

UNIVERSIDADE DE LISBOA
FACULDADE DE LETRAS



**Insights into perceptual ambiguity and inference in art –
a practice-based approach derived from the corporeal
form**

Samuel Viana Meyler

Orientador(es): Prof. Doutor ... *José Pedro Serra*
Prof. Doutor ... *Zachary Mainen*

Tese especialmente elaborada para obtenção do grau de Doutor no ramo de Artes

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To my family

To my mum

Thank you.

Abstract

The goal of this dissertation is to apply the phenomenon of perceptual ambiguity to the corporeal form, adopting examples from the work of acting instructor Jacques Lecoq (1921-1999).

I submit that the sensitivity of our perceptual system, highly adapted to recognise human faces and bodies, both constrain, as well as aid, artistic attempts at embodied ambiguity. Furthermore, defamiliarisation will generally be favoured over indeterminacy because the former is an ambiguous stimuli that preserves the presence of the corporeal form. While these more innate biological components will govern form, theatre practices in the last century have taken an increasingly embodied epistemological approach which has encouraged the use of perceptual ambiguities on stage. Physical theatres reflect this transition, emphasising the body over language to communicate ideas and concepts. For example, the pedagogy of J. Lecoq involves recreating and embodying the external world using the human actor (e.g. materials, animals, colours, masks etc.). This process will naturally result in defamiliarisation because it transforms the human into an ambiguous stimuli, forcing a re-interpretation on the part of the observer. This transformation can be viewed as the result of an imitative or emulative operation whose reproduction, often only partially successful, contains a huge potential for artistic creation.

This dissertation also includes artistic objects as well as two scientific experiments. The practice-based artistic object includes a documentary film entitled 'Sculpting the Body; a theatre of physicality'. By merging both practical and theoretical work, this thesis demonstrates how physical theatre uses embodied perceptual ambiguities as part of its aesthetic construct, and furthermore, argues that this represents a particular manifestation of a wider phenomenon that remains ubiquitous to art in general but which will have different constraints contingent on the artistic medium used.

Key words: Perceptual Ambiguity; Jacques Lecoq; Physical Theatre, Imitation

Resumo

O objectivo desta dissertação é aplicar o fenómeno da ambiguidade perceptiva à forma corporal utilizando exemplos do trabalho desenvolvido pelo professor de teatro Jacques Lecoq (1921-1999). Surge como um produto da combinação do meu trabalho enquanto biólogo e actor.

Neste sentido, começo por propor que a ambiguidade é apenas uma das facetas de um espaço multidimensional que constitui a experiência da arte. Considero a ambiguidade uma propriedade resultante da acção do indivíduo, ao tentar interpretar a sua informação perceptiva e não como uma característica inerente ao objecto. Da perspectiva do cérebro, esta interpretação é fortemente orientada para a redução da ambiguidade, uma vez que, em termos evolutivos, o nosso sistema perceptivo tem-se desenvolvido maioritariamente no sentido de representar funcionalmente objectos reais. Embora a arte seja uma classe de estímulos percebida pelo mesmo sistema, não significa que as criações artísticas sejam, necessariamente, limitadas pelas restrições da experiência visual diária. Considero esta “liberdade perceptiva” a razão pela qual estados prazerosos e aliciantes possam resultar da ambiguidade na arte. Assim, poderei assumir que, na arte, espaços de média e grande ambiguidade são positivamente interessantes, pois desafiam-nos a aplicar um dos propósitos fundamentais da cognição – o interpretar e perceber a nossa realidade – a estímulos “seguros”, que, todavia, são bastante raros, difíceis de processar e até pouco convencionais num contexto quotidiano.

Estudos que se debruçam sobre este fenómeno em formas de arte corporalizadas, como é o caso do teatro, são ainda extremamente escassos. A passagem de pinturas estáticas para performances personificadas efémeras não é trivial, pois introduz a presença física de um corpo em movimento. Do ponto de vista biológico, a nossa sociabilidade enquanto espécie resultou num sistema perceptivo altamente adaptado em reconhecer rostos e corpos humanos –

considero que esta sensibilidade poderá restringir, bem como apoiar, tentativas artísticas de ambiguidade. A título de exemplo, a ambiguidade irá estar restringida, pois não só o performer se encontra limitado pelas circunstâncias físicas (gravidade, anatomia, etc.), como o espectador possui um sistema perceptivo extremamente adaptado em reconhecer o corpo humano. Ambos contribuem para a redução da capacidade de um performer criar imagens perceptualmente ambíguas, usando o corpo e o rosto. No entanto, e até de certa forma paradoxalmente, dado que o cérebro humano se encontra condicionado para detectar figuras e inferir informação a partir da mais pequena expressão facial e corporal, a mera sugestão física de um indivíduo em palco é muitas vezes o suficiente para que o nosso sistema perceptivo infira um determinado estado. Isto aumenta o espaço potencial de inferência do observador. Exercícios em teatro, como o “fazer nada”, retratam bastante bem este fenómeno.

Além disso, uma vez que o requisito geral de uma forma de arte corporalizada é a presença física do próprio corpo humano, isto limita naturalmente o nível de ambiguidade perceptiva, pois o reconhecimento semântico humano nunca pode ser eliminado por completo. O que significa que a ambiguidade perceptiva que irá ser favorecida em performance corporalizada será a desfamiliarização ao invés da indeterminação. Isto deve-se ao facto de aquela preservar a presença da forma corporal. As máscaras teatrais são um exemplo deste fenómeno – estas distorcem a nossa representação normal do rosto, aumentam a subjectividade, utilizam a nossa capacidade de inferir estados a partir da mínima expressão humana, conseguindo, no entanto, manter a presença do corpo físico em palco.

Para além destas componentes biológicas mais inatas, mudanças culturais importantes, que aconteceram no último século nas práticas teatrais, também encorajaram o aparecimento de ambiguidades perceptivas – por exemplo, enquanto modelos de teatro tradicionais foram dominados, não apenas pelo texto dramático, mas também por uma abordagem dualista que tendia a olhar o corpo sob uma perspectiva mais mecânica, o teatro tem adoptado, progressivamente, uma abordagem mais corporalizada. Esta mudança, na

direcção de uma epistemologia corporalizada, desafia a utilização da linguagem como método principal de comunicação e desvaloriza uma abordagem à representação puramente psicológica. Os géneros de teatro físico proporcionam uma oportunidade interessante para explorar ambiguidades perceptivas, pois estes traduzem esta transição, enfatizando o corpo em relação à linguagem na comunicação de ideias e conceitos.

Jacques Lecoq é considerado um dos pioneiros do teatro físico moderno e o seu trabalho inclui muitos dos elementos que considero necessários para uma exploração da estética da ambiguidade perceptiva corporalizada. Sinto-me inspirado, em muitos aspectos, pela artista Emilyn Claid (2006) na sua abordagem em considerar a palavra “ambiguidade” como um verbo: “ambigui-zar”, sendo então o meu objectivo, o encontrar exemplares deste “verbo” na pedagogia de Lecoq. Esta escola centra-se essencialmente na filosofia de que “tudo se move” e, ao longo do seu treino, aos actores é repetidamente solicitado que recriem e encarnem o mundo exterior que os rodeia (elementos, materiais, animais, cores, etc.). Este processo resulta, naturalmente, na “desfamiliarização” – como por exemplo o encarnar a primavera, o cartão, a galinha ou a cor azul, ambigua o corpo, tornando-o desconhecido e transformando-o numa metáfora corporalizada que nos permite olhar a forma humana de uma perspectiva diferente. Da mesma forma, as várias máscaras que Lecoq integrou na sua pedagogia, distorcem a nossa representação normal do rosto, transformando o humano num estímulo ambíguo, o que obriga a uma reinterpretação por parte do observador. Considero que estes exercícios representam exemplos específicos em como a ambiguidade pode ser criada usando a forma corporal.

Por fim, analiso o trabalho de Jacques Lecoq sob a perspectiva biológica da aprendizagem social. Em conformidade com a descrição dos exercícios teatrais supracitados, a desconhecização pode, em última instância, ser vista como o resultado do processo em que um objecto tenta encarnar outro. Esta situação não difere da “teoria da bi-associação”, de Arthur Koestler, que descreve o processo criativo como a combinação de elementos que normalmente não se

encontram associados. Assim, quando um actor escolhe a tartaruga e copia a sua marcha, esta é a sua tentativa de encarnar o movimento daquele animal. No cerne desta questão encontra-se, o que tem sido historicamente denominado por psicólogos e etnólogos (e.g. Byrne 1998, Nehaniv et al. 2001), o “problema de correspondência”, ou seja, como é que o observador realiza acções que “correspondem” às do sistema observado? Na verdade, vejo o processo de “ambiguiizar”, na pedagogia de Jacques Lecoq, como o resultado de uma operação imitativa ou emulativa que surge da tentativa do actor humano recriar, através do corpo, o mundo exterior que o rodeia.

Estas tentativas vão acabar por ser fragmentárias por dois principais motivos. O primeiro, como defendo ao longo desta dissertação, prende-se com o facto de uma das características da arte ser a de procurar representações parciais (i.e. ‘partial matchings’) que possam criar ambiguidade e libertar-nos da experiência perceptiva quotidiana. Enquanto artistas, estamos, portanto, abertos a tais estímulos. O segundo motivo relaciona-se com o facto de, à medida que as possibilidades da acção ou ‘affordances’ que pretendemos copiar se tornam cada vez mais díspares da nossa própria forma corporal, somos forçados a aceitar uma representação parcial. A ambiguidade surge, pois apesar de todos os esforços, nunca iremos conseguir ser inteiramente fiéis à imagem que tentamos encarnar. Consequentemente, apesar de não conseguirmos resolver o problema da correspondência devido às nossas limitações físicas, podemos criar um efeito aliciante em palco através das nossas tentativas em tentar fazê-lo. Assim, a desfamiliarização é criada no teatro físico pois o nosso objectivo não passa por encontrarmos uma representação exacta – na verdade, é o subproduto resultante da tentativa inicial de atingir a representação exacta (e de sermos frequentemente forçados e/ou condicionados a aceitar o parcial) que cria a ambiguidade e conseqüente espaço de inferência para o espectador. Este fenómeno contém um enorme potencial para a criação artística.

Passando da teoria à prática, esta tese inclui ainda um elemento artístico, bem como duas experiências científicas. O objecto artístico ‘practice-based’ inclui

vários vídeos e um filme-documentário intitulado 'Sculpting the Body; a theatre of physicality'; que estreou no DocLisboa Film Festival 2017 (25min). Estas filmagens envolvem um grupo de estudantes exemplificando muitos dos exercícios teatrais descritos na parte teórica desta dissertação, os quais dirigi, ensinei e filmei. O objectivo do documentário foi o de criar um corpo de trabalho independente que existisse paralelamente à tese e que pudesse proporcionar uma referência mais visceral de algo que se trata de uma forma extremamente visual de teatro. Do mesmo modo, concebi e implementei duas experiências científicas que resultaram directamente de questões e reflexões que emergiram durante a criação e preparação desta tese. Devido a limitações de espaço, bem como pelo facto de se tratar de uma dissertação de doutoramento inserida num programa de humanidades, estas encontram-se em anexo. A sua inclusão prende-se com o facto de esta tese se inserir também no programa de Neurociência da Fundação Champalimaud, um programa de pesquisa com o objectivo geral de compreender o cérebro e o comportamento através de abordagens biológicas integrativas.

Na fusão do trabalho teórico e prático, esta tese demonstra como o teatro físico utiliza ambiguidades perceptivas corporalizadas como parte do seu construto estético. A pedagogia de Jacques Lecoq representa apenas uma das manifestações de um fenómeno tão amplo (i.e., ambiguidade) que permanece omnipresente na arte em geral, mas que irá ter diferentes constrangimentos dependendo do meio artístico utilizado. Este fenómeno, em última análise, só existe devido à forma como o nosso sistema perceptivo evoluiu.

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INTRODUCTION

The neuroesthetic researcher Semir Zeki once remarked that “ambiguity is such a prized characteristic of all great art because it can correspond to many different concepts” (Zeki 2002, pg. 67). When I think of artists that I admire it has often seemed that they have, either implicitly or explicitly, left a certain amount of ambiguity to allow me to ‘complete’ the picture, which is based from my own personal experiences, be it from that day, that year, or my life. Author Michael Ende captured some aspects of this phenomenon when he stated “a picture is only completed with its viewer. It must not be ready beforehand” (Ende et al. 2001). This is of course now considered a widely accepted position in art theory – that the experience of art requires the active participation of the observer.

I was forced to intensively engage with this phenomenon in the creation of an art-science project entitled ‘Roots of Curiosity: Time in Science and Art’ that myself and two colleagues (Dr. Ana Rita Fonseca and Dr. Patricia Correia) created and directed at the Centro Cultural de Belem; Fabrica das Artes from 2012 to 2014¹. The intention of the project was to challenge 5 pairs of artists and neuroscientists to create an object that merged both scientific and artistic components, which would then be integrated into a performance, a series of workshops, a documentary, a book and finally a conference. From a performative perspective, the project brought unique challenges I had not faced in previous plays that I had directed – for example how to create an artistic performance that gave the artists the freedom to devise and evoke new associations while simultaneously respecting the scientific validity proposed by the scientists? How

1

The project is documented in detail inside the book ‘*Transversalidades II/Raizes de Curiosidade – Tempo de Ciencia e Arte*’; ed. Madalena Wallenstein/Fundação Centro Cultural de Belem 2015; a teaser of the performance can be found in the DVD accompanying this dissertation.

to place the scientists on an artistic stage while simultaneously defending their creativity and their work? These were not questions with obvious nor easy answers - ultimately they touched upon the different constraints inherent in the communication of the disciplines, a topic which itself could amount to a thesis.

Nonetheless, what seemed to be at the crux of the art-science challenge of communication was how much space of interpretation should and can be allotted to the audience during the performance. A tension often emerged with the scientists who desired an accurate description of their work and their artist pair who often took a more nebulous approach, searching for ambiguities and preferring more indeterminate spaces of potentialities. This bifurcate was most obvious in directing the final product and its performance, rather than during the process of the art-science pairs; I should therefore mention I do not consider it as an implicit endorsement of a CP Snow-*esque* regret of the 'great cultural divide' (Snow 1959). In fact our starting point for the project was the presumption that despite the differences, art and science seek to explore – each with their own unique set of concepts and tools – the unknown. From this came the origin of the title *Raizes de Curiosidade* (i.e. Roots of Curiosity): could it be that artists and scientists are driven by a shared 'root' of curiosity?

During the performance we used the metaphor of the stage as a behavioural box², where the audience came to observe a certain behaviour, came to experience a certain experiment. Indeed the paradox of experience and experiment was a key dramaturgical fulcrum – performance existed in the uneasy relationship between experience-experiment, where the former is unique, unrepeatable, impossible to reduce, and the latter is predictable, repeatable, and to as much an extent as possible, independent of subjective interpretation. As a reference and inspiration we drew from the work of

2

A behavioural box is an artificial environment where external conditions can be controlled and which permits the experimental analysis and manipulation of a particular behaviour, usually through operant conditioning. One of the first scientists often attributed to implementing such a device is Burrhus Frederic Skinner (1904-1990), it is now widely used in the field of neuroscience.

philosopher Jorge Larrosa (*Notas Sobre a Experiencia e o Saber de Experiencia* 2002) who describes the tension of a paradoxical space where there exists both the unrepeatable experience and the repeatable experiment.

Perhaps the most straightforward way to summarize this conflict is to include an excerpt of a monologue by one of the neuroscientists, Alex Gomez Martin, which originated after one of many such strong discussions (and which we eventually decided to incorporate an adapted version into the performance at the Centro Cultural de Belem). The text represents his attempt to capture some of the unique challenges, what he enumerated as “problems”, that emerged during his work alongside a dancer, Sara Anjo (Textbox 1; performance can be found in supplementary DVD). Alex’s words “art contributes to maintain the possibilities and potentials... she demonstrates but does not explain ... she attempts to give the most space for the public to interpret her work....my objective is the opposite, to control everything...I have the opposite task in science – to reduce the mysterious, to explain things” made me vividly aware of the dichotomy in how the two disciplines wished to be interpreted (or at least how these individuals identified or defended themselves within the context of their professions and role within the art-science project).

Alex's text in "The Roots of Curiosity" Performance

Problem #1

*I cannot ask questions directly to the rat
Sara also can not answer objectively.
She knows, she demonstrates, but she does not explain...*

Problem #2

When she shows her artistic object, she attempts to give the most space for the public to interpret her work. When I construct my scientific narrative or design an experiment, my objective is the opposite: to control everything.

Problem #3

What can I do on stage? I feel frustrated because she as a dancer can dance, it is what she does! But I work all day in front of a computer, with data and abstract ideas. What I do requires a base, an explanation, it needs more time to be shared and understood than a performance allows.

Problem #4

If art contributes to maintain possibilities and potentials, I have the opposite task in science: to reduce the mysterious, to explain things. Since an objective space does not exist between us, how then can we possibly meet?

Textbox 1

(Alex's text and Sarah Anjo's dance performance can be found on DVD in supplementary information)

By highlighting the different constraints inherent in the communication of the disciplines, the art-science project 'Raizes de Curiosidade' forced me to profoundly re-examine the role of communication on stage in my own work as an artist: more specifically as a theatre director, a performer and finally as a teacher of theatre whose pedagogy is derived largely from the work of acting instructor Jacques Lecoq (1921-1999). Having experienced first-hand the scientists discomfort in allowing their work to be consciously manipulated in a way that reduced or modulated the informational content as they perceived it, I became fascinated in returning to my artistic medium and exploring what was the 'right' amount of ambiguity (and of course discovering if a 'right' amount even exists). In other words, I became very interested in exploring how physical theatre, which as an art form prioritizes the physical body over more traditional, and often psychological, approaches to acting, leaves spaces of ambiguity so as to encourage interpretation and inference from the observer. If indeed much art is ambiguous, then what types of ambiguity can be found in embodied performances? And how would the presence of the human body, a key aspect of physical theatre as well as a highly significant stimuli within our perceptual system, affect how we create spaces of interpretation for the observer?

This thesis is an exploration of some of these concepts, more specifically probing the phenomenon of perceptual ambiguity and spaces of interpretation which can exist in the corporeal form, drawing from my experience as a biologist and as well as an actor. Although it is inevitable that representation in art and the psychology of perception are deeply intertwined, cognitive scientists have largely limited their research to static visual stimuli rather than the physical body. In the main part I think this is because of the added complexities and ephemeral nature of embodied performance. My objective was therefore to first introduce lines of thought concerning previous research on static visual stimuli and ambiguity, and then proceed to apply these concepts to embodied performance. Zooming in even further, eventually I wish to incorporate examples from the work of acting instructor Jacques Lecoq, whose pedagogy comprises a large part of my theatrical training. It therefore is the artistic medium I have at

my disposal to both create an artistic object as well as explore these questions from a practice-based way.

This dissertation is divided into four main sections:

Chapter 1 introduces research which explores the positive relationship between art and ambiguity. Based on some of the existing scientific and humanities literature, I explore how the brain resolves ambiguities, propose why this might elicit a pleasurable experience, and review empirical studies that attempt to quantify the optimum amount of ambiguity that might be needed within an artistic object. I also introduce perceptual and cognitive examples of ambiguous art derived from static and delineated art forms such as paintings and portraits.

Chapter 2 applies this phenomenon to the human body on a performative stage, both from a biological context and a more recent cultural perspective. This shift, from static paintings to ephemeral embodied performance, is not trivial as it introduces the physical presence of the moving body. I will propose that our perceptual sensitivity to human motion can constrain, as well as aid, artistic attempts at ambiguity. Furthermore, since the presence of a body on stage is a requirement of embodied art forms, I posit that any aesthetics of ambiguity which involves the human body will naturally focus on a specific grade of perceptual ambiguity; more specifically defamiliarisation, as this maintains the semantic recognition of 'body' for the perceiver. Without this semantic recognition, the entire concept of theatre becomes problematic. Chapter 2 also examines important cultural changes in theatre practices in the last century that have encouraged the appearance of perceptual ambiguities - for example, while traditional models of theatre have been dominated not only by the dramatic text but also by a dualist approach which tends to view the body in a more mechanistic way, theatre has increasingly adopted a more embodied approach. This shift towards an embodied epistemology challenges the use of language as the primary method of communicating meaning and can be seen as minimizing a purely psychological approach to acting. Within the embodied theatrical domain, physical theatre genres provide an interesting opportunity to explore perceptual

ambiguities because they reflect this transition, emphasising the body over language to communicate ideas and concepts.

In **Chapter 3** I can now take the phenomenon of ambiguity in the human body and apply it to a specific theatre pedagogy, the work of physical theatre teacher and pioneer, Jacques Lecoq (1921-1999). His pedagogy incorporates many of the elements I deem necessary for an exploration into the aesthetics of embodied perceptual ambiguities. Therefore having identified a role for perceptual ambiguity within the experience of art, and then applied these concepts within the framework of embodied performance, my objective is now to narrow the field of research by focusing on a particular lineage. In many respects I inspire myself with artist Emilyn Claid's (2006) consideration of the word ambiguity as a verb: 'to ambigu-ize', and my objective becomes to search for exemplars of this verb within J. Lecoq's pedagogy. By describing some of his identification and transference exercises, as well as examples stemming from his use of theatre masks, I argue that his methods and tools defamiliarise the human body by distorting our normal or habitual representation of it. It is this distortion that creates an aesthetic 'space of interpretation', forcing the observer into a mode of (re)interpretation. Furthermore, since a natural result of this defamiliarisation of the physical body will be new movement patterns which extend beyond the range of habitual behaviour, ambiguity through defamiliarisation can be used as a training tool for actors which runs parallel to any potential aesthetic value it might contain. Finally I will also explore Lecoq's processes of identification and transference as variations of the correspondence problem in biology (i.e. how does one copy or match the actions or states in the environment with the actions or states in one's body?). Applying this perspective provides certain insights – for example although I view the process of 'ambiguizing' in the pedagogy of Jacques Lecoq as the result of an imitative or emulative operation which stems from the human actor attempting to recreate, through the body, the external world that surrounds them, much of the defamiliarisation that occurs could be better described as goal emulation rather than imitation because it focuses on the consequences of the motor act rather than the motor act itself.

Moving from theory to practice, Chapter 3 incorporates the practice-based element of this thesis, which alongside a series of videos, is a documentary film that I directed, edited and wrote entitled '**Sculpting the Body; a theatre of physicality**'. The documentary has been shown in various contexts, including film festivals, private theatre schools and universities. These screenings involve a group of students exemplifying many of the theatre exercises described in the theoretical part of this dissertation and whom I directed, taught and filmed. The objective of the documentary was to create an independent body of work that ran parallel to the thesis and which could provide a more visceral reference to what is ultimately an extremely visual form of theatre.

Finally, placed in the **supplementary information**, are two scientific experiments I co-designed and co-implemented and which directly stem from questions and reflections that emerged in the creation and preparation of this thesis. The inclusion of this experimental side reflects the fact that part of this thesis is integrated into the Champalimaud Neuroscience Program, a basic research programme with the broad aim of understanding brain and behaviour through integrative biological approaches. Although these experiments could have formed a fourth chapter, limitations of space as well as the fact that this doctoral dissertation is inserted into a humanities program meant that the bulk of this material was placed in supplementary information. Nonetheless, the unusual mix of an artistic object alongside scientific experiments embedded within this dissertation reflects the various institutions which have been involved as primary or co-host institutions, including the Faculdade de Letras, the Escola Superior de Teatro and Cinema, Faculdade de Belas Artes and finally the Champalimaud Neuroscience Program.

The motivation for the first scientific experiment (Experiment A: Social Learning and Imitation in the Rat) was inspired from applying the correspondence problem within the pedagogy of Jacques Lecoq in Chapter 3 – if the various contributions of different (and often simpler) matching solutions cannot be isolated within the dynamic social complexity that is theatre, would it be possible within the controlled setting of the laboratory behavioural box? The

provocation was clear, stated by behaviourist Richard Byrne: “it is unlikely that it will ever prove possible to devise a demonstration of imitation uncontaminated by other social influences and ways of learning” (2002, pg. 78). Therefore the aim of experiment A was to elucidate whether imitation exists in the common laboratory rat and to what extent the contribution of other behavioural matching mechanisms could be controlled for. Rodents were shaped to do novel and complex motor movements and the ability of observers to imitate these actions were analysed. Not enough observer animals reliably copied the movement of the demonstrators to show evidence of imitation, however it should be noted that the null result of this experiment does not necessarily mean that rats cannot imitate, simply that the conditions of our experiment were not sufficient to demonstrate imitation in the sense of copying a novel, complex motor movement while controlling for other social learning mechanisms. The second experiment (Experiment B: Using biological motion to test changes in the perception of ambiguous human movement in a group of theatre students) involves physical theatre students observing perceptually ambiguous images of human movement and examines whether performance increases in function with training. The hypothesis that an actor’s training would improve the identification of ambiguous human walkers was not observed – although a trend of increased performance was found, the trend was similar in magnitude across groups (including controls) and therefore is interpreted as a likely learning effect.

Through merging both practical and theoretical work, both from artistic objects as well as scientific experiments, it is hoped that this dissertation provides an interesting platform that combines a wide range of perspectives and which ultimately places the work of the embodied performer within its larger biological framing.

Chapter 1:

The phenomenon of ambiguity in art

A relatively well established position in contemporary art theory, incorporating information from art theorists, historians, and cognitive psychologists, holds that “images are completed, in conformity with the artists intentions, only through the participation of the observer” (Gamboni 2002, pg. 9). The crux of the argument is that meaning and/or the aesthetic experience is not self enclosed within the art object, ready to be passively absorbed by an ‘inert’ spectator, but that it emerges through active participation on the part of the perceiver. In this sense a potential component of the aesthetic experience can be viewed as a sort of ‘co-creation’ between the artistic object and the perceiver. Although this idea has permeated throughout art history, it is perhaps in the last 50 years that this topic has been increasingly problematized from a range of positions by a number of art theorists e.g. reader reception theory (Barthes 1967), audience reception theory (Hall 1980), the open work (Eco 1962/79), potential images (Gamboni 2002), the beholder’s share (Gombrich 1968), the pensive image (Rancierre 2011), aesthetic contextualism (Bullot et al. 2013), the formless (Bois et al. 1997). These conceptual spaces which have gained new ground within the domain of art theory reflect such statements as Marcel Duchamp’s “it is the onlooker that makes the pictures” (1957, pg. 143-145) and Roland Barthes provocative declaration “the birth of the reader must be ransomed by the death of the author” (1967, pg. 6).

One of the earlier proponents and influences of this idea was Alois Reigl (1858-1905), a member of the Vienna School of Art History - inspired by how artists sought to depict the unconscious, instinctual strivings of people in their portraits, Reigl advanced a new psychological aspect of art, more specifically, that art is incomplete without the perceptual and emotional involvement of the viewer. Reigl would name this phenomenon the “beholder’s involvement”, which

would later be expanded on by two disciples of his, Ernst Gombrich and Ernst Kris. Gombrich and Kris renamed the phenomenon “the beholder’s share” and argued that because of the inherent ambiguity of art each person who saw it would have their own interpretation. Therefore if a work of art has more than one possible interpretation, the “beholder’s share” is the contribution the viewer supplies to the meaning of an image through their own imagination and experience. Umberto Eco, in a seminal work entitled *The poetics of the open work*, also propounded the belief that a work of art was open to a virtually unlimited range of possible readings. Eco’s position was that because every individual’s comprehension of an artistic work will always be modified by his particular and individual perspective, every work of art therefore becomes “both an interpretation and a performance of it” (1979, pg. 49). Eco attributed to the Symbolists the original formulation of a theory of the ‘open work’, and argued that from Baroque to modern Symbolist poetics “there has been an ever-sharpening awareness of the concept of the work susceptible to many different interpretations” (Eco 1979, pg. 56).

1.1 The ambiguous nature of ambiguity

The term ambiguity therefore becomes a very important concept within the framework of this thesis because it is the ambiguous or partly ambiguous nature of a particular artwork that will eventually allow for a space of interpretation on the part of the observer. Indeed any cursory glance at popular art forms will notice ambiguity often seems to be a prevalent and valuable component of much art e.g. it is a ‘characteristic of much great art’ (Zeki 2003, pg. 173), certain art might actually owe their value to ambiguity (Kreitler et al. 1972) and modern art is often puzzling and ambiguous (Minisalle 2013). Nonetheless the term ambiguity itself remains somewhat ambiguous (Moore 2009) and is very much domain dependent³. Perhaps unsurprisingly, even within the domain of art

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Different domains can form vastly differing representations of the word – to take an extreme example, in the field of artificial intelligence ambiguity is often defined as “unknown unknowns”, while uncertainty is “known unknowns”

theory approaches to ambiguity have been extremely varied. While literary critics such as Christopher Bode have taken a very simple line – for example in the *Aesthetics of Ambiguity* Bode resists any elaborate definitions of ambiguity and argues for its basic functioning: “as an umbrella term...having more than one possible interpretation or meaning” (Bode 1988b, pg. 73), other literary theorists such as William Empson have provided highly detailed and intricate descriptions of the different types of ambiguity that exist. In Empson’s seminal publication *Seven Types of Ambiguity*, he considers ambiguity to be “when alternative views might be taken without sheer misreading” (Empson 1949, pg. x); and some of his ambiguity ‘types’ include “...an indecision as to what you mean, an intention to mean several things, a probability that one or other of both of two things has been meant, and the fact that a statement has several meanings” (Empson 1949, pg. 5). Although William Empson’s work on ambiguity no longer remains “the encyclopaedic reference” (Elkin 1999, pg. 97), his work is often cited in the ambiguity literature, including those exploring artistic domains not just limited to verbal ambiguity. So for example theatre critic Ralf Norrman (1977) would later simplify Empson’s categories into either complex ambiguity (where several clearly delineated interpretations exist) or vague ambiguity (where the art remains obscure and/or undefined). And visual theorists such as James Elkin proposed that only three of Empson’s seven types of ambiguity are relevant to the visual arts type one (which is when more than one meaning exists and no logical way to choose between them), type 4 (when two or more meanings do not agree but combine to induce a more complex experience that is more than the sum of their parts) and type 6 (when there is no discernable information so that the observer is forced to create his own interpretation); (Elkin 1999). Other art critics have taken a different approach to Empson, arguing that since different varieties of ambiguity exist it is therefore more useful to include other terms such as ambivalence, indeterminacy and

(Carlton et al. 2007). Therefore from this perspective ambiguity would not provide any space of interpretation for the observer because knowledge of potential variables remains inaccessible.

mysteriousness (e.g. Krieger 2010), openness (e.g. Eco 1968), and polysemy (e.g. Gamboni 2002).

From a neurobiological perspective there also exists descriptions of the term. It is perhaps unsurprising that one of the ‘fathers’ of neuroesthetics, Semir Zeki, would be one of the first to examine ambiguity in relation to art and the brain. In a paper entitled the *Neurology of Ambiguity*, Zeki proposes a neurobiological definition of ambiguity – which is that true ambiguity only exists when no single solution is more likely than other solutions: “Thus a neurobiological based definition of ambiguity is the opposite of the dictionary definition; it is not uncertainty, but certainty – the certainty of many, equally possible interpretations, each one which is sovereign when it occupies the conscious stage” (Zeki 2004, pg. 175). This definition is a useful point of reference and its analysis, alongside its potential limitations, brings up some interesting aspects which underscore the phenomenon of ambiguity.

For example, Zeki’s definition is suggestive of an instability between determinate solutions i.e. “...equally possible interpretations...” (e.g. the Rabbit-Duck image, Figure 1). However in visual art this is rarely the case – many solution probabilities are often distributed unequally (e.g. see Berlyne 1971 and ‘subjective probability’). In other words, while the duck-rabbit image has an equal solution probability (i.e. once the spectator has seen both the rabbit and duck he or she is forced to admit that both are equally valid solutions), artworks will often have a more heterogeneously distributed solution space which reflects a decreasing set of plausible solutions.

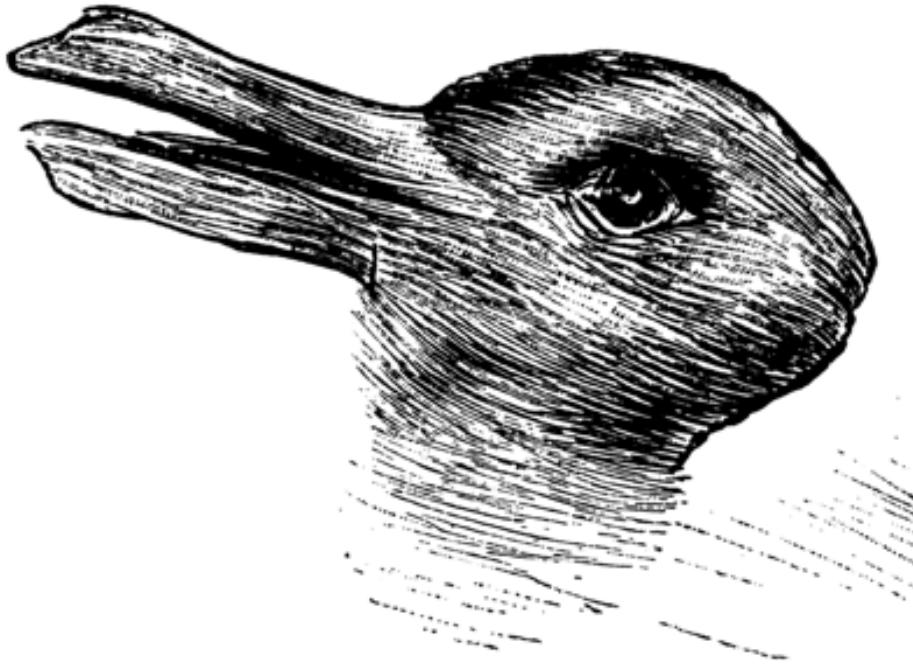


Figure 1: Rabbit-Duck Image

(Unattributed, however thought to have first appeared in October 1892 issue of *Fliegende Blätter*, a German magazine, and often used by American psychologist Joseph Jastrow e.g. Jastrow 1899, p. 312)

Matters become even more complex when we consider perceptually ambiguous images such as indeterminate images, where the potential solution space resists discrete categories such as in the duck-rabbit image. Because of this Claudia Muth has criticised Zeki's approach and argues that any definition of ambiguity should more clearly include images which remain indeterminate – images that “promise to contain identifiable patterns but never provide entire determinacy ... for instance the case in Cubist artworks being evocative of recognisable patterns but hindering Gestalt recognition” (Muth 2015a, pg. 11).

Muth (2015a) further goes on to criticise Zeki's definition because it is suggestive of an oscillation between interpretations i.e. “...each one which is sovereign when it occupies the conscious stage...” while Muth suggests that the conscious awareness of dual processing is important for the aesthetic experience. In other words rather than oscillation between interpretations, a simultaneous processing of conflicting interpretations is occurring. Because of these criticisms, Muth proposes the term semantical instability because she

argues this better captures the aesthetic quality that emerges in artworks that defy determinate interpretation. Moreover, the term semantic instability more accurately incorporates the dynamic nature of an experience with art⁴.

This dynamic nature is evocative of the fact that an experience with ambiguous art is not merely watching a static image – it is created in the shifting environment which exists in the relationship between the artwork and the perceiver. This is important to underline because it becomes even more relevant in non-static art mediums such as embodied performances (which I will turn to in Chapter 2). Since the visual images created in embodied performances are continuously being constructed and deconstructed, this extra parameter (i.e. motion) can potentially increase or decrease the instability between ambiguity and resolution (e.g. even if an ambiguous image on stage has been solved by the perceiver, unlike in a painting its components are constantly in motion, which can make the previous ‘resolution’ irrelevant or require a new interpretation; or vice versa). The artistic experience of the observer is then fluctuating in a dynamic space where what he or she observes is constantly resolving and unresolving – creating what Muth calls semantical instability.

Although I wish to resist the temptation of adopting the term semantical instability simply because the nomenclature within the ambiguity literature is already so vast (Muth herself does not dispense with the term ambiguity), there

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Unsuprisingly, some overlap of Muth’s criticisms of Zeki’s work can be found in different art critics and theorists – for example consider Ralf Norrman’s division of ‘complex’ and ‘vague’ ambiguity described earlier. While Zeki’s definition is suitable for Norrman’s ‘complex’ category (where there is a clear choice of interpretations to be made), it does not capture the type of indeterminate images that would inhabit Norrman’s ‘vague’ category. Using another example, the question of whether ambiguous images are processed all at once was observed in Christopher Bode’s work when he remarked on “the capacity of a work of art to allow or even provoke different interpretations, all of them pertinent and comprehensive, not only in succession but simultaneously as well” (quoted from Gamboni 2002, pg. 9; original reference Bode 1988a, pg. 2).

are nonetheless important aspects which emerge from both Zeki's definition and Muth's terminology that I wish to highlight and which remain relevant to this thesis and its application of ambiguity. The primary one is that the ambiguity that interests me here is a subjective ambiguity, e.g. in other words a phenomenon that is not defined as an object inherent feature but as a sensory or emotional ambiguity (e.g. Nicki et al. 1981, Jakesch et al. 2009, Muth et al. 2015b). This form of ambiguity arises from the result of a conscious entity interacting with the external environment. Therefore although ambiguity is often considered (erroneously) as a property of the physical stimuli (e.g. image X is ambiguous), from a psychological perspective it emerges from the action of the perceiver who is trying to 'make sense' of the information (e.g. we perceive image X as ambiguous). On a very elementary level, this 'making sense' is achieved through the processing of sensory signals from the external environment, and mental actions which use these signals to instil meaning into the world.

Therefore I consider an artwork as a stimuli which potentially elicits a subjective ambiguous experience, which requires interpretation from the perceiver and that can create an aesthetic experience. In other words, I consider ambiguity as compromising one facet of a multi-dimensional space which constitutes the experience of art. I do not wish, nor need, to claim that all art is ambiguous (of course to some extent this is actually true – even the most naturalistic painting will always contain both the interpretation of a canvas hanging on a wall as well as the image), but simply that an aspect of the aesthetic experience that particularly interests me as an artist is ambiguity and the resulting act of interpretation this elicits from the perceiver. This follows philosophical and experimental approaches in aesthetics which try to integrate the cognitive and perceptual processes that emerge in the relationship between the perceiver and the artwork (i.e. replacing the assignment of aesthetic pleasure to either objective stimuli features or the idiosyncratic characteristics of the observer).

A simple and yet illustrative example of this subjective ambiguity was eloquently captured in an experiment by Brugger (et al. 1993). The study involved showing

naive children (i.e. children that had not been previously exposed) the bi-stable rabbit-duck image (Figure 1) on Easter Sunday or an arbitrary Sunday in October. Children tested on Easter Sunday were more likely to see the figure as a rabbit, yet if the test was conducted on a Sunday in October they tended to see it as a duck or similar bird (Brugger et al. 1993). The conclusion was that because of the strong association Easter Sunday has with rabbits in the United States, children were more likely to infer rabbits than ducks when shown the image on Easter Sunday. This illustrates a fine point – even though the image is the same, the sensory information we extract from it is influenced by knowledge, expectations, goals, context and beliefs. In the words of psychologist John Kilhstrom – “we see with the mind as well as the eye” (Kilhstrom 2004, quote taken from www.ocf.berkeley.edu/~jfkilhstrom/JastrowDuck.htm; consulted on 8th March 2018). This phenomenon has influenced many modern aesthetic models in psychology, such as Bulot’s (et al. 2013) ‘aesthetic contextualism’ model.

