the pieces around instead of mentally rotating or strategizing. In the Matrix, the computer simulation can play this role. We could use the elements of the simulation to help solve the puzzle. In contrast, the objects in the dream are all internally generated, so we are not furnishing our cognitive processes with external props. For Clark, cognitive offloading is a key element of experience and embodiment in an environment. The world itself partially composes our cognition when we are awake, as I discuss in chapter 7. This contrasts with Metzinger and Revonsuo's

[55] See chapter 1 for discussion of neuromodulation in sleep.

strong scepticism against direct contact with a physical, external reality. Although Clark may agree that waking and VRs are similar, he would disagree with the dream analogy. For Clark, mind-dependent objects cannot provide the same extension of cognitive abilities provided by external objects in a VR or the waking world, so dreaming cannot be pure consciousness. In chapter 7 I argue that the dream world can be a convincing world model despite being internally generated. However, this is not the case for all dreams. I argue instead that immersion into a world model is common however unnecessary for dreaming.

I argue that certain dream phenomena are accurately described as a PSM embedded within a virtual world, yet this description is not accurate for all dreams. Not all dreams are multimodal: some consist of simple images, thoughts or sensations, with no experience of a PSM. In section 5.2 I argued that these sleep experiences should be included as dreams. Excluding these phenomena from a theory of dreaming because they do not exhibit these traits would be circular if our intention is to show that all dreaming involves a PSM. To name a few examples, isolated hypnagogic hallucinations, simplistic dream images, dream thoughts, and even children's dreams[56] do not necessarily involve a sense of self as occupying a particular point of view. Some dreams, including those which are vague, involve less vivid content and less immersion in the dream world (see chapter 3), are better described as imaginative rather than perceptual. According to my pluralistic view, all of these phenomena are dreams.

Although I think a virtual reality model of dreams is too reductive and the omission of certain dreams is unjustified, I agree that complex dreams can involve a PSM within a dream world. The fact that these can be very convincing virtual realities is evidence against a reductive imagination model of dreaming. Dreams which are imaginative and do not involve vivid perceptual stimuli provide evidence against a reductive perceptual view of dream. Dreaming is neither necessarily perceptual nor imaginative: it can be either, or involve both elements.

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[56] See discussion of Foulkes, chapter 1 and 2.

Conclusion

In this chapter I have argued that hallucination and virtual reality models of dreaming provide a plausible description of many dream experiences. This applies especially to the multimodal, immersive virtual worlds of sleep. However, I have argued that a theory of dreams should also include other sleep phenomena that are not accurately described by perceptual models. Dreams should not be reduced to any of these particular phenomena. I have highlighted some of the similarities and differences between the dream world, virtual realities and the waking world. I argued that the dream body can be represented in many ways, and it is possible for there to be both body image and body schema in dreams. From this, there is a sense in which the phenomenal self-model of the dream body can seem as 'real' as our phenomenal model of the waking body. Dreams often involve first person perspective within a spatio-temporal hallucination. Many dreams are best described as a virtual reality. However, many dreams do not fit these descriptions. Hence, the pluralistic view of dreams incorporates a wider variety of phenomena than Hobson, Windt, Metzinger and Revonsuo's dream theories.

Part II

Philosophy of Dreams: Self, Mind and Cognition

6

Dreaming Vicariously: Implications for the Self

> In the dream I look over the battle and think to myself "I have conquered; the ideals of the Revolution in my hands are sweeping away the old world. Poor Maria Walewska, I wonder where she is now". A man approaches me and questions who I am and what I am doing here. "I am the great Napoleon" I declare, to which the man replies that he never knew that Napoleon was so short. This angers me as I am sensitive about my short stature. [57]

The pluralist view of dreams developed in this thesis implies that dreaming involves a wide variety of experiences, many of which are omitted by narrow or reductive views. In this chapter I discuss the implications of the pluralistic approach for *the self* in dreams. A problem arises from dreams in which the protagonist, or the holder of the first person perspective in my dream, is not the same individual as my waking self. I refer to this phenomenon as *dreaming vicariously.* In such dreams, the protagonist may be, for example, a fictional character or Napoleon Bonaparte, although when the dream is remembered, it will often be remembered from the perspective of the protagonist[58]. These experiences have received little attention in the philosophical literature. To my knowledge they are discussed only by Jerry Valberg, although they present an interesting case with odd implications for identity. This chapter involves an in-depth

[57]Although this Napoleon dream example is not based on a genuine report, it involves aspects common to many dreams such as confabulated memory, dreaming you are someone else and lack of access to one's waking self. This is a modified version of Williams' (1973) example of imagining being Napoleon.
[58] The protagonist may also be viewed from a 3rd person perspective, but dreams which are remembered from the perspective of the protagonist are the most interesting for my purposes.

study into the phenomena and some of these philosophical implications. To whom does the first person pronoun 'I' or 'me' refer when the protagonist thinks "I see the battle"? Perhaps more perplexing: to whom does the thought belong? Who is the protagonist?

I begin with a description of dreams in which the protagonist of my dream, X, is not my waking self, MR. I argue that these dreams are real phenomena that are, although not common, reported in the scientific literature of dreams. I then discuss problems of self-reference in such dreams, and the question of to whom the first person pronoun refers. If we assume that the protagonist of my dream must be *me* because the dream is experienced from the protagonist's perspective, I argue there is no clear answer as to whom the first person pronoun refers, and whether this is genuine or non-genuine reflexivity. I argue that one solution to this problem is that the protagonist of my dream is not my waking self (MR). Instead the protagonist, X, who is not MR, uses the first person pronoun in a genuinely reflexive way.

This is a very strange outcome, as it implies that dreams can represent alternative selves. I will seek to make this view more plausible by arguing that the protagonists of vicarious dreams can be psychologically distinct from my waking self; and that in dreams, psychological continuity is disrupted by disturbed memory and the input blockade (see chapter 1). I conclude that there is a strong sense in which dream protagonists can be temporary entities who will most likely be forgotten forever. Consistent with my pluralistic approach, the protagonist of the dream can be a variety of entities, only some of which are identical to my waking self.

6.1 Vicarious dreams are a real phenomenon

Occasionally when I wake up, I remember having a dream in which the protagonist of the dream was not *me*, although the dream is remembered from the viewpoint of this protagonist. Sometimes the protagonist is a man, or a famous historical or popular figure, such as Napoleon. Although many of the dreams I remember are somehow continuous with my waking life, i.e. the protagonist is *myself* and acts similarly to my waking self, this is not the case for all dreams[59].

Some may argue that in their dreams, the protagonist is always their waking self, not famous or fictional characters. According to this view, dreaming vicariously does not occur. It is true that vicarious dreams may be rare compared with waking-self dreams, however this phenomenon certainly occurs. I have had such dreams myself. In one of my more exciting dreams, the protagonist was a male engineer on a star ship, and he was trying to prevent the ship from crashing into the earth. In other dreams the protagonist has been a ninja warrior, and once I recall a dream in which the protagonist was an old man having a heart attack. These dreams are rarer than waking-self dreams, however cases of dreaming vicariously are also documented in the scientific literature.

Occhionero and Cicogna (2011) describe a variety of ways in which "the self" can be represented in dreams, and a variety of perspectives from which the dream can be remembered. They argue that the experience of self can be "expressed either by way of embodiment-in or identification-with other characters or even objects." For example, one man reports a dream in which he is surrounded by "a lot of beautiful actresses", then, "I'm transformed and become a famous actor" (p 1012). The protagonist shifts from waking self to a different person. The dream self can also be a bodiless, pure thinking agent, a partial body image, a passive observer or another character in the dream. In the dream a person can even identify with an inanimate object, such as a tree or machine. For example, "I was inside a gigantic photocopying machine; I knew I was inside, as an abstract entity, as a mind, I was the machine, so I couldn't see myself" (Occhionero et al. 2005 p 80). Dream protagonists can also be represented by two or more characters that are active in the dream.

[59] To avoid confusion, I will not use Valberg's (2007) description that in my dream *I* was *someone else* because it is not clear what it means for *me* to be *someone else*. As I argue later, despite the dream being *my* dream, it is not clear whether *I* am an agent in the dream at all.

It is important to distinguish between *self* representation and *body* representation. I could have a dream in which *my body* is replaced by a giant photocopier, whilst I still identify with my waking self (MR). Similarly, I could occupy a disembodied, 3rd person observer perspective in a dream, however still identify with MR. I wish to focus on cases in which the perspective of the dream is that of one of the dream characters, whom I define as the *protagonist* as opposed to 3RD person perspective, and specifically cases in which the protagonist does not identify with MR. The protagonist may be a sentient photocopier, or a famous actor, however does not think of themselves as MR. It may be unclear from many alternative self-representation dream reports whether these represent vicarious dreams of the kind I have discussed or alternative body-representation dreams, although I think both types of dream can occur. This possibility is supported by Jerry Valberg (2007).

Valberg acknowledges that a protagonist who is not Jerry Valberg (JV) can occupy the first person perspective of his dream. In Valberg's dream example there are 2 characters; X and JV, where the first person perspective is occupied by X. Although in waking life, Valberg identifies himself as JV, in the dream "I am not JV but X (X is me)" (Valberg 2007, p 62). X can interact with JV in the dream, refer to JV as 'him' and observe JV from an external perspective. If Valberg feels pain in such a dream, and thinks, 'I am feeling pain', 'I' refers to X, not JV. If JV is in pain in the dream, Valberg would observe his pain behaviour from an external perspective. This is somewhat ambiguous, since Valberg refers to the holder of the first person perspective in the dream as 'me', however 'me' does not refer to JV (who is 'me' when he is awake). Since it is unclear what 'I am not me in the dream' means, referring to the occupier of the first person perspective as the *protagonist* as opposed to *me* is more comprehensible. As I will later argue, it may be inaccurate to claim that 'I' am 'X'. However Valberg's example clearly describes a case in which the dream protagonist identifies themself as 'X', and another character in the dream as 'JV'. Valberg reports the dream from the perspective of X, and yet in his waking life he identifies himself as JV, a different character in the dream. I focus on the simpler case in which my waking self, MR, is not represented in the dream at all, but rather there is only the protagonist, X and possibly other characters who are not MR.

This then leaves open the issues of who is the protagonist, and to whom the first person pronoun refers when the protagonist thinks "I see the battle". I shall first discuss the issue of self-reference in vicarious dreams.

6.2 Self-reference and self-representation

In my Napoleon dream, the protagonist NB thinks, "I see the battle of Austerlitz". To whom does 'I' refer in "I see the battle"? One option is that 'I' refers to NB. Of course, NB in real life is dead, so the real NB cannot be thinking anything; the real NB is not the thinker of the thought. If 'I' refers to NB, and it cannot be NB who is thinking the thought, the first person pronoun (FPP) is being used to refer to someone else, as would be the case if I said "I" but referred to Napoleon. However, the thinker of the thought cannot refer to NB as 'I' in the standard sense since one can only refer to oneself self-reflexively. Bermudez (2002) explains "the first-person pronoun is a linguistic type whose meaning is exhausted by the rule specifying that any appropriately uttered token of that type refers to its utterer" (p 96). So I cannot "appropriately" utter a first-person pronoun (FPP) and refer to someone other than myself. When I use a FPP such as 'I' or 'me', it picks out me as the utterer without the requirement of specifying who I am. If I utter "I am MR", this can be informative, according to Velleman (1996), because it aligns two distinct conceptions of myself: one that places the utterer at the centre of her perspective, and one that indicates a person named MR from an outside perspective. Velleman explains that when I utter the phrase "I am MR", this demonstrates how to correlate my self-centred conception of the world "with a centreless conception of the world, as containing someone named "[MR]." "I am [MR]" is informative, then, because it shows how to transfer information between these two conceptions of the world" (p 48). So if the utterer is not NB, the FPP cannot be used *genuinely* to refer to NB.

Another option is that the first person pronoun (FPP) refers to my waking self, MR. However, this is clearly not the case because if the thinker were to instead think "I am NB", this would translate as "MR is NB". In my example, NB is the protagonist, not MR. "I" identifies the protagonist of the dream, so I refers to NB, but not the real NB. One might argue that the protagonist is always an altered version of our waking selves;

the protagonist is me, but with some changes. Or one could say 'I am dreaming in the mode of, or in the persona of, NB[60]. In the dream I am a shorter, male, more megalomaniacal version of myself. However this seems implausible, if we allow that MR can be a character in the dream who is not the protagonist, as is the case in Valberg's example.

We could conclude that the protagonist of the dream refers to themselves as 'I', and the protagonist is neither MR, nor the real Napoleon, but instead a dream version NB. However the implications of this are quite counter-intuitive. This would mean that some dream protagonists are separate identities from my waking self that only exist for a short period during a dream. This possibility might be supported by Locke's (1690) theory in which identity over time is constituted by psychological continuity. In one thought experiment, Locke describes a day man and a night man who are separate psychological entities with no psychological link but share the same body and brain. If there were "two distinct incommunicable consciousnesses acting in the same body, the one constantly by day, the other by night" (Chapter XXVII section 23), then so long as both entities have no psychological link through memory, they would be separate identities. This would not, however, be an entirely accurate description of the protagonists of my dreams, since the protagonist is not always the same person. The dream protagonist of last night's dream is not usually psychologically linked with other dream protagonists. A dream doesn't begin where the last one concluded. A dream protagonist may exist only for a short period of time: perhaps only one session of REM sleep, or one part of one REM session as was the case with the "famous actor: in the dream report mentioned above (Occhionero 2011). Let's consider the possibility that last night, during 4 separate REM sessions, my dream protagonists were: i) a male Asian medical doctor, ii) a female African lawyer, iii) Napoleon, then iv) a Caucasian female philosopher. Due to poor memory retention, the protagonist at session ii) has no recollection of session i), and no way to foresee what will occur at session iii) or iv). I may never again dream of any of these protagonists. As a further complication, the protagonist at stage iv) might be MR, continuous with my waking self, but not linked with the other sessions. So describing

[60] Thanks to John Sutton for this point

the "night man" as a singular dream protagonist who persists 'constantly' throughout all of my dreams would not be accurate.

Proposing temporary entities as dream protagonists is counter-intuitive. One may argue that since I can imagine being Napoleon without a crisis of identity, one should treat dreaming of being Napoleon in the same way. However I will show that this argument fails.

6.3 Imagining vs. dreaming that I am Napoleon

A convincing argument for the treatment of *imagining* that I am someone else is made by Velleman (1996), who argues that the use of the first person pronoun is unproblematic when imagining that I am someone else. If we can adopt a similar solution in the case of the dream protagonist NB, then we need not appeal to temporary dream entities. I argue that Velleman's analysis of the use of the first person perspective is convincing as an explanation of *imagining* being someone else, however the same explanation cannot be applied to vicarious dreaming.

6.3.1 Imagining I am someone else

In normal cases of self-reference, using a first person pronoun (FPP) is a first personal, self-locating thought which provides separate information from the centreless reference of referring to a person called MR. However if I imagine being someone else, I can refer to the imagined individual using FPP, such as 'I see the battle of Austerlitz' where 'I' refers to NB, not MR. Velleman argues that I can only use a FPP in a *genuinely reflexive* way to refer to MR since "genuinely reflexive thoughts don't rely on an antecedent specification of their target: they just point to the subject, at the centre of thought" (1996, p 60). In most cases, 'I' refers to whoever it is at the centre of my perspective (myself), and requires no specification as to whom that person is (MR). However this is not the case in imagining I am Napoleon. The FPP does not automatically point out the centre of my perspective anymore, but an imagined person's perspective.

The self can be disambiguated in two ways according to Velleman (1996).

> It connotes both identity and reflexivity, and either of these connotations might dominate when the word serves as a noun. On the one hand, a past self of mine might be one and the same person as me, identified at some time in the past. On the other hand, a past self might be someone in the past whom I can think of reflexively, in the first-person. In the first sense, selfhood is a metaphysical relation that holds between persons at times, if they are the same person. In the second sense, selfhood is a psychological relation that holds between subjects who are on first- personal terms (p 64).

Velleman (1996) argues that it is the "psychology of perspectives", in other words, the "self-centered perspective that you occupy as an agent" (Ibid p 47), as opposed to metaphysical identity, that is important when considering whether *I* will continue to exist in the future. When anticipating experiencing future events or remembering what I have experienced in the past, it is the first person perspective of such memories or anticipations that expresses what I want to know about my survival. If I can anticipate experiencing from the first person perspective into the future, then I anticipate surviving into the future. Metaphysical identity, on the other hand, is an important but separate philosophical issue according to Velleman.

This view of perspectival selfhood provides a solution to some difficult cases of self-reference, including imagining being someone else. Self-reference can be either *genuinely reflexive,* in cases in which the FPP unselfconsciously points to the centre of reference, or non-genuinely reflexive, when the reference is made self-consciously. I.e. right now I think 'I am typing on a computer' in an unselfconscious way. If instead I imagine being NB typing on the computer, the identity of the imagined user of the pronoun must first be appropriately *framed* to refer to NB before the sentence can be ascribed to the person I am imagining. According to Velleman, if the FPP is consciously framed as opposed to unconsciously pointing out the centre of perspective, this is *not* genuinely reflexive. The FPP is accompanied by consciousness of to whom the FPP refers, whereas genuine reflexivity is unselfconscious - it merely points to the centre of perspective.

Velleman reasons that it wouldn't make sense to claim that Napoleon is using the first person pronoun in a genuinely reflexive way: Napoleon is long dead, and the thought is *my* thought. Yet I am not using the first person pronoun to refer to *me*. According to Velleman (1996), "imagining that I am Napoleon is first-personal, but it is, so to speak, first-personal about Napoleon, in the sense that it is framed from Napoleon's point of view" (p 40). The thought must first be framed by the *"actual subject"* MR, who is the person thinking the thought, so that the FPP is from the perspective of the *"notional subject"* (NB), who is the imagined centre of perspective. The actual subject thinks 'I am doing X', but also frames thought so that NB is the centre of perspective, not *me*.

According to Velleman it is the *framing of perspective* which distinguishes genuine from non-genuine reflexivity, not whether 'I' refers to the *actual subject.* 'I' and 'MR' are different ways of presenting information: the former picks out the centre of perspective, while the latter refers to an individual from a centreless perspective, so not every instance in which I use 'I' to refer to 'MR' will be an example of genuine reflexivity. For example, while imagining being NB, I then imagine that MR replaces NB so that it is MR seeing the battle. When I ascribe the thought 'I see the battle' to MR, the first person pronoun is *not* genuinely reflexive since the thought must be framed so that MR is once again at the centre of perspective. Velleman then compares such an imagined self with my anticipated future self that carries out my intentions, and my past self who is the centre of my memories. This imagined self requires a framed perspective, so is not genuinely first personal. Not all cases of imagining my life in the future will be genuinely reflexive. If I imagine myself as the prime minister, and I imagine addressing the nation, my imagined thought 'I am addressing the nation' may require that the perspective be framed from MR's perspective. I do not *anticipate* being this imagined self in the same way I might anticipate eating breakfast tomorrow, since it is closer to fantasy than anticipation. In contrast, when I form intentions about what I will do tomorrow, and anticipate carrying out my intentions, this would be a case of genuine reflexivity in which no framing is required.

Velleman offers a *unified framework* which he applies to all relevant mental states, including remembering past and anticipating future events. Remembering past events or anticipating future events often requires perspectival framing, whereas remembering walking in the mountains and thinking 'I am impressed by the view' does not require a separate framing so that MR is the centre of perspective. For Velleman, genuine reflexivity is a psychological relationship that links my experience of first person perspective over time, and this consideration is also important for determining my survival or continued existence. The relationship between selves that allows us to anticipate the experience of first person perspective in the future is psychological: "persons are entities whose identity depends on perspectival selfhood" (Velleman, 1996, p 55). Although Velleman does not discuss dreams as part of his unified framework, this may be a more intuitively appealing option as opposed to accepting that dream protagonists are temporary conscious entities. I will argue however that although tempting, this analogy fails.

