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The AUC Undergraduate Journal of Liberal Arts and Sciences is a biannual, interdisciplinary publication showcasing outstanding undergraduate academic papers. The Journal aims to demonstrate the strength of undergraduate scholarship at AUC, to reflect the intellectual diversity of its academic programme, to encourage best research and writing practices, to facilitate collaboration between students and faculty across the curriculum, and to provide students with opportunities to gain experience in academic reviewing, editing and publishing. The editorial board of the journal is constituted of members of the InPrint board, a registered AUUSA committee.

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Foreword

It is established that a majority of AUC students leave AUC with the intention of pursuing graduate studies at the Masters' or Doctoral level. Substantial efforts on behalf of AUC aim to include courses teaching students how to write quality academic papers in the curriculum; however, no institutional body exists to edit and publish academic papers despite being fundamental to the dissemination of academic work. For this reason, InPrint was founded in 2012 to ensure that students' work go beyond the walls of the classroom or the confines of forgotten hard disks.

In its first years of existence, InPrint obtained immediate attention, and received over 70 submissions for its first open issues. Subsequently, the editorial board also promoted the idea of publishing Capstone issues, to further showcase the quality of the theses written by graduated students. However, due to some setbacks within the editorial board, the InPrint committee was unable to publish both Capstone and Open issues for the years of 2016.

The board of 2017-2018 sought to reaffirm the original goal of the Journal, and resume the publication of student articles and theses with the counsel of AUC faculty members in order to further strengthen excellent scholarship at AUC and incentivise best writing practices on the students' behalf. With the successful publication of a selection of graduate students' theses in the Capstone Issue in December 2017, the editorial board has continued its efforts to publish current students' articles in this Open Issue to ensure high quality publications, a neutral selection process thanks to the involvement of peer reviewers and faculty advisors together with meticulous and systematic editing procedures.

This document is a collection of some of the best articles written by current AUC students exemplifying excellent writing practices, skillful analytic reasoning, and, in some instances, original research. Ranging from an account of the construction of hybrid identities through clothing practices in Dutch Muslim converts to a discussion of the ambivalent interpretation of the Casimir effect puzzling world-class physicists, this Open Issue of the Undergraduate Journal of Liberal Arts and Sciences aims to demonstrate the complexity and tensions between various issues of rising importance in our society as captured by current AUC students.

Philip Hartout, on behalf of InPrint

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Sciences

Bacterial Cancer Treatment: How Our Enemy's Enemy Can Become Our Friend

A review of the different mechanisms by which *Salmonella* bacteria can fight solid human cancers

Tom Lotze (AUC)

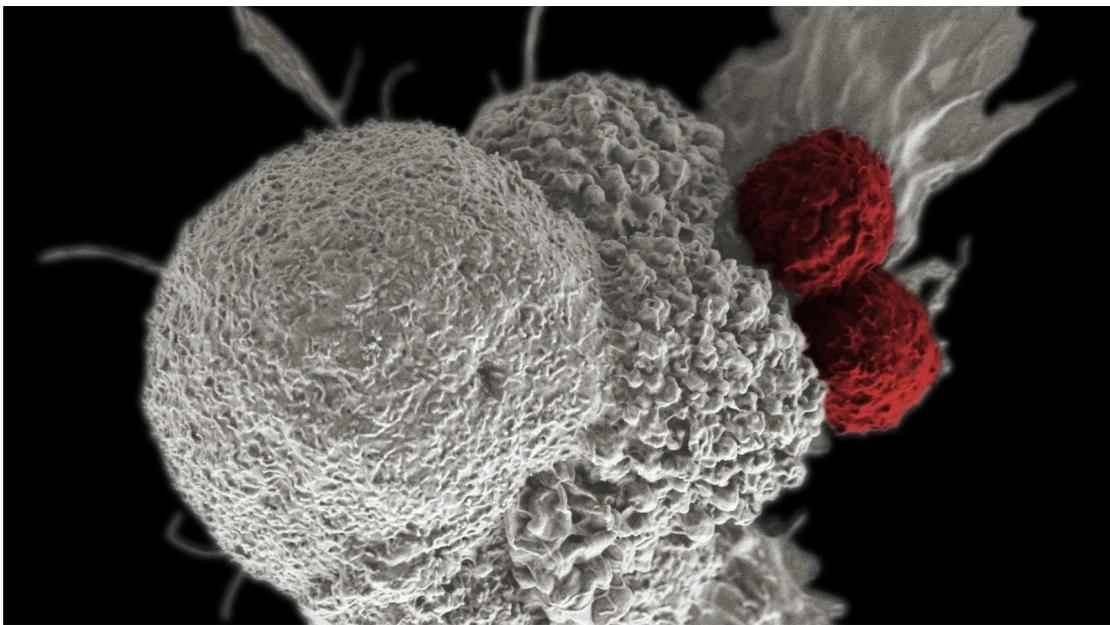


Figure 1: A pseudo-colored scanning electron micrograph of an oral squamous cancer cell (white) being attacked by two cytotoxic T cells (red), part of a natural immune response. This process can be boosted by bacterial cancer therapy. Source: Rita Elena Serda from the National Cancer Institute / Duncan Comprehensive Cancer Center at Baylor College of Medicine.

Abstract

Bacterial cancer treatment (BCT) is an up-and-coming therapy for different types of cancer, but it is not yet used in clinical care. The most prominent species in this field is *Salmonella Typhimurium*, since it shows the best accumulation in tumors and most effective killing, compared to other bacterial species. This paper provides an overview of the recently uncovered mechanisms by which *S. Typhimurium* acts on the cancer cells, effectively killing them and inhibiting tumor growth. Besides direct killing through bacterial toxins, the bacteria can also prime and stimulate the host immune system to attack the cancer cells, provided that the host immune system is functional. However, to make this concept feasible, future research should focus on the best way of administration and ensure that the bacteria do not spread systemically or cause side effects due to bacterial toxins. If these problems can be solved, BCT could become a promising alternative for current chemotherapy.

Keywords and phrases: Cancer immunotherapy, bacterial vectors, *Salmonella Typhimurium*, tumor targeting, tumor suppression, localized drug delivery, bacteria mediated cancer therapy (BCT).