A final aspect of Semir Zeki’s definition and which I will turn to next, is that the phenomenon of ‘true ambiguity’ as he defines it is actually a relatively rare event within our habitual mode of processing. The rarity of ‘true ambiguity’ as a subjective phenomenon captures one of the primary functions of the brain – to reduce uncertainty or ambiguity in the external world – a task it normally accomplishes quite efficiently. For example object recognition is a highly developed skill in humans and non-human primates, often achieved within a few hundred milliseconds (Farbe-Thorpe et al. 1998). Since perception can be thought of as being pragmatically orientated towards the identification of objects in visual scenes (e.g. Cupchik 2009), one of the fundamental purposes of sensory and cognitive processes is ambiguity reduction. This is linked to instilling meaning into the world, which from a biological perspective enhances our chances of survival and reproduction. Therefore considering how the brain reduces ambiguities in everyday circumstances is pertinent because this is the apparatus we have at our disposal when confronted with ambiguity in art.

1.2 How does the brain reduce ambiguities?

One way the brain manages to instil meaning, and reduce ambiguity, is through inferences. Inferences can be conceptualized ‘as the assignment of an object to a verbal or nonverbal concept, or cognitive category’ (Wyer et al. 1979). This act of assignment depends on how similar the object’s characteristics are with those that define the initial category, or at least to one of its established exemplars (e.g. see Heider 1958 for further discussion). For a simple example of inference, a trait such as ‘clever’ may be inferred from a behaviour such as ‘Rachel solves the mystery halfway through the book’. This explanation is arrived using information in part from the immediate situation (e.g. Rachel solves the mystery), but also equally from sources of information stored in memory (e.g. mysteries are mysteries because they are generally difficult to solve). In fact both our cognitive and perceptual systems are constantly operating in this inference regime.

Perhaps an intuitive example of just how naturally and effortlessly this phenomenon occurs within our visual system is to consider our ability to construct representational images from random configurations of clouds in the sky. Many artists have been inspired by this simple experience – for example in Leonardo da Vinci’s *Treatise on Painting* (1492) he emphasised the power of “confused shapes”, such as clouds or muddy water, to inspire the mind to new inventions. This fascination of inferring objects in clouds is such a pervasive experience it has inspired Renaissance painters to contemporary 21st century artists (e.g. *Triumph of Virtues*, Andrea Mantegna or *Equivalent*, Vik Muniz). Popular psychological tests such as the Rorschach test take advantage of the same phenomenon, trying to ascertain mental states through images a patient sees within accidental shapes of symmetrical inkblots (Figure 2).



Figure 2: From top to bottom, (Section of) Andrea Mategna's '*Triumph of the Virtue*' 1502; Vik Muniz's '*Equivelants*' 1993; An original 1921 Rorschach colour test card

As Ernst Gombrich argues in *Art and Illusion: A study in the Psychology of Pictorial Representation*:

“what we read into these accidental shapes depends on our capacity to recognise in them things or images we find stored in our minds. To interpret such a blot as, say a bat or butterfly means some act of perceptual classification – in the filing system of my mind I pigeonhole it with butterflies I have seen or dreamed of” (Gombrich 1968, pg. 155).

Gombrich was applying the concept of perceptual inference to art, defending the idea that to build an interpretation of what an artwork represented, it had to be based on existing knowledge – what he referred to as schemas (Gombrich 1968)⁵. Perceptual inference “refers to the ability to infer sensory stimuli from

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It should be noted many of these perspectives are not necessarily new – for example they can be found in some shape or form throughout the classical period as well. The Sophists philosopher Lucius Philostratus used a discussion in *'The Life of Apollonius of Tyana'* to argue that since cloud shapes have no meaning in itself, we are prone by nature to imitation, which Apollonius called our 'imitative faculty'. Following from Apollonius, Aristotle argued that there is a “universal instinct to engage in mimetic activity” (Halliwell 1987, *Poetics* 4, pg. 34), where he evoked the ability of the brain to constantly infer shapes (such as Philostratus describes above with clouds); e.g. “Thus the reason why men enjoy seeing a likeness is that in contemplating it they find themselves learning or inferring, and saying perhaps ‘Ah, that is he’” (Aristotle 1951, pg. 15). Aristotle’s statements contain the essential seedling of more contemporary cognitive science, which is that perception is pragmatically orientated towards the identification of objects. Or when Aristotle talks about mimesis within the spheres of universals e.g. “poetry speaks of universals, while history of particulars” (Halliwell 1987, *Poetics* 9, pg. 41), this is not unsimilar to Wyer 1979 description of categories to infer against. Without the universal concept of tree, and its semantical classification, we cannot see a new tree and assign it to the cognitive category of ‘tree’. And finally when I later argue that the successful resolution of an image holds an adaptive Darwinian advantage, the inklings of this idea exists in *Poetics*, unformulated of course in a pre-Darwinian period, where Aristotle talks about the propensity to take pleasure in the products of mimesis (since pleasure can be viewed as a way to reward adaptive behaviour).

predictions that result from internal neural representations built through prior experience” (Aggelopoulos 2015, pg. 375). Another way to describe this is that our visual experience is created through an interaction of sensory input, which is noisy and inconclusive, and some knowledge of the world which is embodied in our perceptual systems. It was the German physicist and physician, Hermann Helmholtz (1821-1894), who first noted that perception was not solely limited to sensory information but was an interaction between internal models created through previous experience (for a review on Helmholtz’s work, see Cahan 1993). As Aggelopoulos notes, the subjective impression that everything is being seen within our visual system is simply not true – we are filling them using pre-existing models of the world. Notice we could easily replace the world ‘models’ here with Gombrich’s ‘schemas’. More recent integrative Bayesian frameworks explicitly take into account prior knowledge about the structure of the world (Kersten et al. 2004) – in its simplest form Bayesian frameworks use Baye’s rule to create principled probabilities about a phenomenon based on the combination of both new evidence and prior belief/knowledge (see Ghosh et al. 2006 for an introduction to Bayesian analysis). From this perspective perceptual inference can therefore be considered as an example of the beholder’s share (i.e. the contribution of the viewer) because it uses internal representations, based on prior experience, to influence the reading of a sensory stimuli (e.g. an artwork). In effect, on a perceptual level the beholder’s share becomes the contributions of the nervous system to the construction of an image.

In summary, the external world is ambiguous and yet ‘true ambiguity’ as defined by Zeki is a relatively rare phenomenon, which reflects the fact that perception is mainly concerned with object recognition (Cupchik 2009). Therefore, from a neuroscientific perspective we could expand Ernst Gombrich’s initial argument that a work of art is inherently ambiguous to the external world is inherently ambiguous. And yet the fact that we do not experience the world as such is a reflection of the impressive ability of the brain to resolve ambiguities in our everyday circumstances. As Pressnitzer states:

“...fortunately one highly plausible interpretation usually trumps all others. That this interpretation mostly corresponds to reality is an impressive sign of the sophistication of perception, and not of the simplicity of the problem...”
(Pressnitzer et al. 2011, pg. 5)

Accordingly, any ambiguous image, including an ambiguous artwork, will instigate a process of perceptual inference (Pressnitzer et al. 2011). Consider the example of the clouds given previously where the process of inference is done not only effortlessly but also involuntarily – in fact it is a process which is difficult not to instigate. Interpretation in art from this perspective then becomes an exercise in ambiguity reduction, a fundamental process of everyday perception (Mammasian 2008) and which itself is a reflection of the need to understand the world (the better an individual understands the world, the higher the chances of survival). This perspective leads to a somewhat reductionist position, arguing that the reason we might appreciate ambiguity in art is analogous to the feelings of satisfaction we get when solving a puzzle. In the next section I will argue this is only one potential explanation of why ambiguous art can elicit a pleasurable experience, and that insights which might be derived from ambiguous art do not have to be coupled to ambiguity resolution.

1.3 Why might we appreciate ambiguity in art?

Before continuing, it is probably useful at this stage to introduce a few words on what I mean by the aesthetic experience. Generally speaking the definition of an aesthetic experience remains a vague and somewhat elusive concept – for example some have argued that it is a qualitatively different mental state from everyday experience (e.g. Markovic 2012), while others view it simply as any hedonic response to a sensory experience (e.g. Shinamura 2012). To complicate matters more aesthetic experience and art can be independent – for example one can have an aesthetic experience watching a sunset. Within the confines of this thesis, I confine myself in the aesthetic experience as applied to art. Furthermore when I speak about ambiguous artistic objects evoking an aesthetic experience, I

am trying to capture the ability of art to elicit emotional and cognitive responses (broadly speaking, feelings of pleasure, stimulation, interest etc.; e.g. see Redies (2015) or Leder (et al. 2014) for models of aesthetic experience). Simply put, I'm interested in why ambiguous artistic images can give us strong feelings of pleasure, stimulation, interest, appreciation etc, and this is what I am calling the aesthetic experience of art.

The first and perhaps most obvious reason for why ambiguous images in art can generate such responses is because they often are novel experiences. This is even more salient when considering that our habitual experience of perception is one dominated by successful object identification as well as normalized object placement – e.g. we would expect to see a chair and table in the middle of a living room, but not at the bottom of a swimming pool. Therefore our habitual experience of perception is one that is generally low in novelty. Alongside this, novelty has been shown to be a collative factor in the aesthetic experience (e.g. Berlyne 1971, Jacobson 2006) and it also affects the reward system more generally (experiments have shown that just the anticipation of novelty can activate the reward system (Wittmann et al. 2007)).

A second reason has to do with the 'problem solving' characteristics of the brain described earlier. Since one of the functions of the brain is to instil meaning into this world using the signals it receives – “instilling meaning amounts to finding solutions” (Zeki 2004, pg. 188), the ability to provide several interpretations is a capacity that is important within the function of acquiring knowledge. An aspect of interpretation in art could therefore be simply an exercise in ambiguity reduction, as Massamaliyam (et al. 2008) has argued. This could explain why an artistic image which is not immediately apparent or identifiable can work in its favour – in the words of artist Robert Pepperell, when presented with his first ambiguous image, “part of my anxiety, or unease, during the moment of indeterminate perception...arose from the sense of compulsion I felt to make sense of what was in front of me” (Pepperell 2011, pg. 9). This 'sense of compulsion' which Pepperell describes can be seen as an adaptive cognitive tendency which favours successful recognition and interpretation of a target

(Winkielman et al. 2003), as this in turn potentiates adaptive fitness. Related to this, Kreitler (et al. 1974) argued that stimuli that provided or had various potential meanings had the ability to exaggerate tension. One way to relieve this tension was through the imposition of meaning. This could be one possible explanation for the ubiquity of art: “art allows for the ‘playful’ acceptance of states of mind that are characterized by more tension than is typically appreciated in other everyday experiences” (Jakesch et al. 2009, pg. 2107).

Empirical studies seem to uphold this intuitive statement – for example Ishai (et al. 2007) showed that increased recognition latencies due to the ambiguity of an image was associated with an increase in the subjective ‘powerfulness’ rating by the viewer, suggesting the amount of struggle or effort needed to comprehend an image has some positive relationship to its aesthetic value (Ishai’s description of ‘struggle’ or ‘effort’ is not dissimilar here to Kreistler’s description of ‘tension’). As neuroesthetic researcher Ramachandran points out: “it is as though an object discovered after a struggle is more pleasing than one that is instantly obvious” (Ramachandran et al. 1999, pg. 30). Therefore the experience of participating and perhaps even solving an art work, combined with the subsequent phenomenal subjective feedback of progress which this elicits (itself a reflection of the evolutionary desire for understanding our environment) is a potential contribute to the self-rewarding qualities of aesthetic experiences (e.g. Winkielman et al. 2003, Reder et al. 2004).

A third reason is provided by Muth (et al. 2015b) – she argues that insights which emerge during the processing of an ambiguous stimuli is rewarding irrespective of any ability to ‘resolve’ the image. In a study involving ambiguity and aesthetic preference, Muth found that subjective solvability of ambiguity was not significantly linked to liking. The authors therefore concluded that the aesthetic experience in ambiguous art was driven by insights gained during the processing rather than any ability to ‘complete’ or ‘finish’ the processing: “we advocate that the process of elaborating ambiguous artworks and gaining insights, rather than the state of having ‘solved a problem’ posed by the

artworks, is essential for explaining the aesthetic appreciation they receive” (Muth et al. 2015b, pg. 214).

It should be noted that there is an important (and perhaps necessary) variable when discussing the reasons why a pleasurable aesthetic experience might be elicited by ambiguous art, which is that the knowledge that a physical stimuli is art affects our observational stance (e.g. Brincker 2015). In other words, the knowledge that a stimuli is an artwork changes how we interact with it. For example a distinctive feature of the aesthetic experience is that it normally takes place in rather safe environments (Fridja 1989). This means that in relation to problem solving and insights, artworks might be special because they are a class of objects where ambiguity does not need to be fully resolved from a fitness perspective. In the words of Jakesch (et al. 2009, pg. 2111): “...moderate levels of ambiguity are not only tolerated but also appreciated...this is evidence that art is able to elicit special experiences, such as the enjoyment of ambiguity when viewers perceive and attempt to understand artworks. In other objects and domains, such ambiguity would be seen as threatening and may not be appreciated...”. Disrupting processing routines or entertaining various ambiguous solutions would be a dangerous action in an unfriendly or risky environment (Pressnitzer 2011). Similar observations influenced Emmanuel Kant’s (2007^r) conception of ‘disinterested contemplation’ – that an object viewed aesthetically should be considered without reference to its function or practical use (Beardsley 1975) and has been incorporated into specific aesthetic models (e.g. Martindale 1988). With no potential danger in either the artwork nor the surrounding environment, a more ‘immediate’ functionality becomes less relevant – allowing for the common and popular view of “art for art’s sake”. Applying this concept, Jacobson argues that the aesthetic experience is subject to a “relatively complex network of stimuli, person and situation related influences” (Jacobson et al. 2006, pg. 156). In this particular case the ‘situation-related influence’ incorporates this aesthetic viewing orientation by acknowledging that we might perceive an object differently for example in a museum or theatre then in a supermarket.

Recent neuroscientific studies support this positioning, showing that the knowledge or awareness that a physical stimuli is 'art' affects the viewing orientation (Nadal et al. 2008). For example, Höfel (et al. 2007) created two conditions, a 'viewing' condition and a 'contemplation' condition. Although the visual stimuli was the same for both conditions, in one condition participants were required simply to view graphic patterns and detect a probe, while in the other participants were instructed to contemplate the beauty of the patterns as well as detect a probe. Looking at electrophysiological indices generated by recording brain wave activity (EEG), the results showed that aesthetic evaluation did not occur spontaneously (i.e. the 'viewing' condition) but only occurred in the contemplation condition (Höfel et al. 2007). This suggests that with an identical visual image, different neural processes are engaged if the image is placed within a context that encourages aesthetic viewing. This led Höfel (et al. 2007) to argue that aesthetic appreciation requires an intention from the part of the observer. These findings overlap with Cupchik et al. 2009, whose research showed, using functional magnetic resonance imaging (fMRI)⁶, that aesthetic perception originates both from a function of the perceptual features in the physical stimuli and cognitive control to adopt an aesthetic viewing orientation.

Or in other words, top-down control is required to direct perception to an aesthetic orientation (Cupchik et al. 2009; although see Brincker 2015 for a rejection of the top-down approach). In this case 'top-down' is a somewhat vague term in neuroscience which simply means that a 'higher' thought process is influencing the way in which a 'lower' thought process is interpreting things – so for example in Leder's aesthetic model he proposes that the aesthetic experience consists of a top-down orientating of attention and bottom-up perceptual input (Leder et al. 2004). Here the top-down orientating of attention is what creates the aesthetic viewing orientation.

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Functional magnetic resonance imaging is a technology that measures brain activity by detecting changes associated with blood flow. Since blood flow is highly correlated with neuronal signalling, it is generally accepted that fMRI works as a proxy for neural activity in the brain.

In summary, the reasons why ambiguity might be appreciated from an aesthetic perspective include novelty, problem solving and insights generated during the processing of ambiguous artworks. Furthermore, I have argued that art consists of a unique stimuli that can permit (and in many cases even strive for) a greater amplitude of ambiguity relative to what is generally and/or habitually experienced. So even though art is perceived via the same perceptual system as everyday objects, we nonetheless seem to adopt a different viewing orientation when we perceive an object as art rather than simply an everyday object. In the words of neuroscientist and dancer Vered Aviv “art is free from the functional restrictions imposed on the visual system during our daily life” (Aviv 2014, pg. 1).

1.4 How much ambiguity is required for aesthetic appreciation?

If ambiguity is therefore appreciated and rewarding, perhaps the next obvious question is what level or amount of ambiguity is most rewarding in the aesthetic experience? To take an extreme example, if the beholder’s share is the result of the amount of ambiguity which can exist within a sensory stimuli (i.e. an artwork), then it might follow that the more ambiguous the stimuli is, the more participation on the part of the perceiver is encouraged and therefore the higher the likelihood of a positive artistic experience. This is not necessarily true. For example, in Umberto Eco’s *The Open Work* he points out that images which have too little, or too much, space of interpretation are generally less aesthetically pleasing. For the latter, he suggests that ambiguous work is not “an amorphous invitation for in discriminatory participation” (Eco 1979, pg 19). This is not unsimilar to acting director Peter Brooks statement “give a child a paintbox, and if he mixes all the colours together the result is always the same muddy brownish grey” (Brook 1968, pg. 62). The artistic object must contain outlines, directions, suggestions i.e. the artist proposes and maintains a given field of relations and/or associations. This overlaps well with Gamboni’s position stated earlier: ‘in conformity with the artists intentions’ (2002, pg. 9). On the opposite end, if no ambiguity exists there is no space of interpretation at all. On this side of the

spectrum one must “prevent a single sense from imposing itself at the very outset of the receptive process” (Eco 1979, pg. 53). Therefore it seems a tendency will exist for the beholder’s share to be more strongly activated with ambiguous data at median spaces of interpretation. As neuroscientist Pascal Mamassian argues:

“not all ambiguities in paintings are resolved, and artists probably strive to leave the right amount of ambiguity to let the observer contribute to his experience in a personal way” (Mamassian 2008, pg. 2152)

Does this hypothesis hold out experimentally? Experimental aesthetics seem to have found conflicting results in whether the ‘right amount’ of ambiguity does in fact lie within median spaces of interpretation. The concept can be traced back to much earlier studies that investigated median arousal states and aesthetic preference. For example, Gustav Fechner, often considered the founder of experimental aesthetics, advocated the “principle of the aesthetic middle”, stating that people “tolerate most often and for the longest time a certain medium degree of arousal, which makes them feel neither over stimulated nor dissatisfied by a lack of sufficient occupation” (quoted from Cupchik 1995, original citations found in Arnheim 1985; 862 and Fechner 1978 Vol II: 17 and 260). Fechner’s principle formed the basis for Berlyne’s approach (1971, 1974) - Berlyne suggested that the relationship between complexity and aesthetic preference for an image is non-linear and assumes an inverted U-shape. In other words the least preferred images tend to be very simple or very complex. The existence (or not) of this inverted U-shaped curve with respect to complexity and aesthetic preference has provoked many debates within the aesthetic literature (e.g. see Nadal 2010 for a brief review). For example, Wohlwill (1968) found an inverted U-shape for preference scores to artworks, and suggested at some point an image becomes so complex that the inability to process the information into structural components reduces interest and leads to a decrease in aesthetic value. More recent computational work has supported the inverted U-shaped hypothesis with respect to complexity (e.g. Forysthe 2011, Redies 2012, Spehar 2015), while other studies have failed to find such a relationship (e.g. Stampes

2002, Nadal 2010). Nadal has suggested that different forms of complexity influence ratings in different ways, and the differing experimental results isolated distinctive 'forms' of visual complexity.

In a similar fashion, the existence of an inverted U-shaped curve with respect to ambiguity and aesthetic preference has not been consistently found. Different experiments have found that low (Nicki et al. 1981), moderate (Jakesch et al. 2009) and high (Muth et al. 2015b) levels of ambiguity are preferred. For example, Nicki predetermined a numerical 'ambiguity' value based on the number of word associations particular cubist paintings could elicit, and then exposed naive sets of students to those paintings. The general tendency was that viewing behaviour was found to increase as a function of ambiguity, yet simultaneously 'low' ambiguity artworks were rated as more pleasing and interesting than 'high' ambiguity artworks. A criticism of the study with respect to the inverted U-shaped curve and ambiguity hypothesis was that images of extremely low ambiguity or no ambiguity were not included. So for example the image with the lowest 'numerical' score for ambiguity was *Violin* (1913) by Picasso, an image which can be considered in absolute terms quite ambiguous. This led Nadal (2007) to speculate that potentially the preference for 'low' ambiguity artworks found in Nicki's study was actually a preference for intermediate ambiguity, only that the range of ambiguity was simply not broad enough to reach both extremes of the spectrum (for analogous arguments in complexity, see Stamps 2002).

A study by Jakesch (et al. 2009) found preference for images that had titles which suggested moderate levels of ambiguity. This allowed the researchers to argue for the existence of an inverted U-shaped curve with respect to ambiguity and aesthetic preference, ultimately simulating Berlyne's and Fechner's arousal theory. The study involved presenting artworks with explanatory statements – some of these statements corresponded with the visual data (matched) while others did not (unmatched). By manipulating the number of matched and unmatched statements, the researchers were able to test how the proportion of constant and dissonant information affected ratings of the visual stimuli. The

findings showed that artworks perceived alongside a median level of dissonant information (taken from the matching and unmatching statements relative to the artwork) were the most liked and found to be the most interesting.

Finally, Muth found that the higher the subjectively perceived degree of ambiguity within an artwork, the more participants liked it. The experiment exposed participants to ambiguous artworks from the 20th and 21st century and made them rate images in terms of liking, interest and other affective variables. In a second phase, the same participants were asked to rate each picture in terms of ambiguity, the level of solvability of the ambiguity, and strength of insights which might have been elicited by the ambiguous image. In contrast to other studies, no preference was found for low or moderate levels of ambiguity, but instead for high levels of ambiguity (Muth et al. 2015b).

Perhaps these somewhat inconsistent results can be better explained by considering ambiguity as a multidimensional phenomenon. For example, as discussed previously, ambiguity is subjective (Jakesch et al. 2009). An image might be more ambiguous for one person compared to another, or for the same person at different time points. In other words, 'ambiguity tolerance' is a behavioural trait which varies across and temporally within individuals (for a review, see Reis 1996). Most of the studies described above did not control for ambiguity tolerance. Another confound is that the amount of ambiguity required for an aesthetic appreciation will likely depend on what rewarding component is being activated. As described earlier, the rewarding aspect of ambiguity can potentially derive from solvability of ambiguity but also insights which emerge during the processing of ambiguous material and which do not require solvability (Muth et al. 2015b). Therefore at least theoretically, median spaces of ambiguity will be more likely to allow solvability, while higher spaces of ambiguity will provide insights but more strongly resist solvability.

From the perspective of a problem-solving approach linked to the median spaces of ambiguity, a tension seems to exist on the one hand between having enough ambiguity to encourage perceptual and/or cognitive difficulty, and on the other

hand for this difficulty not to fully impede some level of interpretation and the eventual feeling of progress that this elicits as the image becomes partially deciphered. This idea is captured in Semir Zeki's proposition that a state of ambiguity might be pleasing as long as some valuable information and a certain amount of meaning is assured (Zeki 1999). The difficulty therefore lies in creating the right balance between these two factors. Median spaces of ambiguity should be the most likely to create difficult, but ultimately decipherable, images. This is similar to the work of Umberto Eco and his theory of the 'open work', which focuses on the two points where the inverted U-shape is the lowest - images that are too simple or too amorphous to allow for the right amount of space for interpretation.

However, as mentioned previously, if the rewarding aspect of the ambiguous images was derived from insights gained through the processing of ambiguity instead of any progress in solvability, higher ambiguous states would be tolerated. This would partly explain the results of the Muth (et al. 2015b) study, where subjective solvability of ambiguity was not significantly linked to liking and yet there was a strong preference for high levels of ambiguity. It is likely that a combination of these factors are present within any aesthetic experience with regards to ambiguous art.

1.5 Processing Fluency and Ambiguity

One theory which does not advocate either a positive linear relationship (Muth et al. 2015) nor an inverted u-shaped function (Jakesch et al. 2009) between ambiguity and aesthetic preference is processing fluency theory (e.g. Reber et al. 2004, Belke et al. 2010). In general terms, processing fluency concerns the degree of effort required to recognise and identify a stimuli, and its aesthetic component is based on the fact that subjective ease of processing is generally experienced positively (Belke 2010) and is an important meta-cognitive cue for judgements (Oppenheimer 2008). Accordingly, processing fluency contradicts an aesthetics of ambiguity by stating that the easier an image can be processed the higher its corresponding aesthetic value. In evolutionary terms a pleasant feeling

associated with processing fluency might be because it indicates the availability of appropriate knowledge structures to deal with a current situation (Schwartz 1990). In accordance with this, it has been argued that processing fluency is positively coupled to aesthetic experience (Reber et al. 2004, Belke et al. 2010) – in the words of Reber: “the more fluently perceivers can process an object, the more positive their aesthetic response” (Reber et al. 2004, pg. 364). It has also been linked to a general preference for prototypicality, for example where typical objects are preferred to less typical ones (Halberstadt 2006).

It therefore is an interesting perspective to include because it provides an antithesis to the phenomenon of ambiguity as discussed above: i.e. since ambiguous images will be naturally harder to interpret, they should provide a lower processing fluency and therefore be negatively charged or have a lower hedonistic value. For example, Belke (et al. 2010), taking the position that the phenomenal experience of cognitive-fluency is an intrinsic source of hedonic value in art, devised an experiment to manipulate the mental processing of an artwork through the use semantic priming. Belke and colleagues found that if cognitive ease increased, for example through the priming of related words as titles preceding the onset of a representational picture, there was a corresponding increase in the reported aesthetic pleasure of the image. Conversely, less cognitively fluent processing due to unrelated titles decreased liking ratings, “suggesting that a negative affective marking resulted from the obstructed flow of mental operations” (Belke 2010, pg. 219).

Jakesch (et al. 2013) argues that one way to reconcile the tension that exists within ambiguous images in art (which will have a lower processing fluency) and our preference for fluency is that ambiguity is an essential ingredient because it is harder to process. This conforms with the earlier contention that art is a unique stimuli that alters our observational stance - this might mean that it can therefore tolerate higher levels of disfluency compared to our habitual circumstances. Along these lines, Jakesch (et al. 2013) attempted to address this question experimentally by showing participants original Magritte paintings (ambiguous) and manipulated (non-ambiguous) versions of it, while

simultaneously collecting data on classification, reaction times and preference. Ambiguous pictures were rated significantly more interesting than non-ambiguous ones, yet simultaneously the non-ambiguous pictures were rated as being more fluent under short as well as longer presentation durations (50ms-500ms). These findings allowed the authors to argue that ambiguity is a significant variable in art appreciation even though it is harder to process.

One attempt to reconcile these results could be to argue that processing fluency is more relevant to representational artworks which are based around the concept of beauty – for example fluent processing of prototypes has been described as the ‘beauty in averageness effect’ (Winkielman et al. 2006) and furthermore in the Belke (et al. 2010) study the increase in cognitive ease was seen primarily with representational, rather than abstract, paintings. With regards to art theory, this proclivity towards mimesis and beauty can be considered as a more ‘classical’ approach to aesthetics (e.g. Tartakiewicz 1970, Shinamura 2012). In contrast to this classical approach, contemporary aesthetics has arguably seen an increase in disfluency through the 20th and 21st century, a phenomenon which attempts to prevent “the automatic identification of the content of a work” (Bulot et al. 2013, pg. 135). In fact Bulot’s aesthetic model illustrates a number of examples where disfluency has become a method of expression e.g. disorder (Turner), struggle (Delacroix), uncertainty (Immerdorff) or absurdity (Becket). Notice the similarities of Bulot’s position and Eco’s argument in *The Open Work* of “preventing a single sense to impose itself” (pg. 53). As Bulot describes, “eliciting disfluency disrupts an audience’s thoughtless appreciation of a work and makes the audience pay attention” (Bulot et al. 2013, pg. 136). This description also overlaps well with author Michael Ende’s description of his father’s work, Edgar Ende, who was a surrealist painter: “I would almost say that he has put in a little resistance, which the viewer has to overcome first, before he can enter the picture at all. But later, it will be exactly this overcome resistance providing the strength to really entering the picture and experiencing it” (consulted on 8th March, taken from: www.edgarende.de/Englisch/MuEEnde/Erfolg.htm)

Despite many criticisms of processing fluency theory within contemporary aesthetics, it remains an important variable which provides an interesting counterpoint to any discussion concerning the aesthetics of ambiguity. Furthermore, processing fluency will most likely influence different artistic mediums in different ways – for example, in embodied art forms such as dance and theatre, the fluency and ease of movement made by an acrobat or a dancer is clearly part of the aesthetic experience (it is doubtful that one would find aesthetically pleasing an acrobat in a dangerous situation who is genuinely ‘disfluent’ with his or her movements). Therefore processing fluency might have a larger impact on art forms where the actions that are required to create the artwork both are observed in real-time and form the actual artwork (e.g. a dance on stage rather than a painting in a museum).

Nonetheless, since all artistic experiences is not derived from ambiguity, it is somewhat unnecessary to reconcile these two seemingly contradictory positions. Furthermore I do not wish to suggest that ambiguity maintains any form of supremacy over fluency or vice versa – simply that both will form part of the multidimensional space that is the aesthetic experience and that can appeal in different ways and in different contexts to an observer of art.

1.6 Ambiguities in Art

In this section, I provide some intuitive examples of both perceptual and cognitive ambiguities in artworks. The logic for this perceptual/cognitive division is because ambiguity can arise from both perceptual processes as well as more ‘higher level’ cognitive ones which more actively include memory, learning and experience. As Semir Zeki states, there are different levels of ambiguity (Zeki 2004). In fact throughout the history of aesthetics in art a tension has existed between the relative contribution allotted to perception and cognition in capturing the aesthetic experience, and it is perhaps therefore unsurprising to find that examples of ambiguity can be sourced from more perceptual or

cognitive influences⁷. Furthermore, different time periods and cultural genres throughout Western art have naturally influenced the amount of ambiguity inherent in art to varying degrees, either by constraining or encouraging ambiguity in art.

For example, a prevailing theory which existed throughout Antiquity, the Middle Ages and to a certain degree the Renaissance was that an aesthetic experience in art was derived from an 'objective' beauty – beauty which exists as a property of an object (Tartarkiewicz 2006). Plato's Republic (376e-398b, 595-608b) defined art as mimesis or imitations of reality, and classical aesthetics attached great importance to 'faithfulness' or 'truth' of imitated reality (Tartarkiewicz et al. 1970)⁸. To some extent the technological advances of the Renaissance artists continued this idea, with techniques such as linear perspective and chiaroscuro allowing them to re-create increasingly exact representations of reality (Shinamura 2012). These realistic approaches did not necessarily encourage perceptual ambiguities. This is because, as I have identified throughout this chapter, we perceive our reality as generally unambiguous due to the impressive efficiency of the brain in interpreting our external environment. Therefore objectivist approaches which attempted to copy the external world would have, as a natural consequence, a general tendency to preclude or reduce ambiguity.

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It should be noted that this division within the aesthetic experience in art is now seen as a somewhat false dichotomy, as both perception and cognition are largely viewed as interacting components within a larger network responsible for the aesthetic experience (e.g. Leder et al. 2004; although see Redies 2015 for a model that allows for some flexibility in this regard).

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Studies in empirical aesthetics have partly supported an objective approach, showing that fundamental 'bottom-up' perceptual influences are linked to the aesthetic experience and to aesthetic preference, such as symmetry, balance and proportion, informational complexity, contrast and clarity (e.g. Arnheim 1974, Birkhoff 1944, Gombrich 1984, Berlyne 1971, 1974 etc.).

On the other side of the spectrum, 'subjectivist' positions declared that beauty was a function of idiosyncratic qualities of the perceiver, and began to gain increased recognition with early modern philosophers such as Francis Hutcheson (1660-1739) or David Hume (1711-1776); (in actual fact subjectivist approaches can be traced as far back as the Sophists who had proposed that anything could be beautiful if it pleased the senses (Tartarkiewicz 1970)). In Hume's essay *Of the Standard of Taste*, part of his work entitled *Four Dissertations* he argued that each person could perceive differently a work of art: "Beauty is no quality in things themselves, it exists merely in the mind which contemplates them, and each mind perceives a different beauty" (Hume 1757, pg. 136). Here Hume argues that the aesthetic experience is determined by the perceiver – thereby giving the mind a much more important role in the generation of the aesthetic experience. The 'subjectivist' approach therefore allotted a much more significant role for the interpretation the perceiver supplied to the value of an image. And yet at the same time, it continued to view beauty as the primary driver of the aesthetic experience and this arguably continued to limit the amount of disfluency (and/or ambiguity) that art could create.

However, many of the ideas around aesthetic beauty had to be abandoned with the advent of modern art, which rejected the assumption that a necessary condition of an artistic piece was beauty (Conway 2013). For example, in Impressionism, one of the first distinctly modern movements in painting, the emphasis on realistic scenes is replaced by the impressions of nature (Shimamura 2012)⁹. The notion that beauty, largely derived from accurate

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Due to the inherent and somewhat tempting risk of over-simplifying the history of art into a somewhat linear interpretation, at this stage a small commentary and positioning on *mimesis* is likely warranted – when Shimamura 2012 states that "much of Western Art, particularly up till the 19th century, was principally concerned with creating artworks intended to be experienced from a mimetic approach" (pg. 7) and that in Impressionism "the interpretation of form changes from mimetic depictions of realistic scenes to 'impressions' of nature" (pg. 10), he takes a somewhat reductionist view of mimesis, equating it simply to

imitations of reality, is the sole criterion of good art was 'progressively replaced with more general concepts of pleasure, and more cognitive concepts of interest and stimulation' (Leder et al. 2004). This was necessary because modern and/or contemporary art is often puzzling (e.g. Minisalle 2013), often stimulates and requires a particular search for meaning (e.g. Dewey 1934/2005), cognitive orientation (e.g. Belke 2010) as well as interpretation (e.g. Leder et al. 2014). Modern art therefore would in fact encourage ambiguity in art since one of its characteristics was in fact disfluent processing.

Simultaneously, modern art implicitly continued to approach the aesthetic experience through more 'perceptual' or 'cognitive' lenses (or at least could be sub-divided as such), and therefore the aesthetics of ambiguity which began to emerge in the 20th century can be examined from both these influences or sources. For example, formalist theories such as those proposed by art critics such as Clive Bell (1914) defended that art should be appreciated solely on the basis of its sensory qualities or 'bottom-up' processes; e.g.:

"to appreciate a work of art we need to bring with us nothing from life, no knowledge of its ideas and affairs, no familiarity with its emotions...we need to

imitation or direct copying. This interpretation at its extreme invites a unilinear view of the history of art which culminates in abstraction. From the perspective of ambiguity, one is then enticed to conclude that ambiguity began with modern art which was truly 'post-mimetic' (e.g. Bode 1988b). While it is true that modern art arguably demands larger quantities of interpretation compared to any previous art (Leder et al. 2004), whether or not this justifies the label of 'post-mimetic' is debatable. Here I concur that this line of thought represents what Potolsky argues is a dominant 20th century need of 'escaping mimesis' (Potolsky 2006). In other words, if we return to the origins of mimesis (or at least its Aristotelian origins), the concept of mimesis is much more expansive – for example Aristotle argued that imitation in art (i.e. mimesis) included things 'as they ought to be' as well as 'the portrayal of a possible reality' (Halliwell 1987, commentary). Furthermore he argued that it is more important to imitate skilfully than exactly e.g. "not to know that a hind has no horns is a less serious matter than to paint it inartistically" (Halliwell 1987; *Poetics* 25-26).

bring with us nothing but a sense of form and colour and a knowledge of three-dimensional space” (Bell 1914, pg. 44)

Anti-formalist positions, driven in part by art critics such as Artho Danto and Kendall Walton, took an opposite approach – they advanced that the aesthetic experience is dependent on the intentions of the artists as well as the circumstances under which the art is created and displayed (Danto 1981; although see Dowling 2010 for a discussion on ‘moderate aesthetic formalism’ and its revival in the 21st century). The crux of anti-formalist arguments was that sensory qualities were no longer sufficient to explain the aesthetic experience in modern art because the aesthetic experience was now largely driven by context and a search for meaning (Shinamura 2012). This search for meaning requires a conceptual approach to art - therefore contextual theories gave a larger emphasis to ‘higher level’ cognitive processes, generally citing examples derived from post modern and contemporary art where the significant form argument proposed by Bell arguably played a smaller role (Minisalle 2013).

To provide an iconic example, consider *Fountain* by Duchamp in 1917 (Figure 3). It was not directly created by the artist, nor intended to express a sense of beauty or ‘significant form’ – the intention was to make people think and question the very definition of art. This particular search for meaning can be seen as a cognitive, rather than a perceptual, process – modern art therefore made it problematic to defend the idea that the aesthetic experience in art could be entirely explained by low-level processes (Spehar 2015, Leder et al. 2014). As art theorist Minisalle argues in relation to modern themes such as Dada, Neo-Dada and postmodernism – “art stimulates a network of conceptual relations rather than mere perceptions of the visual aspects of artworks” (Minisalle 2012, pg. 43).



Figure 3: 'Fountain' by Marcel Duchamp 1917

Other classic examples, alongside Duchamp's work, of the 'contextual' position include Warhol's *Campbell Soup* or *Brillo Soap Pad Boxes* from Pop Art (Figure 4). In both pieces the sensory qualities are almost identical to regular ones found in the supermarket (the objects are virtually indistinguishable) yet nonetheless the artwork contains aesthetic properties that are absent from the ones in the supermarket. Therefore perceptual attributes cannot satisfactorily explain the aesthetic experience – a reflection, understanding or appreciation that Warhol is rejecting the separation between fine arts and mass culture is one of the cognitive based interpretations that underlies this particular aesthetic

experience (Danto 1981)¹⁰. This overlaps well with the idea discussed earlier that art is a special stimuli that affects our observational stance.



Figure 4: Andy Warhol's 'Campbell's Soup Cans', 1962 and 'Brillo Box', 1964 (exhibited at the Museum of Modern Art, New York).