6.3.2 Dreamed Napoleon is not analogous to imagined Napoleon

If the solution to the imagining case is applicable to dreaming vicariously, then we might say that when I dream of being Napoleon, the first person pronoun is not used genuinely reflexively. The FPP thus involves self-conscious framing which contextualises the phrase 'I have conquered'. MR is the *actual subject* who frames the thought to be from the perspective of NB, the *notional subject.* This would be a tidy solution, however I will argue that the dream case does not easily fit into Velleman's framework. I will argue vicarious dream thoughts are not necessarily appropriately framed from the perspective of a notional subject.

If we apply Velleman's analysis to my vicarious dream, NB is the notional subject and MR is the actual subject. My vicarious dream would be a case in which, like imagining being Napoleon, I frame the first person perspective as being NB's perspective as opposed to MR's perspective. This is done in a self-conscious way. According to this analysis, the distinction between waking-self dreams and vicarious dreams would be that waking-self dreams require no perspectival framing. When dreaming from the perspective of MR, like remembering, anticipating or experiencing in waking life, my perspective is automatic, unselfconscious, and the use of the first person pronoun identifies who is the centre of the perspective. However this would be distinct from vicarious dreams in which there is both an actual and a notional subject.

I disagree with this description. In vicarious dreams, the actual subject, MR, is not involved in any obvious sense. In my Napoleon dream example, the dream begins with the dream character looking over the battlefield and reflecting on his accomplishments. The character seems to feel gratified, but feels concern over the whereabouts of his mistress. There is no obvious framing about the holder of the centre of perspective. In Velleman's analysis of imagining, there is a clear distinction between the subject who imagines: the actual subject and the imagined subject: the notional subject. However in dreaming, the awareness of a waking self that is separate from the dreamed self can be absent due to memory deficits. MR is not self-consciously dreaming of being NB; rather there is only one subject. But who is this subject, and are they notional or actual?

Perceptual framing is not necessarily present in vicarious dreams, and there are not always distinct actual and notional subjects. In contrast to imagining I am someone else, dreamers often do not realise they are dreaming. Our ability to retain and store memories in dreams is at times greatly reduced, so it is quite possible that the protagonist does not realize they are part of MR's dream. MR may not be an actual subject of the dream, since, unlike imagining, MR does not play any role in the dream. This might be comparable to imagining that I was NB and forgetting that I was really MR, not NB, whilst simultaneously forgetting that I was imagining. Although waking fantasy can involve hallucinatory elements, as discussed in chapter 4 (See Foulkes, 1975), this type of imagining would be more delusional than simply forgetting one was relaxing in a dark room. As previously argued, dreams are more multimodal and immersive. I will focus instead on imagining and Velleman's description although it may be the case that Velleman's analysis does not accurately describe the hallucination-like mind-wandering Foulkes reports. If, as I have suggested, 'I see the battle' in a dream can refer to NB without the framing required by Velleman's analysis, we are left with only two options: either MR uses the FPP in a genuinely reflexive way to refer to NB, or MR does not enter the picture at all.

One might argue that in the dream, MR (the actual subject) realises that the protagonist is only a dream character, and frames the thoughts accordingly. However since lucid dreams are relatively rare, and protagonists are usually unaware they are dreaming[61], it is unlikely that this awareness is common in dreams. But perhaps lucidity is not required for framing: MR might self-consciously frame the thoughts of Napoleon but simultaneously be unaware of dreaming. However self-conscious awareness is often lacking in dreams. The centre of perspective is that of NB, however this protagonist is not necessarily aware of MR.

In contrast, we might claim that MR has tacit awareness and tacitly frames the perspective. However for Velleman, unselfconscious reference indicates genuine self-reference, and tacit awareness is better aligned with unselfconsciousness. FPPs unselfconsciously point to the perspective of the dream protagonist, who is the holder of the centre of perspective. There is no distinct actual subject and notional subject. MR is not in the dream, only NB, the protagonist. When NB uses a FPP, it points out the centre of perspective: other perspectives, such as the perspective of MR in the real world, are not involved. This contrasts with the case of imagining as described by Velleman, in which MR has a real world perspective whilst adopting the imaginary world perspective. Although, as mentioned earlier, extreme forms of mind-wandering may be more akin to dreaming, Velleman does not discuss such types of imagining.

If the protagonist consciously realises 'I am NB'[62] at the beginning of the dream, this should not be considered as framing the FPP in the way Velleman suggests. In waking life I may think 'I am MR', however this does not entail that all subsequent thoughts involving the use of the first person pronoun are framed and self-reference is non-

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[61] See chapter 1 for a discussion of lucid dreaming
[62] This brings up further questions: how did the protagonist of my dream come to believe that they are Napoleon? Beliefs are generally gained over time with experience. In contrast, NB's beliefs seem to have been gained immediately at the beginning of the dream, or over the short duration of the dream. Perhaps this could be explained by changes in the brain that lead to beliefs being formed immediately instead of gradually, but the question of what causes dreaming and dream content, is highly contested and outside the scope of this thesis.

genuine. 'I' refers to '*this* person that I am' from a self centred perspective, and 'MR' is a centreless reference. In the imagining case 'I' refers to 'NB' but it does not also refer to '*this* person that I am (when awake)', rather it refers to a dream perspective. In the dream case, there is only the perspective of the dream protagonist, NB. Unlike imagining, the dream protagonist experiences the dream world as if they are the actual subject.

I have argued that vicarious dreams are not analogous to imagining I am someone else, and cannot be described by Velleman's analysis of self-reference. So despite the strangeness of the scenario, we are left with the possibility that the dream protagonist is a separate, thinking entity. In the following section I will argue that, despite the counter-intuitive nature of such a theory, under a pluralistic view of dream experience, this is not outside the realm of possibility.

6.4 Denying psychological identity between waking and dreaming selves

In this section I elucidate the theory that the protagonist of the dream, *NB,* is not the same person as my waking self, *MR*. Dreams are an interesting example for the study of the self because of the psychological changes the dreaming individual undergoes. These changes are relevant to a psychology of perspectives (Velleman, 1996); and to assessing whether a drastically altered dream protagonist is the same person in the psychological sense as the waking individual.

In chapter 3 I discussed the possibility that dream cognition can be so altered from waking cognition that it is incomprehensible to the waking self. Similarly, altered cognition may cause a disruption in psychological continuity. If we consider psychological continuity to be essential to the persistence of the self over time, rather than the physical structure of the brain or body, it is possible that one brain activated in different ways could house more than one conscious entity. The key issue is then how much I can psychologically change while still retaining my personal identity. Some theorists highlight the importance of causal connectedness of mental states over time (Parfit 1971, 1984) while others insist that my life trajectory determines my personal identity (Schechtman, 2010). I will argue that some theories of identity support the possibility of distinct identities during dreams. For example both John Locke's (1690) and Marya Schechtman's (2010) theories of identity place heavy emphasis on the linking of consciousness over time by memory, however memory can be severely impoverished in dreams. I focus on psychological continuity through memory, and discuss the disruptions of the self in cases where memories are diminished. Firstly, I compare dream protagonists with dissociative identity disorder alters, and argue that a case can be made for dream protagonists as 'alters'.

6.4.1 Dream protagonists as 'alters'

Dream protagonists might be described as analogous with dissociative identity disorder (DID) alters, a disorder formerly known as multiple personality disorder (MPD). DID patients' psychology is fractured into multiple, dissociated personalities that present themselves at different times. We could refer to the protagonists of vicarious dreams as 'alters'. Barrett (1995) argues that dreams "parallel […] the observed phenomena of MPD" (p 61) in that they are highly dissociative[63], display amnesia, and share similar cognitive and sensory features such as alertness and hallucinatory qualities. My dream protagonist NB may in this way be analogous to having a dissociative alter who thinks he is NB.

Daniel Dennett subscribes to the standard view of MPD, in which *multiples* are created in the minds of young children to be able to cope with traumatic abuse. Dennett describes

> what they do, when confronted with overwhelming conflict and pain, is this: They "leave." They create a boundary so that the horror doesn't happen to them; it either happens to no one, or to some other self, better able to sustain its

[63] See discussion in chapter 2

organization under such an onslaught--at least that's what they say they did, as best they recall (Dennett, 1991 Chapter 13).

Dennett goes on to give an account of how multiple personalities can be housed within one brain, although I will not discuss his theory in detail here.

In contrast, John Perry (2009 p 5) argues that genuine cases of MPD/DID are *fractured selves* rather than distinct, whole selves. Multiple personalities only develop in cases where a child is traumatized before they are old enough to have developed full, multifaceted personalities and well-developed autobiographical memories, which indicates that multiple personalities are more like shards of a personality. The self is fractured rather than multiplied, moreover this is further evidenced by the fact that 'multiples' tend to be one dimensional and simplistic personalities rather than multifaceted, normal adult personalities. 'Multiples' may be separated by loss of autobiographical memory, but they may share semantic memories (memories about facts) and procedural memories (memories of abilities) in the same way that the dreaming person may retain some of these memories.[64]

Dreaming consciousness may be analogous to cases of MPD in that dream states can involve severe loss of autobiographical and other forms of memory, as well as the creation of alternate personalities who display different characteristics, personalities and even values. For example, the protagonist of my dream may murder people, whereas I would never do so in real life. We might refer to these entities as *fractured selves* as it seems implausible that a multifaceted, complex personality separate from mine can exist for a short period of time, and then cease to exist after the session of REM sleep has ended. When an individuals' personality changes due to illness or disease of the brain, or she loses a large proportion of her autobiographical memories due to Alzheimer's, she is not *herself* any longer, however not in a strong sense according to Perry (2005). They are not entirely distinct personal identities, but retain a fractured identity. This is also the

[64] There is some controversy as to whether MPD/DID is a real disorder. For example, Spanos (1996) argues that many cases may be brought about by hypnotism. But I accept the view that at least some cases are genuine.

case for DID alters. If we used the same description for dreaming, when I dream of being Napoleon, I am the same person but with diminished autobiographical memory and diminished personality. My dreaming self may be a *fractured* self.

The analogy between DID and dreams only extends so far, and I will argue that my dream protagonists are at times not me in a stronger sense than Perry's examples of DID and Alzheimer's patients. Unlike DID, dream personalities are not a coping mechanism for people who have experienced trauma. Dreams come about not from childhood trauma before full personalities can be formed, but throughout life. Dreams develop differently from DID, so where Perry's argument may be convincing against Dennett's analysis of DID, it may not apply to dreams: perhaps dream alters *could* be multifaceted personalities. Dream alters require an alternate explanation as they are not the result of childhood abuse, perhaps instead they are explained by changes in the brain during sleep[65]. Despite the two states having different causes, the phenomena might share a similar theoretical account. However, since DID forms in childhood the child's personality is fractured and thus each 'alter' could be seen as separate aspects of the same personality. In contrast, my waking self has a normal, 3-dimensional personality, whereas my dream protagonists may display character traits that are entirely unlike my waking self. Dream alters at times behave in ways I would never behave. Therefore unlike DID alters, dream protagonists should not all be considered as separate aspects of my personality. Another difference is that dream alters often are not reoccurring characters as are DID alters. In contrast, DID alters often recur for a long period of time. But this simply indicates that a wider variety of alters is possible for the dreaming subject than the DID patient.

Dreaming involves multifaceted hallucinations, and as discussed in chapter 5, the dream body and waking body can be entirely distinct. There is reason to believe that a dream protagonist is isolated from the waking self to a greater extent than DID alters are isolated from each other, since the dream protagonist experiences a different body and different world than my waking self, whereas DID alters share the same world and

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[65] See chapter 1.1 for a discussion on this.

body. Therefore there is stronger evidence to support dream selves as separate personalities than DID alters.

DID alters are not a perfect analogy for dream protagonists, however they demonstrate the possibility of fractured selves or multiple selves housed in one brain. According to my pluralistic account, dreams can display a variety of cognitive features, so it is not the case that *all* dream personalities are *alters*. It is possible that a dream self can be *myself* in the full sense, especially in lucid dreams. To analyse the possibility that dream selves can be distinct psychological entities, I will now discuss the extent to which a dream protagonist can be psychologically isolated from my waking self. I will argue that a case can be made for psychological discontinuity between my waking self and dream protagonists, based on the loss of autobiographical, semantic and procedural memories, and the possibility that these memories be replaced by different, false memories.

6.4.2 Psychological discontinuity and memory

For the conscious self to persist over time, some theorists argue that it is important to be able to perform mental time travel (Jaynes, 1976). So access to memories may be necessary to attain full self-consciousness (see chapter 8 discussion of Tulving, 1985). Psychological continuity may require many factors, including appropriate causal connectedness over time (Parfit, 1971), memory retention (Locke, 1690) or the retention of one's personality (Wilkes, 1988, Williams 1973). In this section, I argue that a dream protagonist may be psychologically discontinuous with the waking self regarding memory retention and the ability to perform mental time travel, a view that has not been discussed in the philosophical literature.

In some dreams we are isolated from most waking memories, and when waking we are isolated from most dream memories. Our dream experiences are usually forgotten[66], and whilst we are dreaming, we have little or no access to our waking memories. If personal

[66] See chapter 1.1 for evidence for this

identity requires connectedness through memory, it can be argued that the Napoleon protagonist is not psychologically connected to my waking self. NB does not identify himself as MR, which is another reason to reject psychological continuity between dreaming and waking selves. However, such disruption of psychological continuity does not occur in every dream; consistent with the pluralistic view of dreams, psychological continuity can be maintained in waking-self dreams, and there may be borderline cases, as I shall discuss shortly.

Memory recall in dreams, as well as the ability to retain new memories from dreams varies greatly. It is possible to have a lucid dream in which the memory faculties are intact, including memories from the preceding day and highly accurate recall. Of course, this type of full memory access even in lucid dreams is uncommon, for example, you may remember who you are, but not remember falling asleep or what you did the previous day. At the other end of the spectrum, memory may be greatly deficient during a dream. You may forget who you are, your knowledge of events, even your skills. For a detailed discussion of this topic, I begin with an overview of the different types of memory, and their importance to psychological continuity. Discussions of memory in dreams are usually limited to autobiographical memory, however as I will argue, a broader view of memory needs to be taken into account.

There are several distinct types of memory that together furnish our ability to recollect not only experienced events but also facts and abilities. These distinctions are usually ignored in discussions of psychological continuity. *Episodic* memories are memories about my past experiences, such as that embarrassing time when my pants fell down during a sports class. These memories are personal and are about episodes of my life, whereas *semantic* memories are facts about the world that are not personal in the same way. These memories are remembered as propositions as opposed to multimodal narratives; for example, I remember that Pluto is no longer classified as a planet. Both episodic and semantic memories aim at truth and are about facts or events that occurred in the past. In contrast, procedural memories are our skills: memories about *how* to do something. Skills can't be judged based on truth or falsity (Sutton, 2010), although one can be more or less skilled. This is analogous to Ryle's (1949) distinction between "knowing how" and "knowing that".

Procedural memories have received less discussion than episodic or semantic memories in the dream literature. But what exactly is a procedural memory? Is it the *ability* to perform an action? This is ambiguous. I may be able to score a hole in one on a golf course by chance despite having little skill, but this does not mean I *know how* to do it. Maier (2010) notes that *powers* are the properties that "are typically expressed by the modal auxiliary 'can'". Powers that can be aligned with abilities are used to express either *competence*, such as being competent at playing the guitar (as opposed to being incompetent), *potentiality*, such as potentially being able to play the guitar if I practiced (as opposed to not having the potential to be a telepath, no matter how much I practise), or *opportunity*, for example, I can only play if my fingers are not too cold and I am not too tired[67]. It is *competence* that best describes procedural memories. Simply being able to carry out an action doesn't prove my *competence* because I could do something by chance or have beginner's luck. Contrary to the standard view, I will argue that competence or procedural memories are an important aspect of personal identity.

Although it is easy to show that autobiographical memories can be disrupted in dreams, there is less research into procedural memories. If they are identity-constituting, we could argue that, since a dream protagonist retains *my* competence abilities, the protagonist is not an entirely separate individual. In contrast, perhaps abilities are not important for personal identity if only autobiographical memories link psychological continuity over time. For example, my memories of riding a horse when I was a child are more important to my selfhood than my ability to get up on a horse and ride as an adult.

Schechtman notes that "memory based accounts of personal identity as they are usually presented do not simply suggest that memory constitutes personal identity, but more

[67] This may also be described a distinction between *specific* ability; in which they are in a position to carry out an activity, or a *general* ability in which they may not be in the position to carry out a behaviour, but given certain specifications they would (Maier 2010).

specifically that identity is constituted through autobiographical experience memories" (Schechtman, 2010 p 69). An example of this is the view of Bernecker (2010), who argues that certain memories could conceivably be transferred between individuals without any indication of personal identity being transferred. Factual memories about horses or ability memories about how to ride are *extroversive* (i.e. not of one's own mental state) and according to Bernecker they are identity neutral. On the other hand, *introversive* memory (of one's own mental state), e.g. memories about that time I fell off a horse, cannot be neutrally transferred. Either the memory would be delusional for the person "remembering" it, as if *they* had fallen off a horse, or the memory would be stripped of context and no longer true to the original memory; i.e. they would not recognise the other kids riding horses, the location nor the instructor.

According to Schechtman, extroversive memories can still be identity constituting, since

> our memories do not just give us information about the world; they give us information about ourselves. Even when they do not represent our inner lives or include first-person indexicals, our memories tell us about our lives and our trajectory through the world (Ibid, p 75).

Extroversive memory may be important for one's personal identity if it is important to one's *life trajectory*. Forgetting how to ride a horse or the names of different parts of the horse's anatomy would not have a serious effect on the trajectory of *my* life, whereas a surgeon forgetting her skills or relevant factual knowledge would be detrimental to her life. Similarly, introversive autobiographical memories may be more or less important depending on their relevance to one's life trajectory.

I will not evaluate Schechtman's argument here, but simply note that there are arguments that support the inclusion of extroversive memories into an account of identity. So an assessment of the identity of the dream protagonist should not be limited to autobiographical memories alone.

6.4.3 Disrupted psychology in dreams

In this section I argue that all forms of memory can be disrupted in dreams, and note that memories can be *replaced,* either by false autobiographical or semantic memories, or by the gaining of competence abilities. This means there is a very strong sense in which the dream protagonist and the waking self are distinct individuals.

i) Forgetting and recontextualising

It is clear that in dreams we can forget semantic and autobiographical memories. Many have suffered through a nightmare in which they are in an exam but have no access to autobiographical or semantic facts about their study. Another interesting aspect of dream memory is the recontextualisation or confabulation of memories. Baylor & Cavallero, (2001) and Fosse and colleagues (2003) found that episodic memories from waking can be recontextualised into dreams. For example, it was found that dreamers often experience images that relate to their waking episodic memories but taken out of context. Tetris players often reported simplistic game imagery at sleep onset, such as Tetris shaped blocks, or blocks falling to fit into other blocks, however reports lacked elements that would be present in an episodic memory, such as the computer screen, the players hands, etc. The same type of isolated Tetris images were found in amnesic patients, except that upon waking, the amnesic patients could not recall the origin of such objects (Fosse et al. 2003) i.e. that they were from the game Tetris. This suggests that memories about the shape of Tetris blocks can be accessed without the accompanying episodic memory.

There are other ways in which memories can be recontextualised. An episodic memory can be recontextualised as a semantic memory, or a semantic memory can be confabulated and remembered as an episodic memory. NB, the dream protagonist, has access to some factual memories about Napoleon that I have learned from history books; that Napoleon was at a battle in Austerlitz, had a relationship with Maria Walewska and was relatively short in stature. These memories are mistaken for episodic memories. What NB believes to be his episodic memories about Maria Walewska are in fact confabulated versions of my semantic memories about the famous historical romance.

This demonstrates that memory can be disrupted in multiple ways in dreams. Dreams can be highly amnesic, but also display recontextualisation and fabrication of memories. For example, NB's memories about being teased his whole life are completely fabricated: they are not recontextualised from my factual memories as I have no knowledge of whether or not he was teased. If we compare this to the case of memory insertion discussed by Bernecker (2010), the memories shared between NB and MR do not indicate psychological continuity any more than if my memories about horse riding inserted into another's mind would indicate continuity since the memories are taken out of their original context.