Introduction

Cancer is still one of the main causes of death in the Western world and current therapeutics are still far from ideal (Steward & Wild 2014). Chemotherapy has many off-target effects healthy tissue because it affects processes in non-cancer cells (Nallar et al. 2017). Moreover, chemotherapy is often not efficient in reaching the tumor site (ibid). Attempts at developing more specific treatment have brought along other practical and ethical problems, but recently progress has been made in bacterial cancer treatment (BCT), which would be more specific and has other advantages over conventional chemotherapy as well. Currently, clinical trials of BCT for various cancer types are in stage I or II. For an overview, see Hosseinidoust et al. (2016). In the field of bacterial cancer treatment, the characteristics of bacteria are exploited to treat cancer, or as put by Hosseinidoust et al. (2016): “our enemy’s enemy could be our friend”. The most important characteristic of bacteria in the context of BCT is their tumor tropism, meaning that they have the tendency to migrate to the tumor (Massa et al. 2013; Nallar et al. 2017) where they can be exploited to fight against cancer cells. The mechanisms by which the bacteria affect cancer growth are not completely understood, hence they are still being investigated (Massa et al. 2013; Kim et al. 2015; Nallar et al. 2017). Several mechanisms have been proposed to describe the bacterial behaviour at the tumor site, varying from direct effects on the cancer cells

(Massa et al. 2013) to eliciting the host immune system (Grille et al. 2014; Zheng et al. 2017) and functioning as a vector by delivering medicines locally (Zheng et al. 2017). An overview of the different mechanisms has not been provided in the literature, and to partly remedy this situation, this paper gives an overview of the recent literature in the field. The most prominent bacterial species studied for BCT is *Salmonella Typhimurium* because it most efficiently invades tumors and suppresses their growth (Kim et al. 2015). Therefore, this paper focuses on the *S. Typhimurium* and provides an overview specifically for this bacterium.

Why are bacteria so suited for this task?

One of the most established facts about the behaviour of *S. Typhimurium* in humans is that the bacteria tend to move into tumors (Nallar et al. 2017; Massa et al. 2013; Hosseinidoust et al. 2016; Grille et al. 2014). Ratios between accumulation of the bacteria in the tumor and in the liver for VPN-20000, an engineered *Salmonella* strain, were measured to be over 1000:1 (Clairmont et al. 2001; Fu et al. 2008). This behaviour is called tumor tropism, and although its causes are not completely clear, suggested causes include: 1) the hypoxic conditions inside a tumor (Massa et al. 2013; Zhang et al. 2015), 2) the leakiness of tumoral vasculature (Massa et al. 2013), 3) the abundance of nutrients in the tumor (Hosseinidoust et al. 2016; Nallar et

al. 2017) and 4) the protection from the host immune system inside a tumor (Naller et al. 2017). These four factors favour the growth of the *Salmonella* bacteria within the tumor and promote the active migration therein, called bacterial taxis (Hosseini et al. 2016). Lastly, the *Salmonella* bacteria are facultative anaerobes, meaning that they can grow both in oxygen rich and poor conditions (Chang & Lee 2014), and thus can colonize respectively small (metastatic) tumors, as well as large solid tumors. Another favorable characteristic of bacteria in general is the fact that they can easily be genetically engineered to the needs of humans. The first alteration that is often made before use in BTC is to attenuate the bacteria to reduce the chances of damage to healthy tissues and systemic infection (Clairmont et al. 2001). This can involve disruption of the production of toxins triggering pro-inflammatory cytokines in the host, depending on the therapeutic needs (Clairmont et al. 2001; Zheng et al. 2017), or making the bacterium more vulnerable to antibiotics (Clairmont 2001), which is a characteristic needed when the therapy is used to treat patients. Besides that, with genetic engineering it is relatively easy to make the bacteria secrete a desired substance. This can be done using plasmids, which usually transmit genes between bacteria, but that can also be used to artificially modify the genome of the bacterium. The benefit of this will become clear later in the paper.

Three Mechanisms of Exerting Anti-Cancer Effects

Given that the bacteria migrate to cancer cells rather than healthy tissue, roughly three different mechanisms can be distinguished through which bacteria reduce tumor growth. Of note, these three mechanisms are non-exclusive and they can thus act simultaneously. The first major way to discriminate between the mechanisms is to look at whether or not it involves the immune system. The host immune system can be very powerful against the tumor cells, but a functioning host immune system is not self-evident in the tumor. Therefore, methods are also developed to make the bacteria secrete compounds by themselves,

compensating for the absent immune system. The secreted compounds can be either bacterial components that inhibit tumor growth or synthetic anti-cancer drugs (Massa et al. 2013).

Investigating Direct and Indirect Inhibitory Effects

The first method at hand is the direct interference of the bacteria with the cancer cell growth. The most basic mechanism is the local competition for nutrients, depriving the cancer cells from their energy, thereby inhibiting their growth (Chang & Lee 2014). The other pathways are more complicated and involve either autophagy or apoptosis of the cancer cells, which may also occur simultaneously upon exposure to *Salmonella* bacteria (Chang & Lee 2014). Experts distinguish different pathways that lead to either apoptosis or autophagy (mechanisms of coordinated cell death) in the tumor cells. Both Naller et al. (2017) and Fu et al. (2008) have investigated the pathways leading to cell death, beginning with TRAIL (TNF-related apoptosis-inducing ligand) secreted by recombinant *Salmonella* bacteria, which triggers apoptosis via different death receptors (DR4 and DR5) on the malignant host cells. (Naller et al. 2017; Fu et al. 2008). This solution is even more promising, because, by several mechanisms, the bacteria can be stimulated to secrete the desired compound only when practically all the bacteria have migrated into the tumor, reducing the damage to healthy tissue (Naller et al. 2017). In this context, we can hypothesize that triggered TRAIL expression could be an effective tumor suppressing approach (Swofford et al. 2015).

Besides initiation of apoptosis via synthetic compounds, bacterial toxins may induce apoptosis of the malignant cells too (Chang & Lee 2014). An example is α -hemolysin (HlyA), a molecule that creates pores in the host cell membranes, which is fatal to them (Naller et al. 2017). The burst of cell content pouring out through these pores, together with the presence of the bacteria, can induce the immune system to activate a cell-mediated immune response to the tumor cells (Chang & Lee 2014).

This mechanism is more indirect and involves the local stimulation of the host immune system and priming for the specific kind of cancer at hand. Experiments in CD4+ and CD8+ T-cell deficient mice showed significant inhibition of tumor growth following *Salmonella* administration (Chang & Lee 2014).