In summary, psychological analyses have been forced to recognise that aesthetic appreciation is shaped not only by objective stimuli qualities, but also by the combination of the physical stimuli and its perceptual processing, as well as the viewer's cultural experiences, life events, education and even genetic inheritance (Zaidel 2015). In fact positions and theories such as 'objectivist', 'subjectivist', 'formalist' and 'contextualist' are now all considered to have potential aesthetic

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These observations led certain cognitive scientists, such as Bullot (et al. 2013), to reject a psychological approach to the aesthetics of art which searches exclusively for universal laws defined by perception. Bullot demands a 'psycho-historical' approach which combines the cultural and historical influences into the aesthetic experience – these influences are in essence derived from 'higher-level' knowledge and experience, which can be considered cognitive processes.

value, albeit simply occupy different places on the spectrum of aesthetic preference. Therefore any comprehensive approach to capturing the aesthetic experience will require both perceptual and cognitive processes. Most contemporary models of the aesthetic experience in art reflect this understanding, and are composed of the triad of perception, cognition and emotion, thereby combining in different variations both bottom-up and top-down processes for the aesthetic experience (e.g. Leder et al. 2004, Bulot et al. 2013, Redies 2015). Taking an example, Redies's aesthetic model assumes perceptual processing which is universal, and cognitive processing which depends on individual experience and cultural context. The model therefore manages to combine both 'formalist' and 'contextualist' theories, which in Redies view resolves what he calls as the supposed contradiction between the two approaches. In his model, processing in the perceptual channel and the cognitive channel take place independently and in parallel – in the general case favourable processing in both channels is necessary for the aesthetic experience. Emotions modulate the extent of the aesthetic experience and can be evoked from either channel. This is a key aspect – although generally the model requires activation of both channels for the aesthetic experience, exceptions occur because a positive hedonic emotion can be derived from the predominant activation of one channel. Redies argues that 'the model is thus flexible with regard to individual preferences, which are so conspicuous in art perception' (Redies 2015).

In the next section I include examples of both perceptual and cognitive ambiguities in art. Rather than aiming for any form of comprehensive review (which would border on the impossible), I have chosen just a few examples from both 'channels' in order to illustrate the phenomenon of ambiguity from either source. I have used exemplars from static and delineated art forms such as paintings (and photographs) as they reflect the current cognitive literature – as we shall see examples of ambiguities in dance and theatre from a cognitive perspective is highly limited. Furthermore static art is useful to reveal the type of ambiguities that exist in its simplest form – switching to ambiguity in embodied forms brings new questions and problems which I will discuss in chapter 2.

1.6.1 Perceptual ambiguities

As discussed previously, perceptually ambiguous images form part of a larger category of artworks which have primarily been valued due to their perceptual 'low-level' features or formal aspects (e.g. distinct edges, shapes, colours, depth, motion etc.). In general terms, perceptual ambiguities are composed of partially faithful representations of our daily visual experience and yet often portray objects in non-realistic ways. An infinite number of examples abound and can be seen in the cubist (e.g. Pablo Picasso) and surrealist (e.g. Salvador Dali) movements, as well as in expressionist (e.g. Edvard Munch) and modernist (e.g. Marc Chagall) paintings, to name but a few. Ultimately this reflects the fact that in contrast to the processing of daily objects, art is "often engaged in finding new ways to organize and represent objects and scenery" (Aviv 2014, pg. 1) and these 'new ways' will often defy, to varying extents, habitual object recognition.

In fact this is one of the key characteristics of perceptually ambiguous images – the disassociation of the normal habitual relationship which exists between perception and (semantical) recognition. From a phenomenal sense a perceptually ambiguous image resists or denies semantical classification, thereby containing a number of potential readings. Referring back to Muth's terminology described earlier, a semantical instability is created because a seemingly meaningful stimuli (in this case an artwork) is perceived and yet denies easy or immediate identification. Two examples of such images are perceptually indeterminate images and perceptually defamiliar images. On a fundamental level both result in:

- a) a lengthening of time between perception and recognition, a phenomenon which as stated previously does not usually exist in our habitual mode of interacting with the world
- b) a violation of a viewer's perceptual predictions.

In other words, the viewer perceives the content of the image and yet simultaneously finds it difficult to attach its features to an interpretation (association, semantic meaning, memory etc.). As discussed earlier, this goes against our habitual mode of seeing where successful object recognition normally occurs within a few hundred milliseconds. Furthermore this process has the potential to create epistemological shifts e.g. “if our perception of an object or activity or our reading of a text could be impeded or slowed down in some way, then our chances of reaching a deeper understanding of the world and of language and its form would increase dramatically” (Vegge 2000, pg. 9). This positioning is reflective of Leder’s (et al. 2004) argument that modern art has partly replaced beauty (e.g. derived from fluent processing) with other concepts such as ‘interest and simulation’ as the catalysts for the aesthetic experience.

Indeterminate images have been described as those “which promise to contain identifiable patterns but never provide entire determinacy” (Muth 2015a, pg. 11). In other words perceptual indeterminacy evokes contradictions between perceptual cues – cubist paintings (Figure 5) consist of an interesting example of indeterminate art because they “are full of everyday objects that are concealed because they are depicted in a fragmented way that makes immediate recognition difficult” (Muth et al. 2013, pg. 488). Gombrich considered the indeterminate aspect of cubist paintings in a similar way e.g. “each hypothesis we assume will be knocked out by a contradiction elsewhere” (Gombrich 1968, pg. 240).



Figure 5: Pablo Picasso's 'Three Musicians' (1921)

Interestingly, artist Robert Pepperell has explicitly set out to create indeterminate images inspired from determinate paintings – in essence transforming classical pictorial architecture from a period in Western Art that was largely realistic into images which contrary to their initial intention, are elusive and defy recognition on a perceptual level. Pepperell points out that his paintings are “intended to be contradictory – in that they both suggest and deny the presence of objects” (Pepperell 2006, pg. 398). Pepperell’s images are compelling from a theoretical perspective because he often creates ‘open’ works by taking perceptually unambiguous images and manipulating form and lower level features, thereby transforming them into perceptually indeterminate images. He describes viewers responses to his paintings in the following way:

“Their initial response was to think they were seeing a classical painting depicting a familiar theme, such as a landscape, figure, or still life. But wherever they looked to find objects that would corroborate this initial response they

failed to do so. They would fixate on an area in which they saw a human limb or cloth, but then would realize it was a false start, and would look for some other salient feature to pin their interpretation on. Many reported that they were looking at certain forms within the images and sifting through the possible interpretations in their mind, testing various options in order to successfully name what they were looking at.” (Pepperell 2011, pg. 5)



Figure 6: On the left is the painting *Succulus* by Robert Pepperell (2005), while on the right is a detail from Michelangelo's Sistine Chapel ceiling (1508-1512), which inspired Pepperell's painting

Another prime and similar example of perceptual ambiguity is defamiliar images. Defamiliarisation is a term which was first introduced by writer and art critic Viktor Shlovsky in 1917 and involves presenting to audiences common things in strange or unfamiliar ways. In a not unsimilar fashion to indeterminacy, Shlovsky argues that the purpose of art is to impart the sensation of things as they are perceived and not as they are known – but because of the economy of cognition and our habitual and/or automated mode of processing, art must 'defamiliarise' the familiar. In *Art as a Technique* he states:

“the technique of art is to make objects unfamiliar, to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged” (Shlovsky 1988^r, pg. 5)

Shlovsky goes on to provide numerous examples from Russian literature, for example Tolstoy’s use of a horse as a narrator to defamiliarise an enshrined concept within our society – the ownership of private property. By positioning the text from the perspective of a horse, the reader is forced to re-access what Shlovsky considers has become an automatised concept – in this case the ownership of animals. Although defamiliarisation is a distinctive feature of literature and has primarily been investigated as a literary device (Vegge 2000), the basic tenet can be applied to images. For example consider Figure 7 – in *Persistence of Memory* (1931) or *Three studies for a Self-Portrait* (1979-80) both Dali and Bacon defamiliarise a semantically identifiable object which is recognisable as ‘clock’ or ‘face’. This defamiliarisation forces a re-interpretation because the objects do not conform to our normal representation of what clock or face constitute. As Christopher Bode would argue, the stimuli deviates from our original representation of the object.¹¹

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Christopher Bode goes on to describe this phenomenon as ‘deviational aesthetics’ (1988b)

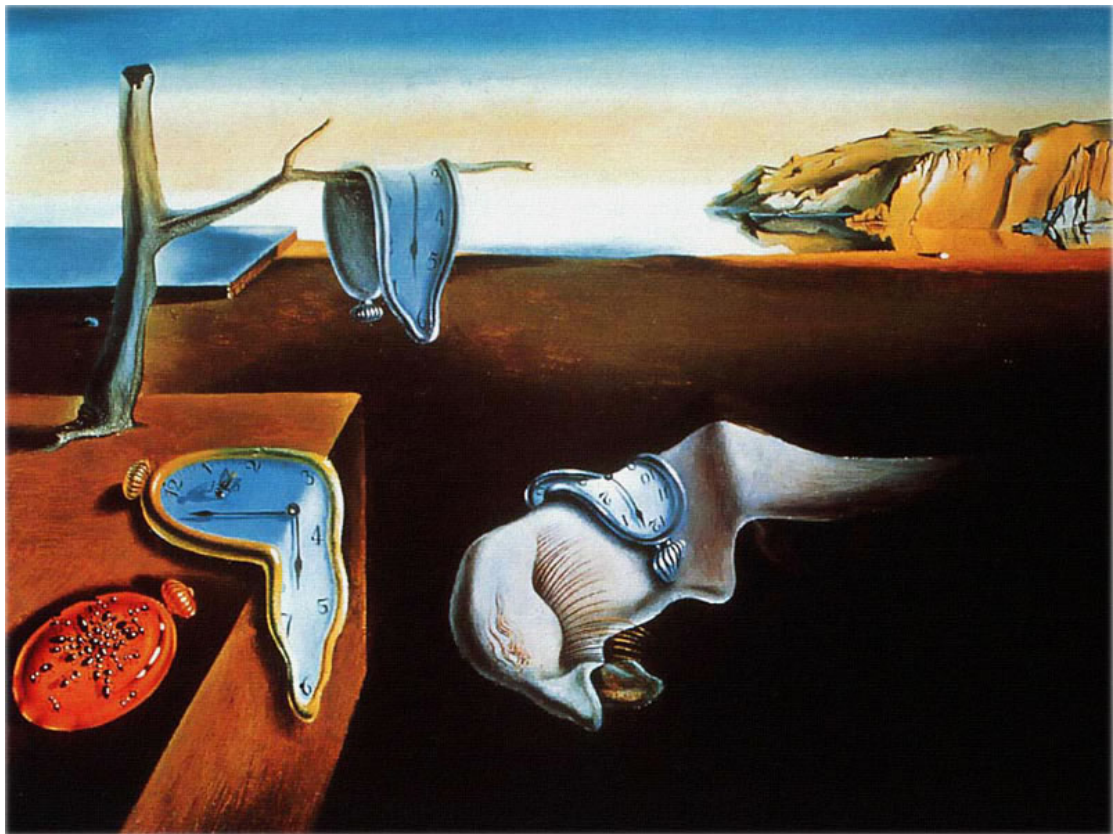


Figure 7: 'Persistence of Memory' by Salvador Dali (1932) and 'Three studies for a Self-Portrait' by Francis Bacon (1979-80).

If indeterminant and defamiliar images both affect the relationship between perception and recognition and violate perceptual predictions, why attempt to describe them as somewhat discrete categories? I wish to argue that a loose distinction between indeterminant and defamiliar images can be made in the following way: while perceptually indeterminate stimuli deny or restrict identification, perceptually defamiliar stimuli allow identification of a particular object or place it into a particular category – it simply modifies the object in such a way that it is strange or uncommon and therefore requires or forces a re-interpretation. In this sense the object is on the edge relative to its prototypical schema and therefore contains an ambiguous aspect which requires re-interpretation due to the new affordances and insights it might (or might not) now contain. For example neither Dali's melting clock, Bacon's distorted faces are necessarily indeterminate in the same way as Pepperell's work. In fact in direct opposition to Pepperell's paintings, the former examples consist of a determinate semantical identification (i.e. the object can be easily placed into a cognitive category entitled 'clocks' or 'faces').

Therefore while both defamiliar and indeterminate images stretch the space between perception and recognition, defamiliar images allow more easily for semantical recognition to occur and therefore in some sense for a higher degree of resolution to emerge. In other words, the object possesses enough relevant attributes required for membership into a particular semantical category (e.g. to infer that a particular object, never seen before, is a 'tree' one must compare this object to the attributes that an individual has defined for membership in the category 'tree' – the object is 'leafy', made from 'wood', has 'roots', is 'growing in the ground' etc.; for further discussion see 'Social Cognition, Inference and Attribution' (Wyer 1973) or 'The Psychology of Interpersonal Relations' (Heider 1958)). And yet, despite the fact that the defamiliarised stimuli has enough relevant attributes, affordances or characteristics for membership into a particular semantical category, it simultaneously possesses components which clearly do not belong within the initially defined semantical category. It is therefore deviational with respect to the prototypical.

I should note that in many respects this distinction between the two terms is not clearly delineated – for example in-between paintings which are semi-determinate cannot be placed easily into discrete categories. When images tend to the ‘full’ sense of indeterminacy, the distinction remains easy because this form of indeterminacy will persistently deny semantical recognition (e.g. Pepperell’s images showed earlier). However this division becomes more problematic when we consider partially indeterminate images such as Cubist paintings – here semantical recognition can emerge similar to defamiliar objects, and therefore the partially indeterminant image actually contains a number of ‘potential determinacies’ (Muth 2015a). In this sense defamiliar images could also be considered partially indeterminate and simply occupy a particular space in a continuum between full determinacy and full indeterminacy¹².

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Another difficulty within this division is that defamiliar images can contain more cognitive elements relative to indeterminate images (since the former allows for object recognition). This is also reflective of the fact that defamiliarisation has emerged from a literature perspective, more specifically the work of Viktor Shlovsky, which I apply here to visual images. As Zeki noted, there are different levels of ambiguity and defamiliar images probably have access to more levels than indeterminate ones. Since the division between perception and cognition is somewhat artificial, in the sense that it is distributive rather than categorical, knowing which ‘level’ defamiliar images are acting on is difficult to ascertain (and in any case, most likely unstable). My wish to incorporate defamiliar images has to do with my application of ambiguity to other artistic mediums such as embodied performances, which I will turn to in Chapter 2. I nonetheless acknowledge that defamiliar images is not a fully bounded perceptual phenomena, but potentially contains both perceptual and cognitive elements.

My argument that they form somewhat discrete categories has to do with their application to other artistic mediums such as embodied performances, which I will turn to in chapter 2.

Finally, a brief mention of abstract art within the context of perceptually ambiguous images. Abstract art is often valued exclusively on form and has been associated with formalist theories described above (e.g. Greenberg 1971). Abstract art can naturally be considered ambiguous because of its non-representational aspect e.g. abstract art “does not exemplify objects or entities familiar to our visual system during daily life experiences” (Aviv 2014, pg. 1). So although ‘Black Square’ by Kazimir Malevich (1915) or ‘Composition with Large Red Plane, Yellow, Black, Gray and Blue’ by Piet Mondrian (1921) easily qualify as ambiguous (Figure 8) – for example either Empson’s type 6 ambiguity (no discernable information forces the observer to create his own interpretation) or Ralf Norrman’s ‘vague’ category of ambiguity (undefined or obscure ambiguity), from a perceptual perspective there is no violation of perceptual predictions which stem from daily visual experience - i.e. in this case the borders and geometrical shapes are clearly delineated and instantly recognised as such. Of course exceptions to this rule will occur in the in-between categories of paintings, such as semi-abstract works which mix realism and abstraction. In fact abstract art’s unique position within our visual processing system, more specifically its non-representational aspect, will make it somewhat problematic in its application to embodied art forms which are *de facto* representational (i.e. the recognisable presence of a human body). From this perspective abstract dance can even be considered as an oxymoron (but for further discussion see Aviv 2017).

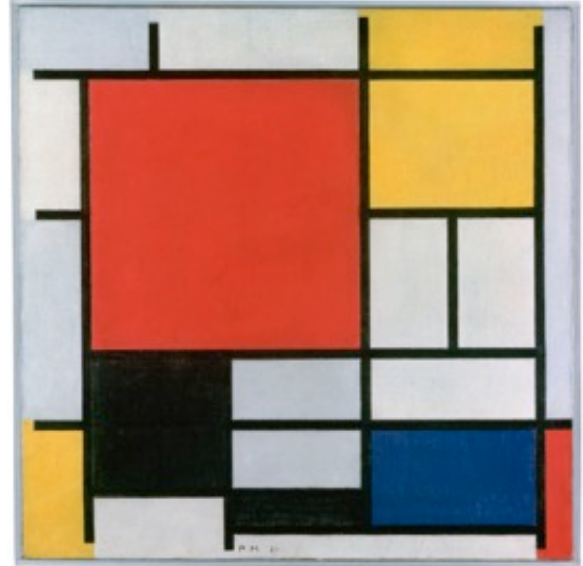
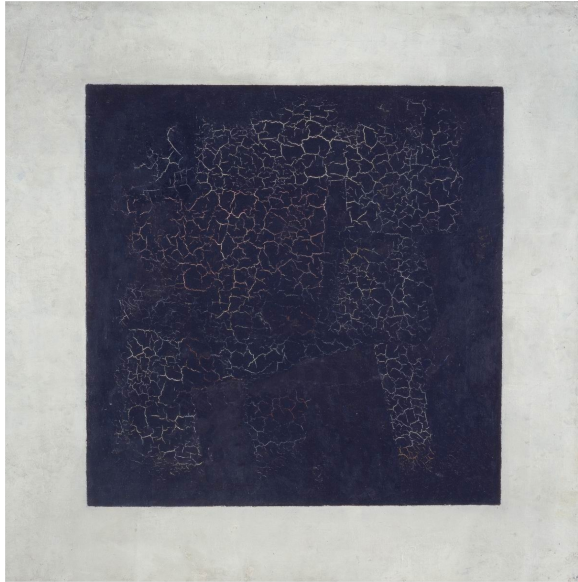


Figure 8: On the left is 'Black Square' by Kasimir Malevich (1915) and on the right is 'Composition with Large Red Plane, Yellow, Black, Gray and Blue' by Piet Mondrian (1921)

1.6.2 Cognitive Ambiguities

Unlike perceptual ambiguities described above, cognitive ambiguity is primarily created through the possibility of multiple narrative interpretations rather than through a difficulty in perceptual identification or classification. An obvious example is in literature, where syntactic or semantical ambiguities exist when a word might have more than one meaning – e.g. the noun 'triangle' can be considered cognitively ambiguous because it can refer to "a three sided polygon, a musical percussion instrument or to a social situation involving three parties...if you were to hear someone say 'it's a good triangle' you could not be sure which meaning...the speaker had in mind" (Miller 2001, quote from on-line essay found at <http://www.kurzweilai.net/ambiguous-words>; consulted on 8th March 2018).

With respect to paintings or images, cognitive ambiguity “arises when a stable percept elicits only one visual experience but more than one meaning or interpretation” (Jakesch 2013, pg. 2). A classic example provided by Semir Zeki (1999; 2004) is a painting from Johannes Vermeer entitled *Girl with Pearl Earring* (1665); Figure 9. Although several valid interpretations of the expression of the face can be made, the fact that it is a face is itself clearly defined and fluently processed in terms of visual stimuli (compare this, for example, with Francis Bacon’s disfluent portraits of face included earlier). The clear definition of face in Vermeer’s painting means that the ambiguity does not arise from a primarily perceptual source (i.e. the identification and categorisation of face), but from a search for meaning derived from that particular human facial expression. Here the brain of the beholder can offer several valid cognitive interpretations, of which many or all can be considered correct. As Zeki describes:

“She is at once inviting, yet distant, erotically charged but chaste, resentful yet pleased...the genius of Vermeer is that he does not provide an answer but, by a brilliant subtlety, manages to convey all the expressions...” (Zeki 1999, pg. 87)



Figure 9: Johannes Vermeer, 'Girl with Pearl Earring' 1665, Royal Picture Gallery Mauritshuis, The Hague.

Another informative and iconic example derives from a photographic image originally used in Roland Barthes's 'Camera Lucida' to discuss the studium and punctum and included in Jacques Ranciere's *The Emancipated Spectator* to describe what Ranciere entitled "the pensive image" (Figure 10). The photograph was taken by Alexander Gardner and is a portrait of Lewis Payne, who was condemned to death in 1865 for trying to assassinate the US secretary of state (as part of the same plan, confederate associates would succeed in murdering president Abraham Lincoln later that evening). Ranciere argues that a tension exists in the photograph due to the several modes of representation, including "the socially determined image of a condemned man and the image of a young man characterized by a rather non-chalant curiosity, focusing on a point we

cannot see...” (Ranciere 2011, pg. 115). Ranciere goes on to identify three forms of indeterminacy¹³ in the photograph:

“...the photograph of Lewis Payne presents us with three images, or rather three image functions, in a single image: there is the characterisation of an identity, there is the intentional plastic arrangement of a body in space, and there are those aspects which the mechanical imprint shows us, without us knowing whether they were deliberate.” (Ranciere 2011, pg. 115)

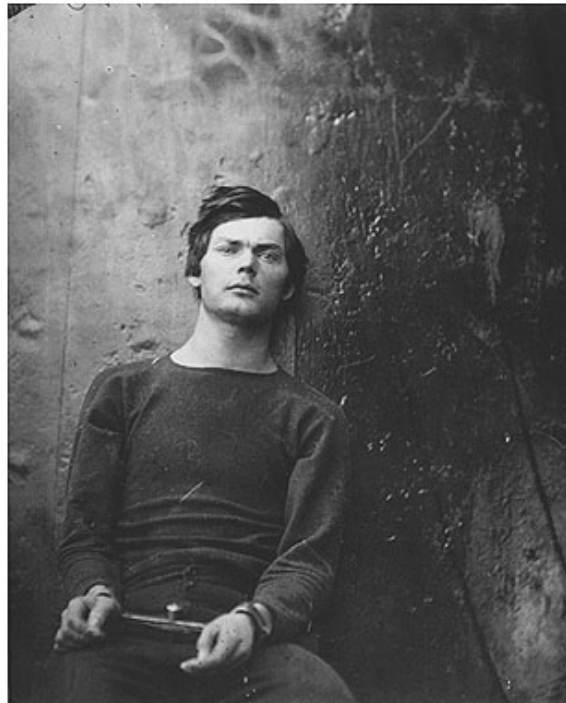


Figure 10: Portrait taken by Alexander Gardner in 1865 of Lewis Payne (soon to be convicted and hanged)

I have purposefully chosen figures and faces to provide example of cognitive ambiguities because as we shall see in chapter 2, due to its significant ‘social’ aspect, the human brain is conditioned to detect and infer states from the

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I consider Ranceirre use of the term indeterminacy here as a more ‘cognitive’ form, in contrast to the perceptual indeterminancies described earlier, because the indeterminacy is originating from a stable percept.

minimum of facial and body expressions. Notice these inferences are a little like the example of the clouds provided earlier in the sense that they are not necessarily always correct – a classic example of this is provided by Gombrich and consists of the famous photo of Winston Churchill taken by Yousef Karsh in 1941 during the early years of World War II (Figure 11). Churchill was pressed for time but had relented to taking a photograph in-between two meetings – at the time he was also smoking a cigar. Karsh describes how he plucked the cigar out of Churchill’s mouth and then took a photo – the resulting look of displeasure came to (incorrectly) represent the defiance of the British at war (Gombrich 1982). As Peter Meinech points out:

“Gombrich showed that for portrait artists and photographers it is the ambiguity of an expression that is important, not neutrality. Thus, expressive ambiguity in faces leads to increased spectator engagement, as our visual processing systems work to complete the picture and make emotional and situational judgements.” (Meinech 2011, pg. 134)

Obviously in embodied performances where a continued presence of human face(s) and figure(s) on stage normally occurs, this phenomenon becomes exceedingly important.



Figure 11: Portrait of Winston Churchill taken by Yousuf Karsh in 1941 after a speech given to the Canadian House of Commons.

1.7 Concluding Remarks

In summary, I have attempted throughout chapter one to introduce a positive relationship between ambiguity and the experience of art. I do not claim that all pleasurable states derived from experiencing art solely originate from ambiguous episodes, but simply that ambiguity is one aspect of the multi-dimensional space which constitutes the experience of art that particularly interests me to explore. I consider ambiguity to be subjective in the sense that it can only emerge from the action of a perceiver who is trying to interpret his or her perceptual information. From this perspective the brain can be viewed as strongly orientated for 'ambiguity-reduction', since from an evolutionary perspective our perceptual system has been developed primarily in order to functionally represent real-world objects. Art is obviously a class of stimuli

perceived through the same system, although artistic creations are not necessarily bounded by the restrictions of daily visual experience. This not only invites us to perceive a greater amplitude of ambiguity in art relative to what is habitually experienced (or even habitually desired), but furthermore it is this 'perceptual freedom' which I consider to be a central component in why pleasurable and interested states can be derived from ambiguous art. More concretely, 3 ways this potentiality transforms into a rewarding state is novelty, the active solvability of the 'puzzle' that is art, and insights generated during the processing of ambiguous artworks which can include, but is independent from, solvability. I also reviewed experimental studies that attempted to quantify what is the optimal 'amount' of ambiguity, and suggest that this is dependent on which rewarding aspect of ambiguity is being triggered. For example, while the rewarding aspect of ambiguity can potentially come from solvability of ambiguity (e.g. which often compromises low to median spaces of ambiguity), it can also be derived from insights which emerge during the processing of ambiguous material which is independent of solvability (e.g. high spaces of ambiguity). Finally I provide a series of concrete examples of ambiguous art, more specifically perceptual and cognitive examples derived from static and delineated art forms such as paintings and portraits.

Having laid the general foundations of the role of ambiguity in the experience of art, my attention in the next chapter can now turn towards applying the aesthetic value of ambiguity and semantical instability to the moving body. For example, I can take the phenomenon of indeterminacy and defamiliarisation and apply it to embodied performance, something that exists within the academic literature in a very limited form. As I have argued so far, much art is ambiguous because a particular aesthetic experience can be potentiated in ambiguous art and this trend can be increasingly observed in art forms throughout the 20th and 21st century. Moving to embodied mediums such as theatre does not invalidate or necessarily lessen this potential, but it will change certain dynamics of how it can be done. As we shall see, the shift from static paintings to embodied performances, more specifically theatre, is not trivial – it now involves human(s) on a stage, interacting with themselves and/or the environment, within shifting

social contexts that share a specific time and space with a 'live' and 're-acting' audience. Furthermore the impact of the physical presence of a human on stage cannot be overstated – in fact I will consider it the major 'complexity increasing' component which emerges from applying the aesthetics of ambiguity to embodied art forms.

Chapter 2: Ambiguity and the Corporeal Form

2.1 Introduction: Moving towards ambiguity and the human body

When making the jump from the scientific and philosophical explorations described in chapter one, but now applied to other mediums such as theatre, the first noticeable event is an immediate reduction, and in some cases even absence, of similar research. In fact experimental aesthetics has historically focused on static visual stimuli such as paintings, photographs or abstract forms rather than the body (Orgs et al. 2013), and perhaps unsurprising, research into the aesthetics of ambiguity has largely following this trend. This orientation is also reflected in contemporary aesthetic models which prefer to introduce artworks (e.g. paintings, illustrations, sculptures etc.) as the input stimuli rather than embodied dynamic art forms (e.g. Leder et al. 2004, Reber et al. 2004, Redies 2015).

A discussion for the reasons why could amount to a thesis in itself – presumably the relative advantages of static delineated artworks, as well as the challenges of ephemeral embodied performances, has resulted in an instinctive preference for the former in aesthetic research, especially within the field of empirical aesthetics. For example static and defined images are much easier to manipulate, which is often an important condition for experimental approaches. In fact the entire field of empirical aesthetics began with Gustav Fechner manipulating simple shapes and colours, which allowed him to have repeatable, controlled experiments isolated along particular dimensions of aesthetic preference (Cupchik 1986). In contrast, experimental manipulations of dance or theatre remains an elusive task – as Calvo-Merino points out, one of the inherent difficulties of experimentally studying the performing arts is that it is a “dynamic, fluent, and fugitive visual art form” (Calvo-Merino 2008, pg. 913; although see

Jola et al. 2012 who argues it is possible “to collect valid data using real life events (i.e. dance) with high ecological validity”, pg. 10).

Furthermore from the perspective of the archive, any visit to a national museum can provide a rich database of paintings which spans across many centuries – embodied art such as performance is more limited to the advent of recording technologies. While textual attempts to capture embodied art forms do exist, the very essence of the medium becomes questionable in a non-embodied form¹⁴. As Murphy 2013 states:

“...textual attempts to preserve embodied experiences mark the body’s absence. While the source of the value of the dance performance is embodiment, dance’s own ephemerality worked against itself...”. (pg. 7)

My main point is that one of the major ‘complexity increasing’ components which emerge when applying the aesthetics of ambiguity to embodied art forms such as theatre is the introduction of the physical presence of a human on stage. The physical presence of a human on stage brings new dynamic qualities which are interesting to contemplate within the sphere of perceptual ambiguity – for example is it even possible (and if so, to what extent) to create perceptually ambiguous images with the human body on stage? Will the perceptual system of the audience inhibit, or aid, such attempts? Furthermore and in parallel, what developments in western theatre have occurred in the 20th and 21st centuries which make such an exploration not only viable but also relevant? For the latter question I will argue that a stronger focus on the body, as well as greater quantities of audience interpretation (analogous to the modern art context discussed in chapter 1) have allowed for an aesthetics of ambiguity which originates from the human body to increasingly emerge within the theatrical

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Of course textual attempts were replaced with recording technologies as they became available – however even then the ‘live’ and ‘embodied’ aspect remains reduced.

context. This latter contextualisation is important because one of my eventual objectives is to introduce, from the perspective of ambiguity and using practice-based examples, certain exercises derived from the physical theatre pedagogy of Jacques Lecoq (1921-1999), who I believe fulfils many of these requirements.

However, before turning to any specific theatre genre or form, these 'larger' questions need to be considered – broadly speaking from a more 'global' and 'fixed' biological perspective to the more 'local' and 'shifting' cultural one. More specifically, the following sections in chapter 2 aim to explore:

- a) the biological challenges which exist in attempting to create ambiguities with the human body (which also 'sets the scene' to explore the tools and techniques which eventually can be used to overcome them; such as with J. Lecoq's work)

- b) the particular cultural developments which have emerged in certain Western theatrical forms in the last century - more specifically the increased embodied approach seen in practices such as physical theatre, and which in turn has, both explicitly and implicitly, incorporated aspects of the aesthetics of ambiguity into the moving body

2.2 A biological perspective: ambiguity and the human figure

The importance of the 'human' in our perceptual system deeply impacts any exploration of the aesthetics of ambiguity in the moving body – this is because our perceptual system is not only highly adapted to recognise human faces and bodies, but it is also naturally drawn to any human figures contained in our visual field. It was the Russian scientist Alfred Yarbus, one of the founders of modern eye movement and tracking, who first showed that when people scanned visual scenes they reliably focused on human figures first. This salience of the human figure is reflective of our position as a highly social species, very much connected and reliant on other humans for survival, reproduction, well-being etc. Therefore since the figure and motion of a person provides

information on their psychological and physical propensities, it is perhaps unsurprising that evolution has correspondingly fine-tuned our perceptual system so as to give priority to the accurate perception of human movement as one of the critical aspects of vision (e.g. for further discussion see McArthur and Baron's 'Ecological Approach' 1983, or 'The Social Brain' by Fritz et al. 2007 etc.).

Take faces for example. Since faces and facial expressions are stimuli which provide a wealth of social information, our perceptual system is extremely adept at processing it (Rivolta 2014). Studies have shown that faces are detected more quickly (e.g. face 'pop-out'; Hershler et al. 2005), are harder to ignore than other stimuli (e.g. Langton et al. 2008) and that even seeing an object as a face facilitates object detection (Takahashi et al. 2015). There is a strong argument that faces represent a special category of stimuli – for example in babies there seems to be early recognition and preference for face-like stimuli, for example within hours of birth babies orientate more readily towards simple face-like patterns (Goren et al. 1975).

It has been shown that the privileged position of faces extends, albeit to a lesser extent, to the entire human body. Studies have shown that even abstract, complicated or ambiguous stimuli of human motion rapidly presented can often be successfully identified such as people dancing or a person walking (e.g. McArthur et al. 1983, Neri et al. 1998). In other words, humans are also highly sensitive to motion of the human body (Aviv 2017). Experiments using methods such as the point light technique, which was first used and developed by Johansson in 1973 (Figure 12), has shown that very little information is required by our perceptual system to construct a human being. Johansson placed a series of dots, strategically positioned, on a non-visible human body (originally reflective tape to the major joints of humans dressed in black) and showed that these dots contained enough information to determine the gender of a person and/or individual identities. In Johansson 1973, he manipulated the amount of display time as well as the number of dots that were presented in human point light displays, eventually finding that "10-12 such elements in adequate motion combinations in proximal stimuli evoke a compelling impression of a human

walking, running, dancing etc.” (Johansson 1973, pg. 201). Furthermore Johansson found that display times as little as 150ms were sufficient for the dots to be organised into a coherent shape of a human figure by the observer. These studies captured how efficient our perceptual system is at recognising perceptually ambiguous images of humans in motion, in essence ‘filling the gaps’ from only a handful of strategically placed data points. Later studies would show that people can also grasp the emotional state of a point light display of a human being (e.g. Dittrich et al. 1996, Clarke et al. 2005), or even intuit the weight of an object handled by a point-light display animation (e.g. Bingham 1993). These examples illustrate “that the human visual system is highly skilled at comprehending another person’s movements and actions, an in mentally reconstructing the body’s motion and its action from very limited information” (Aviv 2017, pg. 3).

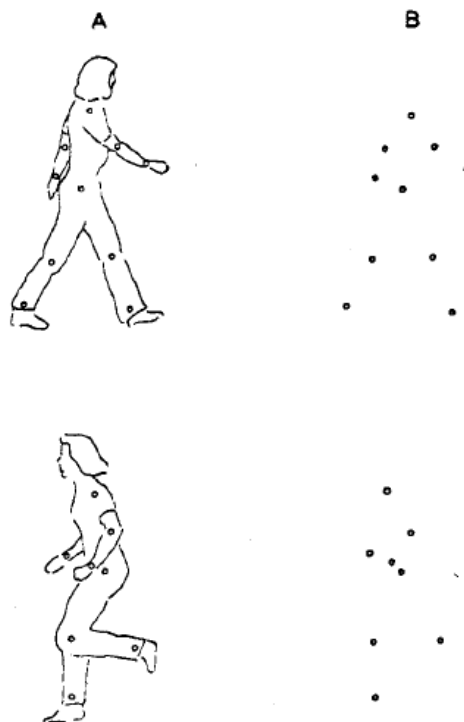


Figure 12: Original point-light display model; reproduced from Johansson et al. 1973.

This ability to discern human motion is also reflected in the fact that many brain regions exist which respond to faces and bodies. Specialised neural mechanisms for processing faces exist in humans, and 3 areas have been identified in the human brain that are strongly activated by faces, which include the fusiform face area in the fusiform gyrus, the occipital face area in the inferior lateral occipital gyrus and a third area located in the superior temporal sulcus (Kanwisher et al. 1997). These face areas are involved in everything from the identification of the concept of 'face', to the recognition of changing facial features and expressions which can provide knowledge about emotional states. Figure 13, reprinted from Zeki (et al. 2013), shows the variety of areas in the human brain that seem to be critical for face and body recognition.

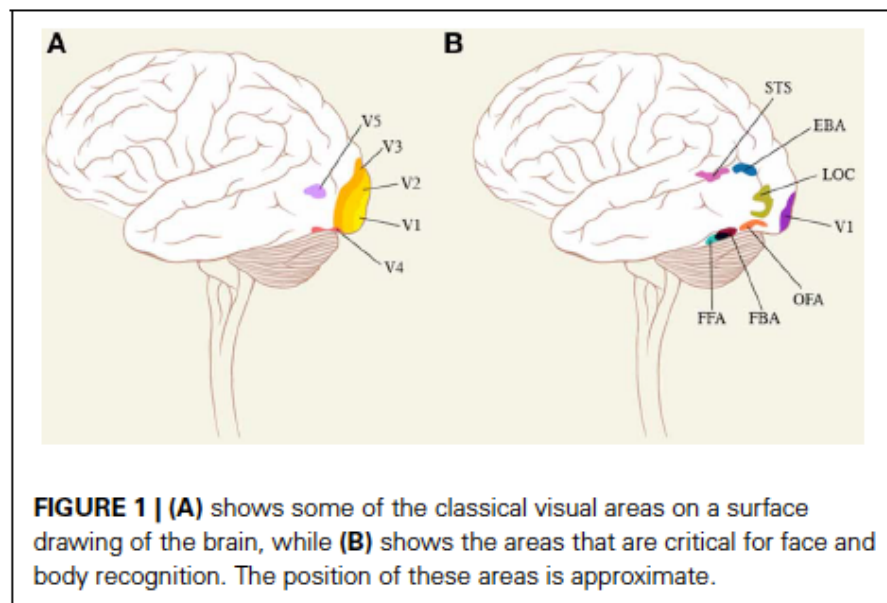


Figure 13: Areas in human brain that process face and body (reproduced from Zeki et al. 2013)

Therefore, if 'human' is an extremely salient stimuli in our perceptual system, a pertinent question then becomes what impact does this have within the context of ambiguity in embodied art? The first response to this question, which I will

defend is only partly true, is that the accurate perception of human movement constrains artistic attempts at ambiguity because the possibilities which exist to transform the human body into a perceptually ambiguous image remain limited. Furthermore this limitation is correlated with the inherent physical restrictions of the human body - after all the physical actor on stage can only do what the body is physically capable of doing (e.g. disassembling the human body into unnatural structures of limbs or body parts such as cubist painting by Picasso, or distorting faces to the extent of a Francis Bacon portrait is not physically possible without irreversible damage).

Accordingly, while the performer is limited by his or her physical constraints of the body and its environment (e.g. gravity, anatomy etc.), the spectator simultaneously possesses a perceptual system extremely adept at recognising the human body. This works in a complementary fashion to reduce a performer's ability to create perceptually ambiguous images using the body and face. In other words, achieving indeterminacy, in the sense of denying a semantic identification of what is observed, is very difficult for the human body on stage to achieve – the perceptual system of the observer will continue to classify what he or she sees as hands from human X, or feet from human Y etc. Essentially, this means that one of the main methods for exploring the moving body within the aesthetics of ambiguity will be defamiliarisation, instead of indeterminacy.

This is why although I have maintained that the boundaries between defamiliarisation and indeterminacy are not clearly delineated¹⁵, nonetheless a distinction between the two can be considered useful when exploring perceptual ambiguity in embodied performance. For example, as just described, defamiliarisation should be easier to achieve than indeterminacy due to both human physical constraints as well as the efficiency of our perceptual system with regards to identifying human movement. Another important reason is that

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As mentioned earlier, I am aware that defamiliar images could also be interpreted as 'partially indeterminate' images which simply inhabit a particular space in a continuum between full determinacy and full indeterminacy

arguably the entire concept of an embodied experience of theatre or dance becomes redundant if the physical presence of a body on stage is completely eliminated, something that would happen in the sense of full indeterminacy. Interestingly, even in the most extreme examples of dance performance that could be viewed as tending or searching for a full indeterminacy, such as Alwin Nikolais's experimental postmodern abstract performance 'Noumenon' (which fully concealed the body using large stretchy bags that completely covered the dancers) the shapes of the bodies still remained and suggestions of hands, feet, or head constantly appeared and reappeared. In other words, the stimuli of 'human' was never fully eliminated – a semantical recognition of human always remained, however slight, for the audience to perceive. The human stimuli was simply defamiliarised. In summary, within a determinant to indeterminant continuum there arguably exists a truncation with respect to embodied performance on the indeterminate end, while defamiliarisation can be considered a more apt definition of perceptual ambiguity in embodied performance because it maintains the primary aesthetic appeal of the embodied art form – the presence of the body on stage (Fig 14).