Dreams in which episodic and semantic memories are lost or confabulated may nonetheless maintain some procedural memories. In the Napoleon dream, although NB lacks memories of who I am, who my family is and what I have been doing for the last few days, NB has ability memories about how to ride a horse, a skill I learned during my waking life, which may indicate some continuity between the life trajectories of MR and NB. If we are to consider certain procedural memories as identity constituting, it is important to take this into account. In the following I argue that procedural memory in dreams can undergo a variety of interesting changes: not only can competence abilities be forgotten, but also new abilities can be gained.

Could an expert guitar player, who plays without conscious effort when awake, and, for whom arguably, playing is an important part of his life trajectory, forget how to play the guitar when dreaming? Hobson (2002) reports the following dream.

> I arrive at a meeting […] and am greeting colleagues. Suddenly I notice Jouvet is there. He recognises me and smiles broadly (not his usual greeting). I am about to call out to him when I suddenly lose muscle tone in my legs and sink to the floor. I cannot communicate and feel lost. (Hobson 2002 p 154)

Hobson experiences lack of agency and loses basic abilities such as the ability to speak and walk. If this were the case, there is reason to think that any ability, no matter how expert, could be forgotten during a dream. Yet Hobson's example doesn't make it clear whether he temporarily *forgot* how to walk, or whether paralysis or some other force prevented him from being able to do so, hence lacking the *opportunity,* not *competence*. However an extreme view can be put forward; that all abilities are completely lost whenever we dream. In the dream, one only *dreams* about performing an action, and, in a sense, cannot perform *any* action. If we apply Sosa and Ichikawa's (2009) argument that the "in the dream operator" implies no actions, thoughts or beliefs really occur in dreams as discussed in chapter 3, abilities cannot be demonstrated in dreams. For example 'in the dream, I played the guitar', strongly suggests that 'I did not *actually* play the guitar'. The same would be applied to any ability according to Sosa and Ichikawa. This can even be applied to *competence* since being competent in a dream does not mean I am *actually* competent. I reject this extreme view, since according to my pluralistic approach, the 'in the dream operator' does not rule out having actual beliefs and thoughts (see chapter 3 for further discussion). The same applies to competence.

Foulkes might argue that dreaming itself is an acquired ability that requires perceptual and imaginative procedural memories, hence it would be contradictory to lose all abilities while dreaming. In chapter 1, I discussed Foulkes (1999) arguments that dreaming requires first learning to perceive the external world, and imagine three-dimensional space. If we consider perception of three-dimensional space to be an acquired skill as Foulkes supposes, this skill *is* retained in most dreams. However since perceptual abilities probably won't distinguish me from anyone else with similar abilities, i.e. they could be transferred between individuals without any change to the self, it is unlikely that one's ability to dream is identity constituting.

Foulkes argues that dreams are furnished mostly by memories of waking experiences; a tree in a dream will usually look like a tree we have seen while we are awake. Therefore I usually retain memories of how trees and other every day objects look, and these images furnish my dreams. However these memories are recontextualised to come from the protagonist's perspective, so it is not clear whether they should be considered as a psychological link. For example, NB's 'episodic' memory of Maria may be quite distinct from my semantic memory of her.

Cognitive deficits during dreams may lead to a loss of procedural memories. If I forget how to play the guitar in a dream, it may be a cognitive deficit as opposed to lack of opportunity. Noë (2005) gives the example of a former ski jumper who can no longer perform a difficult maneuver because her body is no longer in condition. However, she might retain the knowledge- how (competence), and only lack the opportunity to use her skills because she is no longer strong or agile enough. This analogy fails because in a dream, it may be a cognitive as opposed to a physical deficit that prevents the dreamer from carrying out an activity. A better analogy would be a ski jumper who has suffered a brain injury and no longer retains their expert knowledge and general competence. It is no longer a matter of opportunity: while a fitter body would allow the former ski jumper to be able to perform her jumps, the brain damaged ski jumper would still be incapable even if they were physically fit. Admittedly, brain damage is often permanent whereas cognitive impairment in dreams lasts only during the dream. However the temporary nature of dreaming does not entail that one retains one's general-competence throughout the dream. When a stroke impairs the ability to speak, the ability can sometimes be re-learned. The best explanation is that the stroke patient suffers a temporary lack of competence, but regains it with practice[68]. This is also a plausible explanation for dream abilities.

ii) Gaining and replacing abilities

I argue that we can also *gain* abilities in dreams that we do not have when we are awake. This is important for personal identity because if a dream protagonist has a separate set of abilities than my waking self, this is further reason to consider the protagonist as psychologically isolated from my waking self.

We can fly or walk through walls in some dreams. However, perhaps since I am less constrained by laws of nature during a dream, instead of gaining competence, I merely gain opportunity. If I dream of being a professional soccer player, it is implausible to

[68] One might argue that this constituted learning a new ability, since it is neural plasticity that allows different areas of the brain to take over the functions of the damaged area. It may be the case that this constitutes learning to speak in a different way, but I will not discuss neural plasticity here.

think that I have suddenly gained the procedural knowledge that should take years of practise to learn: what precise angle to hit the ball and how much force to apply. Rather the ball appears to go where I want it to go, perhaps travelling in ways that would be impossible in the waking world. If the laws of nature changed in the waking world, I could also be a soccer-pro. So although I have gained opportunity, I have not gained competence. However this is not true for all dream abilities.

In some cases, competence *can* be gained in dreams. Firstly, certain dream abilities may require competence. LaBerge and DeGracia (2000) argue

> the attempt to fly during any given lucid dream may be met with varying degrees of success. The lucid dreamer may fly readily, merely hover, or not be able to fly at all. Likewise, a lucid dreamer may not always be able to pass through walls (p 156).

LaBerge and DeGracia suggest that flying in a dream is an ability that some can attain whilst others do not. Also, an individual might have the ability in some dreams but not others. Similarly, gaining lucidity in a dream can be a learned skill, as discussed in chapter 1. These 'abilities' are not aligned with real world abilities i.e. the procedural knowledge required for flying in a dream is not the same knowledge that might be required to fly in the waking world. Nonetheless, dream flight might be a dream specific general competence that one only has during a dream. This is an example of competence gained whilst dreaming.

Contrary to this, one might argue that the general competence of dream flight or lucid dreaming is not attained in dreams alone, but rather refers to *opportunity.* I only have the opportunity to fly in the dream, but maintain the competence when I am awake in the same way that the former ski jumper might maintain competence but not opportunity after they have retired. The skill of lucid dreaming, as discussed in chapter 1, can be gained through waking exercises, so this suggests that one retains competence when awake. However since individuals rarely have the ability to lucid dream in every dream, this is unlikely to be the case. The abilities are only gained in some dreams, so it is not the type of ability that, once learned, is retained in all scenarios. Even if we reject lucid dreaming as a dream ability, there are other plausible cases to examine.

It is possible that dream protagonists have creative abilities that the waking individual lacks[69]. Dali's dreams inspired his paintings, while Otto Loewi's Nobel prize winning medical discovery was inspired by a dream. This possibility is supported by research on problem solving dreams. Schatzman (1983a, 1983b, 1986) notes there are dreams in which the dream characters assist in solving problems that the waking individual was unable to solve. When the dreamer wakes up, they know the answer to the problem. These are specific abilities of problem solving they gain in dreams alone.

Another possibility is that we can *learn* abilities in dreams which can then be utilised in waking. According to threat simulation theory (Revonsuo, 2000, Valli & Revonsuo 2009), dreams provide scenarios in which we can practice responding to threats in a safe environment, and this helps us to recognise and avoid similar threatening scenarios in the real world. According to this theory, dream practice can improve performance even if the dreams are not incorporated into autobiographical memory, since they have positive unconscious effects. This view is rejected by Flanagan (1995, 2001) who thinks that dreams have no such evolutionary advantage. Flanagan argues that dreams are evolutionary spandrels; traits that piggyback along with other useful adaptations. However whether or not dreams are an adaptation that has served an evolutionary purpose is a separate issue. There is empirical evidence supporting the possibility that in some dreams, we can gain or learn abilities that we did not possess in waking life. However, if these abilities carry into waking life there is psychological continuity between the protagonist and the waking self.

Contrary to the above mentioned example, it is conceivable that NB attains abilities that MR does not possess which are forgotten upon waking. Thus the aforementioned

[69] See chapter 3 for further discussion

psychological continuity does not occur. These would be completely isolated dream abilities, another way in which the dream protagonist can be psychologically discontinuous with the waking self.

If procedural memories are important for the constitution of personal identity, gaining abilities may be equally important to personal identity as losing abilities. If the dream protagonist is a genius chess player whereas I am incompetent, one might question whether the protagonist is *me*. If, for example, the protagonist is more creative than I am but lacks all of the critical thinking skills learned from years of philosophy (a plausible circumstance, given reduced rational capacities in dreaming) one might question the protagonist's identity.

I have highlighted multiple ways in which the psychology of a dreaming individual can be disrupted. In the following section I will discuss how the dream protagonist scenario is an important phenomenon for theories of personal identity to take into account.

6.4.4 NB and personal identity

I propose that in certain situations, the dream protagonist is psychologically disrupted, and discontinuous with my waking self, MR. In such cases, we might say that the dream protagonist is a distinct individual from myself, despite how odd this may seem. When NB thinks 'I see the battle', 'I' refers to NB is a genuinely reflexive way. Alternatively, in other cases the psychological disruption may be less severe; a dream protagonist can be a hybrid personality: partially me, partially not. This depends on whether selfhood comes in degrees, since psychology can be more or less disrupted during dreams. Partial psychological disruption may be more common, however I will focus on vicarious dreams in the full sense.

NB doesn't have much of a life trajectory, existing for only a matter of minutes. His memories are fabricated, some of which are my memories taken out of context. Perhaps, because of this NB is not a psychological entity in the full sense. Rather this gives support to the analogy of fractured selves as dream protagonists. However, as I have argued, we have reason to reject the possibility that dream protagonists are fractured selves in the same way DID alters may be. In contrast, if temporary protagonists *could* be psychological entities in the full sense, this might provide evidence against life trajectories or psychological continuity theories of personal identity. If NB can be a psychological entity, this would demonstrate that life trajectory and psychological continuity are not necessary for selfhood. Other views of personal identity stress the importance of the physical body or causal connectedness between person states. These views would handle the dream case differently. For example, body based views would reject that there is a "dream protagonist" because our identity is defined by our physical body. Our physical body also remains the seat of identity when asleep.

Velleman's perspectival view of the self, as previously argued, might allow for a distinction between MR and NB. If the protagonist has no memory of MR, and cannot anticipate future events involving MR as the centre of perspective, then MR and the protagonist could be distinct individuals. Likewise, MR cannot anticipate *being* NB in a dream in the genuinely reflexive way Velleman describes, although when I awake, I might remember the dream from the perspective of NB. This possibility, that MR can have memories from the perspective of NB, is another quandary.

Although most dreams are forgotten, so there is no memory link between MR and NB, sometimes I remember a dream in which NB was the protagonist. When I wake up, I remember the dream as if I looked through the eyes of NB, and thought like NB. How is it that MR can remember NB's memories if they are distinct individuals? This is not a standard case of memory insertion, since NB and MR share the same brain. However since the case of multiple identities sharing one brain is a very odd case of identity, we could conclude that this was a different type of memory insertion in which the memories of one entity cross over into the consciousness of a separate entity. The disruption between MR and NB may not be complete. There may be hybrid identities: partially MR, partially NB. Nonetheless, despite some crossover it is plausible that there are cases in which there is sufficient disruption to consider MR and NB as separate entities.

Vicarious dreaming provides an interesting and puzzling case for personal identity.

Conclusion

Self-reference in vicarious dreams raises an interesting quandary: to whom does the first person pronoun refer, and who is the utterer? I have argued that the dream protagonist is not a notional subject of the actual, waking subject, although this provides a good explanation for imagining I am someone else. Instead we should concede that the dream protagonist can be a separate entity from the waking self who uses genuine self-reference. However, this is a counter-intuitive outcome. The importance we place on memory in the retention of identity will largely affect what we say about identity during dreams. Conversely, dreaming might alter intuitions about certain theories of personal identity, such as the life trajectory view, or perspectival identity. I have argued that autobiographical, semantic and procedural memories are all susceptible to be not only forgotten, but also replaced by other false or confabulated autobiographical, semantic and procedural memories. From this I have argued that dream protagonists may constitute fractured selves or temporary conscious entities. This raises the possibility of a single brain housing a variety of temporary entities that exist only briefly, for a few minutes of REM sleep. According to dream pluralism, experience during dreams is multifarious, and vicarious dreams provide an example of how altered the dream protagonist can be from my waking self. My dream protagonists can only hope to live on in my memory, however due to poor dream recall, many of them will be immediately lost, never to be thought of again.

7

Extended Mind, Dreaming Mind.

In this chapter I analyse the implications of dreaming, a cognitive state which is isolated from the external environment, for the extended mind theory. The case of dreaming provides a variety of interesting thought experiments for theories of extended cognition, and a counter argument to theories of extended consciousness. In section 7.1 I discuss extended cognition as espoused by Andy Clark and David Chalmers, who argue that tools which allow us to perform or offload complex cognitive tasks can become incorporated into our cognitive systems. Dream cognition provides an interesting test case since dreams are isolated from the external environment, yet can involve cognitive activity similar to that of waking. I argue firstly that dreaming is an example of cognition that is not usually extended because of the input and output blockade during sleep. Secondly, dreaming could potentially be extended with futuristic "external" cognitive enhancement devices. I use the science fiction example of external memory devices that utilise wi-fi connection with the brain to augment memory. This gives a convincing reason to accept such devices as examples of extended cognition, however this argument does not extend to current memory enhancement devices such as notebooks and modern digital diaries. Wi-fi cognitive enhancements devices could be utilised whilst dreaming whereas other types of external tool cannot, indicating higher levels of cognitive integration in the wi-fi enhancement case. If extended cognition is a matter of integration, the ability to undergo a cognitive process during sleep indicates robust integration which is only possible with tools that are wi-fi connected.

Extended consciousness, the view that the *conscious mind* extends beyond the brain, is a tenuous view according to many extended cognition theorists, who contend that only some non-conscious cognitive processes extend into the environment. In section 7.2 I discuss Noë's extended substrate view: that conscious coupled systems form with objects which we perceive in the external environment. I argue that dreams provide evidence against Noë's extended substrate thesis. Noë argues that dreaming does not provide evidence against the extended conscious mind. However this view rests on an unjustified and reductive account of dreams. Noë's view, which states that external objects are necessary for full-blown conscious experience, should be rejected because dreams can be full-blown, isolated conscious experience.

7.1 Extended cognition and dreaming

Dreaming provides an interesting case study for the extended mind because it is a cognitive state which is apparently isolated from the external environment. I argue that dreaming cognition is often but not *necessarily* isolated. The dreaming mind could in theory extend into the environment given futuristic wi-fi cognitive enhancement devices. Although the cognitive enhancement device case is currently only a sci-fi thought experiment, it gives intuitive appeal to the possibility of extending the mind. A dreamer could use their wi-fi device whilst asleep, and this would show that these devices are robustly integrated with internal cognitive processes. However, the dream case separates wi-fi cognitive enhancement devices from other types of tools, such as modern memory storage technologies, digital diaries or notebooks. I argue that there is reason to think that if a device can be used to enhance dream cognition, this would indicate robust integration between internal and external processes.

7.1.1 Does cognition extend?

Andy Clark and David Chalmers (Clark & Chalmers 1998 and Clark 2001, 2006, 2008, 2009) advocate a view which they refer to as "active externalism". According to this view, interaction between internal cognitive systems and the environment can form coupled cognitive systems. They argue that

> if as we confront some task, a part of the world functions as a process which, were it to go on in the head, we would have no hesitation in accepting as part of the cognitive process, then that part of the world is (for that time) part of the cognitive process (Clark & Chalmers 1998 p 9).

According to this view, cognitive processing can be "off-loaded" onto the environment. Some tools can 'fill in' for brain functions or enhance our cognitive functioning beyond normal capabilities. In this way our minds extend into the environment. For example, calculators allow us to calculate complex sums with greater speed and accuracy than we could without. Even using a pencil and paper to calculate large sums grants greater mathematical ability than we could achieve in the head alone. It is not contentious that tools can enhance abilities, however for Clark and Chalmers, cognitive systems include both the brain and external tools under the appropriate conditions.

The hypothesis of extended cognition (HEC), opposes the hypothesis of embedded cognition (HEMC) (Rupert, 2004), according to which "certain cognitive processes lean heavily on environmental structures and scaffoldings but do not thereby include those structures and scaffoldings themselves" (Clark 2008 p 111). According to HEMC theorists, external factors may be causally necessary, like a scaffold, but not constitutive of cognition. Clark argues that some intuitions supporting HEMC are a form of in-head chauvinism; that only neurons have the power to be cognitive systems. In contrast, according to HEC,

> neural goings-on are not blessed with some intrinsic property that makes them alone suitable to act as the circuitry of the mind and intelligence [...] there is no single, all powerful, hidden agent inside the brain whose job is to do *all the real thinking* and which is able to intelligently organise all those teams of internal and external supporting structure (Clark 2008 p 136).

Clark and Chalmers' (1998) famous "Otto and Inga" thought experiment demonstrates the intuitive force of HEC by outlining a case in which Otto's mind forms a coupled cognitive system with a notebook.

Clark and Chalmers' (1998) thought experiment involves the comparison between two people looking for the Museum of Modern Art. Inga remembers how to find the museum, whereas Otto, an Alzheimer's patient, relies on a notebook to remember any important information, and uses it to find MOMA. Otto consults his notebook instead of consulting his internal memory. According to Clark and Chalmers, Otto's notebook functions as part of his memory. Since the *functional structure* of the process, not the physical constituents of the process, matters for whether a process is cognitive, Otto and his notebook together form a coupled cognitive system. Clark and Chalmers highlight four necessary criteria for extended systems: an external object must be constantly accessible, accessible without difficulty, the information is automatically endorsed, and this endorsement is the consequence of past conscious endorsement (Clark and Chalmers, 1998, p 17).

According to "the differences argument" (Rowlands 2009), there are too many relevant differences between Otto and Inga's behaviour for Otto's notebook to be considered part of his cognitive process. However, action and belief states are not relevant to whether processes are cognitive according to Clark and Chalmers. Inga accesses her memory without bodily movement, and her memory is generally, more reliable, difficult to tamper with and faster to access than Otto's, whereas Otto must physically flip through the pages of the notebook, however these differences are not relevant to whether a process is cognitive or not. Although Otto's notepad and Inga's memory are entirely different physical structures, both systems are appropriately integrated with internal cognitive processes and serve the same kind of function.

Here it is important to distinguish between *first wave* and *second wave* extended mind theories (Sutton 2010). Sutton notes that the first wave of extended mind theorists focused on functional similarities and differences between internal and external processes. Theorists supported the extended mind by arguing that according to the parity principle (Clark and Chalmers 1998) an external process can be considered as cognitive if it functions in a sufficiently similar way to internal cognitive processes. In contrast, the second wave of extended mind theory focused on the 'complementarity principle', that "different components of the overall (enduring or temporary) system can play quite different roles and have different properties while coupling in collective and complementary contributions to flexible thinking and acting" (Sutton 2006 p 293). I adopt a second wave approach that will focus on the integration of cognitive processes rather than the parity between internal and external processes. Firstly I argue that integration is key to determining whether a process is cognitive. Secondly I argue that dreaming provides evidence that external tools can potentially be highly integrated with internal cognitive systems. This integration can be so robust that there is good reason to accept the possibility of coupled cognitive systems.

7.1.2 Integration is the key

There are many obvious differences between manipulating a notebook and using our brains, but to decide whether cognition extends, we must distinguish between relevant and irrelevant characteristics for cognition. According to second wave theorists, it is not the similarities and differences that need to be taken into account, but rather, how well integrated the internal and external systems are. Sutton (2009) argues that

> it's just *because* isolated items aren't stored atomically in the brain that our relatively vulnerable biological memories are supplemented by more stable external scaffolding. Brains like ours need media, objects, and other people to function fully as minds (Sutton 2009 p 302).