Using the Host's Immune System

An example of the involvement of the host immune system was investigated by Naller et al. (2017). The authors studied recombinant *Salmonella* artificially expressing CCL21 and TNFSF14. CCL21 is a chemokine important for the migration of immune cells towards the tumor and TNFSF14 is a cytokine amongst others promoting T-cell proliferation and inducing cancer cell apoptosis (Naller et al. 2017). In mice injected with these recombinant bacteria, the infiltration of the tumor by leukocytes and neutrophils was observed (Grille et al. 2014), with subsequent regression of cancer cell growth (Naller et al. 2017). Another method to elicit an immune response is the secretion of a bacterial flagella antigen (FlaB) by engineered *Salmonella* bacteria. Zheng et al. (2017) show that the secretion of FlaB in the tumor stimulates the infiltration of immune cells such as macrophages and neutrophils into the tumor by binding Toll-Like receptor 5 (TLR-5) (Keestra-Gounder et al. 2015). These immune cells then secrete pro-inflammatory cytokines in the tumor suppressing its growth, while the macrophages specifically secrete NO, inhibiting tumor growth even more (Zheng et al. 2017). Massa et al (2013) found an additional underlying mechanism for the increased immune response to the tumor cells triggered by the bacteria. The *Salmonella* bacteria upregulate the expression of connexin-43, a transmembrane protein that is needed to form gap junctions between cells. The increasing number of gap junctions between tumor cells and dendritic cells cause the dendritic cells to cross-present more antigens specific for the tumor cells. The presentation of the specific antigens forms the basis for an adaptive immune response to the cancer cells by the host immune system (Massa et al. 2013).

Autonomous Drug Delivery By Bacteria

The immune system can only fight against cancer cells, however, if it is properly functioning, something that is not necessarily the case in the tumor microenvironment. A third mechanism has been proposed to overcome this hurdle, namely the delivery of autonomously functioning drugs by *Salmonella* that target the cancer cell. Using genetic engineering, the compound can be any protein of therapeutic value. The bacteria are engineered in such way that they can deliver non-bacterial compounds, such as cytotoxic proteins that kill the cancer cells, locally to the tumor (Zheng et al. 2017). Besides the active drug production in bacteria, as described by Zheng et al. (2017), the principle of quorum sensing could be exploited, which is the ability of bacteria to sense the density of bacteria around them. In response to this density, the bacteria alter their secretion of several substances, for example the anti-cancer drugs (Swofford et al. 2015). Since the bacteria accumulate in the tumors, this would mean that the desired compound is only secreted in the tumor and not in the healthy organs, because of this bacterial concentration dependent 'switch' (Swofford et al. 2015).

Challenges

Given all these mechanisms, BCT seems to be a promising therapeutic approach to tackle solid cancers. However, there are some challenges before BCT can be used for clinical treatment. The first point of uncertainty is how to administer the bacteria, as investigated by Hosseinidou et al. (2016). The authors state that for the best therapeutic results, intratumoral injection is the preferred method; additionally, using this method practically no adverse side effects were reported in clinical trials (Hosseinidou et al. 2016; Grille et al. 2014). Furthermore, this method can deliver the bacteria to places that are not easily reached via the systemic blood stream, such as the central nervous system (Hosseinidou et al. 2016). The most common route for drug delivery, oral administration, brings some obstacles with it, the most important one be-

ing that the bacteria need to cross the epithelial barrier of the intestines, preferably without disturbing the microbiome of the gastrointestinal tract (Hosseini et al. 2016; Fu et al. 2008). Intravenous delivery is an option when tumors have higher blood supply than the surrounding tissues, and tests in mice showed no systemic damage, although it has not yet been investigated in larger animals (Hosseini et al. 2016). The second obstacle is inherent to using bacteria as treatment for humans, namely that bacteria can still be pathogenic to the human host and can infiltrate and damage healthy human tissue (Massa et al. 2013; Swofford et al. 2015; Keestra-Gounder et al. 2015). Infiltration into healthy tissue or systemic spread of the bacteria, despite their tumor tropism, can lead to the release of the cargo, such as toxins or immunostimulatory materials in inappropriate places, with obvious consequences (Hosseini et al. 2016). Hosseini et al. (2016) also speculate about the possibility of the bacteria perturbing the healthy microbial system in the body, which could result in various diseases. After the cancer has been treated in the body and the role for *Salmonella* is over, the bacteria need to be excreted from the body, or to be killed to prevent them from causing adverse effects.

Discussion & Conclusion

The variety of mechanisms that result in the inhibition of tumor growth lay out a fine basis for the application of BCT as an effective treatment strategy in humans. Direct effects of *Salmonella* bacteria include the competition for energy with cancer cells (Chang & Lee 2014), a cell death inducing TRAIL secreted by bacteria (Naller et al. 2017; Fu et al. 2008), and bacterial toxins that create pores in the malignant cells (Chang & Lee 2014; Naller et al. 2017). The resulting release of antigens can be picked up by the host immune system, and elicit an immune response to the cancer cells (Chang & Lee 2014). The immune system can also be directly activated through the release of cytokines and chemokines by the bacteria (Naller et al. 2017), or bacterial antigens (Zheng et al. 2015; Keestra-Gounder et

al. 2015). In the absence of a host immune system, autonomously functioning drugs synthesised by the bacteria can be delivered directly into the tumor, preventing systemic effects (Zheng et al. 2017). However, several hazards have been reported too, and the question remains whether the benefits outweigh these liabilities. To overcome these hurdles, we need to ensure that the *Salmonella* strain that is used is attenuated, not inducing systemic disease, and vulnerable to antibiotics (Clairmont et al. 2001). Among others, Clairmont et al. (2001) and Grille et al. (2014) report *Salmonella* strains that have an “excellent safety profile”, implying that the strain is both sensitive to antibiotics and genetically stable, preventing the appearance of resistant strains (Clairmont et al. 2001). Moreover, both Swofford et al. (2013) and Hosseini et al. (2016) state that their engineered bacterial strains expressed the desired products in the tumors without undesired side effects. Overall, this review supports the notion that BCT can be used for medical purposes, especially when combining the quorum-sensing principle studied by Swofford et al. (2015) with the secretion of the load of a desired therapeutic compound. Consequently, there is only need for one time administration of the bacteria, preferably intratumoral, because they will multiply in the tumor and automatically start secreting the drug once they reach a high density. The risk of adverse side effects to healthy tissue is, according to Swofford et al. (2013) and Hosseini et al. (2016) minimal, which is very promising. If future research helps us to fully understand the mechanisms, as well as to find out for which specific types of cancer this treatment would be most promising, the *Salmonella* bacteria may in the future, in the words of Hosseini et al. (2016), act as “microbe autonomous physicians” against cancer.