Figure 14: Jiri Kylian, *As if never been* (1992), dancers Nancy Euverink and Peter Delcoix, photo Dirk Buwalda. Reproduced from Hagendoorn (2004).

Nonetheless, the specialisation in the visual system of human face and movement can also be taken advantage of to aid artistic attempts at defamiliarisation. A very obvious example is to consider the use of masks on stage. Masks can defamiliarise the face (and body) by distorting our habitual, or normal, representation of face. Here it is arguably the proficiency of our perceptual system, more specifically the fact that the human face elicits a very strong response and that we can construct a ‘face’ from the minimum of information, which allows for the existence of masks and its aesthetic appeal. Meineck (2011) argues such a position in *The Neuroscience of the Tragic Mask*; stating that it is exactly because of the privileged position of faces in our visual system which is why “the mask demands to be watched” (pg. 121). In fact Meineck considers that the mask in 5th century Greek theatre was:

“not an afterthought to the creative process of playmaking, merely a disguise, an accoutrement, or just another piece of costume – the mask was actually the focus of the entire visual and emotional experience of the ancient drama” (pg. 151)

Relevantly, an fMRI study showed that the distortion or violation of expectation of faces leads to strong activity in the brain compared to the distortion of normal objects (Chen et al. 2011); in fact neuroesthetics researchers have argued that this is why artists such as Francis Bacon, whose paintings often involves faces, preferred to distort faces but leave objects in the background intact (Zeki 2013). Similarities to Zeki’s argument with Bacon’s paintings can be applied to the use of masks, more specifically that by using masks theatre ‘hijacks’ this natural human tendency of face preference. In other words, similar to how Bacon’s face is not our habitual representation of face and so forces a re-interpretation, the ‘habitual’ representation of the human body and/or face is also transformed by putting on a mask.

Furthermore the Chen et al. 2011 study showed that the violation of faces seems to be resistant to adaptation in the perceptual system in a way that continued exposure to violation of objects are not. This meant that in terms of brain activity, while distorted objects seemed to normalize over time, faces were much less adaptable to normalization. This might contribute, along with various other socio-cultural factors, for the survival and present-day use of certain historical masks from a multitude of traditions e.g. Commedia dell’arte masks from Italy or Dragon Masks from China. The masks simply retain a ‘violation from the norm’ condition that contributes to their aesthetic value, novelty and curiosity.

Similarly, the large variety of masks which are used within the Lecoq pedagogy can be considered a distortion, to varying degrees, of our habitual or normal representation of face and are therefore prime examples of defamiliarisation within physical theatre (Figure 15). Furthermore these distortions affect not only the face, but how the whole body is holistically processed. As Giovanni Fusetti, director of the theatre school *Helikos* and a disciple of Lecoq maintains “a

mask is something that reveals a body that is other than the body of the performer”

(<http://www.helikos.com/pages/workshops-details.php?post=49&lang=en>;
consulted on 8th March 2018).

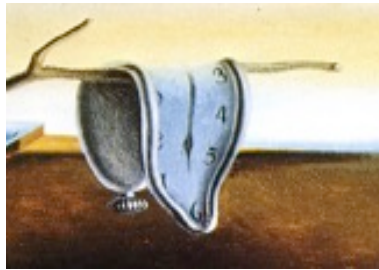


Fig 15: Both Dalí's clocks and the Larval masks appropriated by Lecoq allow for semantic categorisation – both however are defamiliar stimuli because they are not our normal representation of 'clock/time' or 'face/human'.

And of course this phenomenon is not just limited to masks - in fact since the human brain is conditioned to detect figures and infer from the minimum of facial and body expressions, the merest physical suggestion from an individual can often be enough to infer a particular state. Furthermore comparable with the example of clouds in chapter 1, this inference or interpretation occurs automatically and involuntarily (and now, because of the sentient component, even incorrectly). Peter Brook named his far-reaching book after this phenomenon, entitling it *The Empty Space* (1968) and observed that “a man walks across this empty space whilst someone else is watching him, and this is all that is needed for an act of theatre to be engaged” (pg. 11).

A simple exercise that captures this phenomenon quite well and that I often introduce in theatre classes is entitled “Do nothing” (I should mention that the exercise is a somewhat a standard of theatre, and I am sure it exists in many variations). A student is asked to step onto stage and ‘do nothing’ for 3-5 minutes, while the rest of the class simply watches. Besides being interesting with respect to how simply being observed affects and transforms us on stage, what is relevant here is the ease that the spectators have in quickly coming up with stories and images of the student they are watching e.g. he is uncomfortable, he is waiting, he is angry at someone who has not arrived etc. If we place two actors on a bench beside each other ‘doing nothing’, the complexity increases e.g. they are lovers, she/he is angry at him, she/he is in love with him/her but does not want to show it, she/he is mean etc. These interpretations are only semi-voluntary, not dissimilar to how meaning is allotted to clouds in chapter 1. The exercise overlaps well with Jacques Lecoq’s work with the neutral mask, which is a central component of his pedagogy and although used for many reasons, one primary component is that it allows the actor to become sensitive to how movement communicates meaning, and how we are often unaware of what meanings we are unintentionally communicating.

Meineck summarises the objective of the ‘Do nothing’ exercise as follows:

“The purpose of this exercise is to demonstrate three things: First, it is impossible for a human to sit and do ‘nothing’, as the simple act of being watched creates an activity that leads to a contextualization on the part of the observers. Second, observers will interpret the same situation completely different based on the facial and body signals they receive from the sitter. Third, each person will play at doing ‘nothing’ completely differently and it is their facial ambiguity that prompts the minds of the observers to create different scenarios”. (2011, pg. 149)

Notice that in the above exercise one mechanism which we use to help ‘solve’ these ambiguities is social contextualisation: for example if a man and a woman of roughly the same age sit beside each other on stage we are much more likely

to interpret that they are lovers, rather than a mother and son. Contextualisation is a strategy which can provide important clues in ambiguous circumstances and is clearly used within the aesthetic domain – as a simple example, notice how in Magritte’s *Mr Apple* the context (suit, tie, and hat) helps shape the interpretation that the apple is a proxy for a head or face (Cox et al. 2004); Fig 16.



Figure 16: *Mr Apple* (1959); Rene Magritte

Obviously in theatre (and other embodied dynamic performances) social contextualisation is very significant and becomes an important strategy for interpretation from the perspective of the audience – after all humans are interacting within shifting social contexts on stage which can provide important clues to solving potential ambiguities which arise. Therefore the manipulation of social context and/or contextual framing is instrumental in creating spaces of interpretation (later within Lecoq’s method of transference I will highlight the importance of the social relationship in grounding the defamiliarised body). Although the fundamentals of social contextualisation has been identified a long

time ago¹⁶, perhaps one of the most iconic examples of this is filmmaker Lev Kuleshov who “demonstrated that the manipulation of context can alter an audience’s perception of an actor’s facial expressions, thoughts and feelings” (Mobbs et al. 2006, pg. 95). In Kuleshov’s example, shot in 1910s and 1920s with the principal aim to show the usefulness and effectiveness of film editing, a relatively expressionless face of an actor is alternated with various other shots (i.e. a plate of soup, a girl in a coffin, a woman on a divan). Depending on the context, the face is generally interpreted as hungry, intensely sad, or lustful (Meineck et al. 2011). Vsevolod Pudovkin, a student of Lev Kuleshov and who claimed to be the experiment’s co-creator, described in 1929 how the audience read a “...heavy pensiveness of his mood over the forgotten soup... (or were)touched and moved by the deep sorrow which he looked at the dead child, and noted the lust with which he observed the woman. But we knew that in all three cases the face was exactly the same” (Pudovkin 1974, pg. 184). Note how in this example the determinant factor in the inference process of the spectator becomes the social context of the character, which in effect primes the interpretation¹⁷. Furthermore this is only possible because of the spectator’s cognitive ability to input mental states to oneself and others, otherwise known as theory of mind (ToM). ToM gives us a map of the social affordances available to other human beings and infer the intentions which might guide or have guided behaviour. In essence this means that the introduction of the human on stage influences not only the potential ambiguities, but also the relevant strategies for

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For example, Socrates (c. 470-399 BC) pointed out that simply assigning the same text to a different character could disrupt the transmission of passions e.g. “if we put Achilles speech into the mouth of a character who is inferior, or female (387e9-388a1), or in some way the object of mockery, we can prevent the malleable soul from being formed in accordance with the views expressed” (Nussbaum 1993, pg. 107).

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Alfred Hitchcock would describe a similar process in his filmmaking in a well known interview entitled ‘*A talk with Alfred Hitchcock*’, part of a Canadian Broadcasting Corporation series filmed in 1964, <https://www.youtube.com/watch?v=FoxkMMquhXk>; last consulted 8th March 2018.

solving them, since the 'space of interpretation' dramatically increases – e.g. the amount of affordances of a sentient human is exponentially larger than that for a chair.

In summary, from a biological perspective our sociality as a species has resulted in our perceptual system being highly adapted to recognise human faces and bodies – this sensitivity can constrain, as well as aid, artistic attempts at ambiguity. Furthermore, since the presence of a body on stage is a requirement of embodied art forms, an aesthetics of ambiguity concerning the human body will naturally focus on defamiliarisation as this maintains a semantic recognition of 'body' for the perceiver. Finally, social contextualisation is a pertinent strategy to resolve ambiguities and this is more salient in art forms that use the physical presence of humans. As seen with the Kuleshov effect, contextualisation can be used to manipulate the interpretation of human movement.

Having now considered the biological challenges of ambiguity using the human body, I can turn to the embodied art forms themselves, more specifically to certain developments in Western theatre throughout the 20th and 21st century which I will argue provide the space for an aesthetics of ambiguity to emerge. The developments include a greater emphasis on audience interpretation (analogous to the developments in more static art forms as described in Chapter 1), a reduction in the dominance of the dramatic text and the adoption of an increasingly embodied approach to the theatrical dimension. Obviously these three factors are highly intertwined and to a certain degree circular and inseparable (e.g. using less text can encourage more movement to communicate while more communication through movement encourages less text etc.). Nonetheless, I will argue that these prerequisites encourage an aesthetics of ambiguity in the human body to emerge, and furthermore a pertinent example of this is in a particular theatre form which is somewhat problematically entitled 'physical theatre'.

2.3 A theatrical perspective: the shifting role of the body in theatre creation

Relatively speaking, and perhaps unsurprisingly, exploring ambiguity in the moving body has traditionally been delimited to embodied art forms such as dance. Modern and postmodern dance pieces are often abstract and/or non-representational, retaining no ostensible storyline and instead relying on images to create an aesthetic experience in the spectator. Of course whether on a perceptual level abstract dance is really abstract is open to interpretation and discussion – whereas a key facet of abstraction in paintings is the use of non-figurative elements to build content, the medium of dance is forced to omit this quality because of the existence of a recognisable human body in movement. In fact Aviv argues that the closest one can get to the abstraction of the art of dance is to regard the movement, rather than the dancer, as non-figurative: “watching a movement that carries little or no message enables the observer to watch and respond to the course of the movement, rather than to the goal of the movement, which is the usual case in daily life” (Aviv 2017, pg. 4)¹⁸. One only needs to view creations by Merce Cunningham or Alwin Nikolais to see a variety of techniques used to deploy the movement of the body in ambiguous ways, introducing defamiliar movements that are often unpredictable. In fact Cunningham set forth to deliberately exclude literal meanings from dance – arguably postmodern dance has further deconstructed this phenomenon by rejecting any formalism and claiming that any movement can be considered ‘dance’ (Banes 2003).

Emilyn Claid’s ‘Yes? No! Maybe...: Seductive Ambiguity in Dance’ (2006) provides a good description of how British dance culture has constantly embedded several meanings into performance which have been left ambiguous and therefore open to interpretation, especially in the later part of the 20th century. Claid argues, not in a dissimilar fashion to this thesis (but for the first time now in direct reference to an embodied art form), that through this space of interpretation the spectator

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Notice this overlap with Empson’s ‘type 6’ ambiguity, also incorporated in Elkin’s description of potential visual ambiguities (both described in chapter 1)

becomes an active participator in the creation of the performance. Furthermore, Claid suggests that the spectator performs this contribution not only voluntarily, but willingly:

“the illusion is not out there, created by the performer. Creating the illusion is our work, as spectators. We desire the images on a performer’s body to change and dissolve and re-emerge differently. Achieving this is our practice, our responsibility” (pg. 147).

(This description of the spectator overlaps remarkably well with the ‘problem solving’ characteristics of the brain as well as the effortlessness of perceptual inference, as described in chapter 1).

However, despite dance’s obvious flirtation with ambiguity, applying the aesthetics of ambiguity to theatre can seem, at least in an immediate sense, less intuitive or natural. The work of say Martha Graham, Pina Bausch or Anne Teresa de Keersmaeker would easily constitute suitable models to explore the use of perceptual ambiguity in the physical body, but could a similar exploration be made of a play say by Beckett or Odin Teatret?

Studies into the aesthetics of ambiguity in theatre are mainly confined to verbal ambiguities within the dramatic text. As was eloquently captured by Michael Montaigne, a French Renaissance philosopher “speech belongs half to the speaker, half to the listener” (Montaigne 1980, pg. 13); and dramatic text can give much allowance to the beholder’s share. Semantical ambiguities can create a multiplicity of narrative interpretations – for example in Oscar Wilde’s *The importance of being Ernest* (1895), much of the wit of the play is based on linguistical contradictions and misunderstandings. The duplicity of language is used as a tool to create what can be thought of as cognitive ambiguities. For example, the play ends with the following line by one of the central characters, Jack:

“On the contrary, Aunt Augusta, I’ve now realised for the first time in my life the vital Importance of being Ernest”

The semantical ambiguity here is whether Jack is talking about the importance of being honest, (i.e. earnest), or the importance of being named Ernest? The answer is of course, in classical Oscar Wilde fashion, left ambiguous. In fact both interpretations are equally likely to be correct. Endless examples abound – the identity and existence of Godot in Beckett’s *Waiting for Godot* (1953) is left completely ambiguous – who is Godot? A man, a god, or simply the daydream of two homeless men? A useful reference is the book *Does it really mean that? Interpreting the Literary Ambiguous*, edited by Kathleen Dubs et al. 2014, where various articles explore verbal ambiguities in British and American literature (ranging from Shakespeare, Lewis Carrol, to Virginia Woolf).

Nonetheless, explorations into the role or existence of an aesthetics of perceptual ambiguity using the movement of the physical body with respect to theatre have remained relatively rare or non-existent. This is perhaps not unsurprising – traditional models of theatre have been dominated not only by the dramatic text (Lehmann 2006) but also by a dualist approach which tended to view the body in a mechanistic way and which as a consequence devaluated the role of the body in the aesthetic experience (Kemp 2010; Murphy 2013). Without a strong focus on the body within the theatrical context, it is difficult to imagine a space where an aesthetics of ambiguity deriving from the body can emerge. For example Murray et al. 2015 references this devaluation of the body as:

“at its worst being the vehicle by which words are delivered or moved around stage; or reduced to the routine gestures and mannerisms sufficient to convey the stock character inhabiting and making familiar the world of play”. (pg. 7)

Perhaps theatre genres such as realism and naturalism most easily reflect this duality, as they were focused on the dramatic text, were often created from the written page and aimed to represent realistic portrayals of the world (e.g. ones which are commonly and habitually perceived). Unsurprisingly, this left a

somewhat unfertile ground to explore perceptual ambiguities using the body. Such ambiguities and 'open' spaces of interpretation would be undesired and actively discouraged because they would consist of phenomena not part of our habitual, everyday experience (due to the efficiency of our perceptual system, as previously explained).

However, much of the research in the past 2-3 decades of Western theatre practices has recognised both an increase in the use of visual images to communicate, including the body, (e.g. Bennet 1997, Murray 2015, Kemp 2010), as well as a decrease in the dominant position dramatic text has traditionally held (e.g. Lehman 2006, Fuchs 1996, Auslander 1997). This has obviously led to different theatre forms emerging which were not based solely on naturalism or realism – as Peter Brooks argued in the context of American theatre, “naturalistic representation of life no longer seems to Americans adequate to express the forces that drive them” (Brooks 1968, pg. 31). This trend will naturally value a return to the body as the main instrument of theatrical creation and expression, which in turn should provide the necessary elements (when desired) for an aesthetics of perceptual ambiguity to emerge.

A pertinent example of this return to the body is the emergence of the term 'physical theatre' to describe many contemporary theatre forms. The central theme of physical theatre is the placement of the body at the forefront of the theatrical experience, including its creative processes. Murphy suggests that physical theatre can be viewed as a “collection of widely varying approaches, among which difference and opposition thrive, that hold one thing in common: the privilege of the body in both performer training and the act of performance” (2013, pg. 11). The term has become extremely prevalent in many contemporary theatre circles – as Murray states, “physical theatre has had a popular currency among theatre publicists, critics and commentators in the UK, North America and Australia over the last 30 years” (2015, pg. 16).

Despite the popularity of the term, it should be noted that it is nonetheless fraught with difficulties – as a simple example, deciding when a particular style

belongs to 'physical theatre' and when it more aptly belongs to 'dance' becomes highly subjective. The work of certain physical theatre companies such as DV8 particularly illustrate this point in case because they actively attempted to merge theatre and dance (www.dv8.co.uk; consulted on 8th March 2018. Chamberlain (2007) makes a similar argument when he asks whether the term is inclusive of physically-based performances such as the Royal Ballet: "if it doesn't exclude them then it seems to me we fall back into some naive position which argues that dance is 'physical-based' whereas drama is 'text-based' and thus all 'physically based' theatre becomes dance" (pg. 153). The obscurity of the issue is further increased when one considers that contemporary theatre is "in a unique historical period where a multiplicity of styles jostle with one another, and are increasingly combined or juxtaposed in performance" (Kemp 2010, pg. 23). Lehmann, from the perspective of the post dramatic, makes a similar point: "it is essential to accept the co-existence of divergent theatre forms and concepts in which no paradigm is dominant" (Lehman 2006, pg. 20). Therefore the separating threshold between the categorisation of an artistic event as theatre, physical theatre, dance, performance, happening etc. often becomes not only extremely difficult to pinpoint, but even relatively unuseful since very often elements which belong to several can co-exist and merge within the same performance.

However perhaps the biggest difficulty of the term arises when we consider the word 'physical' in relation to more traditional forms of theatre – from this perspective the entire concept of an 'embodied' theatre seems to become somewhat redundant (Pitches 2007). That theatre is physical seems axiomatic – actors walk around stage, and of course the act of speaking is a physical act. The utilization of the concept of 'physical theatre' begs the question: what would a 'non-physical' theatre look like? Ironically, within the context of this thesis a non-physical theatre would be like a perceptually indeterminate theatre – one lacking the primary purpose of an embodied art form, the presence and movement of the body. In other words one is immediately forced to acknowledge that all theatrical activity is embodied. The phrase 'physical theatre' therefore becomes dubious for critical discourse – in the words of Jonathon Pitches, physical theatre

“is fraught with its own terminological problems, partly because as a single form it is borne out of a paradoxical mix of imprecision and pigeonholing” (2007, pg. 48). Its predominantly contemporary usage also makes it misleading - as Murray points out, many theatre practices for the last 2000 years could “conceivably have claimed, or been ascribed, the physical theatre appellation had the terminology been culturally available” (2015, pg. 18); as an easy example, the popular genre that began in Italy entitled *Commedia dell’arte* was highly physical and acrobatic and was prominent during the 1600’s to the mid-19th century (perhaps unsurprisingly due to its physicality, it has enjoyed a recent revival within the contemporary ‘physical theatre’ domain). Murray then goes on to suggest that perhaps the word ‘physical’ in ‘physical theatre’ is more like a reference or symbol to define certain contemporary theatre practices:

“...to be ‘physical’ in theatre is apparently to be progressive, fresh, cutting edge and risky, while at the same time it is a distancing strategy from a range of theatre practices that are perceived in Peter Brook’s phrase to be ‘deadly’ (Brook 1965), outmoded and laboriously word based. To be physical is to be sexy and to resist the dead hand of an overly intellectual or cerebral approach to theatre making...” (Murray 2015, pg. 13)

Nonetheless and despite these obvious obstacles, a complete rejection of the term ‘physical’ seems unfair in the context of an entire historical period, more specifically throughout the 20th century, that saw many new theatre practitioners, teachers and directors giving stronger emphasis to physical activity as a, and even the, means of expression e.g. Vsevolod Meyerhold, Konstantin Stanislavski, Anton Chekhov, Jerzy Grotowski, Odin Teatret of Eugenio Barba, Etienne Decroux, Jacques Lecoq, Philippe Gaulier. This ‘return to the body’ was linked to an increasingly physical approach which began to emerge post-naturalism – as Moschochoriti argues, physical theatre was “initially created in opposition to the ‘dated’ mainstream theatre of the time which was based on realism and naturalism” (Moschochoriti 2009, pg. 9). In fact virtually all developments in 20th century actor training can be seen to focus on a physical approach; as Chamberlain 2007 states:

“it seems to me, all of the key developments in actor-training have involved a physical approach. Stanislavski’s work at the First Studio and his later ‘method’ of physical actions; Meyerhold’s interest in the commedia dell’arte and then his development of biomechanics, Copeau’s interest in commedia and in the work of the Fratellini Brothers, Michael St Denis’s insistence on the importance of gesture and movement and so on. I could add to the list Michael Chekhov, Grotowski, Boal, Bing, Pagneux, Decroux, Pardo, Castrillo, Lecoq...” (pg. 151)

Therefore while the term ‘physical theatre’ clearly remains problematic, an increasing amount of practitioners and teachers were incorporating an ‘embodied’ approach throughout the 20th century. Murphy 2013 takes the position that this embodied approach offered a ‘body-bound’ theory which was a challenge to the dominant undervaluing of the body’s epistemological potential:

“a unique feature of physical theatre’s embodied epistemology is its widespread anti-theory strategy. Even the most divergent practices in physical theatre offer up the imperative of action before intellectual engagement. This reversed the Cartesian mind/body split, prioritizing the body” (pg. 13).

Arguably this increasingly embodied approach can be seen as a reversal of the established Cartesian duality which had traditionally dominated the realm of theatre and which furthermore generally favoured a psychological, rather than a physical, approach to acting. In physical theatre teacher Giovanni Fusetti’s opinion, “the definition of physical theatre carries in itself the germ of war, based on the old separation of body and mind” (The Paradox of ‘Physical Theatre’, unpublished, found at http://www.helikos.com/public/file/The_Paradox.pdf; consulted on 8th March 2018). This psychological approach arguably relied not only on the supremacy of language and the notion that meaning is communicated essentially through the spoken word (e.g. Kemp 2010), but also that the primary aesthetic appeal of theatre originates from a direct transfer of emotion from the actor to the audience (e.g. Murphy 2013). In essence this meant that the responsibility of the actor was to feel an emotion as vividly as possible with the

objective of inducing a sort of ‘emotional contagion’ in the audience as they registered internal states originating from the stage. Physical theatre, and more particularly the work of Jacques Lecoq “does not accept this one to one correspondence and transfer of emotion. It does not concern itself with what the actor feels and rather, focuses on delivering imagery to the audience which may have emotional resonances” (Murphy 2013, pg. 66). Therefore in contrast to many methods of acting such as method acting which uses autobiographical experiences to find the required emotions of a fictional character, physical theatre does not necessarily concern itself with the use of biographical experiences as emotional tools or crutches, but instead relies on the external world as its source material. This does not mean that it rejects emotional or psychological ‘registers’ which have normally been associated to internal states. A more accurate description is that physical theatre remains open to these registers but insists or prefers that they originate from physical actions and the embodiment of phenomena in the ‘external world’ - in the words of Murphy 2013: “the performance pedagogy of Lecoq asserts that all physical, psychological, intellectual, emotional performance registers can be accessed through physical preparation” (pg. 40)¹⁹.

Nonetheless, one of the objectives of taking such a strongly physical approach was an attempt to rebalance many of the heavily psychological approaches to theatre training (Murray et al. 2015). A natural repercussion of this return to the physical body was a reframing of the relationship with the dramatic text – speech becoming just one of the many expressive physical actions available to

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As a critique, it has been argued that this Cartesian reversal inadvertently threatens to continue this conceptual division of ‘psychological’ and ‘physical’ (Kemp therefore prefers to use the term ‘psychophysical’ in his teaching approach). In certain respects while the focus on the physical has challenged outdated Cartesian perspectives, one can argue that a true equilibrium of both physical and psychological would bring it more in line with the concept of embodied cognition, which includes both brain and body (e.g. see landmark publications such as ‘The Embodied Mind’ by Varela et al. 1991, or ‘Metaphors We Live by’ by Lakoff et al. 1980).

the embodied actor. Therefore the focus on the physical was not necessarily an attempt to eliminate the spoken word from theatre, but to reverse the hierarchy of word over body (be it in the creation process, in rehearsals or even the performance itself). For example, Stanislavski (who is often accredited with a psychological approach to actor training until the latter part of his career) used his method of physical actions to try and provoke language and emotion which arose from bodily impulses rather than simply relying on a recital of text which originated primarily from memory, and connected to this, the 'emotional biography' of the actor (later methods such as the Meisner technique would arguably take this concept of impulses in text one step further).

This decentralisation of the dramatic text is well captured in Lehmann's 2006 'paradigm of post dramatic theatre', which was ultimately developed as a way to define contemporary theatre (and in many respects maintains some of the terminological problems which exist relative to the 'physical theatre' definition). Nonetheless, in general terms Lehman's post dramatic paradigm holds that new theatre forms, more specifically those which have emerged from the 1960s into the 21st century, no longer focus on the dramatic text. Or as Hunka 2008 describes:

"more simply, it's theatre, but a theatre which decentres the text as a defining element in the production and reception of the theatrical experience, rendering the text or the play as an element neither more or less central than movement, light and set design, sound or multimedia" (pg. 124).

A good deal of physical theatre companies can be examined through the lens of Lehmann's post dramatic, and indeed many of them are named in Lehmann's book (e.g. Peter Brook, Jerzy Grotowski, Eugenio Barba, Goat Island, DV8 Physical Theatre, Theatre de Complicite etc.). A further important aspect which Lehman highlights within the post dramatic is a different relationship between audience and performer - "the aesthetic distance of the spectator is a phenomenon of dramatic theatre; in the new forms of theatre that are closer to performance this distance is structurally shaken in a more or less noticeable and

provocative way” (2006, pg. 104). Or as Barnett (2008) further argues, a “deliberate suspension of meaning” (pg. 21) pervades post dramatic theatre which results in the integration of the audience into the meaning making process.

Although this reconfiguration between the theatre and its audience perhaps can be seen to culminate in the post dramatic era towards the end of the century, it was nonetheless a “recurring theme in experimental theatre practice in the 20th century, most likely as a reaction to the mainstream naturalistic theatre of the time” (Freshwater 2009, pg. 2). For example, Susanne Bennet (1988) argues “in the theatre practices that followed naturalism that the audience is acknowledged as an important aspect of the dramatic process and the spectator was confronted, often co-opted, into a more direct role in the theatrical event” (pg. 7). Bennet quotes early pioneers in physical approaches such as Meyerhold who, inspired by his work in biomechanics, actively searched for audience participation in the interpretation of meaning²⁰. Nowadays the existence of audience participation in theatre is strongly established, as Helen Freshwater, in her book entitled *Theatre and Audience* notes:

“a plethora of theatrical work now foregrounds the need for active interpretation on the part of the observer, as it requires observers to make their own decisions about the significance of actions or symbolic material” (2007, pg. 17)²¹

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What I mean here by audience participation is not that they are physically participating in the performance, but that they are actively participating in the interpretation of meaning as they observe the performance unfold.

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At this point there is a danger of creating a somewhat oversimplified linear approach to increasing audience participation in theatre. Although it does seem like there is an overall tendency in this direction, a cursory glance will find similar approaches scattered throughout the history of theatre. So for example the Stoic philosophers (very much influenced by Plato’s stern rejection of poetry and his perspective on the ‘passions’) tried to reinvent the audience as active participators, making them ‘actively judging rather than immersed, critical rather than trustful’ (Nussbaum 1993, pg. 137). Seneca the Younger (c. 4 BC - AD

The similarities with Freshwater's position and Emilyn Claid's book, described earlier, with respect to ambiguity in certain forms of dance abound: in the same way that Claid exemplifies the importance of audience interpretation in emerging dance forms in the 20th century, Freshwater similarly describes a variety of theatre troupes which used comparable mechanisms of ambiguity for an aesthetic affect (e.g. the Wooster Group which emphasised audience interpretation by specializing "in jazz-like montages of diverse material", pg. 17).

This reconfiguration of the relationship between the audience and the actor allows an aesthetics of ambiguity to emerge, as discussed earlier, because it encourages an active audience which participates in the construction of meaning. Physical theatre was, and is, part of this reconfiguration, fully embracing this new-found perceptual gestalt, happily eliminating the existence of a 'fourth' wall and actively encouraging and seeking audience interpretation beyond that of linguistic ambiguities. For example Mummenschanz, a prominent physical theatre troupe that originated from the school of Jacques Lecoq, emphasised audience participation and described their work as "a drama which is our drama but everybody can fulfil it with his own life, put himself in it" (quoted from

65) wrote a series of letters to his friend Lucilius that has been described in the following way: "Seneca is keenly aware of the danger of passive, lazy reading. Within the drama, Seneca urges Lucilius to read and reread, to question authority, to learn philosophy rather than merely memorize it" (Schafer 2011, pg. 36). Relatively more recently, Berthold Brecht's famous proposal to replace dramatic theatre with the epic was a desire for an active, reflective, critical, and most importantly, involved audience. Ultimately the comments of the Polish theatre director Jerzy Grotowski's: "Can theatre exist without an audience? At least one spectator is needed to make it a performance" (Grotowski 1968, pg. 32) has existed in some form throughout the history of theatre and belies the fact that audience participation has always been present – after all it is an *a priori* requirement of theatre. Brooks captures this sentiment in a similar statement: "the only thing that all forms of theatre have in common is the need for an audience. This is more than a truism: in the theatre the audience completes the steps of creation" (Brooks 1968, pg. 142).

Leabhart 1989, pg. 104; originally aired in an interview in *Mime Journal* in 1974 by Andres Bossard). Moschochoriti's doctoral thesis (2009) attempts to capture this reconfiguration that occurred in physical theatre post-naturalism:

“the actor-spectator relationship is redefined in physical theatre. It demands audience participation which is intensely emotional, impulsive and imaginary. The composition of movements and gestures which an actor uses in order to convey an image, a symbol, a meaning or even something more tangible must also be construed by the spectator...” (pg. 11)

Therefore to summarize; certain forms of theatre which began to emerge in the 20th century such as physical theatre, not unlike dance, provide an interesting opportunity to explore perceptual ambiguity in the body because they emphasise the body over language to communicate ideas and concepts. This shift can be seen as minimizing a purely psychological approach to acting, which meant that instead of searching for an emotional correspondence between actor and audience created through techniques such as method acting, practices such as physical theatre gives a great deal of importance to visual imagery generated by the physical body and furthermore relies on movement, rather than autobiographical material, to generate emotions both in the actor and the audience. This shift challenged the use of language as the primary method of communicating meaning which is correlated with a loosening of an entrenched dominance of the dramatic text. A further result of this visual, rather than linguistic, approach to theatre (which began to emerge in the post-naturalism period) is that it invites more audience interpretation and inference in the construction of meaning. This overlaps well with Ranciere's concept of the 'Emancipated Spectator' e.g. “it requires spectators who play the role of active interpreters, who develop their own translation in order to appropriate the 'story' and make it their own story” (2011, pg. 22). Ultimately, I posit that these combined correlative developments, although challenging to untangle their relative contributions or weights, provide the necessary elements for an aesthetics of ambiguity to emerge. Furthermore, these manifestations can be

witnessed in a theatre form known loosely and problematically as ‘physical theatre’.

Chapter 3: Exploring defamiliarisation in the work of Jacques Lecoq (1921-1999)

3.1 Introduction

Having identified a role for perceptual ambiguity within the experience of art in chapter 1, and then applied these concepts within the framework of embodied performance in chapter 2 (including the introduction of specific theatre practices that I believe are amenable to such an approach), my objective in chapter 3 is to explore this phenomenon of ambiguity in the moving body in finer detail by focusing on a particular theatre lineage. Chapter 3 therefore will continue this line of enquiry but narrows the field of investigation. To this end I have chosen the pedagogy of Jacques Lecoq, as he is considered a pioneer in modern physical theatre and one of its more significant contemporary contributors (Murray et al. 2015). Lecoq’s work incorporates many of the necessary elements, as outlined in chapter 2, which I deem necessary for an exploration of the aesthetics of perceptual (and cognitive) ambiguities in the moving body.

The promotion of the physical body as the principal tool of theatrical expression and creativity can be seen throughout his work – his embodied epistemological approach is captured well in statements such as “the body knows things the mind is ignorant of” (Lecoq 2013, pg. 8). Furthermore, alongside this elevation of the human body for the theatrical context, his criticism of a purely ‘psychological’ method of acting is well documented, e.g.

“In my method of teaching, I have always given priority to the external world over inner experience ... I do not search for deep sources of creativity in psychological memories ... I prefer to see more distance between the actor’s own

ego and the character performed ... Actors usually perform badly in plays whose concerns are too close to their own” (Lecoq 2013, pg. 17)

One of the central components within Lecoq’s pedagogy is what he called the ‘identification’ and ‘transference’ process - for over 40 years students in his school attempted to embody the external world around them, from elements, materials and animals to even more abstract phenomena such as colours and light (i.e. identification) and then apply it within the theatrical context (i.e. transference). Ultimately one of the aims of this chapter is to explore these corporeal-based exercises from the perspective of perceptual ambiguities, introducing practical examples which describe how Lecoq’s identification and transference process defamiliarise the body²².

In many respects I inspire myself from Emily Claid’s consideration of the word ambiguity as a verb – ‘to ambigu-ize’, which she argues is a fundamental part in the creative process of contemporary dance (Claid 2006, pg. 6). My objective in this chapter is therefore to explore what I will consider examples of this ‘verb’ within either practical exercises that Lecoq created and/or derivations and

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I should mention here that although the pedagogy of J. Lecoq contains particular elements that make it interesting to use in the exploration of an aesthetics of ambiguity in the human body, I do not mean to suggest that J. Lecoq is the only practitioner that incorporated perceptual ambiguity into his pedagogy, nor even that he talked about his work in such a way. It is however the model which I have at my disposal to apply this type of investigation which not only reflects my training as an actor but also fits the required prerequisites I have deemed necessary for such an aesthetics to emerge. My theatrical training has been derived from the proponents of his school, more specifically at the École Lassaad in Belgium, Ecole Philippe Gualier in Paris, Giovanni Fusetti in Helikos and finally a post-graduate course at the University of Evora run by Norman Taylor, a master teacher of the Lecoq pedagogy. All four teachers taught at the Jacques Lecoq school alongside Lecoq before his death, and are regarded in different ways as international ambassadors for the work of Lecoq. Therefore from my perspective as an artist and teacher of physical theatre, the pedagogy of Lecoq and my manipulations of it naturally form the reference point in which to explore the aesthetics of ambiguity in the embodied form.

permutations of it that I have developed over the last decade working at the school *Evoe- Escola de Actores*, a physical theatre school based in Lisbon (more information on the school can be found at <http://evoe.pt>).

3.2 A practice-based approach

One intrinsic component of this dissertation is its practice-based element which is integrated into this chapter. From a practical level, physical theatre is such a visual form of theatre that any written attempt to accurately describe its processes would always be limited without the medium of video²³. This is of course one of the appealing characteristics of practice-based research: its potential to provide a body of information about the creative process that is often otherwise inaccessible within the more traditional academic format (Smith et al. 2009). For example, describing the concept of character creation through the embodiment of an animal will tend to inhabit a somewhat abstract space to non-practitioners or those without experience of physical theatre. Therefore capturing some of the actor Vitor Alves's journey with the tortoise in documentary form is a necessary aid because it makes the work more intuitively accessible to the 'reader-turned-observer'.

A group of students were filmed and interviewed undergoing and practicing exercises that formed part of their course material during the 2015-2017 class at the *Evoe* theatre school, and of which I was intimately involved in teaching. All the videos shown compromise material that I worked and developed with them throughout the two years that they were students at the school. Using this raw material, of over 200 hours of footage, I created a documentary entitled *Sculpting the Body; a theatre of physicality* (25 minutes) and which forms a fulcral element of the practice-based part of this thesis (i.e. the artistic object). Furthermore, 3 short videos were compiled that capture small elements of the exercises that we

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Certain physical theatre teachers and performers have even suggested that the term 'visual theatre' should replace the name 'physical theatre' (John Mowat; previous director of Companhia de Chapito, pers. comm. 2017).

practiced. Both the documentary and the short videos are integrated into the writing of chapter 3.

The objective of making a documentary was not to simply re-narrate my dissertation using a different form of media, but actually to create a body of work that ran parallel to this thesis, an artistic object that describes some of the processes of physical theatre and which can exist independently of the thesis itself. Practice-based research has become increasingly used in Portuguese academic contexts (Hasan et al. 2009) – the potential advantage of incorporating artistic objects within (and without) the thesis is that it allows for the implicit knowledge of the artist-scholar to come to the fore (Candy 2006). *Sculpting the body; a theatre of physicality* was my attempt to do exactly this - create an artistic object which revolved around an artistic process and that brought new elements to the written aspect of this dissertation, and that simultaneously was more accessible to a wider audience not limited to academia. A key message throughout the film is to describe the creation process of physical theatre from two layers: 1) isolating key features of a stimuli to invite the beholder's share to complete our images and 2) manipulating these features to encourage a re-interpretation on the part of the observer (e.g. "so while the process of isolating key features of a stimuli invites the beholder's share into completing our images, the manipulation of these features simultaneously encourages a re-interpretation on the part of the observer. Hopefully what follows will be an aesthetic experience." ; my narration in *Sculpting the body; a theatre of physicality*, minute 19).

I believe this reflects the phenomenon that I have continually argued for during this thesis – that art creates spaces of inference for the observer by being intentionally ambiguous. In fact throughout this thesis I have taken the position that J. Lecoq's pedagogy is an example of a phenomenon which is ubiquitous to art in general and which will simply have different constraints dependent on the peculiarities of which art form it is applied to. The documentary was a practice-based attempt to capture this particular manifestation in a corporeal form while

simultaneously placing it within the context of its larger existence, ideas of which are explored in more detail within this thesis and the previous chapters.

At the time of writing the documentary has been shown in various contexts, including film festivals (*DocLisboa Film Festival* 2017, screening Cinema São Jorge Oct 26th, Lisbon, Figure 17 and Textbox 2; *Madeira Film Festival* 2018, screening Funchal May 16th and 17th) and as course content in private theatre schools (*Evoe – Escola de Actores* in Lisbon, *Acción-Escena* in Madrid and *StageCraft* in Ireland). It has also been screened in academic institutions, such as the *Festival Oh!* organised by students at the University of Minho (Licenciatura em Teatro; Instituto de Letras e Ciências Humanas – March 2018) and the Escola Superior de Teatro e Cinema, Lisboa (Mestrado em Teatro: especialização em Artes Performativas – April 2018).