The key is the extent to which an external system is integrated with the internal cognitive system. So to determine whether a notebook could be part of an integrated cognitive system is to determine whether a notebook can be sufficiently integrated with our memory systems.

Some of the indicators of integration discussed in the literature include:

i) *Transparency:* A system is transparent if it is used in an automatic way so that the mechanisms of the system are not apparent to the individual. For example, a talented carpenter may use her tools in an expert way so that the tool becomes an extension of her arm. She uses the tools automatically without thought .

ii) *Accessibility*: Most internal cognitive systems are usually accessible as well as being transparent. In contrast, a carpenter's tools may not be accessible when they are left behind at the workshop at the end of the day. Of course, accessibility comes in degrees for any cognitive system depending on the state of an individual. Certain cognitive abilities, such as memory, are not accessible at times, for example if the individual is very tired or drunk.

iii) *Reliability:* a well integrated system will usually be more reliable than a less well integrated system. For example neurological disorders may lead to some cognitive processes becoming unreliable. Alzheimer's may cause memory to become unreliable, therefore the sufferer may lose some of their cognitive capacity. This indicates reduced integration. In the same way, Otto's notebook might be tampered with, causing it to be unreliable and disrupting the level to which Otto and his notebook are integrated.

Other indicators in the literature are *speed of processing, difficulty to corrupt, trust* and *constancy.* All of these indicators can be demonstrated to be lacking in particular cases of internal cognition, therefore they are not necessary conditions. However, indicators may be useful for demonstrating the level of integration.

Sufficient integration may be discerned by the degree to which each indicator occurs. For example, today Inga's memory is somewhat less reliable than it was yesterday, however nonetheless, accessing her memory is still a cognitive process because it demonstrates sufficient integration on other dimensions, such as transparency. A notebook may be used transparently if accessed regularly without thinking. However, whether a notebook can be sufficiently integrated to be considered as a coupled system will depend on whether it can achieve a sufficient level of these dimensions of integration.

When dreaming, the dreamer is usually isolated from the environment but can still perform complex cognitive tasks, as argued in chapter 2.2. Yet one can conceive of a case of extended dreaming in which external brain enhancements 'offload' dream cognition. I argue that dreaming provides support for the possibility of extended cognition. The possibility that the mind can offload cognitive tasks even in sleep exemplifies robust integration between internal cognition and external tools. However, I note that this argument cannot be applied to the case of Otto and his notebook since Otto cannot access his notebook whilst asleep. The notebook is inaccessible to sleeping Otto even in outlandish scenarios that I describe.

7.1.3 Extended dreaming

Dreaming provides an example of cognition that can occur when an individual is completely isolated from the external environment. Although external stimuli sometimes filter into dreams, this is uncommon as discussed in chapter 1. However, dreams could in theory extend into the external environment in certain circumstances. One such circumstance, which I shall outline, is a science fiction thought experiment involving futuristic cognition enhancements. If an external device can, for example, be used to improve Otto's memory during sleep, this means that the external device is robustly integrated with Otto's internal cognitive systems. The device is accessible, used transparently and is reliable even when the Otto is asleep and otherwise under the input and output blockade. This thought experiment provides evidence that cognitive systems can extend into the external environment. However, I must specify that such integration could not occur with current technologies.

i) Enhanced Otto

Clark and Chalmers (1998) discuss a sci-fi case of a subject who has received a neural implant. The subject attempts a mental rotation task in which they have to discern whether an object fits into a socket on a computer screen.

> This agent, however, has the benefit of a neural implant which can perform the rotation operation as fast as [a] computer [...] The agent must still choose which internal resource to use (the implant or the good old fashioned mental rotation), as each resource makes different demands on attention and other concurrent brain activity (p 7).

If we imagine that the device is not implanted in the subject's brain but is instead stored in a warehouse and uses a wi-fi connection to the brain, I argue that there is good reason to accept that this external device is incorporated with the internal processes as a hybrid cognitive system. There seems to be no relevant difference between a device placed in the skull that replaces some of the functions of the brain and a device that serves the same functions but is stored elsewhere. This device is significantly well integrated, I argue, that it can potentially be accessed in a dream. I argue that cognitively enhanced dreaming Otto is a thought experiment that could provide strong evidence for the possibility of cognitively extended dreaming.

Wi-fi-enhanced Otto has his memory enhanced by external semi-conductor based devices (e.g. futuristic computer chips) which are wi-fi connected to his memory, but stored in a warehouse. A wi-fi enhancement device could be used to offload or enhance cognitive processes whilst dreaming, and this would indicate a robust integration between internal and external processes. However a disconnected notebook, such as Otto's, could not be incorporated during sleep. Therefore the argument only works for sci-fi examples. In this section I argue that the dream example gives a strong argument that cognition can extend beyond the skull and skin, however I remain neutral on the Otto case. Although Otto's notebook might be robustly integrated during waking, this is not the case during sleep. This might suggest that the wi-fi device is better integrated with internal cognitive processes, however, this does not mean that paper notebooks cannot form coupled systems when awake.

Enhanced Otto can access forgotten information about the location MOMA using his memory chip just as a person without Alzheimer's can access their memory. He need not pick up a notebook to find the information, but rather thinks about the information he is looking for, and it is supplied by the chip. Enhanced Otto falls asleep and dreams about going to MOMA. Whilst asleep, the wi-fi device provides the appropriate information about MOMA's location, and in Otto's dream, the accurate location of MOMA is 'remembered'. Perhaps during the dream, Otto's memory device is more accurate that Inga's memory in a dream. The wi-fi device may not be susceptible to the cognitive failures that can occur in dreams. If, as I have argued, integration is the key of the mark of the cognitive, then the potential ability to access the memory stored on the wi-fi device indicates a robust integration; transparency, accessibility, and reliability. It is transparent because it can be used without realising that an external device is supplying the information. Rather the memories may be accessed simply by thinking about them. The type of connectivity afforded by the wi-fi device makes it accessible and reliable, more so than Otto's notebook, since it can be accessed during sleep as well as when awake, and the information will be accurate so long as the device is programmed correctly.

Potentially, the wi-fi memory device could compensate for Otto's Alzheimer's by offloading the functions of his damaged memory centres onto the device. Although the notebook can replace Otto's forgotten memories and help him live a normal life, only the wi-fi memory device can improve Otto's memory whilst asleep. In the following section I argue that dream cognition cannot extend without wi-fi enhancements.

ii) RBD Otto

In this section I show that although dreams could potentially extend given futuristic technology, it is currently not possible even in unusual circumstances. I describe the most plausible case for dream extension, and argue that even under these circumstances, extension is not possible.

REM sleep behaviour disorder (RBD), as discussed in chapter 3, is a disorder in which the dreamer acts out their dreams, overcoming the output blockade. Imagine RBD Otto, who is an Alzheimer's patient, expert notebook user and also suffers from RBD. Otto might dream of using his notebook, and since he is not under the output blockade, simultaneously pick up and rifle through his real notebook. RBD Otto does interact with the external environment, however, he is still under the input blockade. When he picks up his notebook simultaneously while picking up his dream notebook in the dream, the information from the waking notebook would not filter into the dream: rather only a dreamed object would be experienced. RBD Otto would be reading a notebook that is internally generated, not the real notebook, despite the fact that his sleeping body does pick up and flip through the pages. The dream notebook might say that MOMA is located in the land of Oz, whereas the real notebook says it is down the street. Evidence for this includes instances when sufferers of RBD have nightmares in which they are fighting off attackers, but in reality they are attacking their spouses (see chapter 3). This demonstrates that they are still under the input blockade. So although RBD Otto is the closest that an individual could get to dream extension given current technology, nonetheless his interactions with the notebook are not appropriate to be considered as dream extension.

Although RBD-Otto can manipulate his notebook whilst asleep, he cannot access the information in the notebook. He would have to overcome the input blockade *as well as* the output blockade to find the information he wanted. Of course, this simply means he would wake up, since if he could both flip through the notebook and read the information on its pages, he would no longer be asleep. We can think of an even more outlandish case in which RBD Otto manipulates an auditory notebook which uses audio to inform Otto of the directions to MOMA. As discussed in chapter 3, sound can occasionally filter into a dream, so potentially Otto could access the information from the notebook by hearing it in the dream. However, as mentioned in chapter 1, scientists have been unable to reliably influence dreaming using external stimuli. Causing a dreamer to hear sounds is particularly difficult. So even if RBD-Otto could occasionally access data from his audio notebook, it could not be done reliably. Secondly, RBD-Otto would only be accidentally accessing the information in his audio notebook. In the dream he is manipulating his dream notebook, while it is only a coincidence that his sleeping body is manipulating his real notebook. Hence, this type of interaction should not be considered as transparent access, but rather accidental access. RBD Otto can not access his audio notebook reliably or transparently, so we should not consider this to be a cognitive extension.

To extend his mind, dreaming Otto needs to overcome the input barrier without waking up. The only conceivable way that he could do this would be a wireless connection to an external device that feeds him information directly into the dream. Therefore, dreaming cognitive extension is theoretically possible, however not with current technology.

iii) What level of integration is required?

I do not intend to rule out other forms of tool manipulation as mind extension, I merely wish to support the possibility of extending the mind, even in sleep, with wi-fi devices. Sleep extension cannot be achieved with notebooks and most other external devices, and this shows a difference in accessibility and connectivity, however, this does not mean that notebooks cannot be part of a hybrid cognitive system when we are awake. If integration is determined by accessibility, transparency and reliability, a process that is potentially accessible and occurs transparently during sleep as well as during waking should be considered as highly integrated, and a notebook may be less well integrated than enhanced Otto's memory device. Otto's notebook is not as accessible, reliable or transparently used as the memory device because during sleep, the notebook cannot be accessed. The input and output blockade must be broken for this to occur, and this cannot occur in the case of the notebook unless Otto wakes up. However, this does not discount the possibility that Otto and his notebook form a cognitive system *when awake*. Whether the system is cognitive depends on what level of integration is required, and whether the particular system reaches this level. Dream access only provides a strong case for the wi-fi memory device thought experiment, yet is neutral towards Otto's notebook.

Dream access to a hybrid cognitive system is indicative of high levels of integration for that system, and thus the wi-fi memory device is highly integrated. The information on the memory device is highly accessible, and reliably connected. Otto may automatically reach for his notebook, but not in a dream. When dreaming he can only use a dream notebook, which is internally generated and thus not a cognitive extension. The extended dreaming mind thought experiment supports a *hybrid mind* thesis, in which, as Menary (2006) states, "cognition is understood as the integration of internal non-classical vehicles and processes—like those commonly found in neural networks—with external classical vehicles and processes" (p 330). However, in contrast, the notebook cannot form a hybrid system with Otto's mind whilst he is asleep.

In the dreaming case, there is a difference between the accessibility and connectivity of the wi-fi memory devices and Otto's notepad. This may mean that the notepad is less well integrated than the memory device. However, indicators of cognition exist on a scale; for example a system can be utilised more or less transparently. Not only external tools, but also internal cognitive functions can be used more or less transparently, and be more or less accessible, and reliable. Two possibilities are that either cognition requires a certain threshold of integration, or cognition may also be on a scale, i.e. a process may be more or less cognitive. First I look at degrees of cognition. The scale of cognition could be judged by the level of integration, which depends on the aforementioned indicators. For example, if memory of an event is poor, it becomes unreliable, inaccessible, less transparent and therefore less well integrated, so may be judged to be less cognitive on a theory of cognitive degree. Similarly, we judge the level of cognition of hybrid systems based on this level of integration at a particular time. If this were the case, dream access might indicate a higher level of cognition so that the coupled system with the device is *more* cognitive than the coupled notebook system.

In contrast, cognition may be considered as a threshold that requires a certain level of integration. A sufficient level may be achieved based on the integration indicators such as transparency, accessibility and accuracy with the proviso that low levels of one indicator, such as accessibility, could be offset by high levels of another, such as transparency. For example, one could consider metacognition, in which one becomes aware of one's own mental processes, to be a less transparent process than expert piano playing, which is done automatically without paying attention to cognition. However metacognition is nonetheless cognitive since metacognition is more accessible than piano playing. Dreams indicate that use of a wi-fi memory device is more transparent, accessible and reliable than Otto's use of notebook, however the level of integration required for a system to be cognitive may not be so high. If both systems exceed the threshold of integration, then they both form hybrid systems.

I have argued that dreams demonstrate that connectivity is important for integration, and that dreams could potentially be extended into hybrid cognitive systems. However, more work is needed to confirm whether a notebook can be sufficiently integrated with other cognitive systems to be considered as a hybrid cognitive system. Under a 'degrees of cognition' theory, Otto's notebook manipulation would be judged to be a *less* cognitive process than using his wi-fi device. According to a threshold theory, if the notebook could pass the threshold for integration, both notebook and wi-fi device should be considered equally cognitive.

Dreams provide an interesting case study of HEC because in general, they are isolated from the external environment and they are cognitive. I have argued that it is possible for dreams to be extended into hybrid cognitive systems despite the input and output blockade of regular dreaming. These blockades could be overcome with the use of wi-fi cognition enhancement devices. This demonstrates a robust integration between internal and external cognitive systems. However, I remain neutral on whether Otto and his notebook form a cognitive system. If cognition comes in degrees, we may consider tool manipulation a *less* cognitive process than the case of the wi-fi device. If cognition is a threshold concept, we need to decide what level of integration is required for a coupled system to cross the threshold to be considered cognitive. Then we can determine whether Otto's notebook crosses the threshold.

7.2 The extended conscious mind

In the following sections I argue that dreaming is a counter argument to extended *conscious* mind views (ECM), which state that consciousness, as well as cognition, extends beyond the skull. Alva Noë argues that dreaming does not provide a counter argument to ECM. I disagree, arguing that his view is based on an unjustified and reductive theory of dreams. Firstly, in section 7.2.1 I set out Noë's views on how the conscious mind forms a coupled system with external objects, and in 7.2.2 I discuss Noë's rejection of dreaming as a counter argument to the ECM view. Finally, in section

7.2.3 I argue that Noë's rejection of dreams as a counterargument to the extended conscious mind depends on a theory of dreams that conflicts with the ontology of dreams I set out in part 1 of this thesis.

7.2.1 The extended substrate thesis

According to Noë (2004, 2006, 2007), we should reject the *narrow substrate thesis;* that conscious mental states are all in the head, because this leads to theoretical inconsistencies which I discuss in the following section. Noë instead proposes an *extended substrate thesis* in which factors external to the brain are included in the composition of the conscious mind. Noë's extended substrate thesis involves two main arguments. Firstly, perception is *enactive.* Perceiving requires active participation with objects in the environment. Secondly, the *causal history* of a perceptual event is important as it defines what type of perception has occurred. From these two premises, Noë concludes that conscious perception is partially composed by the external environment. Noë's position is nicely summarised by Clark as a combination of two views; "the 'dynamic entanglement plus unique temporal signature' argument" (Clark, 2009 p 978) also known as "DEUTS". Perception involves "dynamic entanglement" involving *embeddedness* and *interaction* in the world and a "unique temporal signature" in which the causal history is a key element of that experience. An experience is never a single "snapshot" but rather it is a process that occurs over time, hence my experience is always partially determined by events in the past. I summarise these views in the following sections.

i) The enactive view

The enactive view of perception stresses the necessity of embodied interaction with the environment. Noë contrasts this view with the *snapshot view,* which states that the visual field is presented like a photographic image; a detailed, fully present picture in full colour. Noë argues that this view is false. Vision is detailed only in the visual focus, and we lack colour in our peripheral vision. Rather, a mental image is formed by constant eye movements which register the colour of objects in the peripheries and provide details over time. Clark describes that

> the strong feeling of rich visual contact is really a reflection of something implicit in the larger overall problem-solving organization in which moment-by-moment vision merely participates. That larger organisation "assumes" the (ecologically normal) ability to retrieve, via saccades or head and body movements, more detailed information as and when needed. (Clark 2008 p 41).

Noë argues that this type of interaction with the environment is not only important for a detailed view of the environment, but also *necessary* for any visual experience at all. Blindness occurs when the appropriate signals from the eyes are received by the brain, but the individual cannot make sense of the image. There is an "inability to integrate sensory stimulation with patterns of movement and thought" (Noë 2004 p 4). Although sufferers experience visual stimulation, they lack the ability to make sense of what they see, and their experiences do not have representational content. For example an individual who is cured of cataracts cannot immediately comprehend visual stimulus. Over time interaction with the environment leads to understanding visual stimuli, however experiencing visual stimuli alone is insufficient for 'seeing'. Noë concludes that interaction with the environment is necessary for perception.

Noë notes that when we look at an object, the back of the object is in some way present to us despite the fact that we can't see it; the object doesn't appear flat and without detail on the opposite side. The information *feels* as if it is present to us, and this is only because the information could be accessed if you moved your head around. This feeling of accessibility comes from interaction with the object in the external environment itself. Noë reasons that a modest conclusion from the previous discussion is that "at least sometimes, the world itself may drive and so constitute perceptual experience" (Noë 2004 p 3).

ii) The importance of causal history

For Noë, the causal history of an experience is important in defining the type of experience. Noë (2007) states that experience *depends* on "the character of your embedding in and causal history in relation to your environment"(p 485), thus interaction with objects over time is what furnishes our perceptual experience. In other words, an experience does not depend on the content of my *current* experience alone, but also on past events. An example used by Putnam (1975) and Burge (1979) is that if a burn is not caused by the sun but is identical to sunburn in all other physical respects, it is not sunburn. Similarly, according to Noë, the mind is heavily dependent on its causal history, interaction with the environment and embodiment. For example, whether a thought is a memory depends partially on whether the thought is of something the individual actually experienced. Similarly, perception of an object requires dynamic interaction with a physical object. This distinguishes normal perception from hallucination.

Noë (2007) admits that some conscious states can probably occur without dynamic interaction, but "full-blown, mature human experience" cannot be exclusively neural in its causal basis (p 218). An aspect of an experience or simple sensation can be solely neural, for example a smell or a feeling could be caused by scientists directly stimulating the brain, however normal complex experience involving a wide range of senses and detailed perception of objects that occupy space can only occur when the perceiver is embodied and embedded in an environment.

Noë denies that dreams provide a counter argument to the enactive view. Since the common sense view is that dreams are full blown consciousness in the absence of external objects, to support his view Noë must either deny that dreams are examples of full-blown experience, or deny that they are isolated from the external environment. His main argument is that dreams are not full-blown conscious experience, however he also claims that we have reason to suspect they are not isolated from the environment.

7.2.2 Noë on dreams

According to Noë, *full-blown* human consciousness is dependent on the external environment. Therefore, Noë must argue against the standard view that dreams are conscious whilst isolated from the environment. He provides two arguments: firstly, that dreams are not full-blown conscious experience and secondly, that dreams are not fully isolated from the environment. However, I argue that the pluralistic view of dreams is not consistent with Noë's arguments.

Noë argues that dreams do not provide a counter argument to the extended conscious mind because dreams are only minimally conscious, if conscious at all. Full-blown consciousness, according to Noë, requires interaction with the external environment, so we can attain only a minimal conscious state whilst dreaming. Noë argues that dreams, unlike waking consciousness, are unclear, vague and without detail.

> It has been reported by the psychologist Stephen LaBerge (personal communication) that dreaming may differ from non-dream perceptual experience precisely in respect of the stability and richness of represented detail. For example, when you read a sign in a dream, and then look away and then look back, the sign almost always says something different. What explains this qualitative difference between dreaming perception and real perception may be precisely the fact that dream experiences, but not genuine perceptual experiences, do depend only on neural activity for their basis. Normal perceptual experience, in contrast, is anchored by our dynamic coupling to the world (Noë 2006, p 20).

According to the enactive view, detail exists *within* the environment and detail is mostly experienced as *accessible*, although it is not experienced directly. Dreams are unstable and lack detail because they aren't anchored in the world. Appealing to dreams only demonstrates "that *dream experiences* depend on neural states alone" (Noë 2004 p 20). However, according to Noë dreams are not full-blown conscious states, therefore they do not provide a counter argument to the narrow substrate thesis.