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Interpreting the Casimir effect in terms of the Van der Waals forces and the vacuum energy

Jasper Roosmale Nepveu (AUC)

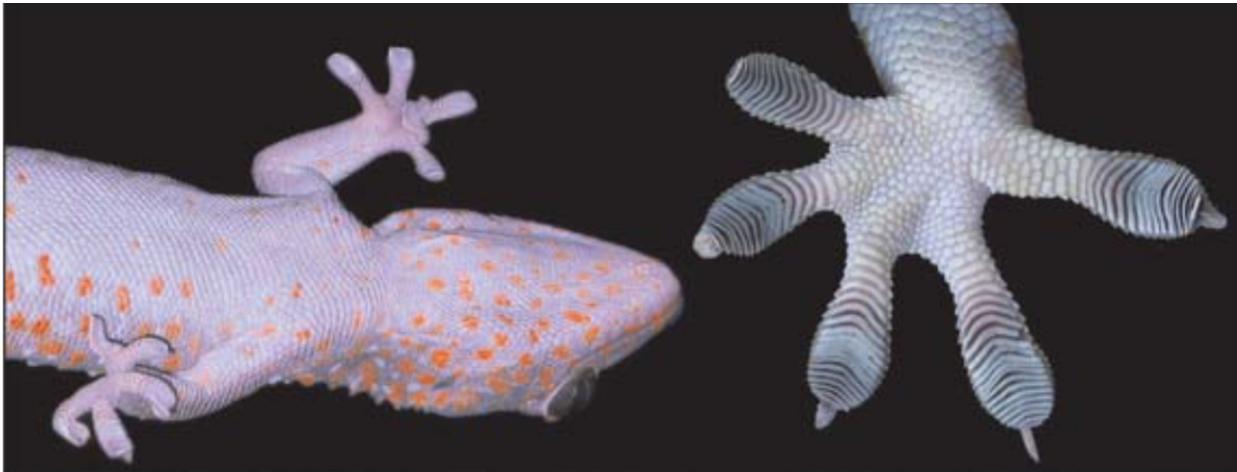


Figure 1: The Van der Waals interactions are responsible for Gecko's exceptional adherence to a wide variety of surfaces. Source: Lamoreaux (2007)

Abstract

The force between parallel metal plates in the Casimir effect can be explained in two different ways, which is why its fundamental origin is still debated. The effect can be interpreted as a demonstration of the vacuum energy that gives rise to the cosmological constant problem, or the Casimir force can be explained as a Van der Waals force, which is computationally more difficult. Because the existence of two different interpretations is potentially indicative of a relationship between the two, the goal of this paper is to analyze the possibility to reconcile these interpretations. For this purpose, a simplified derivation of the Casimir force is provided and explained in terms of both interpretations, and arguments in favor and against the two are analyzed. Although the simplified derivation shows parallels between the interpretations, the conceptual differences in more rigorous derivations imply that they are not equivalent. The interpretations are not mutually exclusive, which is why they can be combined into a third interpretation that describes a physically relevant vacuum energy in bounded systems. When this interpretation gains experimental and theoretical support, it can potentially satisfy proponents of both the vacuum interpretation and the Van der Waals interpretation, while avoiding the cosmological constant problem.

Keywords and phrases: Casimir effect, vacuum energy, Van der Waals forces, quantum fluctuations, cosmological constant problem.

Introduction

The astronomical discrepancy between quantum field theory (QFT) and cosmology, known as the cosmological constant problem, is one of the main open problems in contemporary physics. The cosmological constant is a parameter in Einstein's field equations of general relativity. Its value can be deduced by observing the expansion of the universe, or from predictions of the total mass of the universe by particle physics theories such as QFT (Bianchi and Rovelli 2010). Since energy is equivalent to mass, a nonzero predicted vacuum energy in QFT implies a cosmological constant much larger than the value derived from galactic observations (Rugh and Zinkernagel 2002). It is theoretically possible to avoid the problem by adapting the predicted vacuum energy, but this approach is not widely accepted because some phenomena, including the Casimir effect, seem to confirm the vacuum energy that follows from QFT (Weinberg 1989; Carroll 2001; Rugh and Zinkernagel 2002; Martin 2012; Razmi and Shirazi 2015).

The Casimir effect refers to an attractive force between uncharged metal plates (the Casimir force) that seemingly depends on the vacuum energy and has experimentally been demonstrated by Lamoreaux (1997). The phenomenon has been schematically depicted in figure 1. Assuming the vacuum energy results from fluctuations, the Casimir plates may control which fluctuations can exist in the cavity by imposing boundary conditions. If the energy of the vacuum thereby depends on the distance between the plates, this will result

in a force because the system tries to minimize its energy.

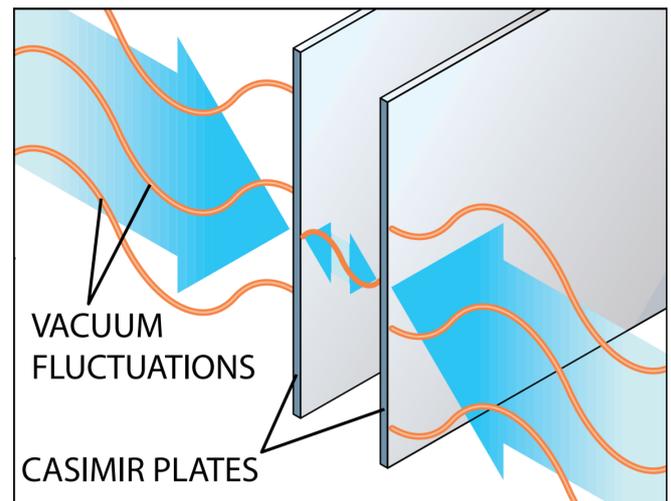


Figure 2: the Casimir effect. Only specific waves of the vacuum fluctuations can exist in between the Casimir plates. Figure adapted from Yam (1997).

Contrarily, it is also possible to explain the same Casimir effect by considering Van der Waals (VdW) forces between the plates, without referring to the vacuum at all (Rugh et al. 1999; Jaffe 2005; Bianchi and Rovelli 2010; Cerdonio and Rovelli 2015; Nikolić 2017). The Casimir plates are uncharged, so that no large forces are expected between them. However, microscopically they consist of charged electrons and atoms that can distribute themselves in such a way to produce small electromagnetic forces between positive regions and negative regions, see figure 2. The resulting forces are called the Van der Waals forces, which

are ubiquitous in nature. For instance, the attraction between the toes of a gecko and the ceiling it runs across, essentially two interacting surfaces, can be explained in terms of these forces (Lamoreaux 2007).