Sculpting the Body; a Theatre of Physicality

Samuel Meyler

Green Years
Green years 4

WORLD PREMIERE

2017 • PORTUGAL • 24'

OCT 26 / 4.15 PM, SÃO JORGE – M. OLIVEIRA CINEMA



A contemporary theatre form often known simply as physical theatre – attempting to explore some of the creative processes involved in expressing a performative art form, which includes the spoken word, but originates primarily from the human body.

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Figure 17: Documentary at DocLisboa 2017 Film Festival;

(<http://www.doclisboa.org/2017/en/filmes/sculpting-the-body-a-theatre-of-physicality-2/>; consulted on 27th February 2018).

This documentary converges upon a contemporary theatre form often known simply as physical theatre – attempting to explore some of the creative processes involved in expressing a performative artform which includes the spoken word but originates primarily from the human body.

It does this by following a group of actors and students in their attempts to embody everything from animals to colours to strange masks ... at the same time it links the work to certain aspects of human cognition, as well as underlining the importance of 'play-and-error' for the creative act.

Textbox 2: Synopsis of documentary; directors statement and script list can be found in digital Supplementary Information

3.3 Perceptual ambiguities and Jacques Lecoq's process of identification and transference

Lecoq's process of identification and transference can be seen throughout his teachings. While the process of identification is normally undergone first and includes observing and imitating the natural world, the process of transference involves placing certain qualities or essences which were embodied in the identification process and mixing them into human characters within the theatrical context. Although both these processes are very much inseparable from the perspective of Lecoq's pedagogy and interwoven within the fabric of his school, they offer different possibilities of defamiliarising the body. Therefore I will examine them both separately (while fully aware that they each exist as part of the same process – without transference, identification cannot be placed into a theatrical context, and without identification, the raw material for transference is not created).

3.3.1 Defamiliarisation through identification

The process of identification is ultimately a process of embodiment – to identify with a particular object and to try and recreate it using the physical body (e.g. people, animals, paintings, elements, materials etc.). This identification process “finds its way into many of Lecoq’s exercises and lies at the heart of Lecoq’s pedagogy and philosophy” (Murphy 2013, pg. 78). Lecoq believed that movement existed in everything (i.e. ‘tout bouge’ or ‘everything moves’) and therefore all observable and/or experiential phenomena held particular qualities and characteristics that could be embodied and inspire the actor:

“Analysis of movement is not necessarily the analysis of the body, it is the analysis of all movements, even the animals, of plants, of the dynamics of passion, of colours, of everything that moves. We are trying to get to the bottom of movement” (McLean interview with Jacques Lecoq, published in Leabhart 1989, pg. 93).

This research is possible, and obviously profits, from our impressive capacity for abstraction and metaphor – to be more precise, in this case the application of a non-linguistical metaphor (i.e. the physical body used to represent something else). As Murphy 2013 states: “abstracting from physical encounters is something humans already do, so the identification process merely reproduces this capacity for aesthetic ends” (pg. 97). For example a student might be asked to improvise the life cycle of an oak, from acorn to full-grown tree (Leabhart 1989). This corporeal process of identification naturally creates a state of defamiliarisation from the point of view of the human body since obviously the human body is not, in actual fact, an acorn tree. In other words by choosing a source material which inhabits a clear and observable place in the natural world, such as the animal “turtle” or the material “elastic”, and expressing it through the physical body, a state of defamiliarisation is created which requires a process of inference from the spectator. The work with identification ‘ambigu-izes’ the

body, as the movement becomes perceptually ambiguous and defamiliar, working as an embodied metaphor that allows us to see the human from a different perspective. Notice the importance of the spectator's contribution in the identification process and that some of the aesthetic value comes from the spectator's 'solving' of the ambiguity. Taking the example of a human moving like a tortoise, which has some parallels with zoomorphism (i.e. art that portrays one species of animal like another species of animal), solving the ambiguity requires mapping the movement on stage with previous knowledge or experience that a spectator might possess about what constitutes a tortoise and a tortoise's movement. This experience potentially decreases if the spectator has never seen a tortoise (i.e. no knowledge structures are available for correct inference) or if the actors embodiment of the tortoise is not good enough for even a partial mapping to be achieved. This overlaps with Eco's approach in *The Open Work*, that without even some form of partial mapping ambiguity remains at the farthest end of the curve, with little aesthetic value. Or as Gamboni describes, the intentions of the artist cannot be read (Gamboni 2002).

Video 1 captures some of the identification process of the work with animals, more specifically actors embodying a tortoise, a bear or a squirrel.

Notes and Reflections of Video 1: Identification with animals (work done from September to November 2015 at *Evoe – Escola de Atores*)

The first step of course is observation. For example, the tortoise. This meant hours on YouTube looking at videos. Originally we actually wanted the turtle but we quickly identified that while turtles live much of their time in water, tortoises live on land and that this difference made the tortoise a more relevant choice for what we desired – after all a land-based animal will be easier to imitate. Its terrestrial features meant that it has a heavy and massive shell while the aquatic nature of the turtle meant it had a lighter shell to prevent sinking. This massive shell makes the tortoise very slow but at the same time provides protection (as oppose to aquatic turtles which at certain times, more specifically inside water, can be nimble and graceful). Our first

challenge – how does the tortoise stand? The legs of the tortoise are bent instead of being straight and are directly under the body (which is surprisingly difficult for a human to do). What do they eat? They are generally herbivores, preferring leaves. What are some anatomic properties of the tortoise that might be interesting to keep for the creative process? For example, the knowledge that the tortoises have extremely small brains is something that can influence the creation of the character e.g. it might not be very smart. Material such as this can become useful later not only during the transference process but also as a tool to aid social contextualisation...

The second step is movement – to get down on all fours in the studio and to try and imitate its walk. This exploration is done purposefully dressed in black – costumes distract us from the essence of the movement and while a ‘turtle suit’ might help initially, its value would extinguish rapidly if not sustained by the correct movement. Therefore at this stage we avoid any props, considering them artificial crutches which although forge an initial recognition in the audience, can prevent us from finding accurate movements.

How do we, as humans, place the arms bent forward and simultaneously underneath the body like the tortoise? The answer of course is that we cannot. This is an important aspect – identification has limits in dissimilar bodies. Therefore from the outset there needs to be an acknowledgment that matching will always be partial. In other words, the physical constraints imposed by the human body should not be seen as problematic. Once we have taken the most approximate physical stance, we begin to move our feet forward one step at a time. One exercise used a lot in Lecoq pedagogy is imagining the ground becoming extremely hot: “I encourage the students to imagine that the floor of the room is burning hot, like sandy beach under the midday sun, obliging them to discover the dynamics of that particular walk” (Lecoq 2013, pg. 92). We found with the tortoise this exercise difficult because the automatic reaction of the actor is to move at a speed which is impossible for a tortoise – pretending to move at full speed while moving extremely slowly is extremely difficult (after some practice, a useful state did emerge however which was slow movement ‘with urgency’ which we kept and

later applied to the human-tortoise). After a tortoise 'walk' was established, we observed and embodied how this animal ate. What was interesting from the videos we saw from tortoises in the wild was how it had to pull leaves with its neck – the neck and the length of the neck are surprisingly long in tortoises. It can really stretch out, and of course, often withdraws when it wants to enter his or her shell. The movement of the neck to pull leaves from bushes had a certain rhythmic feel to it – first the neck would stretch out slowly, further and further till the mouth would clamp down on a leaf. Then the neck would pull back, with the leaf resisting resisting until it released and the neck would jolt back slightly and then return to place. The leaf would then slowly disappear into the mouth of the tortoise. We worked on the rhythm of this over a period of a few days. Other movements of the tortoise were explored (e.g. withdrawing into shell, lying down etc.). The tortoise lack teeth, so we used the lips to hide the teeth and curved the tongue slightly to suggest a more reptilian state. A few times we placed the 'tortoise' (i.e. the actor) on his back, exploring the vulnerability of this particular attitude. This embodied reference of 'vulnerable' would be helpful later during the transference phase.

Our goal was to unite the individual movements of the tortoise into a sequence which captured its essence and state. So in the same way that letters form words that form sentences, individual movement references were used to create 'phrases of movement'. At first the objective was merely to create 10 seconds of turtle – for example perhaps it walking forward, seeing a leaf, stretching out to bite it, pulling it out, eating it contentedly, hearing a noise and quickly withdrawing into its shell. Doing this accurately took time as it required a lot of parsing of movement sequences. For inspiration, we placed a lot of emphasis on different rhythms – the slow walk of the turtle, the jolt of the head when the leaf is pulled free from the branch, the state of eating, the quickness, relatively speaking, of the head withdrawing when it sensed danger. These 10 seconds become 20 seconds, and then 1 minutes and so on.

I've found one way to encourage this discovery, and begin creating almost 'human' reactions which will be useful in the next phase (i.e. transference), is

to take Lecoq's exercise further and add different contexts which the tortoise has to react to – for example to stir curiosity, danger and even arousal. For example the tortoise is walking on stage and eating leaves, and finds a beautiful female tortoise standing in front of him. How does he react? How does he flirt? How does he hide his disappointment when he is rejected? Or the tortoise is walking around and he sees his favourite food, or hears one of his most feared predators – a crocodile which is approaching. Of course the tortoise sees the crocodile before it sees him or her. What is the reaction? Where is the urgency without losing the constraints of slowness which the tortoise has? How will this particular tortoise try to escape? And such forth. The actor must enjoy the process. If she or he does not, we will not enjoy watching him.

Similar processes were used to investigate the bear and squirrel, which I will not describe due to limitations of space. Video 1 captures some short clips of our work.

3.3.2 Defamiliarisation through transference

Although identification creates embodied references, this only serves the actor if and when it is applied to the theatrical context. For example, once the tortoise has been created through the processes described above, now it becomes a reference which can be 'reapplied' into the theatrical context. As Murphy 2013 states: "rendering embodied knowledge into creative fodder" (pg. 81). Lecoq called this the method of 'transference':

"the work done on identification has to be reinserted into the dramatic dimension. For this purpose I use the transference method...This method offers two possible approaches. The first is to humanize an element or an animal, giving it a behaviour or a voice, relating it to other elements or animals. To give a voice to fire is to externalize distress or anger...a second possible approach is to invert the process. You begin with a human character and gradually, at particular

moments of the performance, the elements or animals in which it is grounded show through..." (Lecoq 2013, pg. 45-46)

The method of transference can, as an indirect consequence, reduce or increase the perceptual ambiguity of the actor. While I will illustrate both, obviously within the context of this dissertation what interests me more is how it can increase the perceptual ambiguity of the actor. Therefore consider the example of the tortoise again: while the identification process relies on attempting to perform the tortoise as accurately as possible (e.g. 100% tortoise), the transference process involves humanizing the tortoise - in other words creating a fictional character inspired from elements of the tortoise's physicality and applying these elements to human characteristics and traits (e.g. 10% of tortoise). This process defamiliarises the human into a sort of unstable hybrid of human and tortoise, which results in a peculiar and fictional character that contains some projected idiosyncrasies of a tortoise, subjectively chosen by the actor. **Video 2** captures some of the transference process of the work with animals (the same animals as in the identification process in Video 1 is chosen - tortoise, bear and squirrel).

Notes and Reflections of Video 2: Transference with animals (work done in November and December 2015 at *Evoc – Escola de Atores*)

After observation and then embodiment (parts of the identification process), we can now move to transference. This can be done, as described by J. Lecoq earlier, by two methods. We used the first method which involves humanizing the tortoise to create a fictional character. The temptation is always to first think of human characteristics and personalities which might emerge from the physicality of the animal, for example its slowness might make it stupid, or extremely patient. But before this we try to focus on physical aspects, rather than psychological ones. For example, how do we keep the shell in the human form? In the words of Vítor Alves in his interview on this process, included in the *Sculpting the Body; a theatre of physicality* documentary: "The process of humanisation was to take my hands off the

ground, but try to keep as best as possible the shell because the tortoise has this shell which brings a certain image, and on the other hand, the way it looks around and the way it moves its head” (minute 4:44). After many different attempts, we managed to incorporate this physicality by introducing an extreme case of scoliosis to the character. This gave the sense of ‘shell’ in a human form. The slowness of the movement, plus the size of the neck, was captured in how it looked around. The tongue of the tortoise also remained, and would come out intermittently. Once this physicality was introduced, more psychological characteristics and idiosyncrasies emerging from the personality of a humanized tortoise and identified by the actor could be introduced. For example the small brain of the tortoise made it a little stupid and shy – to capture this slowness of perception, extremely thick glasses were introduced and a certain level of timidity was encouraged. While the slowness of the human-tortoise made it patient, it also gave it a certain hesitancy about everything. This was embodied in a difficulty or impossibility of making any choices – in fact anytime choices emerged it became almost paralysed. Slowly, a character began to emerge.

The fourth step is to place this humanized tortoise into a context. This is similar to placing the fully identified, 100% attempt at a tortoise into different contexts as described earlier. This reflects a fundamental learning point for me within the practice – a character can only come alive when it is in relationship to something else²⁴. For example, in my documentary the performance by the human tortoise sitting on a bench comes from a improvisation entitled the “*Blind Date*”. Here the actor-tortoise has arrived in a park, and is waiting for a woman to arrive. Perhaps they have sent each other many letters, perhaps only one, but what is certain is that they will now physically meet for the first time ever. Of course the ‘patient’ tortoise arrives very early (he probably had left the house two days ago to make sure he was on time) and the improvisation is around what happens as he waits. As he

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This has nice overlaps with various arguments of Aristotle’s e.g. “it is in their actions that all men either succeed or fail... plot-structure as the mimesis of the action” (Halliwell 1987, *Poetics* 6, pg 37)

cleans his glasses making sure he is as presentable as possible, as he sits in the park and mistakenly thinks each woman that passes might be his potential love arriving, as he prepares the first words of his conversation – what will he say? And so on. In this improvisation the woman never comes – how does he play this? How does the patient tortoise slowly become impatient? When does he give up? etc. **Video 2** also includes short clips of a humanised squirrel in a library, and a humanised bear and a humanised squirrel that meet for the first time in a public park (here the improvisation is similar to the ‘blind date’ exercise as described above, only that both turn up to the encounter).

There are two aspects which emerge from the above reflections, inspired from the perspective of seeing this as a process of defamiliarisation, which has affected my work in the studio.

The first emerges from considering the identification process as a form of isolation and the transference process as a form of manipulation. Consider the act of observation and embodiment of a chosen animal. For example, in the case of an elephant we clearly cannot fully represent it because of a series of physical constraints (e.g. its size and weight, our lack of trunk etc.). As mentioned previously, while an elephant costume might help initially overcome some of these constraints, its value on stage cannot be sustained if the dynamics and quality of movement is not one of the elephant. The question becomes what elements and movement exists in a elephant that must be there for its image to be recognisable in the human body? Therefore this is why I consider the term isolation as providing another perspective relative to identification. When we are identifying with the animal, the goal must be to isolate key features of that particular species, as each animal has certain features without which it is difficult to recreate; without which an animal cannot be inferred and does not exist in the eyes of the spectator. This approach of isolation can be seen to contain reverberations from the philosophical position of essentialism, which despite having received a lot of criticism in the postmodern context, nonetheless is useful in this process of isolating key features; essentialism from this perspective

ultimately provides a collective approach which unites action (from the actor) and understanding (from the spectator). As Murphy 2013 states:

“For example, as the class collectively searches for “treeness” through trial, error, and instructor commentary, they create a collective understanding of the basic component of “treeness”. The “treeness” they seek is the collection of the permanent qualities that belong to all trees, regardless of variation among specific type” (pg. 22).

For example, the shell forms such a major part of the tortoise’s reference material that it becomes almost impossible for the spectator to infer the existence of a tortoise without it. This is obviously important in the identification process – the shell, its constraints, weight and affordances must somehow be present in the actor. When we humanize the tortoise in the transference process we need to be careful not to lose this element – after all since the human does not have a shell it remains a challenge to somehow integrate it into the human character. The solution is to find something that represents a shell in a human form (the example in the above creation with Vítor was to give the human character extreme scoliosis, which gave a strong impression of a shell and weight on the back). Another example to illustrate this phenomenon which seems pertinent and that I used in my documentary is Picasso’s creation of the bull series (Figure 18): “Picasso starts with a perfect representation of a bull. But then he begins to deconstruct this representation, reducing it until only its essential elements remain. Eventually what remains is the presence of a bull, enough to suggest and imagine it based on our own experience of what is a bull...” (my narration in documentary, minute 17-18).

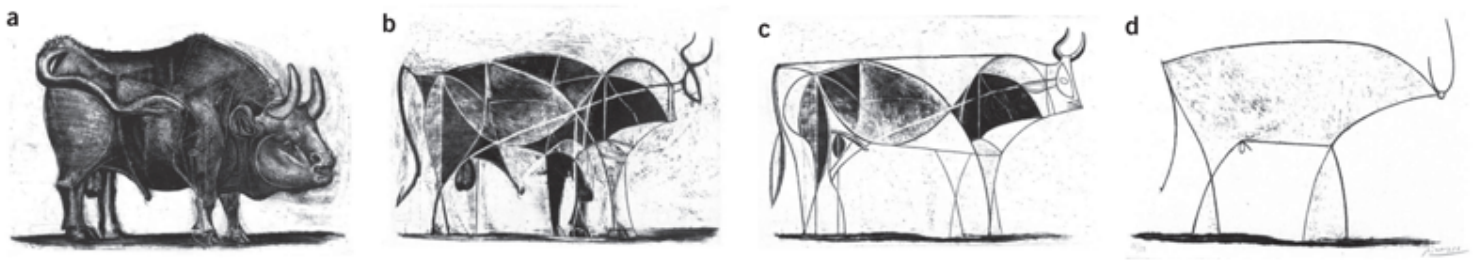


Fig 18: 4 Lithograms from Picasso's Bull Series (1945)

Picasso's search for the essence of the bull can be seen as isolating the key features without which the bull cannot, or does not, exist for us as an image. Our process on stage is highly inspired by this process. The transference process is ultimately a second stage which does not exist in Picasso's Bull series and occurs after these key features have been isolated. This process involves the manipulation of these isolated elements: "our process on stage is not dissimilar to this: first we isolate, as best we can, the essential elements of the bull, and then we take this raw material and manipulate the specific movement sequences – until what is left is a human character with suggestions of a bull, or at least the particular suggestions that actor choose" (my narration in documentary, minute 18).

Video 3 is a short excerpt from the documentary, which describes a simple example of this phenomenon with the student/actor Johan Philip – it captures a short sequence of movements which were isolated during the identification process (e.g. the tongue of the bull, a heaviness and presence when walking, location of eyes positioned so as to give a wider field of vision consistent with many herbivores, awareness of horns protruding from head, the stamping of the feet and infamous charge of the bull seen in the bull rings of Spain/Portugal and captured by authors such as Hemingway etc.). Just like Picasso, we search for the features without which the bull cannot exist. These particular isolated movements are then united to create a sequence of movements. A second step of

defamiliarisation occurs when we manipulate the same movement sequence into the human form.

Another aspect which has emerged from examining this work from the perspective of ambiguity is the need for a sort of 'master gain' which can amplify and reduce, in certain key moments, the percentage of the animal. For example, if the human-tortoise receives a fright, there is a flash of 100% tortoise as it attempts to withdraw into his shell (or its embodied version of the shell). One way I try to capture this phenomenon in the classroom is to propose the idea that the tortoise (or whichever animal) and the human exist within an internal battle, one constantly trying to suppress and dominate the other. While there are clearly moments when the human is winning, there are also moments when the animal overcomes entirely. This constant tension pervades throughout the performance or improvisation. Furthermore it seems, generally speaking, that it is more interesting and satisfying for the audience that the animal wins in certain key moments. I imagine this is because of the increased disfluency/unusual presence of the animal rather than the more normal perceptual construct of human. This tension between opposing forces can be seen in the relationship between push and pull, which is often used as a basic metaphor to approach different dramatic territories within the pedagogy of J. Lecoq (see Kemp 2010, pg. 66-71) and is introduced as part of a series of movements within the first year.

This master gain is connected to the necessity, after the transference process, for the created character to be in relationship to something else to become truly alive. In other words the master gain needs to be modulated with events that occur, for example the arrival of the girlfriend/boyfriend in the blind date exercise described earlier. This places the characters in a contextual situation that will allow for the 'master gain' to be manipulated as a relationship unfolds, as well as providing more layers for the audience to engage in interpretation (linked to the social contextualisation discussed in the previous chapter). Murphy calls this phenomenon "taking a position for or against the object of attention" (2013, pg. 78).

3.3.3 Defamiliarisation with other stimuli: elements, materials and colours

While I have focused on animals as a working example, this process of defamiliarisation can eventually be applied to many types of physical stimuli - for example elements, materials and even colours formed an important part of the pedagogy of Lecoq (in fact in his school the identification and transference process would be done first with elements before animals). Examples of the usage of these objects abound in the work of Lecoq: e.g. on the 20th anniversary of his school in 1976 Lecoq wrote: "Trees, fire, water, wind and earth explode into characters, into letters, names and words" (Leabhart 1989, pg. 90); or in *The Moving Body* he describes elastic materials as "nostalgic to return to their original shape, even though they might not succeed" (Lecoq 2013, pg. 89). In a similar way to how I have described using animals, the embodiment of these stimuli naturally result in 'ambigu-izing' the human body.

Notes and Reflections from investigating Elements, Materials and Colours

The process with non-sentient beings takes a slightly different approach than with sentient ones, one of the main reasons being that unlike a bull or tortoise, we can bring a piece of clay into the study and manipulate it without any practical constraints. Therefore I normally start with clay – we can bring it into the classroom and mould it, squeeze it, sculpt it, transform it. We can see the sensation as it resists, and ultimately succumbs, to the pressure of our hands. Next I ask students to work in groups of two, with one student being the clay and the other manipulating him or her. Where is the resistance? e.g. If an arm is moved, does it rebound slightly backwards? This is a human movement, not present in the movement of clay. Eventually we try to move as we are the clay. A similar exercise can be done with thin wire, moving it and sculpting it. What is the difference in resistance of clay and wire? Which one is weaker, which is more compact and resists? Where are the affordances different, and where are they similar? Eventually we can improvise encounters with objects

– playing with water, building a fire, even frying an egg. From that fictional encounter we introduce varying levels of abstraction – being in the water turns into becoming water, to eventually abstracting water as a character’s quality of movement or speech. Just like in the ‘relationship’ aspect introduced with the animals, how does a watery character interact with one based from fire? What are the potential transformations of the interaction – for example does the human water character boil over, or does it extinguish the human fire character? What about an egg in a frying pan? Who does the oil and who does the egg and what is their relationship? And so on.

My experience has been that many objects contain interesting dualities – for example fire is an interesting element to explore because an actor embodying it usually takes one of two directions – either becoming like fire, hot and angry and whose flames flicker around him or her and can grow in size if more fuel (i.e. an ex-lover, an enemy, a particular situation etc.) is added. The other direction is more subtle but just as interesting – the embodiment of fire consumes the actor, showing his vulnerable side (instead of the actor consuming and burning the space around him). Here it takes a tragic direction, becoming a reference for pain and loneliness (notice again that in both examples the emotional resonances which are eventually created for the spectator originate from an embodied physical metaphor; this reflects Murphy’s 2013 argument that Lecoq’s aversion to theory is “actually a strategy to make way for a new kind of knowing ... grounded in the embodiment and abstract potentials of the sensorimotor”, pg. 100). In fact all the classical elements can be interpreted with a variety of dualities e.g. waves gently break at the beach on a summer’s day versus the a violent sea destroying any ships which have dared cross its path...

Embodying the colours always begins as an extremely subjective process. This is because colours lack a delineation of shape and form, such as a pencil which we might embody, nor does it have movement that we can observe and inspire to, like the examples of the animals described earlier or with an element like fire. Therefore its embodiment remains elusive, with no obvious references (like in the case of fire, where there is the flickers of the flame, the

embers etc.): “since they do not move themselves, our analysis is necessarily forced to become more subjective. For example, how can we describe yellow? What is its height, length, and its density relative to other colours? What emotions can it give us?” (my narration in documentary, minute 11). Interestingly, here the possibility of a spectator to correctly infer and map the movement they see to a specific colour is extremely difficult – after all the human body is not a colour. A spectator might guess correctly using certain cultural symbols e.g. water which signifies blue which represents a girl or ocean or sleepiness – but these are cultural stereotypes which are less interesting than exploring the potential movement of a colour. And in any case they soon run out for colours like purple or orange etc. Here the defamiliarisation effect is achieved due to the difficulty or impossibility of the transference process – more specifically, the inability of the human body to accurately create the image of the colour blue. The movement therefore escapes easy identification and recognition, defamiliarising the body and allowing us to see the human from a different perspective. In the words of Jacques Lecoq: “from the simple lifting of an actor’s arm, the spectators must be able to sense a rhythm, a sound, a light, a colour” (Lecoq 2013, pg. 53).

As a final note, it should be mentioned that these references also have the capacity to reduce defamiliarisation when applied into the transference process. In other words, the transference process does not always add to defamiliarisation, but can undo some of the ambiguity. This is because in the transference process the focus always returns to the theatrical context, which of course does not always require or need an ambiguous physical body at every moment. So for example applying “fire to externalise distress” (Lecoq 2013, pg. 45), or incorporating a projected identification of nostalgia that an elastic material might possess, can be transformed into very concrete terms. A simple example of this is to return to the acorn tree introduced at the beginning of the section. Notice that one of the potential sensorial experiences within this particular identification process can be an appreciation of ‘rootedness’. While the identification process has defamiliarized the body (we do not normally walk around trying to recreate and improvise the lifestyle of the acorn tree), the

transference process can take this physical sensation of 'rootedness' and apply it to a fictional character – creating the image of a man or woman whose personality is strong and confident. The image is not necessarily ambiguous in this case – the transference process has resituated a defamiliar image into a more familiar or usual one. Notice that this fictional character does not originate from a psychological source, such as an autobiographical experience of when the actor felt strong or confident in his or her past. Rather than a biographical memory, the image originates from a reference created during a process of identification. If the audience does indeed perceive 'strength' when observing the character, where does the suggestion of strength come from? The character has not picked up some heavy weight or done some impressive muscular feat etc. The implicit suggestion arises from the actor's identification of rootedness taken from the tree. Of course the audience does not need to know the process that created rootedness, they just need to infer correctly/be struck by existence of rootedness in the character. In the words of J. Lecoq:

“The main results of this identification work are the traces that remain inscribed in each actor, circuits laid down in the body, through which dramatic emotions also circulate, finding their pathway to expression” (Lecoq 2013, pg. 46)

3.4 Perceptual Ambiguities and the use of Masks

Masks are clearly a very direct and visceral example of Claid's 'ambigui-izing' the body as they transform, in a very immediate sense, the human into an ambiguous stimuli. Masks such as those used by Lecoq distort our normal or habitual representation of face and force a re-interpretation on the part of the observer. This arouses interest and curiosity in the viewer due to novelty and the violation of an expectation – after all faces do not normally look like this. More information, arriving only through the perception of movement, is needed to understand the character and its intentions. As I mentioned previously in chapter 2, Christopher Bode would argue that the stimuli (i.e. the mask) deviates from our original representation of the object (i.e. the face of the actor). In the case of masks however, and as I have discussed previously in this thesis, this

process is enhanced because the human brain is conditioned to detect faces and extrapolate emotional states from the minimum of expression (e.g. Fig 19). Therefore masks “leads to spectator engagement, as our visual processing systems work to complete the picture and make emotional and situational judgements” (Meineck 2011, pg. 134). Vovolis describes the mask with its “lack of definitive expression and its open face” as a space which contains “the necessary corporeal and mental conditions for the metamorphosis of the actor” (Vovolis et al. 2007, pg. 1).

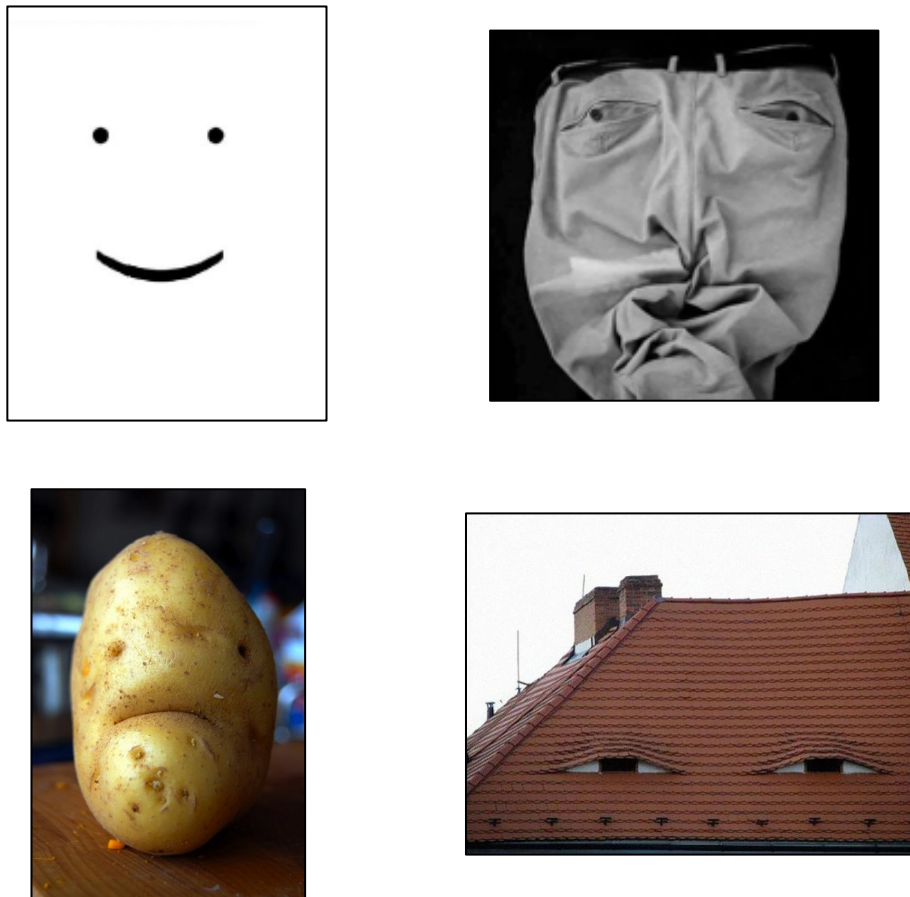


Fig 19: The minimum of information is enough not only for us to see a face, but even to propose a personality and/or emotional state

There are a large variety of masks which are used within the Lecoq pedagogy which can be considered ambiguous (in fact, all masks, from the Greek tragic masks to Noh masks from Japan can be considered in some sense ambiguous; nonetheless I will focus with the ones that I tend to build and work with). Two groups of mask which provide a lot of scope for different ranges of ambiguity are the larval and demi-expressive masks.

The Larval or Basel masks constitute white masks which completely cover the face and are therefore devoid of speech (Fig 20). Historically speaking, they originate from the rich carnival tradition of Switzerland and are an example of a mask form which Lecoq did not create himself but appropriated into his pedagogy. In the *Sculpting the Body; a theatre of physicality* documentary, I describe these masks as “plain white masks, which are speechless, and that suggest a face whose feature are not fully formed. The objective becomes to discover a congruent corporeal impression derived from the non-figurative shape” (my narration in documentary, minute 12). The first exploration with these masks is a physical search for a corresponding body shape that supports the shape and form of the mask.



Figure 20: Examples of Larval Masks used at the Evox Theatre School (Masks made by Pablo Fernandes)

Since the ambiguous nature of these masks make them suggestive of form, without being overtly descriptive, many different possibilities potentially exist in the body to 'hold the shape' of the mask. Furthermore in movement this defamiliar quality is enhanced. For example the small tilting of the head can

change the mask character's state profoundly; and depending on the context, while a certain tilt can be read as comic, another, with a subtle change in rhythm, can become tragic. In fact one could argue two different ambiguities are at play here – the first is the actor who decides what movement fits his or her interpretation of the mask, while the second is the spectator who seeing the performance must interpret the needs, desires and state of the mask. These can be, but are not always, the same.

As a final note on the larval masks and its potential for ambiguity, I consider the plain whiteness of these masks an important aspect of its novelty and ambiguity because I believe it mimics the uniqueness of the human eye – more specifically the large sclera. The large sclera in humans has been hypothesized to allow the position of the iris to be plainly visible and therefore allow the gaze of another individual to be easily perceived (Kobayashi et al. 1997; 2001, for more information see the 'cooperative eye hypothesis' (Bickam 2008)). This is in direct contrast to other animals whose eyes tend to be dark so that they cannot be seen by predators. In many respects the whiteness of the larval masks indirectly takes advantage of this phenomenon, presenting itself as one 'giant sclera' in which we intuitively search for social information in the same way we are accustomed to do so in our daily interactions. In this sense I return to Meineck's 2011 assertion: "the mask demands to be watched" (pg. 121).

Notes and Reflections; exploring the ambiguity of the mask (April 2016)

The first exercise I often introduce is to try to mimic the shape of the larval mask, its contours and depth, in the hand. Certain masks are more flat, more pointy, more round, more human-like, larger, smaller etc. When the form of the mask is achieved in the hand, the students are invited to move around the space as if the hand was the mask, turning and saccaading as it explores the world around it. Since the hand does not have eyes, the sensation of looking is forced to come from the movement of the wrist. Pivoting on the wrist introduces the need to later pivot with the neck.

The second exercise is similar, but now holding the mask to the side, and at the same height, of our faces. What are the different rhythms that exist when the mask turns? How does it move? Does it go in a straight line, or does it bob up and down a little? What is its prominent feature and how does this affect its movement? (e.g. if the primary feature is a large pointy-nose like protrusion, this might be the axis where it turns etc.). During this exercise we can start to introduce the body even though we have not yet actually ‘worn’ the mask – what is a round larval like shape, and how can we embody this? The pointy nose larval – does it know where its going? Does it hesitate less than the round one? What is the body that supports this?

Finally we can place the mask on for the first time. For those watching this tends to be quite a significant moment. One of the first things the observer notices is that the larval masks are not necessarily intelligent – it is tempting for the actor to enter into a comic space immediately. It is also useful to avoid this at the start and focus on capturing movement that seems ‘right’ for that particular mask and that particular actor. A little like how an animal suit can actually be unhelpful, at least initially, entering into the comedy of the mask without the movement to sustain it means that the image extinguishes relatively quickly. Students are eventually asked to choose a mask and then we enter into the transference process – or a variation of it: with our new body shapes and chosen mask, we will place the masks in particular human contexts, with human clothes, human desires, human stories etc. We ‘humanize’ the mask to a certain degree. I consider the humanization process as a return to a medium space of interpretation which exists within the inverted u-shaped curve of ambiguity.

“And through play and observation and exploration we discover what works and what doesn’t. Later we’ll add dramaturgical elements – the almost cartoon aspect of the larval masks allows us to create credible characters which escape the restrictions of realism” (my comment in the documentary, minute 12). An example of creating these ‘credible’ characters includes two plays I directed entitled “A Velhice” and “A Partida” (2015; end of semester work at

Evoe; videos included in Supplementary Information → Artistic Objects), with the actors Mafalda Carinha, Arianna Luci and Winter Lima in the former, and Filipa Duarte, Joao Rodrigues and Catarina Rocha in the latter. The plays are purely visual since the mask covers the face and therefore spoken language is impossible in these masks. This forces the actors to decentralise the text as the main strategy of communication, requiring an awareness and focus into the meaning which is created through their movement. Connected to this, the purely visual approach also requires an awareness of the social context on stage as the audience will use this as a strategy for interpretation.

Other masks, such as the expressive demi-masks (Fig 21), contain more information of the mask's emotional state (note the presence of eyes, mouth and generally more human-like qualities), however they remain clearly distorted when compared to what constitutes our 'normal' representation of face. A fundamental difference of these masks is that the mask does not cover the mouth and therefore allows for text to be spoken or improvised.







Figure 21: Examples of expressive demi-masks used in my classes; (masks made by Samuel Meyler, Pablo Fernandes and Marta Celerico)

Notes and Reflections from Expressive Masks: The ‘Counter mask’

Many of the exercises described with the larval masks can be applied to these demi-masks, but since these masks can also talk, a different set of potential improvisations emerge. To increase the novelty value which ambiguous stimuli normally has, and to make the masks contain more character depth, these expressive masks are regularly played with what is called the ‘counter mask’ in mind. For example, imagine an improvisation with a mask that naturally suggests grumpiness, due to its thick eyebrows, heavy forehead and downturned mouth, and whose grumpiness has been reinforced through movement (or, through a certain behaviour in a social context, for example refusing to participate in something other masks characters have invited him to participate in). Now imagine the ‘counter mask’ to this – a sudden sense of elation or ecstasy. Or falling in love etc. How does an extremely grumpy character admit and allow himself/herself to eventually fall in love? One simple example of an improvisation that can push in this direction is a improvisation around winning a lottery. Numbers are called out, and many masks hold little papers with numbers and are excited (and then disappointed) as their number is not called out. The mask that is naive, joyful, hopeful etc slowly becomes dejected as he or she does not win. We see his or her

countermask. Eventually, someone wins! But its the grumpy character. The one who never believed he or she would win. How does this individual become excited? How is this state played on stage? How far does this new state transform what we knew about this mask? This ambiguity has the potential to arouse a deep curiosity in the viewer, even though the expression of the face (i.e. the mask) has remained unchanged throughout. This defamiliar image in movement, which is suggestive of a semi-human character compels the viewer to determine its intentions, objectives, desires, wishes etc. The movement 'triggers' shared memories and associations in the audience, while simultaneously refusing to fully impose what form those shared memories and associations should take.

3.5 Defamiliarisation and the creative act

By now it should be evident that this process of defamiliarisation described above (e.g. identification and transference, or working with masks etc.) proposes new methods of moving while constraining others. This exploration is therefore extremely useful to generate new creative movements – as humans we often have movement patterns that are habitual (e.g. the way we walk, stand up or sit is often unconscious and computationally efficient; Hagendoorn 2003). While our personal movement schema might be fitting for one character, with a different character it might be unsuitable. Therefore as actors it is certainly useful to widen the range of our movement patterns – defamiliarisation can be considered a useful training tool to this end. Consider the use of larval and expressive masks described earlier, which constrain the space a character can occupy to varying degrees: “by donning the mask, the actor exploits the difference between herself and the mask, changing the way she moves in the mask, and therefore acting upon her own body schema, body image, and perceptual abilities” (Murphy 2013, pg. 57). Different masks constrain different spaces, forcing us into new modes of interacting with the world and creating new motor schemas in the process: “the paradox is that the particular constraints of each mask can provide a huge amount of freedom for the actor” (my narration in documentary, minute 12). Lecoq also describes the mask’s function as a filter,

“provoking the actor to make physical and spatial choices within a more limited range inspired by the mask’s shape and theatrical potential” (quoted from Murphy 2013, original reference Lecoq 2013, pg. 53). This phenomenon is not only limited to masks – for example moving like ‘spring’, ‘blue’, ‘cardboard’ or ‘chicken’ obviously constrains our normal movement patterns in quite different ways. The basic concept is not dissimilar to Arthur Koestler’s ‘theory of bisociation’, which explained new creations and the creative process as the combination of elements that don’t ordinarily belong together (*The Act of Creation*, Koestler 1964). The caveat of applying Koestler’s theory within the work of J. Lecoq is that these uncommon associations will always have one constant – i.e. the physical body.