In chapters 2 and 5 I discussed theories according to which dreams are convincing replicas of waking life. If true, this would contradict Noë's theory that dreams are unlike normal perception. Noë disagrees, arguing that dreams are not convincing simulations of waking life despite the fact that we may not realise we are dreaming at the time. This is consistent with Sosa and Ichikawa's imagination model of dreaming, discussed in chapter 4. When we are dreaming, we do not usually realise we are dreaming, however we *can* tell the difference after waking. Owen Flanagan (2001) in agreement, explains how we can distinguish between dreaming and waking whilst awake. Reduced cognitive abilities (see chapter 2.2) mean that we are unable to discern when we are dreaming despite the fact that there are differences in dreaming and waking phenomenology.

Noë argues that for dreams to provide evidence against ECM, then they must be able to replicate detailed waking experience. However, detailed perception requires situatedness within an environment and ability to interact with objects. He argues "there is some reason to think that full-blooded perceptual experience is not something we could undergo in a dream, for there is reason to think that dream experiences, whatever their nature, are not of the same basic kind as perceptual experiences" (Noë 2007 p 471). In dreams we do not interact with objects nor experience objects as being within reach. We have no "skilful access" to the world when we are dreaming (p 472, Noë 2007). We evolved to perceive the world by interacting with it, and the mechanisms of perception are set up for such interaction. Noë argues that "it would be surprising if the mechanisms designed to secure knowledge of the world around us were such as to function entirely normally off-line" (Noë 2007 p 473). Because of our lack of grounding in the world while dreaming, the extended substrate thesis predicts that dreaming experiences should have very limited richness and detail. This, according to Noë, is an accurate prediction: dreams are vague and lacking in detail.

Noë also claims even if dreams are conscious, there is reason to suspect that they are not fully internally constituted because dreams are limited to the amalgamation of past experiences of the world.

> There is probably reason to believe that what we can experience in a dream is limited by our past experience of the world. If that's true, then dreaming shows only that a certain narrow class of experience— the dream experiences—can occur (must occur) when an animal whose life is normally spent in close engagement with the world is for a time decoupled in sleep (Noë 2007 p 473).

Noë thinks that we cannot dream of something we have not experienced in the waking world, thus we should expect that interaction with the world is historically necessary for dreams. However, this theory is mentioned briefly as an intuition and is not supported by further argument.

Noë concludes that dreaming only demonstrates that *dream experiences* satisfy the narrow substrate thesis, and even this may be false if dreams cannot occur without the amalgamation of past experiences. I argue that Noë's view rests on insufficient evidence and his view depends on an implausible reductive account of dreams.

7.2.3 Dreaming as a counter argument to the extended substrate thesis

In this section I argue that Noë's argument relies on a reductivist conception of dreaming. In part 1 of this thesis I argued for a pluralistic view of dreams, and in this section I argue that this view is inconsistent with Noë's extended substrate thesis. I argue that dreams encompass a wide variety of experience, from convincing replicas of waking life, to bizarre experience unlike waking life. From this I show that dreams are not always impoverished experience, and they are not always dependent on waking memory. I argue that according to my pluralistic approach, some dreams rely on waking experience, but others do not. Dream pluralism does not support Noë's extended substrate thesis.

7.2.4 Differences between dreaming and waking

There are differences between certain dreams and waking reality which I have discussed in earlier chapters. However these differences are not sufficient to support Noë's extended substrate thesis. I argue firstly that some differences can be explained by changes in brain activity during sleep, and in section 7.2.5 I support this by arguing that certain dreams are accurate representations of waking life.

i) Differences explained by changes in the brain

In chapter 1 I discussed changes in the waking and sleeping brain, and how these relate to changes in experience. If Noë is correct, our lack of embeddedness in an environment must be part of the reason why dreaming phenomenology is different to waking, and detailed dreams should not be possible even if brain activity is similar to that of waking. Our reports of dreams are often vague and lacking in detail, which is consistent with Noë's claims, however the explanation for this may not be the input blockade. In chapter 3 I argued that the different modulation of the brain as well as poor memory storage and access lead us to confabulating many aspects of the experience. Studies have shown that alterations in brain activation during sleep correlate with reports of alterations in the dreaming experience. For example, the lack of volition and rational control and bizarreness detection is correlated with a reduction in the activation of the prefrontal cortex (see chapter 1).

There are good reasons to think that the input blockade does not necessarily lead to experience that lacks detail. Hobson (2002) argues that "we do not regard the differences in input source to be an adequate explanation of the phenomenological distinction between waking and dreaming"(p 832). Lacking a relatively stable external environment may have some effect on the way we experience many dreams, however according to Hobson, variation is primarily caused by a difference in neuromodulation and neuronal activation. The fact that dreams can be unstable, e.g. words on a page shift (as discussed earlier), may be explained by the reduced capacity for concentration and attention. Noë might argue that it is the change in brain function *and* the lack of grounding in reality that makes dreams qualitatively distinct from waking experiences. Even if we accept that the important distinction between dreams and waking reality may be due to differences in brain activation, this does not refute Noë's extended substrate thesis. However, if embeddedness were necessary for detailed experience, it would be impossible for any dream to replicate waking experience. As I argue later, this is not the case.

According to my pluralistic view of dreams, some dreams can be convincing waking life simulations, which I argue in section 7.2.5. This suggests that embeddedness is not the explanation for changes in dream phenomenology. If the dreaming mind can create convincing world simulations, then embeddedness is not necessary for full-blown consciousness as Noë argues. However, firstly I assess Noë's claim that dreams lack clarity and vividness.

ii) Clarity and vividness in dreams

Often dream reports lack clarity and vividness, however this may often be a quality of the report, but not of the dream. Lack of vividness in a dream report may be due to poor memory rather than a lack in phenomenal vividness whilst dreaming. In chapter 3 I discussed ways in which dream reports may not reflect the content of the dream itself. Memory loss is generally greater in dream reports than in waking reports, which leads to confabulation. This has been correlated with inhibition of memory-associated areas of the brain (see chapter 1). Hobson (2002) maintains that "the absence of episodic memory in dreams reflects the inaccessibility of hippocampally stored information to the dreaming brain" (p 686). According to Hobson, many aspects such as lowered memory and rationality are the result of a change in neuromodulation, particularly in that "the shift from aminergic dominance in waking to cholinergic dominance in REM lowers the probability that consciousness will be exteroceptive, logical, and mnemonic while correspondingly raising the probability that consciousness will be interoceptive, illogical, and amnesic" (p 686). It is not clear that vagueness of reports should not be seen as an indicator of vague phenomenal experience in dreams. Many dreamers report vivid imagery, so even if some dreams are vague, this is not true for all dreams.

iii) Phenomenal differences or reduced attention?

Dreams in which characters, objects and scenery shift and morph are consistent with Noë's assessment of dream phenomenology, however it is not clear if this morphing is a phenomenal difference or whether attention is lacking in some dreams, which leads to shifting of scenery and character. I previously argued that memory and attention are reduced in dreams, and this can lead to inconsistency in dream narrative. Dreams which display higher levels of control and attention also display higher levels of narrative consistency (see chapter 2.1). Some dreams involve normal activities, such as picking up an apple and taking a bite, in which none of the dream imagery shifts or morphs. In false awakenings, as discussed in chapter 4, the dream world can accurately resemble my bedroom. The features that distinguish dreams from waking reality tend to be attention rather than *phenomenal* content. The *vividness* of the dream content may be similar to the waking content even though we suffer from lack of attention and other cognitive deficits.

In the following section I argue that according to the pluralistic view of dreams, many dream experiences are accurate simulations of waking life, and therefore Noë's argument, that dreams are not full-blown consciousness, fails.

7.2.5 Similarities between dreaming and waking

According to Noë, hallucinations, veridical perceptions and illusions have different natures based on their grounding in reality. Noë ascribes to disjunctivism, a theory according to which perceptual experiences such as hallucinations, veridical perceptions and illusions do not involve the same fundamental kind of experience (Soteriou 2009). Although such experiences may be indistinguishable, an experience is not of the same fundamental kind solely due to indistinguishability on the basis of introspection. So even if dreams were accurate simulations of the waking world from the first person perspective, according to disjunctivism, they are not the same type of experience as waking. However, I argue that there is reason to believe that dreams can be full-blown conscious experience. In this section I argue that since dreams can be phenomenally indistinguishable from waking, this provides evidence against Noë's version of the extended substrate view.

i) Extended substrate vs. the phenomenal self-model

As discussed earlier, Noë argues that our failure to realise we are dreaming is due to reduced cognitive capacity as opposed to convincing world simulation. However, according to my pluralistic account, cognitive capacity is not reduced in all dreams, so reduced cognitive capacity is insufficient to always explain why we fail to realise we are dreaming. However, some dreams are convincing replicas of waking life, and this is good evidence against Noë's claims. In chapter 2 I argued that some dreams are cognitively unimpaired, convincing replicas of waking experience. In chapter 4 I argued that realistic false awakenings are particularly convincing simulations of waking life. False awakenings can be so realistic that upon waking, the dreamer is unsure whether they were just dreaming. So although I agree that many dreams are bizarre and unlike waking life, this does not accurately describe all dreams. In some dreams, we believe we are awake simply because being in the dream is like being awake. I argued that dreams can even have body image and body schema.

Metzinger (2003), as discussed in chapter 5, argues that both dreams and waking experience are in a sense "virtual". We form world models that are largely based on predictions of body movements and assessments of how we can interact with objects, rather than experience objects as they are (see chapter 4). We often perceive objects based on how we can interact with them. This is a useful method for reducing the amount of information necessary to navigate an environment since we have a limited attentional capacity. We only require information that leads our hand to the correct orientation if we want to pick up an object.

Noë would agree with Metzinger's discussion of perception based on interaction. However, according to Metzinger, although our interaction with the environment is causally necessary for experience, the brain dictates what the potential interactions with the environment are through simplification of our perception of objects. Sometimes our world model helps us navigate the world, and sometimes it fails (see the case of phantom limbs and OBE's in chapter 5). Waking experience, as well as dream experience, consists of world models or virtual realities. According to the phenomenal self model

(PSM) view, the dream state consists of a virtual reality created by the sleeping mind which replicates the external waking environment. Objects in the dream world can be experienced in the same way we experience objects in the waking world. In chapter 5 I argued that the PSM is an accurate description of many dream phenomena, especially highly realistic dreams such as convincing false awakenings. If this is the case, then dreams provide a counter argument to the extended substrate thesis: even if only some dreams accurately represent the embodied sense of self in a world experienced during waking, then contrary to Noë's argument, the dream state can consist of full-blown consciousness. Although some dream states are vague as Noë describes, some involve a PSM within a convincing virtual world model. It is not necessary that physical objects are present for the mind to produce a multimodal virtual world model. I argue that according to Noë's description of interaction with the world, dreams can replicate full-blown conscious experience by providing a world model.

ii) Vivid dreams

According to Noë, waking phenomenology is rich and vivid, whereas dream phenomenology is not. Information from the environment is not fully represented in our experience, yet we experience the detail as *available* for scrutiny. In contrast, dreaming phenomenology cannot have such availability since there is no detail to scrutinise. I argue that this is not the case. Many dream reports involve detailed experience, and in lucid dream reports, dreamers scrutinise the dream world and are often impressed by the level of detail represented. For example

> Steve and I are looking up at the sky and there's a white parachute coming down- as it gets closer, I can see two people on the chute—one has skis on and is doing flips. I'm wondering aloud to Steve how this is possible and explicitly say, "This must be a dream- we're dreaming- this is a lucid dream!" [...] I remark on how stable the environment is- I find it hard to believe. We're in a beautiful lush canyon area- lots of blue-greens and purples, water below (Levitan 1994 p 41).

In this example, even as the dreamer scrutinises the surrounding environment, they are impressed by the detail and stability. As discussed in chapter 3, false awakenings can be especially vivid, accurate representations of the surrounding environment; so much so that the dreamer can be unsure *after* really waking whether the false awakening was a dream or not. An important aspect of Noë's argument is that dreams are vague and thus distinguishable from waking once the dreamer has woken. Dreamers are only unaware that they are dreaming, according to Noë, because of reduced cognitive capacity. However, not all dreams are distinguishable from waking reality and display reduced cognitive capacity.

According to Noë's assessment of lucid dreams and correspondence with Stephen LaBerge, objects are unstable and do not hold up to scrutiny. However, LaBerge (2000) states that during lucid dreams

> one can reason clearly, remember the conditions of waking life, and act upon reflection or in accordance with plans decided upon before sleep. These cognitive functions, commonly associated only with waking consciousness, occur while one remains soundly asleep and vividly experiencing a dream world that is often nearly indistinguishable from the "real world" (p 962).

This is strong evidence against the narrow substrate thesis. As discussed in chapters 2 and 5, non-lucid dreams can equally be vivid, realistic and involve cognition similar to that of waking. The fact that dreams are very vivid and can be phenomenally nearly indistinguishable from waking experiences contradicts Noë's description of lucid and non-lucid dreams.

Consider this dream report from van Eeden (1913):

> I dreamt that I stood at a table before a window. On the table were different objects. I was perfectly well aware that I was dreaming and I considered what sorts of experiments I could make. … Then I saw a decanter with claret and tasted it, and noted with perfect clearness of mind: "Well, we can also have voluntary impressions of taste in this dream-world; this has quite the taste of wine (In LaBerge, S. & DeGracia, D.J. (2000 p 295).

The experience reported in this lucid dream example seems to replicate the experience one might have when tasting a glass of wine. Multiple senses together emulate a similar waking experience. Many dreams lack bizarreness or shifting scenery, and reports indicate rich detail. LaBerge and DeGracia (2000) note that lucid dreams can include combinations of all the sensory modalities, for example

> vision, audition, somatosensation, gustation, olfaction and the submodalities therein. […] The vividness and richness of the perceptual environment ranges from the "minimal" in which most or all sensory qualities are absent or greatly attenuated, through the "typical" much like everyday experience, to the "surreal" in which the environment is vibrantly, psychedelically alive with fantastic, extravagant detail. (LaBerge & DeGracia, 2000 p 284)

Here LaBerge and DeGracia describe dreams as ranging from lacking in detail to *greater* than normal waking detail. This description is not consistent with Noë's dismissal of dreams as rich, vivid experience. Although LaBerge and DeGracia (2000) admit that lucid dreams can be 'bizarre' and include shifting features and discrepancies, this is not a feature of all dreams. Dream surroundings can remain consistent throughout the dream experience. 'Morphing' elements are only a feature of some dreams.

I have argued that there are examples of vivid, highly detailed imagery in dreams. There isn't any *type* of phenomenally conscious experience that cannot be duplicated in a dream, since both lucid and non-lucid dreams can be convincing simulations of waking experience. Noë may reply that even in fully lucid dreams, there is still the common occurrence of looking at writing on a page that changes every time you look away. This suggests that the grounding in reality is necessary for such detail to remain constant. However this does not show that dreams are a different *type* of consciousness, just that they often lack consistency and normalcy. Moreover, Noë's argument hinges on the importance of *availability* of external objects for phenomenal experience. I argue dream objects can display such availability.

iii) Dream objects are presented as accessible

Noë- describes waking perception as visual stimulus coupled with a sense of presence. Noë's examples of felt presence, such as the experience of the roundness of an apple, require an actual object to be present. If an actual object needs to be present for there to be a sense of accessibility, then dreaming phenomenology would be quite distinct from waking experience[70]. Either dream objects would appear as flat splotches of colour, lacking three dimensions, or they would appear as not entirely present and unavailable for interaction. How does a dream apple appear to us? Does it visually appear to be two-dimensional and not give us any sense that it is a round object with an accessible reverse side? I have not encountered any research to suggest that this is a feature of dreams; that objects are not perceived as accessible. Another explanation could be that we visually perceive the front and back of the apple *at the same time* like a Picasso painting. Although dreams are often bizarre and this type of perception *could* occur, this is not a feature commonly reported. The apple in the dream looks fully present to us, however visually only one side is seen at a time. We can move around the dream apple and pick it up. The apple may morph into another object, such as a banana or a giant spider, nonetheless as I have argued, this is not a feature of all dreams.

As an interesting thought experiment, the experience of object morphing could be replicated in waking life. Let's imagine in the future nanotechnology develops so that there are machines which can morph into different objects. One of these morph-bots firstly appears as an apple then morphs into a spider shape when it is picked up; a very technologically advanced April fool's joke. Alternatively, there could be a room full of nanotech robots which constantly morph and change, replicating a bizarre dream. This may banish the sense of "presentness" of objects, however our phenomenal experience would still be "full-blown consciousness". This suggests that full-blown conscious experience may be present even in dreams in which morphing occurs.

Dreams also *feel* detailed to us. As I have discussed, dreams are often reported as being highly detailed, even lucid dreams in which there is no apparent cognitive deficiency. Noë claims that our experience of the waking environment as being detailed is not an illusion, rather it *is* the case that our experience is detailed, however the detail is contained *within* the environment, ready to be accessed. However I have argued that

[70] Earlier I noted that Noë's view involves embeddedness and a unique temporal signature of causal history. One could argue that dreaming involves causal history, however, Noë does not argue that perceiving objects might involve temporal signature alone. Even if dreaming requires memory, as I later discuss, it still lacks embeddedness in the waking world.

dreams can involve the same sense of detail as waking experience. In a lucid dream one can marvel at the convincing detail in the dream. If Noë is to argue that dreams must in principle be phenomenally impoverished, he must give evidence for this as opposed to assuming that dreams must be impoverished due to their lack of grounding in an external environment. Without such evidence, his argument is question begging.

7.2.6 Dream phenomenology as externally constituted

Noë argues that if dreams attained the status of full-blown consciousness, they may themselves be partially constituted by the external environment. This would give us further reason to reject dreams as a counter argument to the extended substrate thesis. Foulkes (1999) might agree with this point. He argues that during the first few years of development, young children learn to dream. We have little reason to think that a foetus, for example, could dream (see chapter 3 for further discussion). This might suggest that we require experience of the external world and memories before we can dream. However, Foulkes' analysis does not provide strong support for Noë's thesis.

Firstly, it is unclear whether waking experience is a causal necessity or constitutive of dreams. If we accept that there is an input blockade for most dreams (see 7.1.3), then previous experiences of the external environment through memories must compose our dreaming experience. Noë does not explain exactly how dreams are partially composed by the environment, however this may involve the unique temporal signature aspect of his theory. Even if I allow that my experience of a red apple is partially composed of a red apple, I might deny that my memory of the apple is also thusly composed. Although memory by definition depends on causal history, it is not necessarily constituted thus. In the same way sunburn is necessarily caused by the sun and is defined by its causal history, however it is not *composed* of the sun's radiation. It is more likely that the past causally necessitates memories. Noë argues that dreams are composed of memories, however it is not clear that memories are composed of the experiences they represent. As discussed in chapter 3, memory is a complex process of recreation. It is not clear if memory traces are partially constituted by perceptual experiences, nor if dreams are partially constituted by memories. However, there are other reasons to reject causal history as a part of cognitive extension.

Even if memory causally affects our dreamed experience, that does not entail that dreaming is a type of replaying memory. I have argued that dreams can be vivid world model simulations, so it is unlikely that they should be classed as phenomenally similar to (at least most) memories. Also, dreams may involve imaginative elements (as argued in chapter 4) or even novel experiences. Most dream reports are of objects that have been experienced in waking life, and even fantastical dream items may have been seen in a movie. However although people never report having dreams involving round squares or a colour they have never seen before, novel experience may nonetheless occur in dreams. Reports of entirely unique experiences would be nearly impossible to remember and probably impossible to report. It is possible that dreams with hyper-intensity as I have described earlier are novel experiences. Hyper-stimulation of the visual cortex could cause experiences which are not based on memory and that cannot be described. If a novel, full-blown phenomenal experience can occur when detached from the external environment, then at least some experiences are not partially composed by the external environment. This is empirically difficult to test, however the possibility of novel dream experiences has not been ruled out by current scientific research.