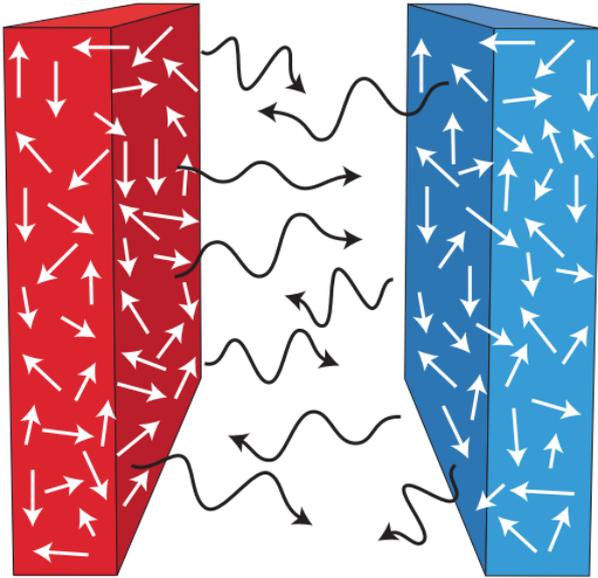


Figure 3: The Casimir effect shown as resulting from Van der Waals forces. The white arrows depict the non-uniform charge distribution in the metal plates, the black arrows represent photons which carry a resulting electromagnetic force. Figure adapted from Rodrigues et al. (2011).

Since it is possible to explain the same phenomenon in two conceptually different ways, the fundamental origin of the Casimir effect and its implications on the cosmological constant problem are unclear. The academic debate on the Casimir effect is focused on deciding between the vacuum energy and VdW forces as the origin of the Casimir force, but a different approach is adopted by Brevik and Milton (2007). They state that the interpretations are equally valid and must both be physically real. In addition, Cugnon (2011) considers it possible that the mechanisms they represent are interrelated, meaning that the existence of two interpretations has a physical origin which might reflect more than a coincidence. However, the claim that the two interpretations are related or equivalent currently lacks strong theoretical evidence.

My goal is therefore to analyze the possibility for a shared physical foundation of the two interpretations, which is hinted at by Brevik and Milton (2007) and Cugnon (2011). Emphasizing the sim-

ilarities between the interpretations, I will provide a simplified derivation of the Casimir force based on the vacuum energy and clarify how the derivation differs in the VdW interpretation. I will subsequently compare the interpretations and the arguments that support them, and illustrate how different interpretations can be reconciled by making an analogy with special relativity.

Derivation of the Casimir force

The simple equation that resulted from the work of Casimir and Polder (1948) on the VdW forces between parallel plates was independent of the type of material. This suggested a different approach to account for these forces in more elementary terms, because the VdW interpretation is inherently based on material properties (Lamoreaux 2007). Casimir found a satisfying description by reasoning that a change in the distance between perfectly conducting plates would decrease the vacuum energy, giving rise to the Casimir force that depends only on fundamental constants and the separation distance y :

$$F(y) = \frac{\pi^2 \hbar c}{240 y^4}. \quad (1)$$

The vacuum is defined as the state, denoted by $|0\rangle$, with lowest possible energy in a fixed configuration. Its energy is given by the expectation value of the relevant Hamiltonian operator: $E = \langle 0|H|0\rangle$ (Rugh et al. 1999). In this derivation, the free electromagnetic field Hamiltonian (H_{EM}^0) will be used to calculate the vacuum energy, following Casimir (1948). The next section is devoted to analyzing the meaning of this Hamiltonian,

$$H_{EM}^0 = \sum_{\mathbf{k}} \hbar\omega_{\mathbf{k}} (\hat{a}_{\mathbf{k}}^\dagger \hat{a}_{\mathbf{k}} + \frac{1}{2}), \quad (2)$$

$$E_{vac} = \langle 0|H_{EM}^0|0\rangle = \sum_{\mathbf{k}} \frac{1}{2} \hbar\omega_{\mathbf{k}}. \quad (3)$$

In the Hamiltonian (2), the number operator $\hat{a}_{\mathbf{k}}^\dagger \hat{a}_{\mathbf{k}}$, which counts the particles with wave number \mathbf{k} , has an expectation value of zero for the vacuum state, but the factor of one half gives rise to a nonzero total energy. The energy $\hbar\omega_{\mathbf{k}}$ is associated to the wave number and on the type of material

through the dielectric constant (ϵ):

$$\hbar\omega_{\mathbf{k}} = \frac{\hbar c|\mathbf{k}|}{\sqrt{\epsilon}} \quad (4)$$

(Nikolić 2017). The summations of equations (2) and (3) include only physically allowed wave numbers \mathbf{k} , so the vacuum energy depends on the imposed boundary conditions (Rugh et al. 1999). In Casimir's original derivation (1948), the set of possible waves was restricted by assuming superconductivity in the metal plates, which implies that no electromagnetic wave can penetrate the material ($\epsilon \rightarrow \infty$). Jaffe (2005) criticizes the choice to set the dielectric constant to infinity, since it obscures the general dependence on the type of material, which is the reason why the assumption of superconductivity will not be made in this derivation. In general, for non-superconducting metal plates at a fixed distance in vacuum, the dielectric constant is a function of position. After a Fourier transform, it can be rewritten as a function of the wave number. For every separation distance y , $\epsilon_y(\mathbf{k})$ represents a different function and produces a different vacuum energy through the summation of (3) (Nikolić 2017). Therefore, the vacuum energy depends on the configuration,

$$E_{vac,y} = \sum_{\mathbf{k}} \frac{1}{2} \hbar\omega_{\mathbf{k}} = \sum_{\mathbf{k}} \frac{1}{2} \frac{\hbar c|\mathbf{k}|}{\sqrt{\epsilon_y(\mathbf{k})}}, \quad (5)$$

resulting in a force, if y is a variable, because the system will try to lower its energy.