This idea that our habitual mode of interacting with the world (either through thought or movement) can potentially reduce new creative solution spaces is conveyed in the term ‘functional fixedness’, which is described in the *Academic Press Dictionary of Science and Technology* as “the tendency in problem-solving to evaluate objects or devices only in terms of their conventional use rather than in terms of all potential uses” (Morris 1992, pg. 892). For example someone with high functional fixedness is generally less likely to use an object in an atypical manner.

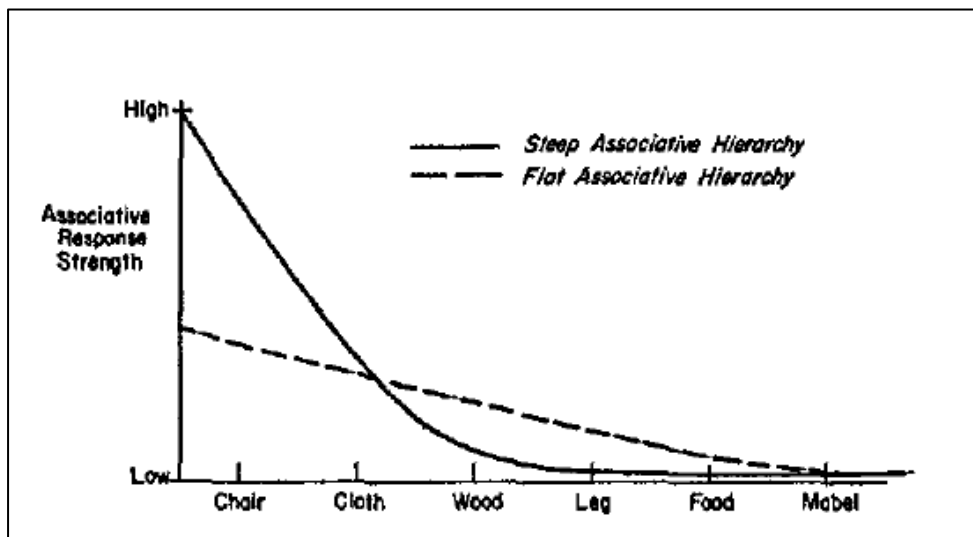


Figure 22: Associative hierarchies around the world “table”, reproduced from Mednick 1962

Mednick (1962) provides an example of functional fixedness relative to the number of associations a particular object can provide, e.g.

“if we present an individual with the word “table”, what sort of associative response does he make? The individual who tends to be restricted to the stereotyped response, such as “chair”, may be characterized as having an associate hierarchy with a steep slope ... we can also conceive of a second sort of individual whose associative hierarchy is characterised by a rather flat slope ... for him this response (chair) is not overly dominant and so it is more likely that he will be able to get to the less probable, more remote associations to table” (Mednick 1962, pg. 222-223, Figure 22).

Examples of experimental studies of functional fixedness include the candle problem (Duncker 1945) or the two string problem (Maier 1931) – for example in the candle problem, participants are asked to fix and light a candle in a way that the wax will not drip onto the table below. They are provided a candle, a book of matches and a box of thumbtacks. The solution requires using one of the objects in a manner that is not its primary utility – in this case emptying the box that holds the thumbtacks and using it to catch any dripping wax. Participants with high functional fixedness would only perceive the box as a device to hold

thumbtacks, not occurring to them that the box could actually be part of the solution.

Similarly, artists that wish to generate novel and original ideas will often need to overcome both functional fixedness and/or established modes of thinking. Many examples of self-imposed constraints exist throughout a large variety of artistic mediums e.g. George Perec wrote a detective novel without using the letter 'e' (*La Disparition* 1969), Keith Garret played with a broken piano that only had two chords to improvise with which forced him to step outside his normal improvising space (Köln Concert; <http://tamingwickedproblems.com/success-story-keith-jarrett-and-the-unplayable-piano/>; last consulted on 3 March 2018) performances such as Steve Paxton's *Transit* (1962) consisted of limited ballet movements repeated at different speeds and rhythms (see Hagendoorn 2003, pg. 222, for further discussion and a series of examples). In physical theatre, defamiliarising the physical body similarly constrains habitual movement patterns which allows for the creation of new motor schemas. Ambiguity therefore not only provides interest, curiosity and other 'pleasurable' states to the audience, but it also can be seen as part of the creative process to provide actors with new movement references (and constrain older more established ones), which is applied later to different theatrical creations.

The driving force behind finding these new movement schemas, that transforms technique into something beyond just an exercise, is play. Jacques Lecoq called this 'le jeu', and it was a strong, always present element throughout his school. As former student Alan Fairbairn describes, published in the book *Jacques Lecoq and the British theatre*:

"the whole notion of play is essential to Lecoq's school. The most important element of play ... always seemed to be connected with making the most of whatever material was available theatrically when you were on stage at any particular moment. I think play is about rendering the moment on stage into life – bringing it alive – exploiting the moment" (Murray 2002, pg. 33).

Other well-known former students of J. Lecoq, such as Philippe Gaulier, would later start their own school and promote this as the most sought-after ingredient for any improvisation. In October 2016 I studied a 4 week module of 'Le Jeu' with Philippe Gaulier in Paris – for 5 weeks we attempted to share our pure pleasure, found inside the smallest of actions, with our audience. Chapter 4 of my documentary, entitled 'The Pleasure', is inspired by a lot of that work e.g.:

"... the indispensable ingredient, the driving force, be it working with masks, or films, or indeed any theme..... has to be play. Without a certain playfulness and pleasure in our movement, technique is lifeless, it remains an uninhabited space... so even more important than moving like the perfect animal is the enjoyment of pretending to move like one... Theatre should always be a game...so on some level, independent of whether it is true or not, we should believe that we are the best and most beautiful human turtle that ever existed...we see this all the time in children – when they create their imaginative realities they very rarely question their technique – if they are an aeroplane, they are an aeroplane and that is it - you don't see them stop to consider if the angle of their wings are perfectly parallel...or if the nose is perpendicular to the tail and such forth. I guess what I am trying to say is that we must believe in the world we create and this belief is driven through play...play transforms us - it allows for spontaneity, it suspends disbelief, it is highly contagious, and finally it weakens the fear of failure..." (my narration in documentary, minute 22).

This overlaps well with what psychologists often term 'social pretend play' – for example research in psychology has identified three basic transformations of social pretend play (Leslie 1987): the substitution of one object for another (e.g. a pen for an aeroplane), the projection of an imaginary characteristic onto an object (e.g. a scared aeroplane), and finally the creation of a situation that does not exist (e.g. embodying the aeroplane in the living room and crashing onto the sofa). These transformations are obviously present in the pedagogy of Lecoq. In many ways theatre then becomes a sort of grownup game for adults, with play being the creative force from which naturally emerges defamiliarisation, in many respects the 'fuel for the engine'. In fact one could consider both traditional and

contemporary theatre as the most sophisticated theory of mind game ever invented by adults²⁵. After all, theatre could be considered as a sort of social pretend play for adults, albeit with more rules, an eventual audience and a much stronger emphasis on aesthetic value.

In the words of Goncu et al. 2005, pretend play is “a life span activity allowing us to develop representations of experiences with affective significances” (pg. 145). Physical theatre in many respects appropriates itself of this phenomenon and pushes these boundaries further by applying them to unusual representations, such as creating the mental state of a plastic bag that is being blown in the wind, or projecting mental states onto less ‘complex’ organisms such as a chicken or a lobster. Furthermore, this defamiliarisation must be a ‘meta-process’ in the sense that one must be aware of the pretend nature of the play. For example, while the actor might be interested in recreating the life cycle of an oak as accurately as possible in the human form, he or she does not leave the studio believing they have become an oak tree. In fact fully identifying with a tree, animal or colour is not only impossible and/or unnecessary, but also even unhealthy: “of course we do not mean total identification, which would be worrying, but rather playing at identification” (Lecoq 2013, pg. 43). Here again we see Lecoq’s preference of a psychological ‘distance’ between the actor and the character that is portrayed.

3.6 Defamiliarisation and the imitative act

This chapter has primarily described specific theatre exercises based on the pedagogy of Jacques Lecoq to exemplify how physical theatre can defamiliarise the body. Furthermore, it has explored how this process of defamiliarisation is a result of the human actor attempting to recreate and embody the external world surrounding her (e.g. elements, materials, animals, colours etc.). Fundamentally, this process involves the ‘matching’ of one object onto another e.g. when an actor

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Although theory of mind remains a somewhat elusive concept in neuroscience, it can be summarised as the ability to input mental states to oneself and others; in this case we can expand the word ‘others’ to include non-sentient objects.

chooses a tortoise and copies its walk this is an attempt to 'match' his or her movement to the movement of that animal. At the heart of this issue is what has been historically termed as the 'correspondence problem' by both psychologists and ethnologists (e.g. Byrne et al. 2003, Nehaniv et al. 2002); i.e. how does the observer perform actions which 'correspond' to those of the observed system?

In many respects Jacques Lecoq's processes of identification and transference can be considered a variation of the correspondence problem, albeit applied and constrained by an aesthetics of theatre. The applied social learning that occurs in physical theatre²⁶ is therefore one peculiar example of a larger problem that has captured the imagination of behavioural scientists for the last century - more specifically, how does an autonomous agent (e.g. a human) observe actions or states in the environment and match these with states or actions in one's own body? Normally this 'matching' of movement from one autonomous agent to another has typically been examined from an evolutionary perspective - more specifically, how social learning can impact and potentiate behaviour in adaptive ways (e.g. Reader et al. 2003, Call et al. 2002, Byrne et al. 2002). Since the work of Jacques Lecoq can be considered an (unusual) exemplar of the correspondence problem, it naturally incorporates some of these same 'solutions' identified by social learning research. As artists, it is these solutions and its manipulations which are ultimately what allows us to defamiliarise the human body.

For example, the most obvious solution of the correspondence problem which is used in the identification and transference process of Jacques Lecoq is imitation. The word imitation has inhabited a somewhat problematic space within the

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Learning because the students are embodying new movements (e.g. finding the state of a tortoise or discovering how a particular mask expresses itself); *social* because they are learning it in a group, receiving feedback and orientation; and finally *applied* because the objective of learning is modulated within the context of theatre and with the ultimate objective of performing these new movements in front of an audience.

biological domain²⁷ – while some researchers use the term broadly to denote the copying of a behaviour, usually linked to a body movement (e.g. Meltzoff et al. 1989, Nehaniv et al. 2002, Brass et al. 2005), others argue that ‘true’ imitation requires the copying of a motor movement which results in a novel behaviour (e.g. Thorpe 1963, Zentall 1996, Heyes 2001, Byrne et al. 2002). This latter position can be considered a more intricate or complex definition of imitation, which Byrne (2003) defines as “observational learning of a novel and complex skill, which cannot be explained by the priming of actions in an individual’s existing repertoire” (pg. 530)²⁸.

Another operational requirement of Byrne’s definition is that ‘true’ imitation consists of a behaviour that can be parsed – i.e. behaviour that is composed of several distinct subcomponents (Byrne 1995). This ensures that imitated

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As already mentioned in chapter 1 (e.g. footnote 7), the word has also been problematic within the humanities literature and its application within the context of *mimesis*.

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Interestingly, the phenomenon of imitation in the biological sciences has increasingly been seen as much more of a distribution than a category. This has meant that the boundaries of what constitutes imitation has become less discrete, and has resulted in imitation being sub-divided into a variety of forms and behaviours. For example, Byrne (et al. 1998; 2002) propose that imitation can be subdivided into program and action-level imitation, which tries to capture whether novelty in imitation comes from a new sequence of movements (i.e. the combination of existing movements) or the copying of a new ‘unitary’ movement which has never been performed by the observer before. In their behavioural parsing approach, they take the stance that most imitation is not really about adding discrete novel movements (action-level) but instead about adding new arrangements to an already broad repertoire (what they term as program-level imitation). From this approach, imitation in Jacques Lecoq’s work would generally fit into program-level imitation. Other approaches have subdivided imitation into production and contextual imitation (e.g. Bates et al. 2010), with production imitation the result of learning a new action, while contextual imitation involves a non-novel action applied in a different way or in a different environment. Arguments exist for the work of Jacques Lecoq to fit into both these categories.

movement is both complex and novel because it controls for Thorpes 'instinctive tendencies' (Thorpe 1963) – in other words although individual subcomponents of a movement can be interpreted as actions that already exist in the repertoire of the animal and which are primed through observation, it is the reproduction of these actions in the correct sequence which satisfies the definition of novel (Byrne 2003). Again the exercises described in Lecoq's pedagogy easily fit into this description as they are composed of several subcomponents which have to be re-arranged into an overall gestalt. In other words, not only is moving like a tortoise a novel action for most humans, it also requires isolating a series of elements e.g. the movement of the legs, the protruding tongue, the withdrawing into the shell etc., all of which need to be consolidated in a correct sequence to create the overall sense of tortoise in the spectator.

In summary, many of the identification processes of Jacques Lecoq can easily be considered examples of the more complex definitions of imitation because many of the resulting embodied references consist of novel motor movements and behaviours. Therefore perhaps one of the most common ways the correspondence problem is solved in Lecoq's pedagogy is by imitation, and furthermore the more intricate or complex form of imitation described above. It is therefore the act of imitation that allows us to defamiliarise the body.

However, it would be erroneous to define or explain all of the 'matching behaviours' described in the Lecoq pedagogy solely by imitation. Some exercises, especially those where the similarity between the actor and the embodied object becomes increasingly disparate, apply different solutions to the correspondence problem. In fact, as the similarity of form decreases, the ability to imitate becomes increasingly more difficult. For example, in the identification process one embodies colours, but how can one imitate a colour if a colour has no movement? As a wavelength of light, what form of correspondence are we attempting when we try to match our bodies to a colour? From a social learning perspective, it is difficult to say that we imitate the colour red or yellow. After all, what is the motor action we could say we are imitating? Here it becomes more appropriate to describe the matching behaviour with goal emulation, which

comprises a different social learning behaviour. The distinction between goal emulation and imitation involves how we arrive at our goal, more specifically whether we solve the correspondence problem through the copying of an act or through the copying of the consequences of an act. The difference lies in the fact that when the focus of matching is on the consequences of an act, the 'motor route' no longer remains confined to the same one as the observed agent. The observer in this case attempts to "reproduce the completed goal ... by whatever means it may devise" (Tomasello 1990, pg. 284). Or in the words of Call et al. 2002:

"emulation involves reproducing changes in the state of the environment that are a result of a demonstrator's behaviour, whereas imitation involves reproducing the actions that produced those changes in the environment. To illustrate, when a demonstrator cracks open a nut with a hammer, emulation would consist of reproducing the cracked-open nut independently of the actions used by the demonstrator, for instance, by biting into it to open it. In contrast, imitation would consist of copying the demonstrator's hammering actions to open the nut" (pg. 213)

Accordingly, some aspects of the identification process in the Jacques Lecoq pedagogy involve other classes of matching behaviour which do not necessarily constitute imitation because they focus on the end 'state' of a particular phenomenon, rather than the actions which generated that phenomenon in the first place. In the example of identification with colours, our matching behaviour is based on goal emulation because what we are interested in is capturing the state or result of the object as much as its movement. The same occurs when we try to embody a sunset or sunrise – as actors we are interested in the consequences of the act, e.g. the gradual change in light. This is the reference we can later use on stage, for example how the body being slowly drained or filled with light can represent a character falling in or out of love.

Generally, goal emulation is used when imitation is not possible, and this occurs when the physical dissimilarity between the observer and the observed becomes

so great that no space of actions exist which allow a 'motor mapping' – or as Nehaniv (et al. 1998) states:

“as the similarity between bodies and their manner of acting on the environment decreases, the problem of mapping becomes in general more and more difficult and finally degenerates into an impossibility” (pg. 3).

Goal emulation can then be thought of as a key mechanism in the process of defamiliarisation in physical theatre because it involves more abstract states, rather than the copying of a discernable and/or recognisable motor movement. This naturally tends to result in atypical movements which are open to interpretation by the observer.

Recapitulating, imitation and emulation can be considered as the primary mechanisms which allow us to 'ambi-guize' the body. Although we rarely achieve a 'full' match in Lecoq's work due to the physical limitations of our body, nonetheless our attempts to do so can create an engaging effect on stage. In fact in many cases it is the by-product of attempting a full match (and being forced to settle for a partial one) that creates the ambiguity and resulting inference space for the spectator. Defamiliarisation is then created in physical theatre because of, rather than in spite of, partial matching. In other words, our best attempts cannot achieve complete faithfulness to the image which we are trying to embody, and this 'failure' is the source of our ambiguity (this disfluency through partial matching overlaps well with Bullot's aesthetic model, described in chapter 1).

This is also why I portray the process of identification as akin to a process of isolation – for example, rather than fully identifying with an animal, the goal must be to isolate key features of the particular species without which it cannot exist. The actor's choice of what to match then becomes extremely important – what elements of the movement should be favoured, and which should be discarded? In my opinion Lecoq implicitly acknowledges this constraint when he

stated “of course we do not mean total identification, which would be worrying, but rather playing at identification” (Lecoq 2013, pg. 43).

This perspective reinforces an important aspect of art which has permeated throughout this thesis – that while from an evolutionary perspective copying adaptive behaviour will favour the highest possible match which exists on the continuum from ‘matching’ to ‘non-matching’, an aesthetics of art does not have this constraint – in fact it is the freedom from this constraint which might be one of the key features of art.

What about other solutions to the correspondence problem that might be used in ‘ambigui-izing’ the body with Lecoq’s exercises? I have not yet considered solutions to the correspondence problem that are driven by the priming of an existing repertoire (e.g. response facilitation) or ones that occur by increasing individual trial-and-error learning probability (e.g. social facilitation, local and stimuli enhancement). This is because imitation and emulation can generally be regarded as more ‘higher order’ learning mechanisms, more compatible with the intentional act of observation and eventual reproduction of new motor movements by a human student. However, the correspondence problem can be solved in a myriad of ways which have been well described in the literature and which include: imitation (e.g. Thorpe 1963); emulation (e.g. Tomasello 1990); goal emulation (e.g. Whiten et al. 1992); stimuli or local enhancement (e.g. Spence 1937); social facilitation (e.g. Galef 1988); and finally mimicry, including contagion (e.g. Thorpe 1963) and response facilitation (e.g. Byrne et al. 1998; 2002). A brief terminology of the various correspondence ‘solutions’ are included in textbox 3; for further discussion and description see Call (et al. 2002), Zentall (2001), Whiten (et al. 2002), Byrne (et al. 1998).

BOX 1: Behavioural Matching Mechanisms

Local enhancement:

an animal is attracted to a particular location due to a conspecific, and spends more time exploring in this location which increases chances of individual trial-and-error learning

Stimuli enhancement:

similar to above, but attraction is to an object (e.g. a lever, bar or other manipulandum)

Social Facilitation:

the presence of a conspecific increases arousal, exploratory behaviour and/or makes an area more interesting

Response Facilitation:

when a pre-existing response is seen in the movement of a conspecific, making it more available and therefore more probable that it will be used in the near-future. Contagion is an involuntary form of response facilitation (e.g. contagious yawning).

Mimicry

The actions of a demonstrator are copied without the understanding of the demonstrator's goals

Emulation (and Goal Emulation):

animal learns about the environment, or a particular output from that environment, because of the actions of an observer

Imitation

observational learning of a novel and complex skill, which cannot be explained by the priming of actions in an individual's existing repertoire (Byrne et al. 2002).

Textbox 3: Solutions to the correspondence problem

Do these matching behaviours exist within the pedagogy of Jacques Lecoq? They must be considered active components to some degree. For example, in the rehearsal studio practicing the movement of an element like fire or water amongst a large group of actors/students is potentially aided by social facilitation, since the presence of other conspecifics doing the same or similar actions should encourage more individual work/exploration/arousal. Indeed simply being in a space where other humans walk on all fours should prime similar movements that exist within a pre-existing repertoire; i.e. response facilitation. Furthermore many performances use local or stimuli enhancements on stage to direct audience's attention and gaze. In fact any scenography can be considered as some form of local and/or stimuli enhancement. One somewhat extreme example of this is Joao Fiadeiro's performance *O que fazer daqui para trás* (2015), which occurs with a completely empty stage minus one microphone (Pic 23). Performers run on and off stage, stopping at the microphone to speak. The microphone becomes a stimuli enhancement, and its placement on stage a local enhancement – after all when actors do appear and reappear, this is where they will pause to address the audience. For the audience the presence of the microphone is an object/location where we attend to – especially since for periods of the performance there is a complete absence of other stimuli on stage (including actors).



Figure 23: *O que fazer daqui para traz* (2015); creation by choreographer Joao Fiadeiro (notice the microphone as the only object on stage).

Returning to the work of Jacques Lecoq, stimuli enhancement often becomes very important with certain processes, for example when working with the larval masks. While these masks are often excellent in the classroom to practice and explore movement, I have often found through experience that they are overtly ambiguous and abstract to place into an actual play. Furthermore these masks cannot speak and the movements need to be large and simplified. In this case, stimuli and local enhancement become instrumental for humanizing the mask and bringing the ambiguity to a more median space of interpretation, in theory providing the ‘ambiguous sweet spot’ on the inverted u-shaped curve described in chapter 1 (if the aesthetic value in this case is driven by solvability). Stimuli enhancement contributes in giving the mask a social context e.g. strongly symbolic objects (e.g. suitcases, letters, a doll, workman’s clothes etc.) which reduces the ambiguity by providing clues and contextual information for the audience to interpret characters, motivations, possible actions etc., (Fig 24A/B). This encourages what Umberto Eco describes as a “field of relations” with

enough information for the work “to be completed” by the audience (Eco 1989; pg. 19). Figure 24B shows stills of different larval plays I directed in end of semester work at *Evoe* theatre school, mentioned earlier, and placed in supplementary videos attached to this dissertation (Supplementary video material → Artistic Objects → Larval Masks (A Partida/A Velhice)) .



Fig 24A: Example of larval masks without stimuli and/or contextual enhancements





Figure 24B: Examples of larval masks with stimuli and contextual enhancement

Nonetheless, even though these ‘simpler’ matching behaviours clearly contribute in some form to the social learning evident within the pedagogy of Jacques Lecoq, accurately isolating their relative contributions to both the aesthetic experience as well as the learning of new motor acts within the dynamic social complexity that is theatre remains a herculean task. While they clearly play a contributing role, even within the behaviours described above and attributed to imitation (i.e. learning by observation of novel and complex behaviour), determining the relative contributory weight of these simpler matching mechanisms may be practically unachievable with so many variables occurring at the same time (as well as within the context of a school where experimental manipulations would not always be in the students interest). This dilemma was the inspiration for one of the scientific experiments embedded within this thesis (supplementary material, experiment A). If the various contributions of different matching solutions cannot be isolated within the comparative ‘emergent chaos’ that is theatre, would it be possible within the controlled setting of the laboratory behavioural box? How would such an experiment even look like? The provocation was clear, stated by behaviourist Richard Byrne: “it is unlikely that it will ever prove possible to devise a demonstration of imitation uncontaminated by other social influences and ways of learning” (2002, pg. 78).

Therefore, inspired by a) the correspondence problem applied within the pedagogy of Jacques Lecoq; b) the difficulty in isolating these social learning mechanisms within the ephemeral nature of the theatrical stage; and finally c) the fact that an experimental protocol which can control for ‘simpler’ behavioural matching mechanisms in animals has not been firmly established²⁹,

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For example, many cases of social learning in animals such as rodents, which originally claimed or proposed imitation as the implemented solution to the correspondence problem, had to later be revised because other ‘simpler’ mechanisms were able to explain the same phenomenon (e.g. Heyes et al. 2000 or see Galef 1988, Byrne et al. 1995). Historically studies in animals that have attempted to show imitation have traditionally used the operation of a manipulandum e.g. bar, lever, joystick etc; rather than exclusively focusing on

we (collaboration with Dr. Marta Moita, Dr. Scott Rennie, João Frazão and Alexandra Silva at the Champalimaud Research Foundation) designed an experiment to elucidate whether imitation exists in the common laboratory rat and to what extent the contribution of other behavioural matching mechanisms (e.g. social facilitation, priming, local enhancement etc.) could be controlled for or eliminated (due to limitations of space, a description of the complete experiment is placed in the proceeding supplementary material; Experiment A: Social Learning and Imitation in the Rat). The integration of this scientific experiment which stems from a humanities dissertation reflects both my biological background as well as the fact that part of this thesis was written and integrated into the Champalimaud Neuroscience program, a basic research programme with the broad aim of understanding brain function and behaviour.

Historically studies in animals that have attempted to show imitation have traditionally used the operation of a manipulandum e.g. bar, lever, joystick etc.; rather than exclusively focusing on the movement of the agent themselves (e.g. the 'two action' test, Dawson 1965). In our experiment, we were interested in taking out any manipulandum, anticipating that this might solve many of the local enhancement and stimuli enhancement confounds that occurred in other experiments attempting to show imitation. Therefore, rodents were shaped through operant conditioning to do uncommon and complex motor movements in space and then the ability of observer rats to imitate these actions were examined. Whereas the experiment can be criticised as accentuating a somewhat anthropocentric perspective of behaviour (after all, the first-order question should really be do rats actually need to learn by imitation in the wild?³⁰ Laboratory rats such as Long Evans are primarily nocturnal and therefore presumably gain a lot of information from other sensory systems such as tactile

the movement of the agent themselves (e.g. the 'two action' test proposed by Dawson and Foss 1965, originally in budgerigars/ common pet parakeet)).

³⁰

I assume here the biological position of Nicholas Humphrey, e.g. "we do not expect to find that animals possess abilities which far exceed the calls that natural living makes upon them." (Humphrey 1976, pg. 303)

(i.e. whiskers) and odour), the origin of the experiment stemmed from a particular conceptual challenge: what would an experimental paradigm look like that could show imitation and simultaneously control for less 'complex' types of behavioural matching?

The intricacy (and difficulty) of the experimental question is laid bare with the results of our first experiment. In experiment A1, demonstrators were trained to do novel motor movements by rewarding them with water when the desired movement (i.e. a rear - standing on hind limbs and coming down again) was successfully performed. After a few weeks, once the demonstrator could reliably perform the movement repeatedly for a sustained period, observers were positioned adjacent to the demonstrator, separated by a clear, transparent, perforated acrylic frame. Once the demonstrator finished a pre-determined set of movements which the observer could monitor in the adjacent box, the observer was then placed in the demonstrator box with access to the reward under the same conditions (Figure 25). Simultaneously, and in a different experimental box, a control group observed an empty box for a similar amount of time and then were placed in the demonstrator side of the box and given access to the reward under the same conditions.

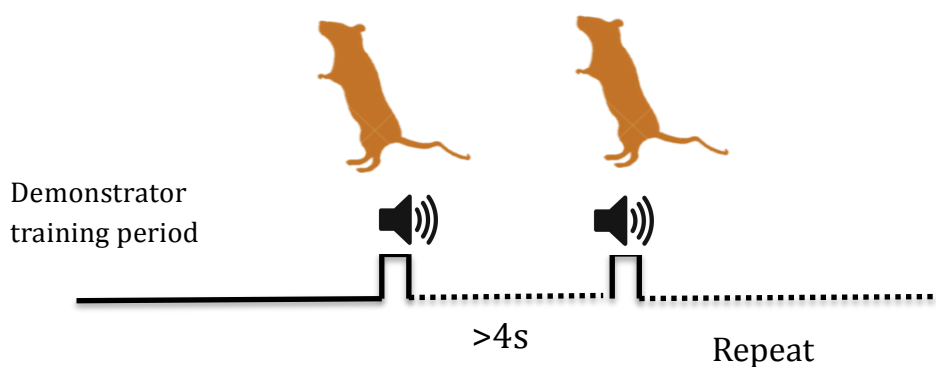




Figure 25: Demonstrator (yellow) and Observer (black) behavioural shaping

While both groups (observer and control) learnt the task, the observers learnt the task more quickly than controls (Figure 26). While it would be tempting to argue that these results are indicative of imitation, simpler learning mechanisms such as those described in textbox 3 can still potentially explain the data. Therefore, Occam's razor would suggest that we should prefer the 'simpler' mechanism or solution.

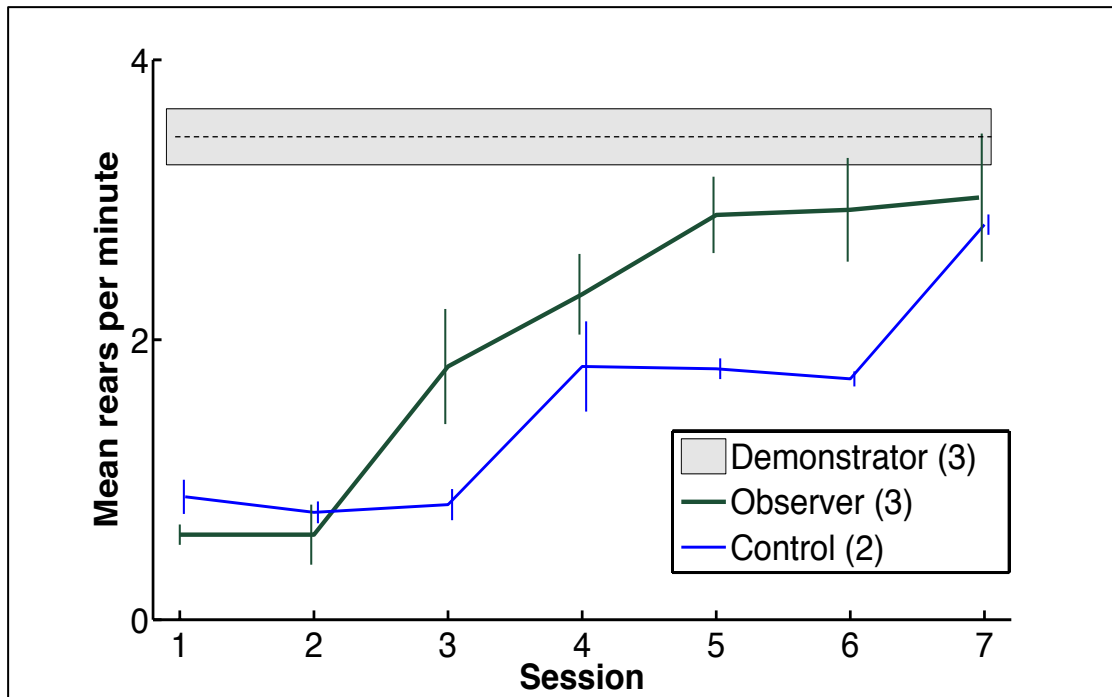


Figure 26: Observers learn to rear for reward faster than controls

In fact, there were various problems in claiming these results as proof of imitation. The first issue is that since the control group (which had no ‘demonstrator’ category to observe) also learnt the same behaviour, observational learning was not actually required to learn the motor act – it can be explained simply through exploratory trial-and-error behaviour on an individual level. Therefore the task could be ‘solved’ without needing to copy the motor act of a demonstrator. Secondly, a mechanism like social facilitation could explain why the observer group learnt faster than the control group. Simply the presence of another animal (i.e. the demonstrator) could have increased curiosity and arousal, meaning that the observer was more likely to rear. A third problem comes from the fact that even though we significantly increased the frequency of the chosen demonstrator movement (i.e. a single rear), nonetheless the movement also already exists within the existing repertoire of the observer. Therefore it is not necessarily a novel act, and without novelty, most behaviour can be explained by a simpler ‘priming and trial-and-error model’ (Byrne et al. 2002). Therefore in this case, observers might have learnt faster than controls

simply because they were primed with a motor act that was within their existing repertoire (i.e. response facilitation rather than imitation). As Byrne states:

“any experiment that uses changes in the relative frequencies of actions already present in the individual’s repertoire as evidence of imitation is potentially vulnerable to reinterpretation as response facilitation” (1998, pg. 670)

A final problem was that an operation requirement of Byrne’s definition of imitation is being able to parse the behaviour. The ‘novel’ movement that we trained our demonstrators to do was not necessarily composed of clearly distinct subcomponents, and therefore whether or not the movement can be defined as novel is questionable (at least in the sense of a new sequence of pre-existing movements as conceived in Byrne’s program-level imitation; although it must be noted that this really depends on what level movement is looked at – for example is the single rear one ‘movement’ or can it be described as a series of movements which involve pushing up of paws, lifting of head, lowering of head etc etc.). Nonetheless, we would attempt to address these problems in our second experiment with rodents. The crux of the results in the second experiment was that although we argue that we were able to train ‘demonstrator’ rats to produce novel, complex movement patterns through operant conditioning, not enough of the ‘observer’ animals were able to copy the movement of the demonstrator to show evidence that imitation in rats is possible. The experiment therefore did not provide any conclusion to the provocative question made by Byrne et al. 1995, “Do rats ape?”, nor refute his assertion, stated earlier, that creating a scientific experiment which shows imitation while controlling for other social influences is perhaps impossible (Byrne 2002, pg. 78). However I should mention of course that the null interpretation of this experiment does not mean that rats cannot imitate, simply that the conditions of our experiment were not sufficient to demonstrate imitation in the sense of copying a novel, complex, motor movement while controlling for other social learning mechanisms.

In many respects these results underscore the challenges of coming up with such an experimental design, and furthermore to what degree it is even possible to

fully disentangle which solutions to the correspondence problem an animal might be using when copying a new behaviour. In fact the physical existence of discrete categories of behavioural matching is itself questionable – it is more probable that copying a complex behaviour of a conspecific often involves the combination of a variety of such categories which overlap to differing degrees along a spectrum of increasing complexity. The continued subdivision in the literature of different forms of imitation reflects this, where the phenomenon of imitation is increasingly viewed as more of a distribution than a category. As Byrne argues: “behaviour that is entirely imitated cannot be expected anymore than can behaviour that results entirely from nature or entirely from nurture. Instead, it is more likely that several different mechanisms contribute to the development of any single behaviour. Even if one of these mechanisms is imitation, the acquisition process will also be influenced by genetic predisposition, other learning mechanisms, and other social influences” (Byrne 2002, pg. 78). Considering the difficulty to show imitation within the controlled setting of the laboratory, this further emphasises the unfeasibility of isolating or untangling to what level simpler solutions of the correspondence problem contribute within the theatrical domain.

In summary, the identification and transference processes of Jacques Lecoq can be seen to represent an unusual exemplar of the correspondence problem in social learning, and while it is tempting to link the notion of correspondence to simply a phenomenon of imitation, from a biological perspective there exists a number of other strategies which can potentially explain behavioural matching. As a case in point, some of the matching which occurs in physical theatre between human actors and the phenomena which they embody could be better described as goal emulation rather than imitation because they focus on the consequences of the motor act rather than the motor act itself. Furthermore other solutions to the correspondence problem, such as social facilitation or local enhancement, are contributing components within the aesthetics of theatre but whose relative contributions remain difficult to unravel. Inspired by this difficulty, we designed an experimental protocol in the laboratory using the common rat to attempt to disentangle whether imitation could be shown while

simultaneously controlling for other simpler learning mechanisms. Evidence that imitation in rats is possible was not found.

CONCLUSION

One of the central aims of this dissertation was to explore and apply Jacques Lecoq based exercises within the framework of perceptual ambiguity. I take the position that median and high spaces of ambiguity in art are positively engaging because they challenge us to apply one of the fundamental objectives of cognition – interpreting and understanding our reality – to ‘safe’ stimuli which nonetheless is often unusual, disfluent, unconventional etc. Art forms which apply the human body on stage are governed by a similar desire to instil meaning, however from a cognitive perspective they are further influenced by the fact that a) humans occupy an extremely salient position within our perceptual system and b) the spectrum of human social affordances is relatively large, which in turn increases the potential inference space at the disposal of the observer. Furthermore a general requirement of an embodied art form is the presence of the physical body – this naturally constrains the level of perceptual ambiguity within the embodied domain because the semantic recognition of human cannot be entirely eliminated for the concept of theatre to survive. This means that the perceptual ambiguity that will be favoured in embodied performance will generally be defamiliarisation, rather than indeterminacy, as this preserves the presence of the corporeal form. Theatre masks are an example of this phenomenon – they distort our normal representation of face, increase disfluency, take advantage of our ability to infer states from a minimum of human expression and yet simultaneously maintain the presence of the physical body on stage.

It should be noted that a wide range of modern theatre forms are potentially suitable candidates for the perceptual ‘ambi-guizing’ that is described in this thesis, which in my opinion reflects the paradigmatic shift of recent decades to favour a more embodied approach to performance. Arguably theatre has been slow to reject a Cartesian duality with respect to acting and the notion that meaning is expressed through language alone has only really begun to be challenged within mainstream practices in the last few decades (e.g. Lehmann’s

'post dramatic' era). Therefore while cognitive ambiguities within the dramatic text are omnipresent throughout the history of theatre (e.g. the work of Oscar Wilde or Samuel Beckett etc.), perceptual ambiguities have increasingly emerged as a result of this shift to a more embodied epistemology within theatrical performance.

In many respects, the work of Jacques Lecoq can therefore be considered as simply one of many contemporary theatre forms to favour a more embodied theatre and which makes it an appropriate model for exploring the aesthetics of perceptual ambiguity. Of course the perils of focusing on such a contemporary teacher is to forget Brecht, Artuad, Meyerhold, Decroux or Grotowski, among others. While Brecht believed that epic theatre needed to reactivate stage-audience exchanges (Bennet 1988), Grotowski placed the corporeal form as the principal method of expression, and rejected a naturalistic approach as it obscured a more profound level of 'truth' (Mosochochoriti 2009). Etienne Decroux was also another pioneer whose school was a 'major artery' of the physical theatre domain – statements such as “for art to be, the idea of one thing must be given by another thing. Hence this paradox; an art is only complete if it is partial” (Decroux 1977, pg. 30) overlaps well with the medium levels of ambiguity and the inverted u-shaped curve as described in chapter 1. Even the work of Jacques Copeau, whose teachings are at the source of both Lecoq's and Decroux's work could also be a very suitable candidate for defamiliarisation. Further research would include applying this phenomenon more widely to the plethora of different theatre lineages that have emerged throughout the 21st century.

From a biological perspective, I view the process of 'ambiguizing' in the pedagogy of Jacques Lecoq as the result of an imitative or emulative operation which stems from the human actor attempting to recreate, through the body, the external world that surrounds them. These attempts are ultimately fragmentary for two primary reasons. The first is that, as I have argued throughout this dissertation, one aspect of art is to search for partial matchings that can create ambiguity and which free ourselves from the experience of everyday perception.

As artists we are therefore amiable to such stimuli. The second reason is that as the action possibilities or affordances we wish to copy become increasingly disparate relative to our own corporeal form, we are forced to settle for partial matching. Ambiguity is then created because despite our best attempts we will never achieve complete faithfulness to the image which we are trying to embody. Consequently, although we will never be able to solve the correspondence problem in Jacques Lecoq's work because of our physical limitations, we can create an engaging effect on stage through our attempts to do so. Defamiliarisation and disfluency is then created in physical theatre because our objective does not need to be a full 'match' – in fact it is the by-product of initially attempting a full match (and often being forced or encouraged to settle for a partial one) that creates the ambiguity and resulting inference space for the spectator. This contains a huge potential for artistic creation.