Finally, if dreams do involve a unique temporal signature, but lack embeddedness in the environment, then we should not class dreams as being extended. Extension requires both elements: dynamic entanglement and unique temporal signature or "DEUTS" as Clark, (2009) describes. Dreaming provides examples of internally generated world models in which the dreamer is embedded and with which the dreamer interacts. According to the view described by Noë, an isolated mind should not be able to create such a convincing world replica, even if that world simulates the waking world based on our waking memories. Since, when I pick up a dream apple, I am not interacting with a real apple, the sense of accessibility of the dream apple is not caused by interaction with a physical object. A dream apple, according to Noë's theory, should not have this sense of accessibility. However, as I have argued, dreams can involve vivid details and accessible objects that we interact with just as we interact with objects in the waking world.

Conclusion

I have argued that dream cognition could potentially extend into the environment if we were to use wi-fi cognition enhancement devices which are remotely connected and integrated into cognitive processing. This thought experiment shows that external tools can conceivably be highly integrated into our cognitive systems, so much so that they can be utilised during a dream. However, such robust cognitive integration cannot occur for certain types of tool manipulation. Conversely, dreams provide reason to reject the extended conscious mind thesis. Dreams *can be* full-blown conscious experience that is isolated from the external environment. If the external environment is a *necessary component* of full-blown conscious experience, then complex, rich experiences of a dream world could not occur. If we are to accept an extended substrate thesis, it must be a weak version which states that the conscious mind can sometimes extend into the environment, however these same conscious states can also occur without such extension. This is not a view that Noë supports, thus we should reject his extended substrate thesis.

8

Consciousness in Dreams

Dreams provide a test case for assessing different views of consciousness because any theory of consciousness must also have a plausible explanation for dreams: whether they are conscious, semi-conscious or unconscious. A plausible theory of consciousness must include a theory of dreaming which is consistent with current dream theory. However, many modern philosophers of consciousness fail to provide plausible explanations of how dreams are accounted for by their theories. In this chapter I review several theories of consciousness and argue that each view implies a different stance on dream consciousness. In the consciousness literature, insufficient attention has been paid to how dreams are described by these theories, and even theorists who do take dreams into account often do not pay sufficient attention to current dream theory. My main focus will be Block's theory of conscious. I argue that although Block pays insufficient attention to dreams, and his account of dreams is implausibly reductive, his access and phenomenal consciousness distinction can provide the most plausible account of the multifarious experiences that occur during sleep.

In section 8.1, I discuss theories which imply that dreaming is unconscious. I begin with a discussion of memory and consciousness, highlighting views according to which forgetting may indicate unconsciousness. I then argue that according to the Higher Order Thought (HOT) theory, a large proportion of dreams may be unconscious, which would be consistent with the anti-experience views discussed in chapter 3. On this view, HOTs are necessary for experience to be conscious. In some dreams, our cognitive capacities are decreased which leads to a cessation of higher order thought, therefore according to HOT theory such dreams should not be considered as conscious. However, instead of supporting the anti-experience thesis, I argue that this provides evidence against HOT theory. In section 8.2 I discuss conscious dreaming. According to global workspace (GW) theory, dreams are conscious, however we should not consider them as equivalent to normal waking consciousness in adults. I argue that although GW theory is consistent with the received view of dreams, it provides an unsatisfactory explanation of dreaming. This is due to insufficient clarification of the similarities and differences between dreaming and waking in a way that is consistent with GW theory as a whole.

In the final section of the chapter, I analyse Block's distinction between access and phenomenal consciousness. I argue that this distinction provides a plausible account of the variety of conscious experience that occurs in sleep. Although some dreams are fully conscious, others only retain phenomenal consciousness while lacking access; only when we wake up and recall such dreams do we gain access consciousness of the experience. Although Block rejects this way of applying his general theory of consciousness to the case of dreams, I argue that this is based on an implausible reductive view and insufficiently detailed analysis of dreaming. In support of my view, I provide evidence for the possibility of phenomenal consciousness that lacks access. I conclude that dreaming is an important test case for theories of consciousness because some theories, such as higher order thought theory, have counter intuitive implications in regards to dreaming. Theories of consciousness require a plausible explanation of dream consciousness, and of the theories discussed, a distinction between A- and P-consciousness provides the most plausible account of dreaming despite the fact that Block himself does not apply his view to dreaming in this way. Dreams are a test case for theories of consciousness because any theory needs a plausible account of dreaming that is consistent with current dream research. Inability to provide a plausible account of dreaming weakens any theory of consciousness, since dreaming is an important and pervasive aspect of our mental life.

8.1 Unconscious dreaming

In this section I discuss views of consciousness according to which certain types of dreaming should be classed as *unconscious*. Views in which memory indicates consciousness and Higher Order Thought (HOT) theory both imply that some dreams are unconscious. I argue that the implication of unconscious dreaming provides what many dream theorists would deem an intuitive case *against* such views. If we are to accept HOT theory, we must allow the possibility that dreaming can be unconscious. This is a theory which, as discussed in chapter 3, is not supported by the current literature on dreams.

8.1.1 Unconscious dreaming and memory deficits

According to some views of consciousness, memory deficits can be explained by a lack of conscious experience. In this section I discuss views of consciousness which stress the importance of consciousness for memory, and which suggest that lack of memory of an event may indicate lack of consciousness.

In chapter 3 I discussed a thought experiment in which curare and amnestic are used instead of general anaesthetic (Dennett 1978). Dennett argues that if pain is forgotten before it can be acknowledged, then it is not a conscious experience. Here I discuss a similar view according to which forgetting may indicate unconsciousness. According to Jaynes (1976), normal waking consciousness involves the ability to perform mental time travel, without which an individual cannot reminisce and anticipate future events, so in a sense they are not "fully conscious" (Jaynes 1976 p 371). Tulving (1985) similarly argues that consciousness is necessary for memory. There are three types of consciousness that are associated with three types of memory, and when a type of consciousness is lacking, there can be no associated memory type. I argue that Tulving's analysis suggests that a lack of memory can also indicate unconsciousness[71].

[71] This discussion is relevant to the chapter 6 taxonomy of memory: procedural (skills), autobiographical (memories of events) and semantic (memories of facts).

Firstly, *procedural* memory is concerned with how tasks are accomplished "with the acquisition, retention and utilization of perceptual, cognitive and motor skills" (Tulving, 1985, p 3). This type of memory explains how after hours of practice we can play a song on the piano without consciously controlling every action. This is associated with what Tulving refers to as *anoetic* (unknowing) consciousness, which is "perceptually registering, internally representing and behaviourally responding to aspects of the present environment, both external and internal" (p 3). *Semantic* memory is the symbolic representation of knowledge, including our memories of facts and numbers, such as 'Canberra is the capital of Australia' and '8x8=64'. This is associated with *noetic* (knowing) consciousness, which is the awareness of objects and events and the relations between these objects and events. *Episodic* memory is of events that we have experienced in the past, and this is associated with *autonoetic* (self knowing) consciousness. This type of consciousness is the experience of events as a part of one's own personal past, in contrast with knowledge about the world that was not experienced personally. This distinguishes events that have happened to us from other mental activities such as thinking, imagining and so on. Tulving argues that autonoetic consciousness is a "necessary correlate" (p 5) of episodic memory.

Tulving uses the example of a man (N. N.) with severely impaired episodic memory due to a brain injury caused by a car accident. N. N. nonetheless has retained his semantic and procedural memory. The man can recall details about the date he moved into his new house, what the Statue of Liberty looks like and the shape of America, however cannot remember any experiences from his personal past. Knowledge of his past has an impersonal quality, and he is unable to anticipate future events: he has lost the capacity for mental time travel. Tulving suggests that this subject has severely impaired autonoetic consciousness as well as episodic memory. When he tries to remember what he did in the morning or imagine what he is going to do in an hour he experiences nothing but blankness.

> He seems to be living in a "permanent present." In terms of the threefold classification of consciousness proposed here, we could say that N.N. possesses both anoetic and noetic consciousness but not autonoetic consciousness, and that his procedural and semantic memory systems are relatively unimpaired whereas his episodic memory is severely damaged (Tulving 1985 p 4).

Tulving's description of 'autonoetic' could be disambiguated into two types of self-consciousness; consciousness of personal identity, and consciousness of the self in time. N. N. appears to have, or at least reports feeling an element of personal identity, yet lacks a sense of self in time. Tulving's considers this as evidence that "autonoetic consciousness is a *necessary correlate* of episodic memory" (Tulving 1987 p 5).[72] However, his description of N. N. suggests that memory deficiencies can indicate unconsciousness. I argue that this view implies that poor memory in dreams can indicate that some dreams are unconscious.

I argue that since episodic, procedural and semantic memory, or memories of events, abilities and facts, could be lost in a dream, such dreams could be defined as unconscious. Although Tulving argues that consciousness is necessary for memory, and not vice versa, a lack of consciousness might be the best explanation for memory loss in dreams. In chapter 7, I discussed a variety of ways in which memory during dreams is diminished. We do not remember who we are or what we were doing before falling asleep, due to poor autobiographical memory. Memories of events that occur during dreams are often forgotten immediately, sometimes so that at the end of a dream we do not remember how the dream began. If woken up during REM sleep the memory might be maintained, however memory loss is rapid. Semantic memory of facts that we know whilst we are awake can be lost in a dream, for example the common dream in which we turn up for an exam having forgotten everything we studied. In dreams we can forget our addresses, even our names. People often report dreams where they in a house that they believe is theirs despite the fact that it looks entirely different from their real home. This may indicate that the dreamer has forgotten what their house looks like, which demonstrates lack of episodic memory. In chapter 6 I also argued that procedural and semantic memory can be lost in dreams. Although Tulving focuses on autonoetic consciousness, he suggests that noetic and anoetic consciousness are also linked with memory. Tulving explains that the case of N. N. "tells us that amnesia can be

[72] Evidence against this is shown in studies of global anterograde amnesia by Vargha-Khadem and Gadian (1997). Patients with this amnesia display a severe reduction in episodic memories of everyday life but retain semantic memories. Surprisingly, their lives were quite normal, "all three patients attended mainstream schools and attained levels of speech and language competence, literacy, and factual knowledge that are within the low average to average range" (Vargha-Khadem & Gadian 1997 p 376). It is unclear from this to what extent their conscious experience is diminished, and to what extent autonoetic consciousness is a necessary correlate for episodic memory.

characterized as a derangement of consciousness and not just a derangement of memory for past events" (p 5). Tulving focuses on the derangement of autonoetic consciousness as a cause of deranged autobiographical memory, however the same can be applied to noetic and anoetic consciousness. Amnesic dreaming might indicate that such dreams involve derangements in autonoetic, anoetic and noetic consciousness. If all three forms of consciousness are absent, then we can clearly classify a subject as unconscious.

Tulving argues that autonoetic consciousness is necessary for autobiographical memory. His examples suggest that lack of autobiographical memory can indicate absent autonoetic consciousness. In dreams, individuals suffer from memory deficits and this might be explained by a lack of autonoetic, anoetic and noetic consciousness. However, as I have explained, poor memory is only an indication of deranged consciousness. Here I conclude that Tulving's analysis leaves open the possibility that some dreams, those that are highly amnesic, may be unconscious. This is consistent with an anti-experience view of dreams.

The previous analysis would not demonstrate *why* consciousness during dreams might be deranged or lacking altogether, simply that poor memory may indicate unconsciousness. In contrast, in the following section I discuss Higher Order Thought (HOT) theory which offers an explanation for unconscious dreaming: the absence of higher order thoughts. According to HOT theory, HOTs are necessary for consciousness. Our inability in some dreams to have higher order thoughts should lead HOT theorists to conclude that some dreams are unconscious.

8.1.2 HOT or not?

In this section I argue that HOT theorists have as of yet paid insufficient attention to dreaming. I argue that since dreams at times lack higher order thoughts, according to HOT theory, such dreams much be unconscious. However, this is a counter intuitive outcome, and suggests an anti-experience thesis of dreams. As discussed in chapter 3, such a theory is implausible. Therefore HOT theorists need a more plausible alternative for explaining dream phenomena.

i) State consciousness and HOTs

According to higher-order thought (HOT) theory, a mental state is conscious only if it is accompanied by a thought about being in that state. Rosenthal maintains that

> we are conscious of our mental states by virtue of having accompanying thoughts about those states. When a mental state is conscious, we are transitively conscious that we are in that state. So the HOT that accompanies it will be a thought to the effect that one is in the target mental state (Rosenthal 1993 p 361).

Rosenthal argues that stalemates in the discussion of consciousness arise from the fact that different disambiguations of 'consciousness' are used in different contexts, whereas philosophers need to agree on which disambiguation is being used if any agreement is to be reached. *State consciousness* according to Rosenthal is the disambiguation of consciousness that is most philosophically interesting. It is a property of some mental states that involves awareness of being in that state. This contrasts with *transitive consciousness,* which describes the *consciousness of* a stimulus, and *creature consciousness*, which describes being awake and aware. These are common uses of the word 'consciousness' which, according to Rosenthal, we should not confuse with the philosophically interesting form, state consciousness.

State consciousness distinguishes conscious from unconscious mental states. Rosenthal argues that not all mental states are conscious, and that "when a mental state is not conscious, we are not in any way conscious of being in that state" (Rosenthal, 1993 p 357). For example, beliefs can be unconscious. Believing that your best friend is a reliable person is often an unconscious belief in that you are not actively aware of the belief at all times. However, many of your actions will be affected by this unconscious belief. If your friend does not show up for dinner as organised, you might be very surprised and disappointed because this contradicts your unconscious belief. If you did not have such a belief, you may have been less disappointed. So despite such a mental state not being constantly *state conscious,* it plays a causal role in behaviour. Rosenthal argues that not just beliefs and thoughts can lack state consciousness, but also sensations. For example, one can be distracted from their mild headache and for a time not be conscious of the sensation. He argues that it seems unlikely that the mental state simply disappears, because often such unconscious states will still play causal roles in behaviour.

According to Rosenthal, the theory which best accommodates state consciousness is higher order thought (HOT) theory: a state is conscious only if there is a higher order thought accompanying that state which contains propositional content about being in that state. For example, the state of being in pain is accompanied by a thought about being in pain, such as 'this is pain'. Since mental states are not conscious in and of themselves, Rosenthal argues that there must be either a higher order *sense* or higher order *thought* about a state for it to be conscious. However, since intentional states are independent of sensory qualities, what makes a state conscious must be a higher order thought as opposed to a higher order sense of the state.

According to the pluralistic view I proposed in part 1, dreams can display a wide range of cognitive features. In some cases cognition is severely diminished. We often lack the ability to rationally monitor our thoughts and actions, and often lack a sense of self, agency and control. Metacognitive thoughts are often lacking in dreams, as well as other higher order thoughts. In the following section I argue that some dream experiences do not involve HOTs, and thus, according to HOT theorists, should be seen as unconscious. I argue that HOT theory implies an anti-experience thesis of certain dreams in which cognition is impaired.

ii) Not-HOT dreams

HOT theory states that higher order thoughts are necessary for consciousness therefore some dreams are unconscious. In many dreams our capacity for higher order thought is drastically reduced, thus we often do not have HOTs in such dreams. Although dreams are largely ignored by HOT theorists, this view is discussed by Sebastian (2011). He argues that activation in the dorsolateral prefrontal cortex (DLFPC) is necessary for the generation of HOTs when we are awake. Since the DLFPC is deactivated during REM sleep, there is reason to concede that HOTs do not occur during dreams. According to Rosenthal, "qualitative properties do occur without HOTs, but HOTs are needed for there to be something it's like for one to be in such states" (Rosenthal 2000b p 236). Sebastian argues that, given the above analysis, the HOT theorist has two options for describing dream cognition. Either during dreaming, the DLFPC is not essential for HOTs, or dreams are unconscious. He argues that both positions are implausible, hence we should reject HOT theory.

Sebastian finds it implausible that the neural correlates of HOTs would be different when awake and asleep. We have no good reason to suspect that higher order thoughts can occur without the DLPFC in waking *or* during sleep, so if HOT theorists want to accept this option, they need strong evidence to support it. As there is currently no such evidence, the remaining option is that dreams are unconscious.

If some dream states lack HOTs, then those dream states would not be conscious according to HOT theory. The most convincing examples of dreams that lack HOTs are dreams in which reflective awareness and metacognition are absent. Many examples of these were discussed in chapter 2.2. In such dreams, the dreamer is often unable to reflect upon their own cognitive state, and it is likely that HOTs such as 'I see a blue object' or 'I am in pain' are absent. We may be incapable of HOTs due to reduced cognitive capacity in such dreams. If HOTs are absent in some dreams, then a HOT theorist would have to concede that such dreams are unconscious mental states. Perhaps the altered activation of the sleeping brain causes unconsciousness despite high levels of activation in the visual and motor cortex. If this were true, such dreams would be unconscious mental states that causally affect our behaviour, similar to the way unconscious beliefs affect behaviour. However, dreams cause us to make dream reports, but are not conscious experiences that occur during sleep. This is consistent with the anti-experience theses discussed in chapter 3. However according to Sebastian this is also a reason to reject HOT theory.

Sebastian rejects the anti-experience thesis of dreams. He agrees with my chapter 3 conclusion that Malcolm (1959) and Dennett's (1976) anti-experience theses are implausible given the current research on dreaming. From this he concludes that HOT theory is implausible because it does not offer a reasonable account of dreaming. I agree that dreams pose problems for HOT theory, however, I find that Sebastian's description of dreams is an overly reductive view of dreams. This means that not all dreams are problematic for HOT theory as Sebastian argues. Sebastian's argument relies on the lowered activation of the DLPFC in all dreams. However, as I discussed in chapters 1 and 2, neural activation can alter during sleep, so that the DLPFC can be more or less active in different dreams, or throughout a single dream (Kubota et al. 2011). As I discussed in chapter 1, the role of the DLPFC in dreaming is a contested issue. I argued that the discrepancies between research groups may be due to the alteration of brain activity in dreaming. Some dreams display a deactivated DLPFC, whereas others do not. For example, as Domhoff (2011) notes, although early PET studies found lowered DLPFC activation in both REM and NREM sleep, in a later study "Maquet et al. (2005) found that some areas within the dorsolateral prefrontal cortex are more active in REM than NREM, contrary to earlier neuroimaging studies" (p 5). Therefore, Sebastian's claim that the "neural correlate of the reporting access to our visual conscious experiences depends on the dorsolateral prefrontal cortex which is deactivated during dreams", is not accurate.

Regardless of brain activation during sleep, higher order thoughts occur in many dreams. According to the pluralistic view of dreaming, only some dreams lack metacogniton and HOTs. In other dreams, cognition can be similar to waking. This is supported by Kahan and Laberge's (1994) research, according to which many dreams display waking levels of cognition and metacognition. Sebastian does not cite any of these recent studies. I agree with Sebastian that HOT theorists have failed to take dreaming into account which poses challenges for the theory. However, the challenge to the HOT theorist is not as strong as Sebastian maintains. Firstly, not all dreaming is problematic for HOT theory. Some dreams are clearly conscious and involve higher order thoughts. Rather, HOT theorists have to explain those dreams in which cognition is impaired and HOTs are absent. Still, this is quite a challenge, and one that HOT theorists need to take seriously. I discuss how HOT theorists might go about explaining the possibility that some dreams are unconscious, although as I note, further work needs to be done.

Although dreams need to be taken into account by HOT theorists, this is not an insurmountable challenge. There are still options that the HOT theorist could take to explain the dream puzzle. However, HOT theory cannot easily account for dreams. Despite lack of evidence to support the theories of Malcolm and Dennett, it might be necessary for HOT theorists to bite the bullet and concede that some dreams are unconscious. The theories of Malcolm and Dennett discussed in chapter 3 have been widely rejected by modern dream theorists. In chapter 3, I argued that there is room for scepticism towards the accuracy of dream reports under a pluralistic view of dreams. However, as I argued, we should reject both Malcolm and Dennett's anti-experience theses. Another option left to the HOT theorist is to claim that it is possible that certain stages of REM are unconscious, however we shouldn't refer to this as 'unconscious dreaming'. If HOT theorists reject the possibility that 'unconscious dreaming' could occur, they might instead claim that only REM sessions that involve HOTs should be classed as dreams. Therefore dreams do not occur during stages of sleep where the DLPFC is deactivated and HOTs do not occur. However, dreams are often reported upon waking from these 'unconscious' stages, which I call 'not-HOT' stages of sleep. This poses a separate problem for the HOT theorist.