In the definition of the vacuum, y was assumed to be a fixed parameter, but if the separation distance between the Casimir plates is allowed to vary, by turning the parameter y in (5) into a dynamical variable, the dielectric constant and consequently the vacuum energy will become a function of the separation and the total Hamiltonian acquires a kinetic energy term $p_y^2/2M$. Nikolić (2016) argues that this approach is fundamentally incorrect since the Hamiltonian in (2) is only valid for fixed y . Therefore, the derivative to calculate a force will be illegitimate. However, the adopted approach resembles the widely accepted Born-Oppenheimer approximation, in which the electronic energy levels for atoms at a fixed separation distance in a molecule are computed before a kinetic term is added to take the relative motion of the atoms into account (Jecko 2014). This approximation is valid since the electrons adapt very

quickly to changing distances between atoms. Similarly, since the fields in the vacuum adapt almost instantaneously to a change in configuration, first calculating the energy for a fixed separation distance and subsequently allowing y to vary results in a good approximation of the true situation.

After turning y into a dynamical variable, a force can be computed by taking the derivative of the energy with respect to y . At first sight, the infinite sum of (5) may seem troublesome, but this infinity can be treated in multiple ways. Milton (2001) notes that the vacuum energy can be written as the sum of an infinite constant and a finite function of y : $E_{vac} = E_{\infty} + E(y)$. It is also possible to add up only finitely many terms in (5) by ignoring all waves with higher energy than some arbitrary cut-off, since high energy waves are not affected by the metal plates (Casimir 1948; Nikolić 2016; Rugh and Zinkernagel 2002). In both ways, the derivative with respect to y will be finite, so a force can be computed:

$$F_{vac} = -\frac{\partial E_{vac}(y)}{\partial y}. \quad (6)$$

A detailed calculation is omitted because it does not provide new insights. The derivative would result in the Casimir force (1) if the metal plates were assumed to be superconducting, but since the superconducting assumption was not made, (6) will result in a more general expression that depends on the material through the dielectric constant ϵ (Nikolić 2016).

Initially, Casimir and Polder (1948) considered the Van der Waals forces to calculate the interaction between neutral objects. This derivation did not require the notion of a vacuum energy, but it does consider the electromagnetic field in between the metal plates, which results from charge fluctuations in the material. Even at absolute zero temperature, the fluctuating charge distribution of particles in the metal plates results in a dipole moment in the other plate proportional to the electric field and the dielectric constant: $P = (\epsilon - 1)\mathcal{E}$ (Nikolić 2017). The coupling of the electric field and the polarization depends on the distance between the plates through the dielectric constant and the electric field. This creates an extra energy term that

produces the VdW forces:

$$\begin{aligned} E_{coupling} &= \left\langle \int \frac{P \cdot \mathcal{E}}{2} d^3\vec{x} \right\rangle \\ &= \int \frac{(\epsilon(y) - 1) \langle \mathcal{E}^2 \rangle}{2} d^3\vec{x} \neq 0, \end{aligned} \quad (7)$$

$$F_{VdW} = -\frac{\partial E_{coupling}}{\partial y}. \quad (8)$$

The VdW forces between the metal plates also depend on the dielectric constant. Similar to the vacuum interpretation, ϵ can be set to infinity, which corresponds to the assumption that only the outer layers of the metal interact (Bordag et al. 2001). In an exact calculation that assumes superconducting metal plates, (8) also evaluates to the correct Casimir force of equation (1) (Jaffe 2005). A more detailed derivation is not provided because the microscopic treatment of the charge distribution is outside the scope of this paper, but see Jaffe (2005) or Bordag et al. (2001) for a more complete treatment.

The interpretations of the energy

The essential ingredient in the derivation in the vacuum interpretation was the factor of one half in the Hamiltonian of (2), but it is not clear what mechanism this factor represents. Its mathematical origin is a postulate in the partially arbitrary quantization procedure in developing QFT², which does result in a consistent theory (Peskin and Schroeder 1995; Rugh et al. 1999; Bordag et al. 2001). The factor of one half is often ignored since it usually does not have any physical consequences. Some argue that it can be set to zero, resulting in a zero vacuum energy (Volovik 2006; Nikolić 2017). However, Bordag et al. (2001) explain that this procedure would only be valid for the vacuum in absence of boundaries, because the moving plates give rise to energy differences that should not be neglected. Clearly, the factor of one half is relevant as it generates the Casimir force, but the underlying physical process that results in a nonzero vacuum energy remains speculative.

The vacuum energy is sometimes assigned to particle pairs being spontaneously created and de-

stroyed, which is thought to result in a large vacuum energy, but this approach cannot be represented by the factor of one half, since the *free* Hamiltonian of which it is part does not describe particle creation and destruction (Klauber 2013). When interactions are considered, another Hamiltonian does consider brief particle creations, but without a net contribution to the vacuum energy. Instead, the nonzero vacuum energy may result from excitations of the electromagnetic field, called quantum fluctuations (Volovik 2006; Razmi and Shiraazi 2015).

However, the nature of these fluctuations is unclear, since they do not represent fluctuations in time and they are unmeasurable by direct experiments (Klauber 2013). In the derivation of the Casimir force, the fluctuations are stationary electromagnetic waves with an average measured electric field $\langle \mathcal{E} \rangle$ of zero, but the classical energy of the electric field depends on $\langle \mathcal{E}^2 \rangle$, which is nonzero for quantum fluctuations (Rugh and Zinkernagel 2002):

$$E = \langle H \rangle = \left\langle \int \frac{\mathcal{E}^2}{2} d^3\vec{x} \right\rangle = \int \frac{\langle \mathcal{E}^2 \rangle}{2} d^3\vec{x} \neq 0. \quad (9)$$

Although this equation looks similar to equation (7), the electric field \mathcal{E} is completely different, resulting from vacuum fluctuations instead of fluctuations of the charge distribution in the Casimir plates.

Indeed, the VdW forces also involve quantum fluctuations, resulting from the same postulate that gives rise to the factor of one half for the vacuum energy. These fluctuations are conceptually easier to understand since they are physical fluctuations and they create a measurable electric field (Rodriguez et al. 2011). Therefore, the interpretation of the energy in the VdW interpretation is less disputable, but both the vacuum energy and the VdW forces may arise from quantum fluctuations.

Reconciling the Van der Waals and vacuum interpretations

In a conference, Casimir was once asked: “*Is the Casimir effect due to the vacuum fluctuations of the electromagnetic field, or is it due to the van*

²In the canonical quantization of classical fields, it is assumed that the classical Poisson brackets for conjugate fields imply commutation relations between the fields in the quantum theory. Changing the order of the fields then introduces a factor of one half, but the order to begin with in the classical theory is arbitrary.

der Waals forces between the molecules in the two media?" to which Casimir replied: "I have not made up my mind" (quoted in Brevik and Milton (2007)). Other authors have remarked a seemingly fundamental relation between them (Bordag et al. 2001; Cugnon 2011), but no mathematical support has been provided. Therefore, it is important to consider the possibility that the two interpretations correspond to the same underlying physical effect, which for the present purposes will be done conceptually.