This is one of the reasons why throughout the thesis I talk about the creation of artistic references – we embody references of the external world through imitation/emulation that has the potential to create novel social settings and perceptually defamiliar human bodies which are potentially interesting on stage. The solution space we search for in theatre is then governed by aesthetic concerns that becomes far more extensive than simply successful matching. In many respects accurate attempts at behavioural matching then becomes part of the process, and not necessarily the product, of the work of J. Lecoq.

As a final note, applying modern biological perspectives of imitation to artistic practices reveals some interesting parallels to the concept of *mimesis*, a philosophical term which is often translated as imitation within art theory. In fact many of the ideas explored throughout this dissertation deal with the relationship between an image and its real counterpart – this is an ageless discussion throughout the history of art and that is perhaps best captured within the context of *mimesis*. However, throughout the last century mimetic artworks have often been constrained to artistic forms which attempt direct realism, or what would be construed within the vocabulary of this thesis as a 'full' matching. This has led certain art historians to accuse art theory of trying to 'escape

mimesis' (Potolsky 2006), by confining or reducing mimetic art to how well it has succeeded in reproducing reality. Contemporary views on imitation in the biological sciences have only just begun to let go of a similar entanglement, abandoning the 'all or nothing' classification that traditionally dominated the debate within the scientific literature (Waal 1998). Comparing mimesis with imitation as perceived in modern biology therefore reminds us of its more expansive interpretation, somewhat ironically bringing it more in line with its original Platonian/Aristotelian conception.

This is because modern descriptions of imitation in the biological sciences have increasingly regarded imitation as a distribution rather than a category. In fact, in a biological sense, imitation in social learning behaviour rarely results in a 'full' or identical match; e.g.:

“exact coping, even with similar embodiment, is almost never possible: one never has exactly the same agents with exactly the same kinds of bodies in exactly the same setting when the behaviour of one agent is said to match that of another, as they must differ at least in their situatedness in time and/or space, not to mention other innumerable details” (Nehaniv et al. 2002, pg. 1).

Byrne's definition of 'program-level' imitation captures some of the complexity of this issue because it is a form of hierarchical imitation where although structural organisation of an imitated movement is copied, the minor details are not. For example, Byrne identified a series of sequences that adult mountain gorillas (*Gorilla beringei*) use to eat nettles – while there are obligatory states and sequences that the animal must pass through (e.g. folding the nettle inward to minimize the powerful stinging hairs on the leaf), the details of how this sub-goal is reached is variable and may even be acquired by individual learning (Byrne et al. 1998; 2003). What is imitated therefore is the overall goal, but not necessarily the motor actions that allowed the ape to arrive at particular sub-goals (Byrne goes on to argue that this type of imitation is actually the most common contributor to learning both in humans and other non-human primates.

Although part of another discussion, in some respects this can be seen as a form of ‘emulation of sub-goals’ rather than ‘imitation of an overall goal’).

The point is that imitation or emulation within the biological sciences literature is no longer constrained to examples where full matching is attained, and this has been a slow development within biology over the better part of the last century. In a similar fashion, mimesis in art does not need to be bound to examples of direct realism. In fact its original concept was much more extensive – for example Aristotle argued that imitation in art (i.e. mimesis) included things ‘as they ought to be’ as well as the ‘portrayal of a possible reality’ (Halliwell 1987, pg. X). Halliwell captures some of this sentiment when he states that his preferred translation of mimesis is representation, suggesting that mimesis concerns “images, representations, simulations or enactments of human life, rather than with direct claims or arguments about reality” (Halliwell 1987; pg. 72). Potolsky makes a similar argument when he points out that mimesis “needs not to be true to fact to be pleasurable and persuasive. It needs only to be true to the principles and normal processes of human cognition” (2006, pg. 41). These more nuanced interpretations more accurately capture how mimesis and disfluency (e.g. partial matching) can co-inhabit the same space. From this perspective, partial matching can be viewed as a mimetic construct, rather than its exception. J. Lecoq’s pedagogy simply becomes another manifestation of this phenomenon, with specific characteristics that are a result of its human embodiment and to a lesser degree, the more recent cultural shifts of theatre in the last few decades.

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SUPPLEMENTARY INFORMATION

General Introduction to the Scientific Experiments

The aim of the following supplementary section is to incorporate two different scientific experiments I designed and implemented which directly stem from questions and reflections that emerged in the creation and preparation of this thesis. Limitations of space, as well as the fact that this doctoral dissertation is inserted into a humanities program, meant that I have placed this section as supplementary material rather than forming a fourth chapter. The inclusion of scientific experiments reflects the fact that part of this thesis is integrated into the Champalimaud Neuroscience Program, a basic research programme with the broad aim of understanding brain and behaviour through integrative biological approaches.

Experiment A was inspired by the different behavioural matching mechanisms which are used in the pedagogy of Jacques Lecoq. While imitation and emulation are clearly used for the partial matching which results in 'ambigui-izing' the body, simpler matching behaviours must also contribute in some form to the social learning evident within the pedagogy of Jacques Lecoq. If the various contributions of different matching solutions cannot be isolated within the comparative 'emergent chaos' that is theatre, would it be possible within the

controlled setting of the laboratory? Therefore inspired by how Lecoq's pedagogy creates references for the dramatic context by embodying complex (and often unusual) movements, the act of which involves the careful observation of conspecifics, rodents were introduced as an experimental model to explore how this phenomenon is ultimately representative of a more general adaptive behaviour. The aim of Experiment A was to elucidate whether imitation exists in the common laboratory rat and to what extent the contribution of other behavioural matching mechanisms (e.g. social facilitation, priming, local enhancement etc.) could be controlled for or eliminated. Rodents were shaped to do novel and complex motor movements and the ability of observers to imitate these actions were analysed. While demonstrator rats could be trained to produce novel, complex movement patterns through operant conditioning, not enough observer animals reliably copied the movement of the demonstrators to show evidence of imitation.

Experiment 2 is linked to the human perceptual system, and involves physical theatre students observing perceptually ambiguous images of human movement. More specifically, the experiment involved testing if an intense period of physical theatre training could improve performance in the identification of ambiguous biological (human) motion. The hypothesis was that if physical theatre students do indeed spend much of their time 'ambigu-izing' the human body (as I have described in chapter 2), this would reflect in superior performance in the identification of ambiguous human movement. To investigate this possibility, two groups of students were given a two-interval forced choice task that examined performance on scrambled and distorted human walkers. Data points were taken before they began their studies, and 3 months into their course. Performance is compared to a control group of students of a similar age and over the same period of time and which were not involved in any form of embodied movement (e.g. dance, theatre etc.) A third experimental group, of experienced and professional physical theatre teachers, was also conducted at a later time point. The hypothesis that an actor's training would improve the identification of ambiguous human walkers was not observed – although a trend of increased

performance was found, the trend was similar in magnitude across groups and therefore is interpreted as a likely learning effect.

Experiment A: Social learning and Imitation in the Rat³¹

Introduction

As described in chapter 3, the work of Jacques Lecoq can be seen as an unusual exemplar of the correspondence problem – i.e. how does the observer perform actions which ‘correspond’ to those of the observed system? Or as Mohammad describes: “how can actions and motions of the demonstrator be mapped to the learner’s body and frame of reference?” (Mohammad et al 2016, pg. 25). For example choosing a turtle and copying its walk is an attempt by the actor to match his or her movement to the movement of the turtle. Normally this ‘matching’ of movement from one autonomous agent to another has typically been examined from an evolutionary perspective – more specifically, how social learning can impact and potentiate behaviour in adaptive ways (e.g. Reader et al. 2003, Call et al. 2002, Byrne et al. 2002). Research into social learning has elucidated a variety of ‘solutions’ to the correspondence problem – as I described in chapter 3, different theatre exercises arguably require or employ different solutions to this problem (i.e. imitation and emulation).

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Collaboration: Samuel Viana Meyler (SVM), Alexandra Silva (AS), Dr. Scott Rennie (SR), João Frazão (JF) and Dr. Marta Moita (MM). SVM, SR and MM designed the studies. SVM built the behavioural boxes. JF automated, using bonsai, the task design. SVM and AS ran the studies. SVM analysed the data and wrote this chapter/manuscript. Posters from symposiums and conferences (2015;2017) included on google drive.

Furthermore, although simpler 'matching' behaviours clearly play a contributing role within the pedagogy of Jacques Lecoq, determining the relative weight of these simpler matching mechanisms is difficult to disentangle and control for within the emergent experience of theatre. This was the inspiration for the following scientific experiment – if the various contributions of different matching solutions could not be isolated within a human theatrical setting, would it be possible within the controlled setting of the animal behavioural box in the laboratory?

Therefore, inspired by a) the correspondence problem applied within the pedagogy of Jacques Lecoq; b) the difficulty to isolate these social learning mechanisms within the ephemeral nature of the theatrical stage; and finally c) the fact that an experimental protocol which can control for 'simpler' behavioural matching mechanisms in animals has not been firmly established, we designed an experiment to attempt to elucidate whether imitation exists in the common laboratory rat and to what extent the contribution of other behavioural matching mechanisms (e.g. social facilitation, priming, local enhancement etc., description in textbox 1) could be controlled for and/or eliminated.

In fact many cases of social learning in animals which originally claimed or proposed imitation as the implemented solution to the correspondence problem had to later be revised because other 'simpler' mechanisms were able to explain the same phenomenon (e.g. Heyes et al. 2000 or see Galef 1988, Byrne et al. 1995). In fact many of the solutions to the correspondence problem actually precede imitation. For example, behavioural matching in animals can potentially occur from a variety of mechanisms which have been described in the literature, which besides imitation (e.g. Thorpe 1956), can include stimuli or local enhancement (e.g. Spence 1937), social facilitation (e.g. Galef 1988), observational learning (Call et al. 2002), emulation (e.g. Tomasello 1990), goal emulation (e.g. Whiten et al. 1992), mimicry, including contagion (e.g. Thorpe 1956) and response facilitation (e.g. Byrne et al. 2002). Many of these behavioural matching mechanisms narrow the behavioural exploration of an

individual in different ways, which in turn increases the likelihood of discovering and/or achieving a particular goal simply by individual trial-and-error learning. A brief terminology of the various correspondence 'solutions' are included in the textbox below; for further discussion and description see Call (et al. 2002), Zentall (2001), Whiten (et al. 1992), Byrne (et al. 2002).

Behavioural Matching Mechanisms

Local enhancement:

an animal is attracted to a particular location due to a conspecific, and spends more time exploring in this location which increases chances of individual trial-and-error learning

Stimuli enhancement:

similar to above, but attraction is to an object (e.g. a lever, bar or other manipulandum)

Social Facilitation:

the presence of a conspecific increases arousal, exploratory behaviour and/or makes an area more interesting

Response Facilitation:

when a pre-existing response is seen in the movement of a conspecific, making it more available and therefore more probable that it will be used in the near-future. Contagion is an involuntary form of response facilitation (e.g. contagious yawning).

Mimicry

The actions of a demonstrator are copied without the understanding of the demonstrators goals

Emulation (and Goal Emulation):

animal learns about the environment, or a particular output from that environment, because of the actions of an observer

Imitation

observational learning of a novel and complex skill, which cannot be explained by the priming of actions in an individual's existing repertoire (Byrne et al. 2002).

Textbox 4: Solutions to the correspondence problem

Studies in rodents that have explored observational learning have generally used the operation of a manipulandum (e.g. bar, lever, joystick etc.) rather than exclusively focusing on the movement of the agent themselves³². This has been true since early research exploring the capacity of animals to imitate (i.e. Thorndike 1898). Thorndike's experimental set-up basically involved two categories, a group exposed to a particular behaviour and a group not exposed to a particular behaviour. For example observer animals would watch a demonstrator operate a manipulandum and this was compared with a naive demonstrator or empty box. The ability to learn faster in the presence of a demonstrator was then taken as evidence of imitation. Ethnologists would later point out that simple mechanisms, such as social facilitation or local enhancement, could potentially explain the same results (e.g. Thorpe 1956)³³.

Another method, called the 'two-action test' and originally proposed by Dawson et al. 1965, involves demonstrators operating a manipulandum which contains two alternative actions. Two groups of observers watch trained demonstrators operate the manipulandum in only one of its potential actions. Therefore both groups of observers witness the same problem being solved by a conspecific but in different ways. The probability of an animal performing the action compared with the frequency of each group in using the same action as the demonstrator is taken as evidence of imitation (Whiten et al. 1992). For example, Heyes (et al. 1990) placed rodents in a behavioural box which involved moving a bi-directional joystick in different directions (Figure 27). Observers which had watched demonstrators push to the left for reinforcement significantly pushed themselves to the left when the joystick was available, while simultaneously the

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A recent paper by Takano (et al. 2014) replaced manipulandums with food pellets, however this still maintains focus on the manipulation of object rather than the movement of the individual.

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Nonetheless, Thorndike's original set-up has been used in different ways, for example to compare social learning with behavioural shaping (e.g. Jacoby et al. 1969)

number of instances that an observer who had watched a demonstrator push to the left but then pushed to the right when the joystick was available remained low.

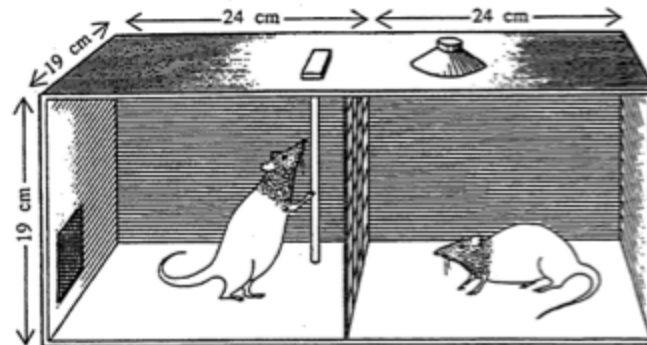


Figure 27: Diagram of apparatus used in Heyes 1990, showing demonstrator and observer position

While the two-action test seems to control for local enhancement as described above, an unresolved critique was that it could not discriminate between response-reinforcer relationship and stimuli-reinforcer relationship (Whiten et al. 1992). For example, rodents could be simply learning that lever to left gives reward, which then generates behaviour in the observer which increases this probability. In this case the rat has learnt something about the reward as a function of lever and not necessarily about the motor plan of the demonstrator. An experiment by Denny (et al. 1983;1988) raised questions about the 'social' aspect of this experiment by showing that similar results could be found by observing an automatic joystick which moved to the left or right.

Another critique of the two-action test, linked to this problem of motor action, is that Heyes (et al. 1990) did not actually record and compare the movement of demonstrator and observer (e.g. was the joystick moved with the paws, nose or body?). Arguably they therefore were looking at if the result was copied and not the behaviour (Byrne et al. 1995). This means that an interpretation of the

experiment is that rats can use goal emulation to discover certain behaviours, rather than imitation, a position that Byrne (et al. 1995) points out in an article entitled '*Do Rats Ape?*'.

We hoped to circumvent some of these constraints by focusing our experiment on the movement of an agent rather than using a manipulandum which required an operation. The aim was to create a behavioural paradigm that could explore social learning in an animal model (i.e. the Long-Evans rodent strain) by focusing entirely on the motor movement of the individual and which could be orchestrated from anywhere inside the experimental box. Unlike previous experiments, the motor movements would be completely independent of any operation of objects (e.g. manipulandums – Zentall et al. 1972, Heyes et al. 1990;2000 or food – Takano et al. 2014). The origin of the experiment stemmed from a particular conceptual challenge: what would an experimental paradigm look like that could show imitation and simultaneously control for less 'complex' types of behavioural matching?

In many respects our experimental set-up is more similar to the exposed/non-exposed method of Thorndike, albeit with some key differences – without the manipulandum, local enhancement is (theoretically) ruled out because location becomes independent of learning/reward (i.e. spending more time in a particular location does not necessarily increase chances of getting reward). Furthermore, stimuli enhancement should also be controlled for because without the manipulandum, the only stimuli that exists is the motor movement of the conspecific.

Experiment 1;

Materials and Methods

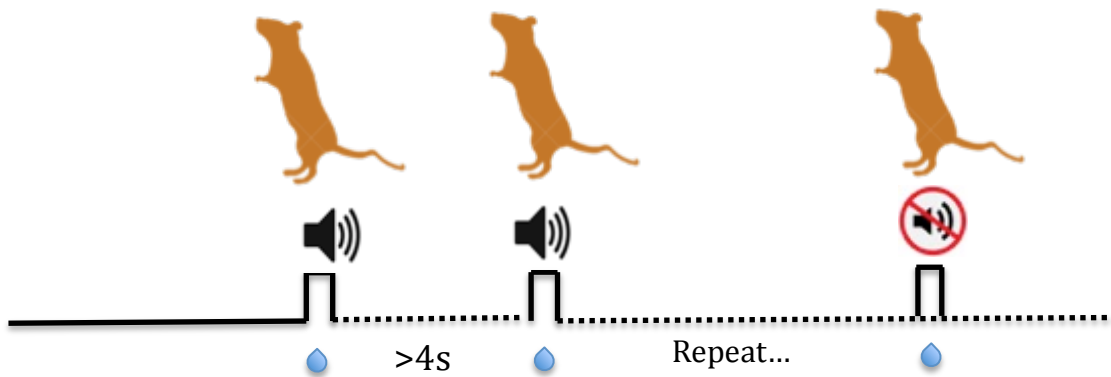
The movement selected to be matched was a 'rear', which consisted of a pre-existing movement that occurs in relatively low frequencies. Behavioural shaping was done through operant conditioning (Skinner 1953). Demonstrator

training phase involved water-deprived rats (24 hours of 2x5 minute drinking bouts) into an experimental box where whenever a part of the body was raised over a pre-defined height, a tone and water reward became available for 4 seconds in a water poke at the centre of box (Figure 28). An automated system was created using Bonsai.³⁴ Due to the available motor affordance space of rodents, the way to receive a reward was through rearing. We shaped animals so that they could reliably undertake 55 rears with the minimum of pauses or breaks and eventually without a reinforcing tone.

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Bonsai is an open source visual programming framework for processing data, more information at Lopes et al. 2015.

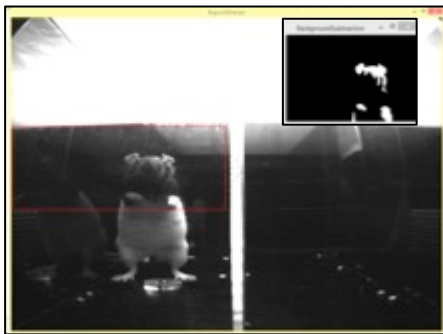
DEMONSTRATOR TRAINING



REAR DETECTION

Rear

Region of interest is intersected



Reward

Poke to get water reward

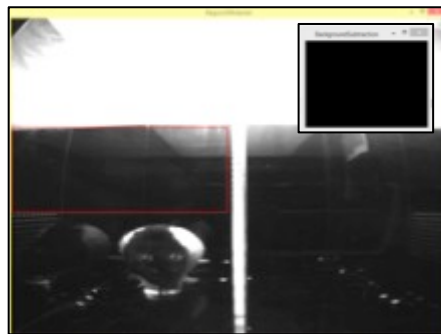


Figure 28: Demonstrator behavioural shaping

Once demonstrators (n=3) were trained, water-deprived (24 hours of 2x5 minute drinking bouts) observers (n=3) were positioned adjacent to the

demonstrator while the latter repeatedly performed rears. The two animals were separated by a clear, see-through, perforated (i.e. 'smell-through') acrylic frame. Once the demonstrator had reached 55 rears, the observer was then placed on the demonstrator side with access to reward under the same conditions (Figure 29). Simultaneously and in a different experimental box, a control group observed an empty box for a similar amount of time and then was placed on the "demonstrator side" and given access to reward under the same conditions as the demonstrator in the other condition.

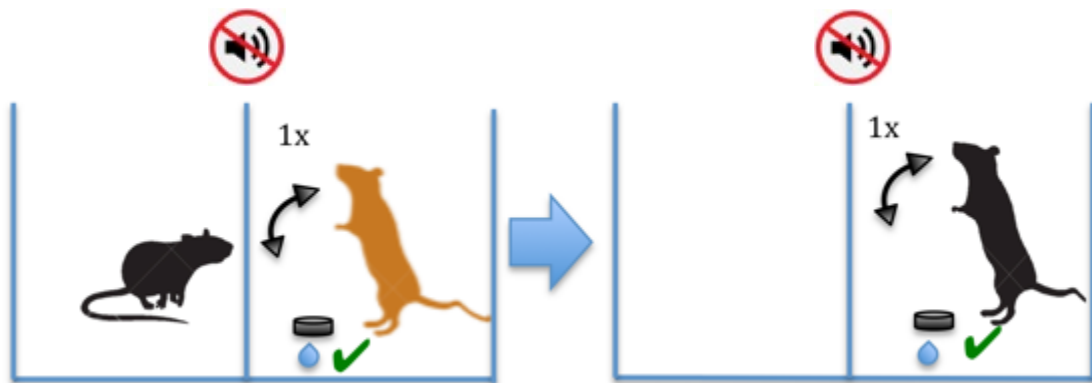


Figure 29: Experimental conditions; experiment 1. Observer (black) watching demonstrator (orange) and then placed in demonstrator box with access to same reward condition. Controls watched an empty box.

Results and Discussion

Shaping behaviour of demonstrators took 8 sessions to stabilise (55 rears were completed on average within 15-20 minutes). Both observers and controls both learnt the task, although observers learnt the task more quickly than controls (Figure 30). This reproduces similar results found in rodents using manipulanda (e.g. Zentall et al. 1972).

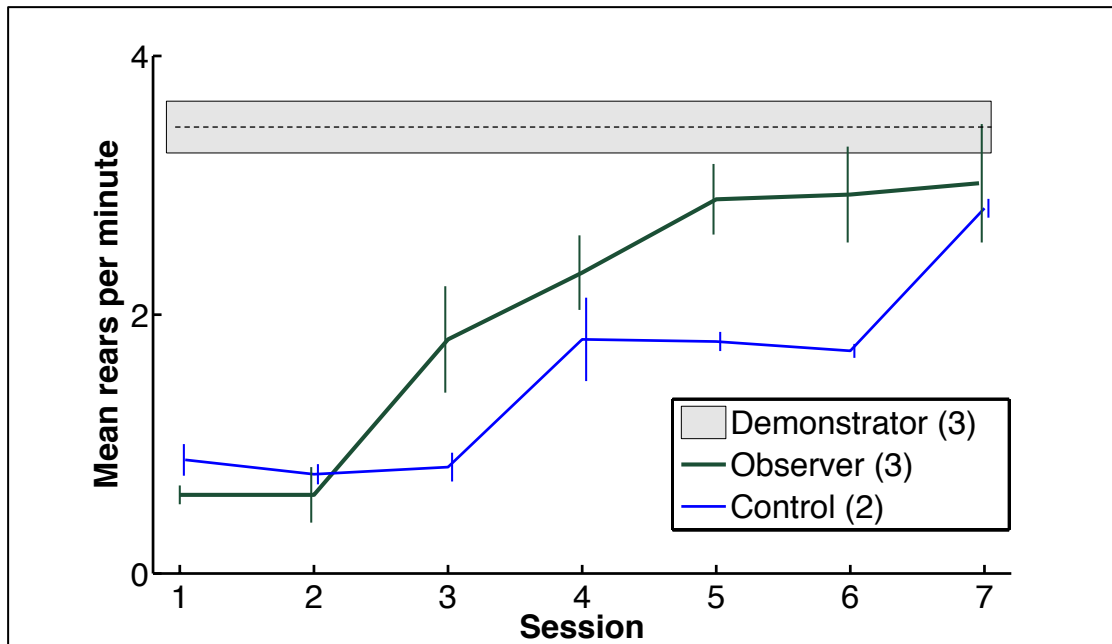


Figure 30: Observers learn to rear for reward faster than controls

These results were inconclusive of imitation for various reasons. Firstly, since the control group also learnt the same behaviour, observational learning was not actually required to learn the motor act – it can be explained more simply through individual trial-and-error behaviour. Therefore the experiment can be solved without any need to copy the motor act of the other. Secondly, a mechanism like social facilitation can explain the results – simply the presence of another animal could have increased curiosity and arousal, resulting in increased rears (a behaviour itself that reflects increased curiosity and arousal). A third problem is around the concept of novelty – the movement we chose already existed within the repertoire of the observer. Therefore observers might have learnt faster than controls simply because they were primed with a particular motor act that they could execute (i.e. response facilitation rather than imitation). As Byrne 1998 states:

“any experiment that uses changes in the relative frequencies of actions already present in the individual’s repertoire as evidence of imitation is potentially vulnerable to reinterpretation as response facilitation” (pg. 670)

To address these issues, a second experiment attempted to increase the complexity of the copied motor movement. The rationale for this was the following – firstly, the added complexity of the movement would lower the chances that a control group could replicate it through trial and error. Secondly, we wished to address the issue of novelty by shaping a movement that did not exist within the normal repertoire of the rat. Besides new action movements, novelty also exists in the arrangement of known movements (in fact since any movement action at the most basic level exists within the repertoire of an observer, it is often the creation of a sequence of basic elements which is difficult to copy and can constitute novelty; Byrne 2003). Therefore we shaped rodents to do a ‘head-bobbing’ movement, which we considered a novel movement since it is rarely observed within the normal repertoire of the rat, and furthermore it creates a new arrangement or sequence of basic elements or actions (two rears in quick succession).

Experiment 2;

Materials and Methods

Demonstrators were shaped with a similar system as experiment 1, with the adaptation that the region of interest (ROI) had to be intersected twice before water reward became available. A successful trial was defined as rat raising part of her body into the ROI, lowering it outside of this area, then entering it again and finally placing snout into water poke and drinking available water (Figure 31). During shaping, the interval between rears was progressively lowered as performance improved. Two different tones were used for each rear and a light was turned on when a water reward was potentially available. It was hoped this would reduce complexity of task and aid learning. After each second tone (which signalled water reward was available), a ‘time-out’ interval of 4 seconds occurred where rearing would not provide a tone.

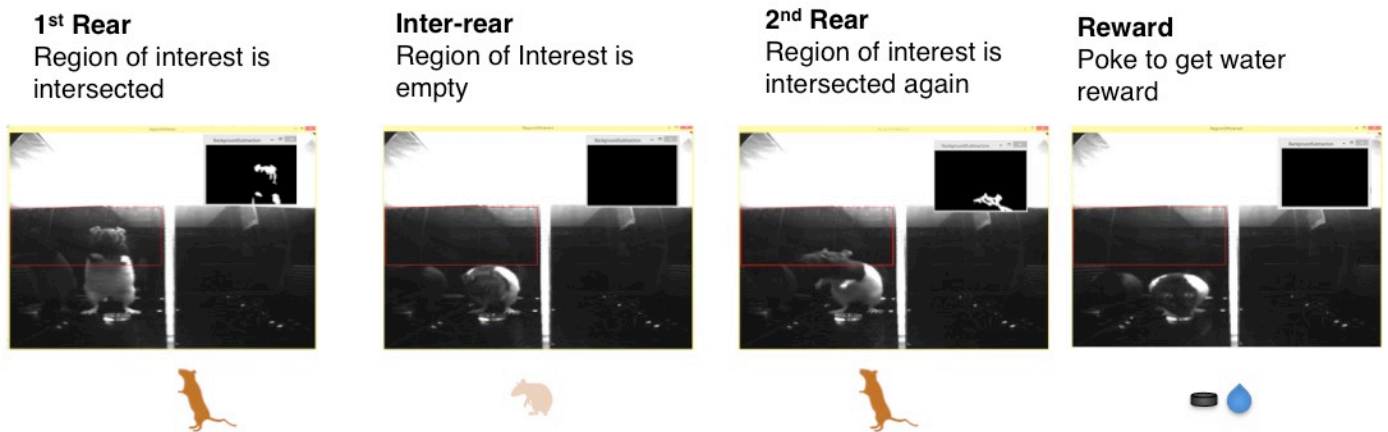


Figure 31: Demonstrator training of 'head-bobbing'

For the observers, 3 experimental groups were used: sequential, simultaneous and control. In the sequential condition observers were placed adjacent to demonstrators with no water poke available to them in this period, after which they were directly placed in the demonstrator box with the same reward conditions as demonstrator. In the simultaneous condition, observers were placed adjacent to demonstrators and had access to water reward in their box if they performed the head-bobbing movement. A final control group sat in an empty box for a similar amount of time and then was placed in the demonstrator box and given access to reward under the same conditions (Figure 32).

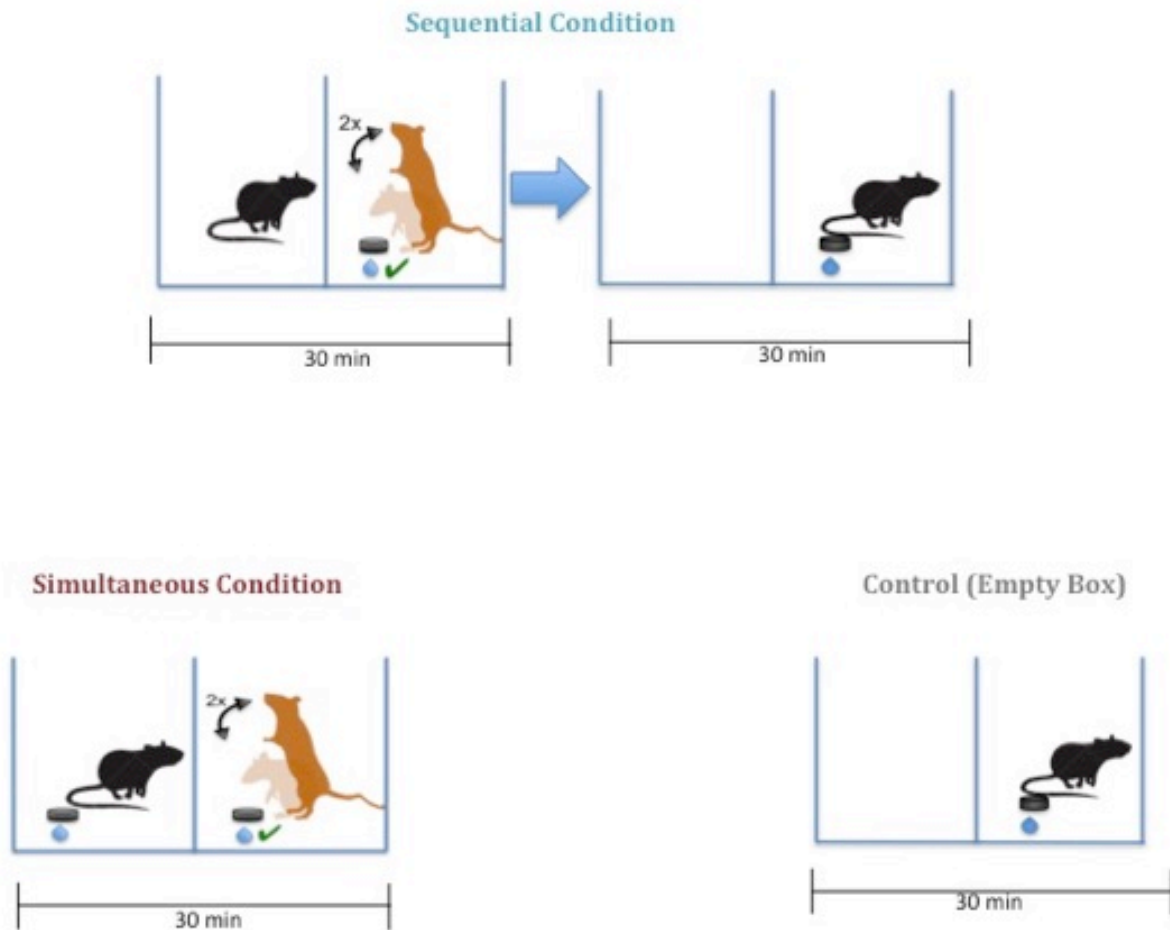


Figure 32: Observer experimental groups

Results and Discussion

Shaping behaviour of demonstrators took much longer due to the added complexity of the movement. As performance improved, the time in-between rears was reduced which in turn increased difficulty of task. In total it took 47 sessions (days) to have a group of reliable demonstrators (n=8) with an extremely high volume of ‘head-bobbing’ behaviour. By the end of the demonstrator training phase, performance was consistently over 100 movements per session and the inter-rear period had been decreased to under 2.5 seconds (Figure 33 and 34).

We describe the movement as a head-bobbing movement instead of a double rear for the following reason – during demonstrator shaping it became apparent that the movement was not necessarily composed of two rears, which we would describe as the animal lifting off its front paws from the ground (i.e. first rear), then returning to a crouching position with all paws on the ground, then lifting off onto two paws again (i.e. second rear), and then lowering itself onto all fours and poking for a water reward. However, when examining the video recordings, we noted that it was more accurate to say that the rodents solved the task by ‘bobbing’ their head in a vigorous motion. In other words, during the inter-rear period, their paws mostly did not return to the ground and usually throughout the movement they stayed balanced on their hind legs. This movement is most likely the most cost-efficient way to solve the task because a ‘head bob’ resulted in the minimum amount of movement which was required to enter the region of interest, leave it, and then re-enter. Considering the animals would do this movement often over 200 times per session, it is not surprising that they would find the least energy consuming method of performing the task – in this case by bobbing their heads instead of twice performing a rearing motion in its entirety. Therefore describing the movement as a ‘head-bob’ rather than ‘double-rear’ in many respects emphasises and captures the unusual and novel aspect of the behaviour. On DVD included with this thesis, Supplementary video → Scientific Experiments, video **“Difference between double rear and head-bobbing”** captures the difference in the two movements. **“Demonstrator Performance”**, shows the eventual head-bobbing movement of the 8 shaped demonstrators.

Furthermore the demonstrators did the head-bobbing movement in slightly different ways. These little “extra” details of movement are not necessary to receive reward, but become part of the movement repertoire because a) it makes it easier for a particular rat to execute the required movement and/or b) might be incorrectly construed as part of the required behaviour to receive reward (e.g. not unlike superstitious behaviour, when an incorrect association between cause and effect occurs). For example, Demonstrator 3 usually (over 75% of trials) takes two or three steps before rearing. Demonstrator 8 did not fully learn the “head-bobbing” movement, and often used front legs in the movement.

Therefore demonstrator 8's movement was more similar to two quick single rears.

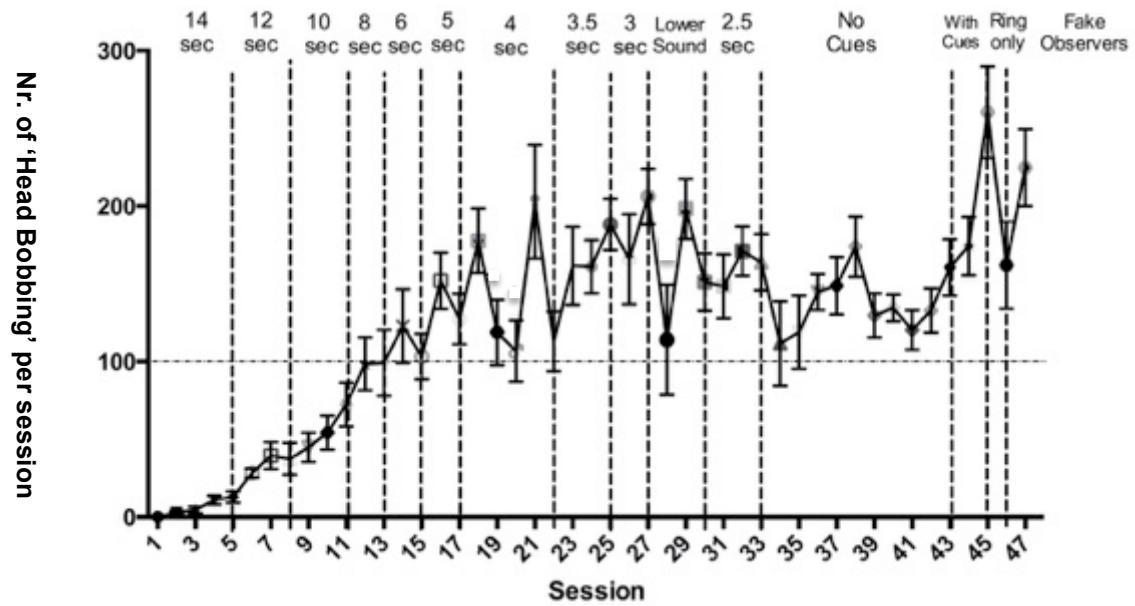


Figure 33: Demonstrator performance throughout behavioural shaping sessions. (No cues is without tones or light; in session 46 and 47 fake observers were placed to see if presence/distraction effected demonstrator performance.