Subjects often manage to make reports when woken from not-HOT stages of sleep. Is it possible that we become conscious of the qualitative properties of the not-HOT stage only after we wake up, or is it nonsensical that we could potentially report unconscious states? In chapter 3 I discussed evidence which supports the fact that dreams which involve higher levels of metacognition and other higher order capacities are more likely to be reported and with greater accuracy. So reports from the not-HOT stage would be less common. However, this is nonetheless problematic because it is unclear how an unconscious state could be reported at all. HOT theorists must from this concede that we can become conscious of an unconscious state after a period of time has passed. For example, it is possible to remember and report a session from a not-HOT stage that occurred hours before waking. Although it is more common for such stages to be forgotten and only those that occur directly before waking to be reported, thus retrospective consciousness that occurs after long periods of time is not the norm in the case of dream reporting, such reporting does occasionally occur. However, the possibility of waking from an unconscious dream and reporting it immediately is itself problematic. Remembering and reporting an unconscious experience seems hardly possible. One explanation I discussed in chapter 3 is based on Dennett's view that experiences that are not recognised are not conscious. Some dreams, according to this view, are not recognised as experiences whilst sleeping, and thus are unconscious until we become aware of them upon waking. Hence, we could not distinguish between dreams that are conscious and those that are unconscious during sleep since both are potentially reportable upon waking. A HOT theorist could deny that we have HOTs about such dreams until waking, thus we become conscious of dreams upon waking.

Retrospective consciousness, an anti-experience thesis of dreaming proposed by Dennett, is contrary to modern dream theory. However, HOT theorists may have to accept that we can gain retrospective consciousness of not-HOT stages of sleep. Sebastian claims that because of this we should reject HOT theory, and save ourselves from this counter-intuitive outcome. Instead, I argue that HOT theorists need to pay greater attention by accounting for dreams. Until HOT theorists can show evidence for retrospective consciousness or adopt an alternative explanation of not-HOT reports, HOT theory is unsatisfactory. I later argue that it is more plausible to concede that some dreams involve *impoverished* consciousness, rather than retrospective consciousness of unconscious states. It is unclear how dreams would be described by HOT theorists such as Rosenthal, and this is the weakness of his theory.

HOT theorists need to explain how dreams fit into their theory, which, to my knowledge, has not yet been satisfactorily achieved. From this I conclude that HOT theory currently does not satisfactorily take into account all forms of conscious experience. Thus more work needs to be done before HOT theory could be considered a plausible theory. In contrast, according to other theories, dreams should be considered as fully conscious. In the following section I discuss global workspace (GW) theory, according to which dreams are fully conscious. This is preferable to a theory of unconscious dreams. However I argue that GW theorists have paid insufficient attention to explaining how dreams fit into GW theory and therefore do not have a satisfactory account of dreams.

8.2 Full consciousness in dreams

In this section I argue that global workspace theory (GW) implies that dreams are conscious experiences. According to GW theory, consciousness occurs when a cognitive process is globally accessible to other mental processes via a *global workspace* in the brain. Higher order thoughts, according to GW theory, are not required for a process to be conscious. According to Baars (2002), consciousness is necessary for processing novel or unusual experience, and is required for creativity. I argue dreams can be novel or unusual experiences, which is consistent with Baars' conjecture that dreams are conscious. However, Baars' description of dreams as being akin to an early form of consciousness is more suggestive of dreams that are not *fully* conscious. It is not clear how different types of consciousness correspond with GW theory. Although dreams do not provide a counter argument to GW theory per se, Baars' description of dreaming, which suggests a separate type of "early" consciousness, is unconvincing and itself does not fit well with GW theory. This theory needs more work to plausibly account for dreams.

8.2.1 Global workspace theory

Global workspace (GW) theory, as supported by Baars (2002), Baars, Newman and Taylor (1998), Dehaene and Changeux (2004), and Dehaene and Naccache (2001) and others, emphasises the importance of a *global workspace* in the brain which allows for certain cognitive processes to be widely accessed by other areas of the brain. These processes are conscious because they are the most accessible to a variety of cognitive functions and they are dominant over other processes. Baars explains

> global workspace theory suggests a fleeting memory capacity in which only one consistent content can be dominant at any given moment. Dominant information is widely distributed in the brain. This makes sense in a nervous system viewed

as a massive distributed set of specialized networks. In such a system, coordination, control, and problem solving could take place by way of a central information exchange, allowing some regions – such as sensory cortex – to distribute information to the whole (Baars 2002, p.47).

According to GW theorists, the global workspace allows certain mental states to be conscious by distributing their contents to a wide range of systems in the brain. Conscious states are globally distributed throughout the brain and "this global availability of information through the GW is what we subjectively experience as the conscious state" (Dehaene and Naccache, 2001, p 1). Baars uses the analogy of a spotlight in a theatre that highlights some brain processes, whilst others remain in the dark recesses of the unconscious brain. This spotlight is under the control of both the frontal executive cortex and other areas such as the brain stem, emotional centres in the amygdala or pain systems depending on the type of sensory input (Baars 2003). Consciousness may also require that information be sent to "self-systems" that regulate conscious information consistently with the higher-level context of personal identity. These involve certain constants such as life goals and beliefs. Baars (2003) argues that a large body of empirical evidence supports GW theory.

Dehaene and Naccache (2001) argue that many cognitive processes, including semantic, motor and perceptual processes, occur unconsciously. Attention to stimuli distinguishes non-conscious from conscious processes: we are conscious of stimuli when we attend to them, and those we do not attend to are unconscious. As mentioned in the previous section this is described by Rosenthal as transitive consciousness or *consciousness of* an item. For example, patients with hemineglect (Driver & Mattingley, 1998) who cannot attend to the left side of their visual field behave as if they are not conscious of this area. Inability to pay attention to stimuli also leads to the patient being unconscious of stimuli. This is also demonstrated in inattentional blindness experiments (Mack and Rock 1998). When ordinary subjects don't attend to a stimulus because they are distracted by another item, they are unconscious of the stimulus, as discussed in chapter 5. Consciousness may be necessary for maintaining representations over time. This is demonstrated in the Sperling experiment (1960, discussed in section 8.3.1) in which a subject reports seeing 12 letters on an array but can only report 3 of the actual letters. According to GW theory, the subject retains consciousness of only a few of the items, and is not conscious of the others. Our conscious attention can only maintain the information about 3 of the letters, not all 12.

Baars explains that the purpose of consciousness is to process novel data and allow creativity. Unconscious processing has proven to be very limited in many ways. Creativity, learning, self-knowledge and problem solving all require a level of consciousness, without which behaviour and reaction to stimulus are stereotyped and limited. GW theory entails that conscious processes are those which are distributed across a wide range of neural processing centres. It is this global accessibility which allows us the capability of comprehending novel information as well as "planning a novel strategy, evaluating it, controlling its execution, and correcting possible errors" (Dehaene and Naccache 2001 p 11). Unconscious processes, which lack such global resources, work as "modules" (p 12) which are specified functions that cannot process novelty. Only conscious processes can utilise multiple subsystems in order to process novel information. Consciousness also allows us to be creative and solve problems in novel ways that would not be possible unconsciously.

Unconscious processes are modular and conscious processes are global according to GW theory, and a consequence of this is that consciousness is not a clearly demarcated process in the brain, but rather can subsume a variety of global functions (Dehaene & Naccache, 2001). This is supported by the theory that "many brain areas contain workspace neurons with the appropriate long-distance and widespread connectivity, and at any given time only a fraction of these neurons constitute the mobilized workspace" (Dehaene and Naccache 2001 p 14). Conscious processes are defined by the style of organisation rather than the area of location in the brain, and the global workspace can fluctuate throughout the brain.

8.2.2 Global workspace and dreamscape

According to GW theory, higher order thoughts are not required for cognitive states to be conscious, so dreams in which metacognition is poor or lacking can be conscious.

Attention and access in dreams are highly variable, so an internally generated stimulus that occurs during sleeping but is not accessed by the global workspace would not be conscious. However, according to GW theory such stimuli would not be classed as dreams. Since "global workspace theory suggests a fleeting memory capacity that enables access between brain functions that are otherwise separate" (Baars 2003), whether a stimulus is conscious depends on whether it is accessible to a variety of disparate brain functions, or in other words, available to the global workspace. Dreams, which are often reportable, are conscious and thus widely distributed in the GW.

The GW isn't defined by specific areas of brain activation, rather global availability to a wide range of areas. Thus deactivation of the DLPFC does not mean a dream is unconscious. However, wide-scale deactivation of brain areas may weaken the GW since there is no longer a sufficient level of global accessibility. Binding in some dreams is very poor, which may be explained by failure in neural connectivity. This may mean the global access is weakened, and that the dream experience is not accessible to some of the other cognitive processes. However, the GW of the dreaming brain may simply be an alternative type of workspace from the normal waking GW. According to Baars, "conscious perception involves more than sensory analysis; it enables access to widespread brain sources, whereas unconscious input processing is limited to sensory regions" (Baars 2002 p 47). Therefore, for dreams to be conscious, they must involve access to widespread brain sources. However, GW theory does not entail that the DLPFC or other specific areas that are often deactivated during dreams are necessary for such access.

According to Baars (2003), *normal* waking human consciousness involves purposeful use of endogenous sensory experience, such as inner speech and voluntary visual imagery. This is known as the *working memory*, and may require prefrontal self-systems which are lacking in many dreams due to deactivation of the DLPFC and other prefrontal areas of the brain during REM sleep. However, this only describes normal waking human consciousness. According to Baars, dreams, unlike waking, resemble an early form of consciousness. Baars suggests that dreaming consciousness involves spontaneous imagery which developed in animals long before purposeful consciousness developed in human.

> Prefrontal cortex is key to voluntary goals in humans, and speech is of course the basis of the phonological loop involved in mental rehearsal. In contrast, spontaneous imagery may have appeared much earlier [than purposeful use of visual imagery] -- such as the visual image of a lion evoked by the sound of a lion's roar. Such spontaneous imagery may be common among mammalian prey animals, while predators may have spontaneous visual images of prey that can be smelled but not seen. Certainly the dream state, characterized by rich conscious visual imagery, evolved with early mammals (Baars 2003).

Rich[73] but involuntary sensory consciousness may not require distribution to higher thought areas of the brain, so dreams may be conscious without activation of the DLPFC. Thus dreaming is not voluntary, but rather may often only attain the status of "spontaneous imagery" or "early consciousness".

Baars' analysis of dreaming is not clearly consistent with all aspects of GW theory. For example, according to Baars "conscious perception involves more than sensory analysis; it enables access to widespread brain sources, whereas unconscious input processing is limited to sensory regions" (Baars, 2002 p 47). It is not clear how "spontaneous imagery" or "early consciousness" is consistent with this theory. If spontaneous imagery and early consciousness were limited to sensory analysis, they would be unconscious according to the aforementioned analysis. However it is more plausible that Baars intends that they are an intermediate form of consciousness that is more primitive than modern human waking consciousness. If dreams involve sensory analysis but lack access to widespread brain sources, then the theory may conclude that such dreaming is unconscious. The concept of early consciousness needs to be analysed in more detail if dreaming is to be adequately taken into account by GW theory.

[73] I interpret "rich" in Baars' usage to mean vivid, intense, or highly detailed

According to a pluralistic view of dreaming as discussed in section 8.1, cognitive systems may vary according to the dream. Certain dreams display reduced higher order thought and rational capacities, while others attain high levels of these cognitive processes. So according to pluralism, some dreams are clearly conscious according to both GW and HOT theories. However it is the cognitively impaired dreams that are most problematic for both theories. HOT theory leads to the counterintuitive outcome that we have retrospective consciousness of unconscious sleep states. Baars, on the other hand, defines cognitively impaired dreams as involving "spontaneous" imagery or akin to "early" consciousness that developed in animals, however, it is not clear how this is consistent with the requirement that conscious experience is accessible to the global workspace. This distinction between modern human consciousness and early consciousness would suggest there are different types of consciousness, some of which are less accessible to the global workspace.

In the next section I discuss another alternative that allows for different types of consciousness: that some dreams are phenomenally conscious but lack access consciousness. This view contrasts with HOT theory in that it posits that all dreams are conscious, however unlike GW theory, dreams can at times be a different type of impoverished consciousness: lacking *access*. I outline Block's view of the distinction between access and phenomenal consciousness, and argue that some dreams are examples of phenomenal consciousness that lacks access.

8.3 Impoverished consciousness

In this section I argue that some dreams have *impoverished* consciousness in the sense that they lack *access consciousness*. I argue that Block's distinction between access consciousness and phenomenal consciousness convincingly describes some dream experience, even though Block himself rejects this view. I argue that Block's rejection of dreams as an example of phenomenal consciousness that lacks access is based on an inadequate understanding of dream phenomena. I highlight this by showing that dreams provide a better example of P- without A-consciousness than the Sperling experiment, an example used by Block. Consequently, I support his theory of A- and P-consciousness, but reject his assessment of dreams.

8.3.1 Access and phenomenal consciousness

According to Block (1995, 2007), there are two types of consciousness that need to be disambiguated: *phenomenal-consciousness* (P-consciousness) and *access consciousness* (A-consciousness). This ambiguity often leads to confusion in consciousness theory. Block's view differs from global workspace theory and HOT theory which both emphasise access as the *necessary* attribute of consciousness. P-consciousness, put simply, is just *experience*. We can experience stimuli with our five senses, such as smell or taste, or we can experience thoughts, imagination or hallucination. To be in a p-conscious state means that there is something that it is like to be in that state (Block 1995). It is debatable whether certain mental states, such as beliefs and desires, are P-conscious. For example, is there anything that it is like to believe that God exists? Perhaps such a belief would evoke emotions or other associated phenomenal states, however it is contentious whether the belief itself has an experiential quality. Block argues that we are instead only A-conscious of such mental states.

A-consciousness occurs when the contents of a perceptual state are incorporated into the 'executive system', so that the state is poised for, or capable of, being used for reasoning, thinking, reporting and controlling behaviour. Block describes A-consciousness as being "(1) inferentially promiscuous (Stich, 1978), i.e. poised to be used as a premise in reasoning, and (2) poised for [rational] control of action and (3) poised for rational control of speech" (Block, 1995 p 239). Although (3) is not an essential feature, since one may be incapable of speech whilst being capable of A-consciousness, (3) is mentioned only as an indicative feature. Rather (3) is essential for the *empirical study* of A-consciousness, since theorists rely on reports to research cognition.

Block reasons that phenomenal consciousness may occur in the back of the brain, which includes the parietal lobe, associated with movement, orientation, recognition and perception of stimuli as well as the occipital lobe, associated with visual processing. The strongest neuronal coalitions win over weaker coalitions, and send information through to the frontal lobes associated with reasoning, planning, problem solving, emotions and speech. This in turn may result in feedback loops to the back of the brain. For example, if a pain signal in the back of the head is strong enough, the information is sent to the frontal lobes for processing to enable rational action and inference making. Then information feeds back to the back of the head, which may affect the quality of the experience, and so on. However according to Block this is no reason to think that the losing coalitions are not phenomenally conscious. Certain coalitions are only slightly weaker than the winning coalitions, so it is plausible that they are only slightly weaker regarding phenomenal quality. I later argue that since frontal lobes are often inactive during dreams, many dreams may lack access consciousness.

To support his theory, Block highlights evidence to support the double disassociation between A and P consciousness. At times, we can have A-consciousness without P-consciousness, and vice versa. I focus on the possibility of P-consciousness without A-consciousness, and argue that dreaming provides an example of such dissociation.

i) P-consciousness without A-consciousness

You are sitting in your living room and the hum of the refrigerator switches off. You are aware of the change, despite the fact that you were not previously paying attention to the sound. This *may* be a case of phenomenal consciousness without access, argues Block, however it is unclear whether you did have phenomenal consciousness of the humming for the preceding 20 minutes. You may instead only be conscious of the *change*. A more clear-cut example is a drill being used constantly for a period of time across the road. After 20 minutes of drilling, you may become desensitised to the sound and stop noticing it, but nonetheless be relieved when the noise ceases. This is more likely to be a case of phenomenal consciousness that lacks access since the drill was heard throughout, however for a time the noise did not have any effect on your rational capacities or behavioural control. Block argues that experimental data also supports the A- and P-distinction.

In Sperling's (1960) experiment, subjects were briefly shown 3 rows of 4 letters. Subjects generally report *seeing* all the letters, however when asked specifics about which letters were shown and where, subjects could on average accurately report about 3 or 4 letters randomly across the array: less than half. In the next part of the experiment, an arrow points at a row of letters 1.5 seconds after removing the stimulus. Alternatively, in other experiments a tone was played to indicate a row, pitched high to indicate the top, medium for the middle and low for the bottom row. Participants could generally name every letter of the indicated row. Block argues that the Sperling experiment is an example of P-consciousness of all 12 letters, but A-consciousness of only 4. By signalling to a specific row of letters, the stimuli of those specific letters stored in the back of the head become the dominant coalitions, winning over the stimuli from the other letters. We become A-conscious of that row, excluding the other letters in the array from A-consciousness. Block explains that this is because we have a greater capacity for P-consciousness than for A-consciousness, which he calls "phenomenological overflow" (Block 2007 p 489). We have phenomenal capacity for 8 to 12 objects, whereas our access capacity is limited to 3 or 4. The 1.5 second delay between letters and indicator is evidence that all items *do* remain phenomenally conscious, since we then become access conscious of *whichever* line is signalled. This could not occur if we lost p-consciousness of any of the letters.

ii) Alternative explanations of the Sperling experiment

The strength of the Sperling evidence as support for a disassociation between access and phenomenal consciousness is contentious. Chalmers (1997) argues that

> only three letter representations are *accessed,* but it is nevertheless plausible that each of the nine was *available,* until the process of access destroyed their availability. This works because the modified notion of A-consciousness is dispositional – not access, but *accessibility* is required. And it is plausible that all

> nine letter-representations are A-conscious in the modified sense. So even in this case, P-consciousness and modified A-consciousness occur together (p 149).

According to this view, P-consciousness and A-consciousness are not separable. Rather all items are potentially accessible for 1.5 seconds, then accessing particular letters renders the rest of the letters inaccessible.

Another explanation is that only *generic* information is available for all 12 letters, whereas *specific* information is available for only 4 of the letters (Phillips 2011 p 402). For example, generic information is that all items are letters, a certain size, colour and orientation. Specific information is which particular letters they are. Alternatively, we might have limited or weak access to what those letters are. This claim is made less plausible by the apparent "winner takes all" aspect to reports about conscious experience (Hohwy 2007 p 13). When asked to rate the strength of a stimulus, people tend to report 'strong', or not report at all. There are very few cases where stimulus is reported as being *weak* conscious experience. However, I argue that dreams provide a more convincing example of P- without A-consciousness

8.3.2 Phenomenal dreams

In this section I argue that cognitively impaired dreams provide evidence of P-consciousness without A-consciousness. According to the pluralistic view, this description does not apply to all dreams since some dreams, for example lucid dreams, clearly involve A-consciousness. However here I focus on dreams which lack metacognition, agency and other relevant cognitive features of A-consciousness. I argue that Block's brief assessment of dreams is incorrect, and does not take into account the relevant dream experiences that I highlight. Block should concede that some dreams are examples of P-consciousness without A-consciousness. I argue that we may *become* A-conscious of the content of cognitively impaired dreams if we wake up at the appropriate time during REM sleep. This is analogous with the delayed A-consciousness demonstrated in the Sperling (1960) experiments.