A standard example in special relativity illustrates how two seemingly different interpretations can be physically equivalent (Griffiths 2013). Consider a charged wire on a train moving through a magnetic field, where the motion creates a force that acts on the wire's charges. This force can be interpreted in two ways. For an observer outside the train, the charges are in motion and therefore the force can be interpreted as *magnetic* in nature. For an observer inside the train however, the charges are stationary and cannot be affected by magnetic forces at all. Seemingly accidentally, the latter observer finds an *electric* force due to a dynamic magnetic field that exactly matches the magnetic force. The observers could therefore naively dispute whether the electric force or the magnetic force is fundamentally correct. The debate was solved when Albert Einstein showed that both interpretations describe the same physical mechanism from different, equally valid, perspectives (Griffiths 2013).

Although this thought experiment exemplifies the correspondence between different interpretations, one should not take it as proof that any two interpretations are equal if they make the same predictions. As a counterexample, the work done on an object that is lifted by a magnet can easily be computed by considering the magnetic forces, but from the principles of electrodynamics it follows that a magnetic force cannot do work, since it always acts perpendicular to the displacement (Griffiths 2013). Hence, this approach results in the correct formula and is a useful tool for calculations, although the method is fundamentally illegitimate.

The derivation of the Casimir force presented in the previous sections shows the similarities between the VdW and vacuum interpretations, hinting at an equivalence between them like the electric and magnetic force interpretations in the example of special relativity. In both interpretations

of the Casimir effect, the force is a macroscopic effect that results from quantum fluctuations (Bordag et al. 2001), of which the meaning in vacuum is unclear. In addition, both interpretations involve the dielectric constant and result in the same expression if its value is assumed infinite at the metal plates. Rugh et al. (1999) argue that the Casimir effect cannot distinguish between the interpretations, and Cerdonio and Rovelli (2015) argue that choosing between them is merely a matter of convenience.

Furthermore, the equivalence of the VdW and vacuum interpretations has been shown for spherical geometry instead of parallel planes, while treating the interpretations in approximation (Bordag et al. 2001; Brevik et al. 1999).

Jaffe (2005) and Nikolić (2016) claim that some of the similarities between the two interpretations that were present in a simplified derivation will not appear in more rigorous derivations, because the applied approximations are fundamentally incorrect and merely a computational tool. A rigorous derivation of the VdW interpretation without any notion of the electric field is possible, although it is usually not considered because it is computationally more difficult (Jaffe 2005). Such a derivation does not need to depend on the macroscopic dielectric constant, but can be based on more elementary arguments (Nikolić 2016).

Even without considering the details of the derivation, the conceptual difference between the two interpretations is problematic. The vacuum interpretation is based on the assumed reality of the vacuum energy, which would be too large to agree with the small cosmological constant that follows from cosmological observations (Rugh and Zinker-nagel 2002). A consistent theory with both a large vacuum energy and a small cosmological constant requires an unimaginable degree of fine-tuning of the different factors that contribute to the cosmological constant (Lamoreaux 2007). Stating that the cosmological observations are the least ambiguous direct measurements of the vacuum energy, Rugh et al. (1999) use the cosmological constant problem as an argument against the vacuum interpretation. This view is opposed by Bianchi and Rovelli (2010), who argue that the precise consequences of the vacuum energy on the cosmological constant are unknown. They explain that even though the vacuum interpretation is based on QFT, which predicts a large vacuum energy, the Casimir

effect only implies real energy *differences* in vacuum. This means that the Casimir effect is not straightforwardly related to the absolute vacuum energy that contributes to the cosmological constant (Bianchi and Rovelli 2010).

The conceptual problems of the vacuum energy, the cosmological constant problem and the arguments by Jaffe (2005) and Nikolić (2016) based on more rigorous derivations render it difficult to find a common physical basis for the two interpretations. However, no author argues that they are mutually exclusive, meaning that no interpretation needs to be invalid, nor do the two have to be equivalent. This leads to a third interpretation by Simpson (2014), incorporating elements of both the VdW and the vacuum interpretation. In Simpson's view, which is presently only philosophical, the Casimir force can be explained as a fundamental property of the metal plates and the vacuum combined, interpreting the interaction between matter to be mediated by vacuum fluctuations. This view agrees with Cerdonio and Rovelli (2015), who argue that the Casimir effect only has implications on the vacuum in relation to matter, without consequences on a system without material boundaries. Hence, since the vacuum energy would only be real in combination with interacting boundaries, the energy of an isolated vacuum can be set to zero, in agreement with the cosmological constant of our universe.

Conclusion

When bounded by metal plates, or the toes of a gecko and the ceiling, the vacuum in QFT has a nonzero energy that can be ascribed to quantum fluctuations and gives rise to the Casimir force. In approximation, the VdW forces arise from fluctuations in matter and reproduce the same Casimir force. The conceptual differences in the meaning of the vacuum make it difficult to prove the equivalence of the interpretations in terms of the vacuum energy and the VdW forces. However, there is no physical reason why the Casimir force cannot depend on both the VdW forces between the metal plates and the vacuum energy across the space separating the boundaries. Therefore, material interactions and the vacuum energy can both be incorporated in a combined interpretation.

At the present stage, this combined interpreta-

tion is mainly philosophical. Future research should therefore provide mathematical support and clarify why the vacuum only has a well-defined energy in combination with boundaries, as it assumes. Additionally, future demonstrations of other effects of a nonzero vacuum energy will contribute to an understanding of the vacuum that might stimulate mathematical development of the combined interpretation. Possibly, a new theory of quantum gravity is required to fully understand the vacuum and the cosmological constant. However, by incorporating part of both the vacuum and the Van der Waals interpretations, the combined interpretation can presently satisfy proponents of both, while avoiding the cosmological constant problem.