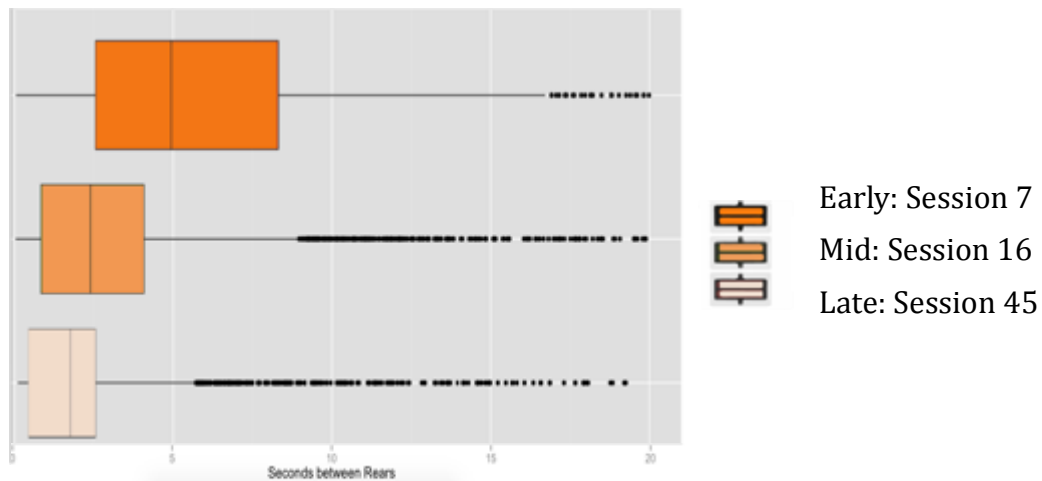


Figure 34: Rear Interval of demonstrators during early, mid and late training

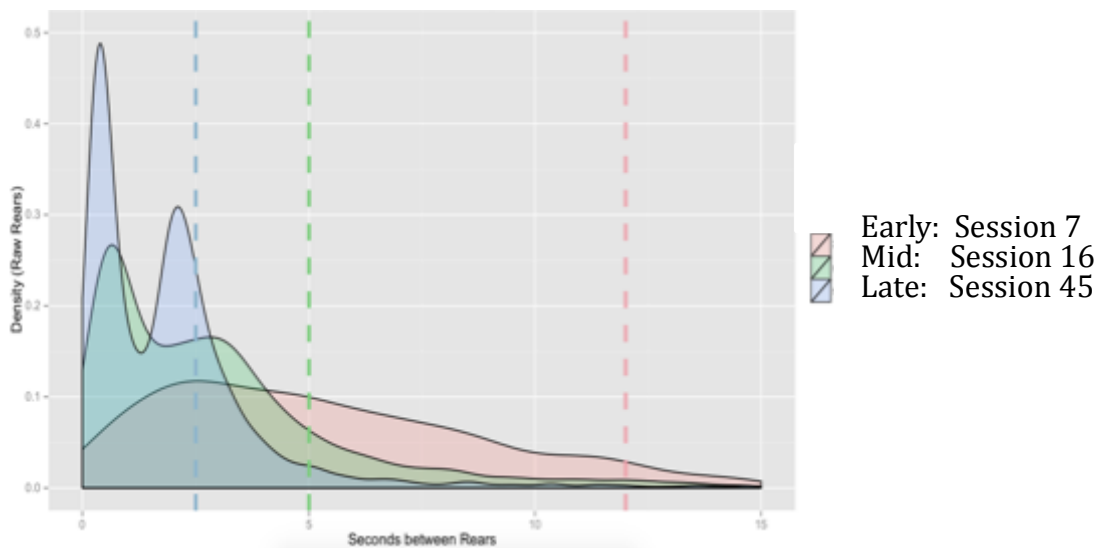
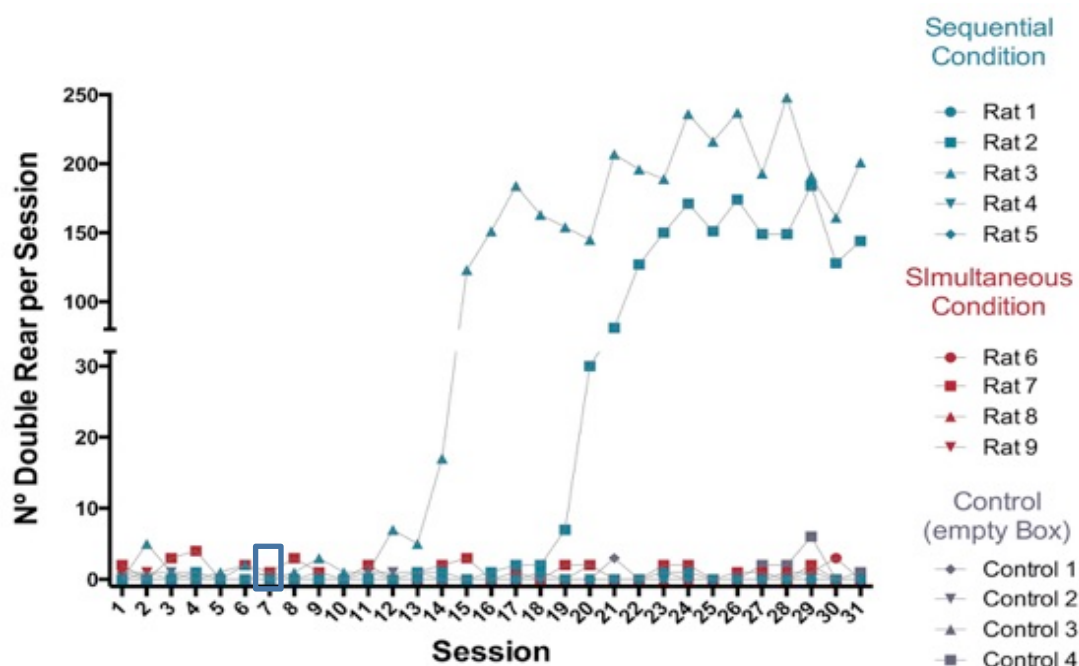


Figure 35: Density plots of demonstrator performance during training. Dashed lines denote the interrear limit of the selected session (i.e. entering the ROI outside of this limit would not result in a water reward or tone).

Figure 35 shows density plots over training which eventually shaped behaviour onto two peaks of time (i.e. late session 45). Since the time between the second rear and the first rear is larger due to the rodent collecting the reward (contrary to leaving the ROI and re-entering it), the first peak in the graph corresponds to the second rear, while the second peak corresponds to the first rear.

Both observers and control group were given one month to potentially learn the movement. In the sequential condition (n=5), two animals managed to learn the movement, being able to do 130-180 times the head-bobbing per session (Figure 36A; 36B). On DVD included with this thesis, Supplementary video → Scientific Experiments, “**Observers 4 and 6 head bobbing**” captures some of their performance. No rodents from the control group (N=4), nor the simultaneous condition (N=4), learnt the movement (Figure 36A). Out of the observers that learnt the movement, no idiosyncratic differences in movement linked to their specific demonstrator was identified (e.g. the ‘extra’ details of movement not necessary to receive reward but that became part of the movement repertoire of demonstrator).

A



B

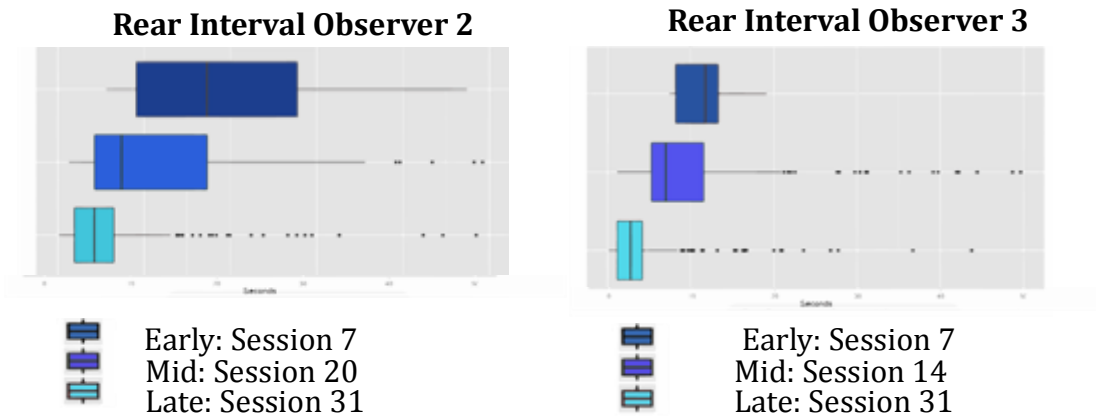


Fig 36A: Observer performance in the various experimental groups.

36B: Rear interval performance over early, mid and late sessions of the two observers that succeeded in learning the movement.

DISCUSSION

The above experiment showed that demonstrator rodents could be shaped using operant conditioning to do a complex and unusual sequence of movement which we regarded as novel. While two animals (out of five) learnt the 'head-bobbing' movement in the sequential condition, none learnt in the simultaneous or control condition. The fact that none learnt in the control condition is demonstrative that the movement is sufficiently complex to not allow for learning simply through individual trial-and-error, which was one of the original motivations for making the movement so complex. While this complexity prevented the control group from learning, in many respects it was too difficult – after all, not enough observer animals were able to copy the movement of the demonstrator to show evidence that imitation in rats is actually possible. The experiment therefore did not provide any conclusion to the provocative question

made by Byrne et al. 1995, "*Do rats ape?*". We wish to highlight that the null interpretation of this experiment does not of course mean that rats cannot imitate, simply that the conditions of our experiment were not sufficient to demonstrate imitation in the sense of copying a novel, complex motor movement. In many respects this further highlights the challenges of coming up with an experimental design that could show imitation in animals such as rodents, and to what degree it is even possible. The experiment was therefore not able to provide a response to the contention of behaviourist Richard Byrne - "it is unlikely that it will ever prove possible to devise a demonstration of imitation uncontaminated by other social influences and ways of learning" (2002, pg. 78).

It is tempting to infer that the two rodents learnt in the sequential condition because they had no other stimuli to attend, meaning that they were more aware of the demonstrator rats presence more often. In the simultaneous condition rodents had access to a water port which meant they might have spent more time exploring this rather than attending to the movement of the demonstrator. Due to the positioning of our camera's, we do not have empirical data to test this hypothesis. In hindsight, one aspect which could have strengthened the experiment would have been to sort observer behaviour into categories of observation and non-observation. Takano (et al. 2014) used camera footage post-hoc to rate the observation of the observers, placing them into discrete categories (i.e. face to face, ambiguous face to face and ambiguous). This sort of information would have been useful to control whether the sequential condition resulted in increased viewing time compared to the simultaneous condition, and if the observers that learnt the motor movement attended the demonstrators more frequently.

Another difficulty in our experimental design was separating imitation and emulation. The difficulty in disentangling these two processes has been previously documented (e.g. Tomasello 1990; Whiten et al. 1992: rodents). For example, a criticism of claiming imitation in the two-action test is that since there only exists a limited number of motor actions in the rodent that results in

moving the lever, how to distinguish if the specific movement pattern was copied by design or by necessity? Whiten et al. 1992 argues that to separate imitation and emulation, a variety of ways to copy the consequences of the act must exist. When this is the case, imitation is then claimed if the specific movement pattern of the demonstrator is copied (e.g. Zentall 2006, Kis et al. 2015). However in the two-action test there exists a limited number of motor affordances for rodents which will push the lever. Therefore hypothetically it could be the consequences of the action and not the action itself which is being copied, yet since the only action which exists to reach the goal is in fact the one executed by the demonstrator, it could be mistakenly identified as imitation. In our experimental design, the behaviour is itself the goal of the act, which means that if the experiment had been successful, emulation and imitation would have remained difficult to disentangle³⁵.

A key question of course for creating such an experiment is whether rats actually need to learn by imitation in the wild? For example strains such as the Long Evans are primarily nocturnal and therefore presumably gain a lot of information from other sensory systems such as tactile (i.e. whiskers) and odour. Therefore it is not clear that rodents such as the Long Evans would be in a position where observational learning, through imitation, would exist as an adaptive behaviour in the wild (and which would bring added benefit that could not be achieved through applying some of the simpler solutions to the correspondence problem described here). Despite their nocturnal tendencies, we do not consider the visual acuity of the rodent as an impediment to observational learning by imitation – in their natural environment rats need to use visual information to escape both airborne and ground predators, and rats have a large field of vision due to the positionment of the eyes on the side of the head. Studies have been able to train rats to discriminate objects across a range of sizes, positions, as well as depth and place rotations (e.g. Alemi-Neisse et al. 2013). It has been argued that the visual abilities of different rat and mice strains should

³⁵ It should be noted that while Byrne (1995) maintains that therefore the two-action test in rodents can be interpreted as goal emulation, Heyes (et al. 2000) would call this stimuli-reinforcer relationship and Hogan (1988) ‘valence transformation’; see Whiten (et al. 1992) for further discussion.

be evaluated before they are used in visuo-spatial learning tasks since selection pressures associated with rat domestication for laboratory use has resulted in rodents with visual abnormalities (Wong et al. 2006). Nonetheless, studies have shown that the Long-Evans strain continue to have acuity in the range of 1.0 c/d, which is similar to wild rat strains (Prusky et al. 2000). It should also be noted that studies which have involved rodents in observational learning have often used the Long-Evans strain (e.g. Jacoby et al. 1969, Zentall et al. 1972, Takano et al. 2014 etc.), which is also the strain we used in this experiment.

Ultimately, the central question can be re-examined from an ethological perspective – we cannot necessarily expect animals to learn skills or behaviours that do not have a biologically significant function in the wild. This is perhaps another possible criticism of the experiment: the ‘head-bobbing’ movement lacks ethological grounding in the sense that it remains unclear if having the capabilities to learn such a movement would bring about an adaptive behaviour that can be functionally applied in a naturalistic setting. In many respects this reflects a somewhat out-dated anthropomorphic positioning in biology – searching for the ‘holy grail’ of imitation in ‘cognitively less complex’ animals (Matheson et al. 1998, pg. 697). It has been argued that historically speaking, imitation has taken a somewhat disproportionate focus within the observational learning literature while other mechanisms possibly more relevant to species survival has been ignored. As Wall argues, contemporary views on an animals capacity to imitate has somewhat moved on from the ‘all or nothing’ classification that has traditionally dominated the imitation debate (Waal 1998).

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Experiment B: Using biological motion to test changes in the perception of ambiguous human movement in a group of theatre students³⁶

Introduction

Throughout this thesis I have argued that since much art is ambiguous, it is not surprising that physical theatre has also incorporated this aesthetic potential in the human form when possible. Using this as a base, I have explored how the pedagogy of Jacques Lecoq, more specifically his identification and transference processes, defamiliarise the human body by distorting our normal or habitual representations of it. This distortion creates a 'space of interpretation', forcing the observer into a mode of (re)interpretation. Furthermore I have defended that ambiguity through defamiliarisation can be used as a training tool for actors since the natural result of this will be new movement patterns which extend beyond the range of habitual behaviour. From these positions the following question then emerges: if physical theatre actors and students are indeed spending much of their time 'ambi-guizing' the human body, does this mean that their perceptual systems are better attuned to identifying perceptually ambiguous stimuli of human movement?

A standard task within the scientific community to explore the perception of human movement has been the manipulation of point-light displays of human walkers along different dimensions, often in an attempt to detect the threshold in which they can no longer be identified. As described in Chapter 2 of this thesis, point-light displays of human walkers involves placing a series of strategically positioned dots on a non-visible human body. One of the first researchers to use this method was Johansson (1973), placing reflective tape on the major joints of

³⁶ Collaboration: Samuel Viana Meyler (SVM), Dr. Tiago Porteiro (TP) and Dr. Zach Mainen (ZM). SVM designed the studies, SVM and TP ran the studies. SVM analysed the data and wrote this manuscript. Published in *Proceeds of Art/Science Conference, University of Algarve* (2013) under the title "Biological motion: a quantification tool for actors? A brief experiment and commentary".

humans that were entirely dressed in black and with a black background³⁷. Johansson's initial experiments showed that these dots contained enough information to determine the gender of a person and/or individual identities (Figure 37), eventually concluding that "10-12 such elements in adequate motion combinations in proximal stimuli evoke a compelling impression of a human walking, running, dancing etc." (Johansson 1973, pg. 201).

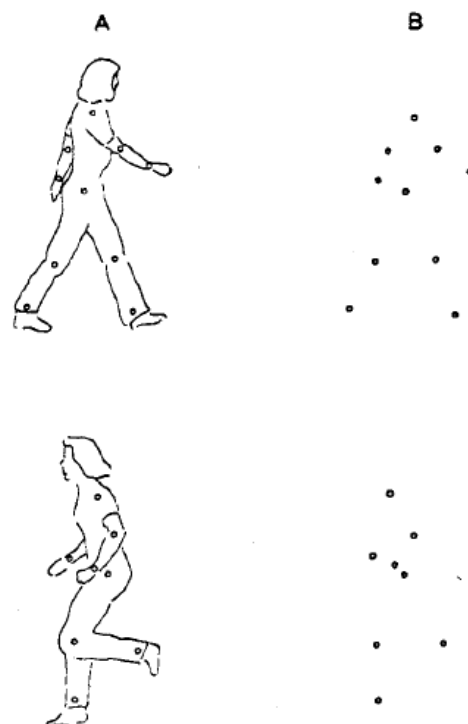


Figure 37: Walking and running subject (left) and corresponding dot configurations (right); reproduced from Johansson 1973.

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Many of Johanson's initial work of point light display walkers is still available e.g. <https://www.youtube.com/watch?v=1F5ICP9SYLU>, last consulted on 8th March 2018.

Johansson went on to find that display times as little as 150ms were sufficient for the dots to be organised into a coherent shape of a human figure by the observer. These studies captured how efficient our perceptual system is at recognising perceptually ambiguous images of humans in motion, in essence ‘filling the gaps’ from only a handful of strategically placed dots. Later studies would show that people can also grasp the emotional state of a point light display of a human being (e.g. Dittrich et al. 1996, Clarke et al. 2005), or intuit the weight of an object handled by a point-light display animation (e.g. Bingham 1993). These examples illustrate how “the human visual system is highly skilled at comprehending another person’s movements and actions, an in mentally reconstructing the body’s motion and its action from very limited information” (Aviv 2017, pg. 3).

Another experimental method commonly used is to increase the amount of dots that are displayed, usually by superimposing multiple scrambled walkers on top of a coherent and veridical walker. This is then incrementally increased or decreased depending on the performance of the observer. Generally speaking, the greater the number of dots which are superimposed onto a walker, the more ambiguous the stimuli becomes and the harder it is to detect or identify the human walker which lies behind the ‘mask’ of scrambled walkers. For example Cutting 1988 introduced a series of scrambled-walker ‘masks’ which made it increasingly difficult to identify the walking direction of the unscrambled walker which existed behind the mask. He found that while 22 mask elements did not affect performance, introducing 55 masking elements caused performance in judging the walker’s direction to return to chance. These type of manipulations are now somewhat ubiquitous in the biological motion literature, used for a diverse set of research objectives ranging from developmental research in children (e.g. Pelphrey et al. 2008), autism spectrum disorder (e.g. Murphy et al. 2009), sensitivity to social interactions (e.g. Manera et al. 2010), perception of emotions in dance (e.g. Dittrich et al. 1996) and neuroimaging studies (e.g. Grossman et al. 2000).

Therefore one method to explore if perceptual cues of human movement are judged differently in embodied performers is to introduce a psychometric study assessing biological motion perception along a number of dimensions (e.g. gender, scrambled walker, distorted walker etc.). An actor spends hours in rehearsals watching the human form in movement and attempts, on a daily basis, to decompose various aspects of the human body in motion. Furthermore since physical theatre students are potentially engaging in the defamiliarisation of the human body (as I have argued throughout the thesis), this might modulate their performance in ambiguous point-light displays. Therefore the experimental question was the following: having experienced an intense period of physical theatre training, would students improve in their ability to accurately identify 'defamiliar' biological motion stimuli of human walkers, and furthermore would this ability be superior to those that did not undergo such training?³⁸.

Materials and Methods

Participants and Study Design

The study comprised 29 subjects, which were placed into 3 groups. 23 were enrolled as undergraduates in either their first year of a bachelor degree in theatre (n=11) or the first year in a bachelor degree in architecture (n=12) at the University of Evora, Portugal. A third group (n=5) were composed of physical theatre professionals, each with a minimum of 10 years experience.

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Some evidence does exist in the literature that perceptual cues are judged differently in dancers - for example Brownlow et al. 1997 used biological motion to test whether dance experience influenced judgement of dance movement in point light display walkers. The experiment filmed choreographed dancers and created two point-light display 'dances' with markedly different rhythm changes. 'Novices' and 'experts' were then asked to rate the dance along a variety of dimensions. Dance experience was a significant variable - for example a dance categorised as happy was rated as exaggerated and less fluid for experts rather than for novices, although the researchers did cite that a weakness of the study was the definition of 'expert' and 'novice' dancers (Brownlow et al. 1997).

The study was conducted during a single semester during which the theatre students received extensive training in many of the exercises described in chapter 3, more specifically the identification and transference processes of J. Lecoq. Performance was measured at two time points, prior to their course starting (T1) and once the physical theatre training had been conducted (at the end of the semester; (T2)). The architecture students received no physical theatre training, nor were they involved in any other embodied performance activity throughout the study period. All students were tested on the same day and at the same time. The five physical theatre experts participated at a later date.

THE BMLtest

The BMLtest was developed by the Biomotion Laboratory (Queen's University, Ontario) and is a web-based application that assesses multiple abilities believed to play a role in biological motion (Figure 38)³⁹. An in-depth explanation of the BMLtest can be found in the paper 'A battery of tests for assessing biological motion' (Saunders et al. 2001), as well as on the Biomotion Laboratory website.

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The test can be done online at <https://www.biomotionlab.ca>; permission was kindly granted for it to be used in this study by Dr. Niko Troje.

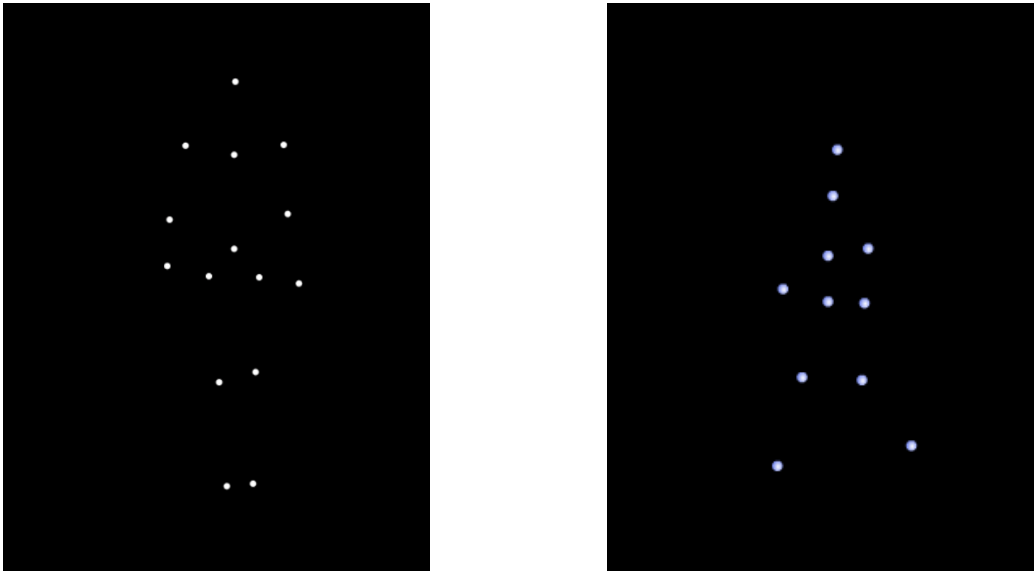


Figure 38: Example of unscrambled human walkers in the BMLtest (in the second picture the walker is moving to the left)

The subset of tests which most overlapped with perceptual ambiguity of human movement were chosen; this included the 'detection test', the 'distortion test' and the 'gender differentiation test'. The detection test assesses the ability to extract biological motion from randomly superimposed elements, while the distortion test assesses whether participants can correctly discriminate a partially scrambled walker. Finally the gender differentiation test assesses the sensitivity of the participant to the gender of the walker. The tests are linked to processing perceptual ambiguity in human movement because the degree to which the human body is defamiliarised is incrementally increased until it cannot be correctly identified at a higher than chance level (Figure 39).

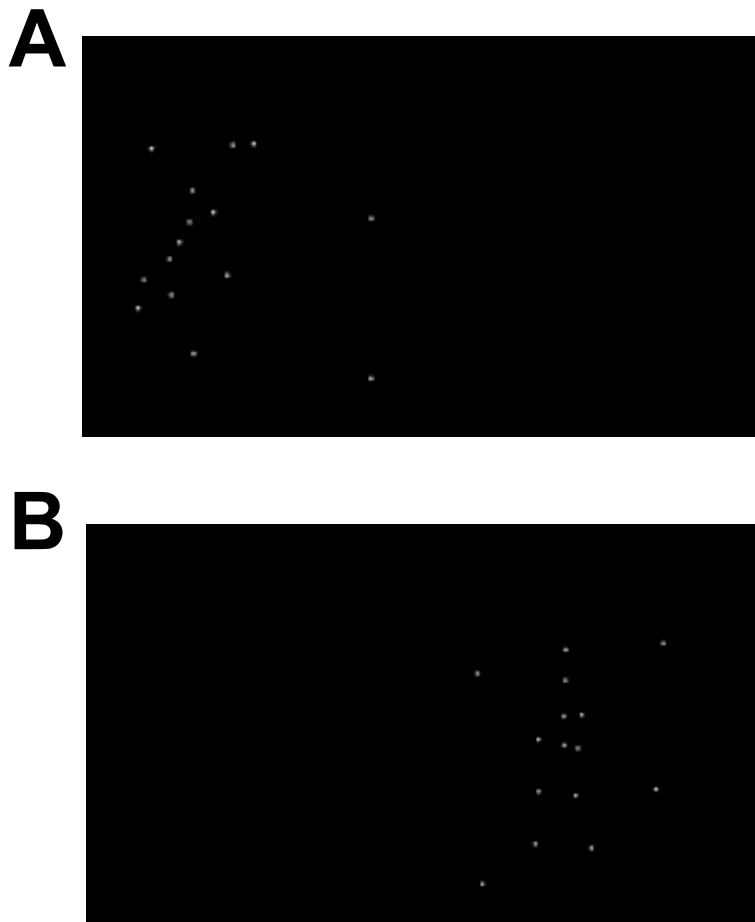


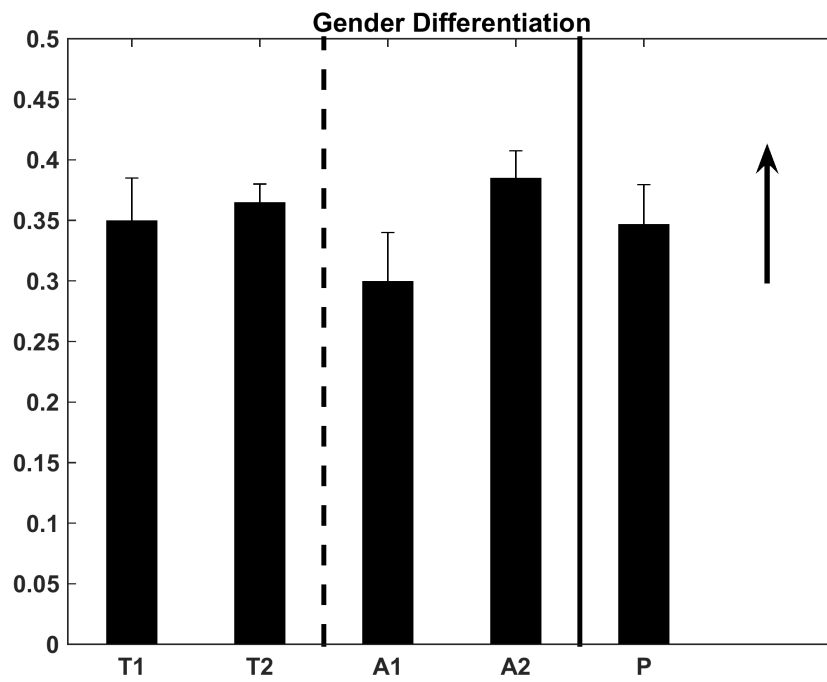
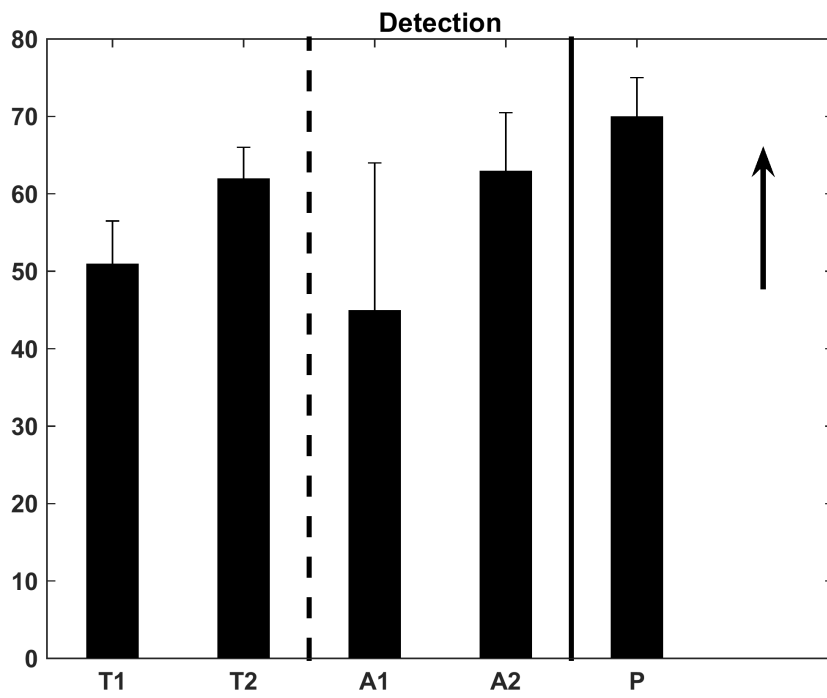
Figure 39: An example of the two-interval forced choice (detection test). Both A and B are displayed sequentially for three seconds in movement –the subject is then asked which included the human walker (in this example, display B). Difficulty is incrementally increased by adding dots to both displays that do not represent the human walker.

The BML test was introduced at time points T1 and T2. If physical theatre training could indeed increase the correct identification of ambiguous human movement, this should result with an increase in performance at T2 relative to T1. Architecture students were used as a control because any trend towards increased performance in T2 relative to T1 could be interpreted simply as a learning effect within the experimental task rather than actual improvements derived from theatre training (e.g. Pavlova et al. 2000 found that merely presenting a walker for 10s familiarised observers and that this positively affected performance in a detection task at a later time point). Therefore performance at T2 would be subtracted from T1 in both groups and then

compared; a significant difference between groups could suggest that the theatre students had indeed improved in detecting ambiguities beyond that which would be expected from simply increased experience in the task. For this, a t-test was used with significance at 0.05. A final data point was the inclusion of 'experts', subjects which had a great deal of physical theatre experience (a minimum of ten years training and performing). The assumption was that if physical theatre was indeed improving the ability to detect ambiguous human motion then experts should potentially perform better than students, even without any familiarisation of the task (i.e. no T1).

Results

The hypothesis that actors' training would improve the discernment of ambiguous human walkers when compared to a control group was not found (Figure 40A and 40B). The trend towards increased performance from T1 to T2 was observable, but this trend was similar in magnitude across groups. It is therefore interpreted as a likely learning effect.



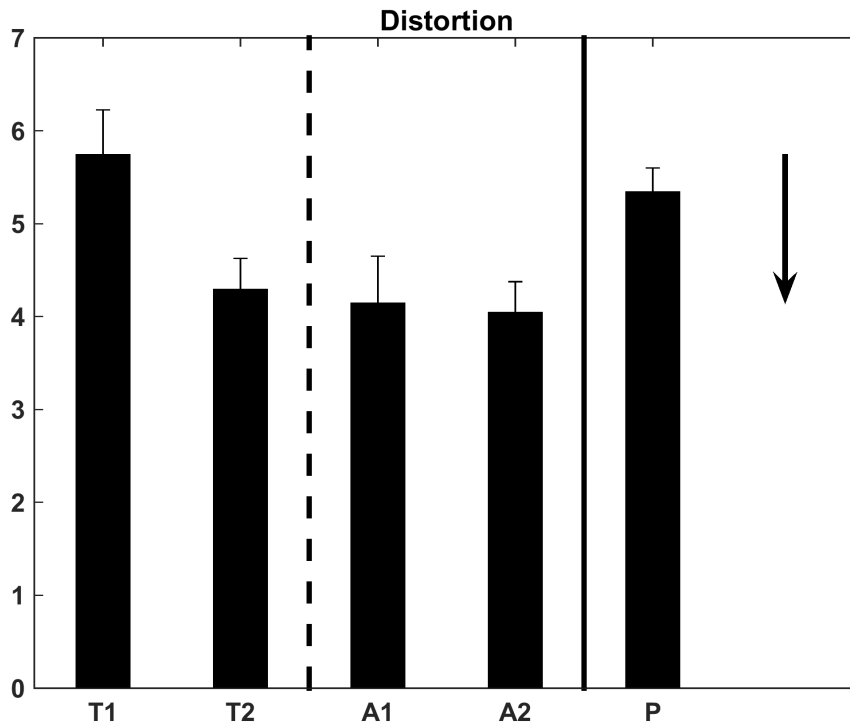
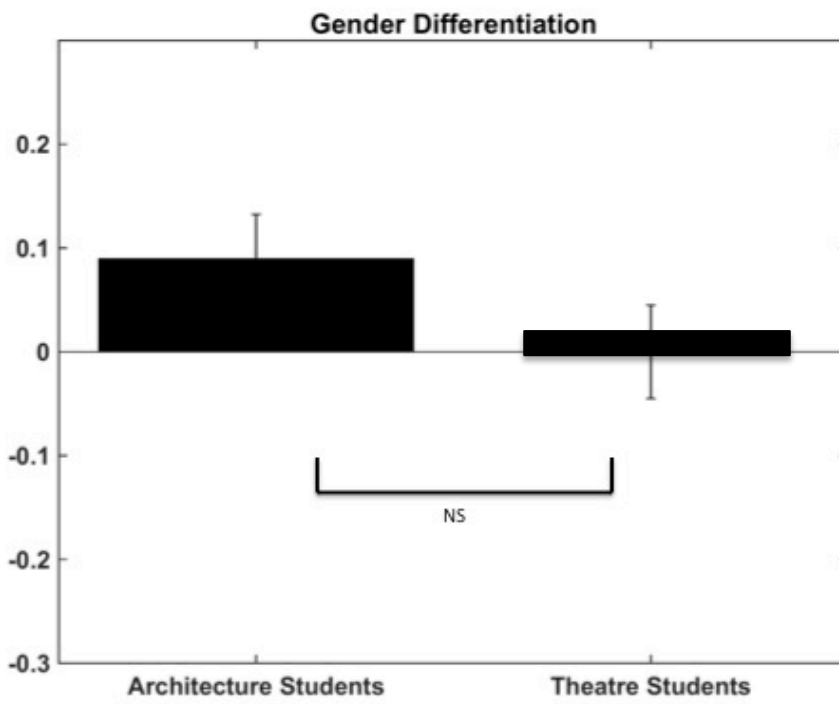
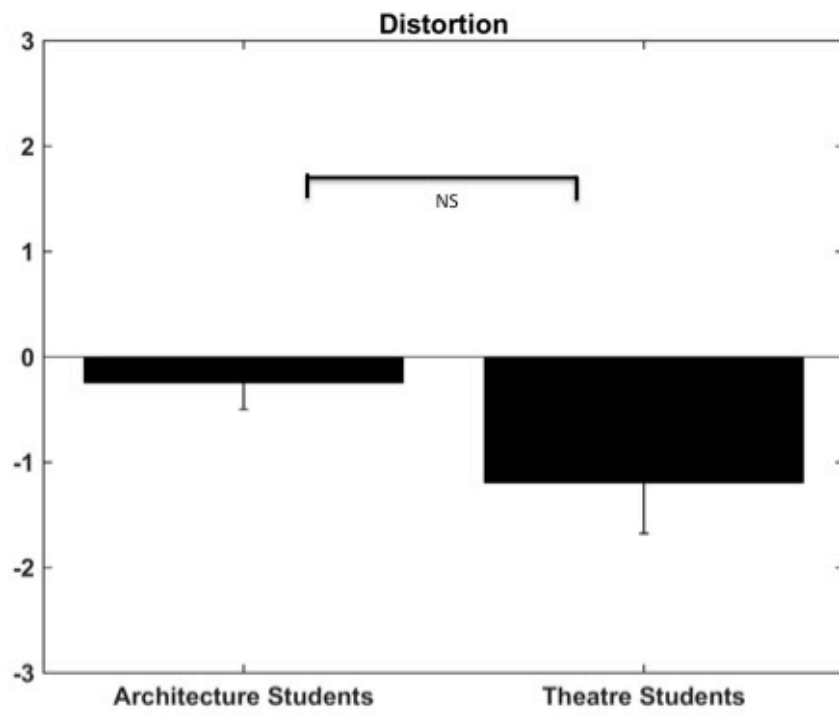


Figure 40A: Results of BMLtests. T1 and A1 are theatre students and architecture students at timepoint 1 respectively. T2 and A2 are theatre students and architecture students at timepoint 2 respectively. P indicates another group, physical movement teachers, tested at a later date. The Y axis is a measure of psychophysical accuracy (arbitrary units), where the direction of the arrow on the right indicates the direction of improving performance. Black lines represent the standard error of the mean across subjects.



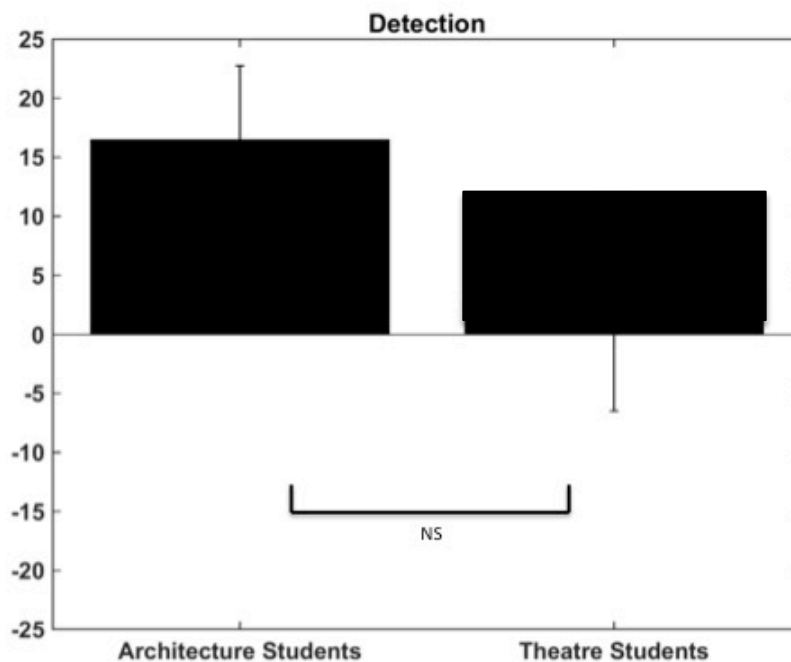


Figure 40B: Change in performance compared (T2 - T1 and A2 - A1); t-test not significant.

Discussion

The aim of the study was a first approximation to examine whether ambiguous biological motion of human walkers could be used to show effects of physical theatre training on the perception of human motion. It is important to underline that this study was opportunistic in nature, taking advantage of access to a specific theatre population during the early phases of their training. Furthermore the sample size was a limiting factor for statistical analysis. Therefore it is difficult to take any concrete conclusions from the study. The limited results show that physical theatre training did not result in any improvement in the perception of ambiguous point-light displays of human walkers. There are a variety of possible interpretations for these results of which I shall now briefly list.

The first possible explanation is simply that perceptual ambiguities do not play such a large role in physical theatre as I have proposed, and therefore it would be

unreasonable to expect that these students would improve their ‘ambiguity detection rate’ during training. A second interpretation is that the students did not spend sufficient time working with perceptual ambiguities over the semester for a significant increase to be observed. It should be mentioned that the objective of the first semester was not explicitly focused on improving the resolution of perceptual ambiguities in the human body. Instead it involved exercises in body awareness, masks, movement, improvisation and even voice work. Therefore although the students received roughly 15 hours of theatre training per week, not all of this would be relevant to the experimental question.

A third explanation is that the psychophysical metric used here might have an upper limit of performance that participants achieved too soon. The resultant “ceiling effect” would mean there was no room for improvement to be captured. Further research from the Biomotion lab would be needed to understand if possible ceiling effects exist in the BMLtest. A fourth possible explanation is that the type of low-level motion cues that are tested in the biological motion experiments of the BMLtest do not comprise the kind of ambiguous stimuli that physical theatre students are observing and embodying, and therefore it is unrealistic to expect a corresponding increase in performance relative to control since they are not being trained along the relevant perceptual dimensions. The fact that the expert group, despite a great deal of theatre experience, did not perform better than students favours some combination of the first, third and/or fourth interpretations. It should be highlighted again however that this study was opportunistic in nature and limited in scope.

ACKNOWLEDGEMENTS

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