According to Block, dreams are less intense and detailed than waking consciousness. Therefore they are not an example of P- without A- consciousness. Block (1995) states that

> On my account, dreams are a form of consciousness, though they are of less intensity than full blown waking alertness. Consciousness[74] is an on/off switch: You are either conscious or not. Though once conscious, the system functions like a rheostat, and there can be an indefinite range of different degrees of consciousness, ranging from the drowsiness just before one falls asleep to the full blown complete alertness of the obsessive (p 262).

So Block rejects the possibility that dreams lack A-consciousness. However, Block's assessment of dreams as a less-alert form of consciousness is only an accurate description of some dream experience. My pluralist model of dreams supports the possibility that dreams lack the requirements of A-consciousness noted above. I discuss this in more detail in section i) below. My interpretation that dreams are an example of P-consciousness that lacks A-consciousness is supported by Revonsuo (1995a).

> Dreaming seems to be a pure case of P-consciousness without A-consciousness: it has all the phenomenological properties without having any of the normal functional relationships to perceptual input or external behavior. However, if the motor output blockade is removed during dreaming, the person or animal will act out the dreamed behavior in accordance with the dream events (Hobson 1988, p. 150). The observed behavior is in such a case driven by current conscious experience, but it would hardly count as "rational control of action" from an outsider's point of view - people who have REM sleep without atonia often injure themselves badly during attempted dream enactment (Schenck et al. 1986). Thus, there is complex control of action that is the expression of an underlying mental reality but that would probably not be considered A-conscious (p 266).

Revonsuo's view is accurate for *some* dream experiences according to dream pluralism. I argue that access consciousness of many dream experiences is dependent on being woken up at an appropriate time during REM sleep.

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[74] It is unclear whether Block is referring to A- or P- consciousness here.

I argue that the distinction between A- and P-consciousness forms the basis of an intuitively appealing theory of dream consciousness. I also argue that dreams provide support for Block's theory by providing an example of P- without A-consciousness that is more plausible than the Sperling example.

i) Dreams and the criteria for A-consciousness

Most of what we dream, we do not remember unless we are woken up during the appropriate stage of REM. Many periods of dreaming occur during one night but very rarely can dreamers recall and report more than one sequence of dreaming. Usually only the dream that occurs just before waking is remembered (as discussed in chapters 1 and 2), although most REM sleep awakenings elicit dream reports. This suggests that waking up during REM sleep often is essential to be able to recall and report dreams. I firstly argue that cognitively impaired dreams often lack the criteria for A-consciousness, and secondly waking in time to remember and report the dream is essential for the dream to become A-conscious.

Block himself rules out dreaming as a case of phenomenal consciousness without access. He argues "in dreaming, one's representations *are* poised to control behavior, but behavioral systems are paralyzed, so there is no behavior. Dream contents are A; so they do not provide a case of P without A" (Block 1997, p 166). However, he incorrectly assumes that all dreams are poised for rational control of behaviour. REM sleep behaviour disorder (RBD) patients act out their dreams and often seriously hurt themselves or their partners. They may jump out of windows believing they can fly, or attack their spouse thinking that they are a monster (see chapter 3). So even if the output blockade is broken, dreamers don't display rational behaviour. One could argue that their behaviour *would* be rational given that the dreamer believes that they can fly, or that they are fighting a monster, however, dream decisions and behaviour are not always rational. Block does not consider the fact that the dreaming brain can have such reduced cognitive capacity: a fully rational waking mind would realise that flying is impossible and would not attempt it in the first place. They would realise that monsters do not exist, and question the existence of the monster in front of them. In other dreams, the dreamer lacks volition entirely, as discussed in chapter 6. Instead they go along with the dream narrative without making conscious decisions or rational actions.

Cognitive capacities are greatly reduced in some dreams. Irrational thoughts and decisions (see chapter 2) and poor memory access (see chapter 1) are a few examples of this. The three criteria for access consciousness according to Block are inferential promiscuity, rational control of one's actions and reportability. Dreaming consciousness often lacks all three of these criteria.

Inferential promiscuity, the ability to use information to make inferences, is severely lacking in many dreams. For example, whilst dreaming we are unable to notice bizarre features and make rational inferences about such features. Inference-making capacities can be either unavailable or severely impaired whilst dreaming. We either accept bizarre occurrences as normal, or make bizarre rationalisations of the event. For example, Hobson (2002) reports the following dream in which he is watching an acquaintance of his (Roger) try to land a helicopter:

> …suddenly, very suddenly, the helicopter became a tractor, a farm tractor with big wheels which, on hitting the ground, flew apart, one large wheel rolling wildly downhill while the rest of the tractor veered to the left with Roger now running behind (p 130-131).

In his dream Hobson does not notice the strangeness of a helicopter morphing into a tractor, and does not question whether his perception is accurate. Rather he watches the events unfold without making any interferences or performing any rational actions. His experiences are not inferentially promiscuous.

Dreamers often lack the ability to rationally control their actions. Lack of control might be linked to the other reduced rational cognitive faculties, agency and memory access. Dreamers behave irrationally since they cannot make rational decisions, and behave in ways that are out of character[75]. Poor memory access means that the dreamer is unable to use past experiences to guide their actions. The dreamer often immediately forgets what they have just dreamed due to a reduced capacity for memory retention, so events in the dream environment can shift without the dreamer noticing anything unusual. This leads to actions being irrational and unrelated to a person's situation. Inability to question the changing and unstable landscape in dreams is another demonstration of how dreamers can be irrational. If a fully functioning waking mind found itself in a bizarre dream scenario, the waking mind would question all bizarre aspects of the landscape and come to the conclusion that something was wrong with their experience. This happens occasionally[76], however the dreamer often accepts the dream environment as if nothing is unusual.

Being poised for rational control of speech and reportability may be contingent on being woken at the appropriate stage of sleep. This is where I draw the parallel between dreaming and the Sperling experiment. Cognitively impaired dreams may only become access conscious upon awakening, which is analogous to the array of letters that become A-conscious after signalling. However, dreams provide a more convincing example of P-without A-consciousness than the Sperling experiment.

ii) Dreaming vs. Sperling

According to Block's analysis of the Sperling experiment, the subject becomes A-conscious of a line of letters *after* the array has been removed. According to Block's analysis, frontal areas of the brain are necessary for access consciousness. The sleeping brain often lacks activation in these frontal areas (for example the DLPFC, see chapter 1.1) which provides evidence that some dreams are not A-conscious. In contrast, areas in the back of the brain, such as the emotional centres, the visual cortex and motor areas can be highly activated. A-consciousness, according to Block, results from dominant stimuli from the back of the brain feeding through to the front, sometimes causing a

[75] In chapter 6 I argued that dream protagonists may be so different from their waking selves that they are not the same person, but rather a distinct dream personality.
[76] Known as pre-lucidity

feedback loop between the front and back. The indication of one line of letters causes those letters to become the dominant stimulus in the Sperling experiment. In comparison, if the dreaming brain lacks the appropriate interaction between front and back, dreams may lack access consciousness according to Block's analysis, although strong activation in the back of the brain suggests P-consciousness occurs. However, when the subject wakes from a dream, the frontal cortex becomes active, and the dream becomes reportable. At this stage, the dream stimuli may become part of a feedback loop in the waking brain. In the same way that pointing at a line of letters in the Sperling experiment causes that line to become A-conscious, so waking up a person in the middle of a dream allows that person to process and recount details about that dream, thus becoming A-conscious of the experience.

Without being woken at the appropriate time, the dreamer is often unable to recall or recount dreams. Waking during a dream may allow the waking brain to gain access and capture sufficient memory traces of the otherwise cognitively impaired sleeping brain. Perhaps the dream becomes poised for rational control of action and speech *after* waking. When the dream is committed to memory then the waking mind can use those memories for making inferences and rationally controlling behaviour. For example, after waking I can infer that I was dreaming and write down a dream report, however whilst dreaming, rational inferences, control of behaviour and thought were not available. I argue dreams are a more plausible case of P- without A-consciousness than the Sperling experiment.

Dreaming provides a better example of P- without A-consciousness than the Sperling experiment for several reasons. Firstly, it is unclear in the Sperling experiment what is accessed and what is not, as discussed previously. Perhaps all stimuli are temporarily accessible until most are forgotten 1.5 seconds later. Secondly, neurophysiological evidence supports the absence of A-consciousness in dreams, but not in the Sperling experiment. It is unclear whether feedback loops from the back to the front of the brain are involved when we experience the unreported letters. If the unreported letters are P- without A-conscious, then they do not form dominant correlations to the front of the brain. However, there is no evidence for this. In contrast, dreams display lowered levels of cognitive capacity and lack of activation in the dorsolateral prefrontal cortex and other frontal cortices, so this evidence supports the lack of A-consciousness in such dreams. Dreams thus provide a clearer case of experience that lacks Block's three criteria for access consciousness. The information cannot feed through to the prefrontal lobes since they are not active. In the Sperling experiment, the DLPFC is active, and it cannot be ascertained which stimuli form sufficiently strong coalitions. Dreams thus provide a convincing case of P- without A- consciousness. In the following section I highlight some apparent counterarguments and provide responses, arguing that dreams are a convincing case of P- without A- consciousness.

iii) Counterarguments to dreaming as P-consciousness without A-consciousness

In this section I briefly discuss counterarguments to my thesis, and explain why nonetheless, dreams are a convincing example of P- without A-consciousness.

One might argue that dreaming consciousness does not rule out the three criteria set out by Block in the way I have discussed. There are many contrary situations in which bizarreness and irrationality do not occur, as discussed in chapter 2, and this is an important aspect of the pluralistic account of dreaming. In a mundane dream, I might walk down the hill towards the shop to buy some milk. My belief that the shop is down the hill and stocks milk leads to a rational behavioural response. Behaviour in dreams can be rational. The same can be said for making rational inferences. In a dream I may infer that there is someone at the door when the bell rings; a perfectly rational inference. If dreams were never rational, we might expect less mundane dream reports. Laws of nature are often followed in dream worlds, i.e. gravity usually works, trees grow up from the ground etc. Similarly, some dreams are remembered without the need for waking up during the dream episode, rather after waking up in the morning one might remember a dream that occurred hours earlier. Some individuals may remember multiple dream experiences in the morning. However, this does not discount the possibility that *some* dreams are P- without A-consciousness. The variety of dream phenomena is described by the pluralistic view of dreams I set out in part 1 of this thesis. Highly irrational, bizarre dreams provide the best examples of P- without A-consciousness.

In chapter 2 I discussed theories according to which dreams reflect waking life, to a considerable extent. According to this view even if *some* dreams lack access consciousness, this would be a small subset of bizarre, irrational dreams. However it is unclear whether access consciousness is attained even in mundane dreams about walking down the street or answering the doorbell. Perhaps 'normal' responses to certain stimuli are not *rational* responses, but rather *automatic* responses; e.g. answering the doorbell when the bell rings is second nature, so I do it as a reflex without rational consideration. Nonetheless, even if mundane dreams have A- consciousness and are the norm, at least a subset of dreams are good examples of phenomenal without access consciousness.

Block himself denies the possibility of P- without A-consciousness in dreams. However, according to Block's own argument, whether or not a dream is access conscious depends on feedback loops from the back to the front of the head. In many REM dreams, the frontal and pre-frontal cortices are deactivated, which leads to lack of metacognition, lowered capacity for logical inference making and reduced ability to distinguish the unusual from the usual. The level of deactivation will dictate whether or not we can have A-consciousness in dreams. In some REM dreams, especially lucid dreams, the frontal areas are activated to varying degrees (see chapter 1). Therefore, I think pluralism towards dreaming consciousness can be accurately accounted for by Block's theory of consciousness. Dream consciousness can be anywhere on a spectrum from waking level access to lacking access. Dreams are sometimes fully conscious i.e. have both A- and P-consciousness, whereas at times they are impoverished in the sense of being P- without A-conscious. This is a plausible description of dreams that allows dreaming and normal waking consciousness to at times be highly distinct. This supports Block's overall theory, as any theory of consciousness requires a convincing explanation of dream consciousness. HOT theory and GW theory do not succeed to the same extent.

Conclusion

I have argued that theories of consciousness require a plausible account of dreaming that is consistent with current dream research. HOT theory implies an anti-experience thesis of cognitively impaired dreams, which is a counterintuitive outcome, and inconsistent with modern dream theory. I argue that it is implausible to concede that we can report unconscious mental activity upon waking. HOT theorists need to either demonstrate how retrospective consciousness can occur, or offer an alternative explanation for not-HOT dreams. According to GW theory, dreams may be a straightforward case of consciousness with poor cognitive capacities such as rationality and metacognition. However, Baars describes dreaming as involving *spontaneous* imagery and emulating an early form of consciousness. It is not clear according to this analysis whether different types of consciousness should be then distinguished according to the GW view. Block's distinction between access and phenomenal consciousness allows for the possibility that cognitively impaired dreams are conscious but distinguishable from full-blown waking consciousness. Instead such dreams may lack access consciousness while retaining phenomenal consciousness. I argued that cognitively impaired dreams provide a promising example of phenomenal consciousness that lacks access consciousness. Furthermore, despite the fact that Block rejects this possibility, dreaming supports his overall theory of consciousness.

Conclusion

Dreaming is of great interest for the study of philosophy and cognitive science because of its broad variety of cognitive and phenomenal features. I have set out a pluralistic approach to dreaming that focuses on the variety of dreaming, and I have applied dream phenomena discussed in the empirical literature to debates in philosophy of mind.

A cross-disciplinary approach

My cross-disciplinary approach to the study of dreaming has involved the evaluation of empirical research, scientific experimentation and philosophical argumentation. In the study of dreams, a cross-disciplinary approach is appropriate as an integrative evaluation of the research on dreams, focusing on a variety of aspects. This broad approach was necessary to support a pluralistic view of dreams. Scientific empirical data is important in supporting the pluralistic view, as this empirical research provides evidence that dreams are a broad range of experiences. As I have argued, there is disagreement as to exactly how bizarre dreams are and what are the most prevalent cognitive features: however a broad range of experiences do occur in dreams, and I discuss a variety of common and rare features. Some experiences such as lucid dreaming and vicarious dreaming are relatively rare, but are nonetheless important to take into account. I have analysed how a variety of dream experiences have various implications for philosophical theories of the self, mind and cognition. My approach was to analyse the empirical data in the scientific literature to establish the pluralistic view, and then to apply the analyses of these results both to my arguments about dream pluralism and to other areas of philosophy.

Dream pluralism

In Part I of this thesis, I showed that reductive theories of dreaming either provide implausible accounts of dreaming, or do not take into account all the varieties of dreams.

I discussed the content and cognition of dreams, and argued that some dreams contain a variety of bizarre elements and irrational cognition, whereas many dreams are accurate representations of waking life and display waking levels of cognition. I then argued against a reductive, anti-experience view of dreams, and argued that dreams are experiences that occur during sleep. However, dream reports are prone to fabrication, especially for cognitively impaired dreams. Therefore, we cannot assume that dream reports accurately indicate the content of dreams. I discussed imagination models of dreaming and compared them with the perceptual views of dreams, demonstrating that both views are overly reductive. Instead, dreams contain a variety of perceptual and imaginative features. Some dreams are imaginative whilst others are primarily perceptual, although many contain both imaginative and perceptual elements.

The limits I have set out for dreaming are that they are experiences that occur during sleep, and our cognitive abilities in sleep can equal, but do not exceed our waking cognitive capacities. I argued that anti-experience theses are implausible, although the reportability of dream may often be questionable. I do not broach the topic of psychoanalysis in dreams, or whether dreams contain symbolic, meaningful content.

Philosophy and dreams

In Part II of this thesis I applied a variety of dream phenomena to debates in modern philosophy of the self, cognition and consciousness. I argued that dreams are an aspect of consciousness that deserve greater attention in philosophy, and that it is an oversight that most theorists have not taken dreaming sufficiently into account. Firstly, I analysed a type of dreaming that I referred to as "dreaming vicariously", in which the protagonist of the dream is not the same person as the dreamer. I argued that these types of dreams pose an interesting problem for philosophy of the self because it is conceivable that dreams can contain alternative personalities. I then applied dreaming to the extended cognition debate, and argued that it is feasible that dreaming cognition could be extended into the external environment in the future if we develop wi-fi cognitive enhancement devices. However, dreaming usually involves only internal and isolated cognition and conscious experience. This, I argued, provides a counter argument to the theory of extended consciousness, since most dreams are both isolated and full-blown conscious experience. Finally, I applied dreaming to a variety of theories of consciousness, and found that there is insufficient attention paid to dreaming in consciousness theory. I argued that distinction between access and phenomenal consciousness affords a plausible account of the variety of conscious experience in dreams, whereas higher order thought theory and global workspace theory currently offer no plausible account of dreaming. Since dreaming is a pervasive conscious experience that occurs for most people multiple times every night, it is important that any theory of consciousness provides a plausible account of dreaming that is consistent with the current dream theory.

Research obstacles

The main obstacle in my research has been the lack of discussion from philosophers of mind about dreaming and how dreams relate to theories of consciousness and cognition. This is an untapped area of philosophy that deserves greater attention, but the lack of research has made research challenging, requiring the application of philosophical theories in new ways to the study of dreaming. Often I have had to conclude that is it unclear what a particular theorist or view would or should say on a matter, since the issue of dreaming has received insufficient research. Even theorists who touch on the topic often spend only a brief amount of time setting the issue aside. Sometimes this has led to counterintuitive outcomes. The discussions of dreaming consciousness I have encountered either imply an implausible theory of dreams that is not consistent with current dream research, as is the case with higher order thought theory, or when analysed in detail these discussions seem to contradict the theory in question, as with global workspace theory. However, the lack of research in the area of dreams calls for an integrative approach such as the pluralistic view.

I have focused on an integrative approach, applying disconnected theories of mind into contact with each other in novel ways . However, the general lack of interest in dreams from many philosophers of mind has left open a broad area of discussion that I hope to have touched upon and made innovations towards. Philosophy of the self, consciousness and the extended mind have generally not touched on dreaming, so my contribution has been to bring these theories together.

Future work

Although dreams have received considerable attention from the sciences, the same cannot be said for philosophy. This is an oversight that should be redressed in the future. I have attempted to begin redressing this oversight in this thesis, joining a handful of philosophers who research dreams. Further research needs to be carried out in the study of consciousness to ascertain a plausible theory of dream consciousness. The current theories of consciousness need to address dreaming consciousness to be consistent with current dream research from the sciences and current dream ontology. Insufficient effort has been spent accommodating theories of consciousness to dream theory. For example, I have argued that higher order thought theory is weakened by the possibility of dreams that do not involve higher order thoughts, and global workspace theory only provides a vague and unclear account of dreaming. Future research should be devoted to addressing these issues.

The possibilities for applying dreams to areas of consciousness are broad. Dreams provide a variety of thought experiments and challenges, some of which I have discussed in this thesis. In the future I hope more philosophers will take up dreaming as a research interest to insure that all varieties of consciousness and cognition, those that occur during sleep as well as while awake, are appropriately accounted for.

Empirical research on dreams still has a variety of untapped avenues for novel discovery. One of the unsolved mysteries of the sleeping brain is the contribution of the dorsolateral prefrontal cortex (DLPFC) during dreams. Some studies show that it is deactivated during sleep, whereas other show there is some activation of the DLPFC. Little work has been done on the activation of the DLPFC during lucid dreaming. The contribution of the DLPFC during lucid and non-lucid dreams is important for cognitive science as it could provide important correlations between DLPFC activity and cognitive processes associated with frontal activation, such rationality and metacognition. In chapter 1 I discussed the lack of empirical work on neuroimaging during children's dreams. The difficulties of such research as discussed in chapter 1 have delayed progress in this field, however, this is an important area of research for the development of dreams and cognition. Finally, in chapter 3 I discussed the ability of lucid dreamers to signal that they are dreaming, and the possibility of using hand signals to indicate specific dream content. The initial research was carried out decades ago, and results were inconclusive. With better technology that we have today, this research paradigm could be taken up once more. If hand signalling were successful, it would be the most definitive way to verify dream content since research participants would be reporting dream content as it occurred.

I conclude that dreams are an important area of research for philosophy that has unfortunately received insufficient attention. I have applied dreaming to a variety of philosophical debates and highlighted the areas in which more work needs to be done.

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