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Sciences

You Are What You Eat

A Comparison of Therapeutic Nutritional Strategies for Depression

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Abstract

Depression is a highly prevalent disorder, with symptoms leading to a decreased quality of life, impaired well-being, and the potential for suicide. However, current treatments are not always available or effective and thus novel treatment strategies are required. As current research suggests an important role for nutrition in depression, this paper assessed the most effective way to use nutrition as a therapeutic strategy, specifically by comparing nutraceutical interventions and overall diet interventions. Based on the results of randomised controlled trials, studies for both intervention types show (1) inconsistent results, (2) relatively low scores on efficacy, and (3) relatively high scores on accessibility. However, based on important differences in study validity, specificity of the effect, and the potential of nutraceuticals to be harmful for patients' health, this paper identifies overall diet interventions as the preferred treatment strategy. Further studies are necessary to validate the efficacy of the interventions and to establish the optimum mode of delivery, which is valuable information for developing new treatment strategies and preventing depression.

Keywords and phrases: Depression, treatment strategy, nutraceutical interventions, overall diet interventions, nutritional psychology

Introduction

Depression is a highly prevalent disorder and is expected to be the leading cause of the global burden of disease by 2030 (Deady et al. 2017). It is associated with a range of symptoms, leading to a decreased quality of life, impaired well-being, and potentially even suicide. At present, there are different treatments for depression, including psychological treatment and antidepressant medication, but these types of treatment are not always effective or available for every patient (WHO 2017). This is problematic for global health, and becomes even more so when considering the rise in depression prevalence. It is therefore important to find innovative ways to treat depression; accordingly, this paper will assess one of such way, specifically the use of nutrition as a novel treatment strategy for depression.

In recent years, nutritional research has increasingly concentrated on the effects of diet and nutrition on mental health, and the results suggest an important potential for nutrition in treatment strategies for depression (Lai et al. 2014; O'Neil et al. 2014a). These strategies predominantly focus on two distinct domains: (1) overall diet interventions and (2) the use of nutraceuticals. The most widely studied diets used for overall diet interventions are the 'unhealthy' Western diet, and the 'healthy' traditional and Mediterranean diet, and their re-

lationship with depression is well established. The Western diet, characterized by a higher intake of foods with increased saturated fat, refined carbohydrates, and processed food products (O'Neil et al. 2014b), increases the odds of depression. The odds of depression are decreased by both the traditional diet, characterized by high intakes of fruit, vegetables, fish, and whole grains (Lai et al. 2014), and the Mediterranean diet, high in vegetables, fruits and nuts, cereal, legumes, and fish, and low in meat and whole-fat dairy products (Akbaraly et al. 2009; Jacka et al. 2010; Sánchez-Villegas et al. 2009; Psaltopoulou et al. 2013). In comparison to overall diet interventions, which can be used as both a replacement or on top of usual treatment, nutraceuticals are considered to be predominantly adjunctive. This complementary type of treatment is in the form of nutritional supplements, and the studies supplying the strongest evidence are in favour of omega-3 and folate in reducing depressive symptoms (Morris et al. 2003; Su et al. 2003; Sarris et al. 2012; Almeida et al. 2014). There is also substantial evidence that vitamin D and S-adenosyl methionine (SAME), in combination with antidepressants, lead to reductions in depressive symptoms (Sarris et al. 2016).

What is largely missing, however, is a clear overview and comparison of these strategies

¹Source: Selub, E. 2015. Nutritional Psychiatry: Your Brain on Food. Harvard Health Publishing, Harvard Medical School. Retrieved from: <https://www.health.harvard.edu/blog/nutritional-psychiatry-your-brain-on-food-201511168626>

relative to one another, which would establish to what extent overall diet or nutraceutical interventions are effective for treating depression and could lead to a reduction in depression symptomatology and ultimately prevalence. Notably, literature provides conflicting evidence on the results of both interventions (Chocano-Bedoya et al. 2013; Quirk et al. 2013; Forsyth et al. 2015). This study will, therefore, assess the most effective way to use nutrition in the treatment of depression, specifically by comparing literature on randomised controlled trials of nutraceutical interventions and overall diet interventions, taking into account consistency, efficacy, safety, and accessibility of these interventions. The comparative character adds insight to the efficacy of overall diet interventions and nutraceutical interventions; thus, the results are consequential for future nutritional intervention studies, by delivering valuable information for the development of new strategies for the treatment of depression, the development of further clinical trials, and, ultimately, the prevention of depression.

Consistency and Efficacy

Assessment of the literature reveals a high level of inconsistency between nutritional intervention studies. Research has only recently set out to test the potential of overall diet interventions in treating depression, resulting in a limited number of randomised controlled trials in the field. Only last year, the first randomized controlled trial that specifically tested the efficacy of an overall diet intervention in people with clinical depression, proved effective (Jacka et al. 2017). It was called the 'SMILES' trial, and its intervention comprised dietary advice and support, focusing on the consumption of, amongst others, whole grains, vegetables, fruit, legumes, fish, lean red meats, chicken, eggs, and olive oil, whilst reducing intake of so called 'extras', such as sweets, fried food, fast food, and sugary drinks. It resulted in relatively large improvements for the participants with a more than 25% reduction in symptom severity, and there was a significant difference in the number of participants achieving remission between the dietary support group and the con-

trol group. Furthermore, the dietary support group showed greater improvements on the commonly used Hospital Anxiety and Depression Scale (HADS), as described before (Zigmond and Snaith 1983). These effects, however, were only measured at a twelve-week endpoint and there was no assessment of the long-term effects in this study. Moreover, such an assessment of long-term effects of overall diet interventions is not yet available.

Three earlier, related clinical trials found no significant differences in improvement between their treatment and control groups. Unlike the 'SMILES' trial, these studies did not specifically investigate the effect of a dietary intervention on depression; two studies looked into the effect of lifestyle interventions, including diet, on depression and anxiety symptoms (Forsyth et al. 2015; Serrano Ripoll et al. 2015), and the other examined effects of the Mediterranean diet on mood in general (McMillan et al. 2011). This makes it difficult to judge the relevance of their results in relation to this paper's research question. Remarkably, McMillan et al. (2011) did identify some positive effects of the Mediterranean diet on specific aspects of mood, such as alertness and contentment, while there were no significant effects on the same mood measures in the 'SMILES' trial. On the whole, the efficacy of overall diet interventions is therefore debatable, but the most relevant evidence supports the beneficial effects of using diet as a treatment strategy for depression.

This inconsistency among the results is also found in randomised controlled trials of nutraceutical interventions. In studies assessing treatment for depression based on omega-3 fatty acids and B vitamins, the results are conflicting. Mozaffari-Khosravi et al. (2013) found eicosapentaenoic acid, a type of the omega-3 fatty acids, to be an effective treatment option, whilst three other studies did not find any superior effect of omega-3 or vitamin B supplementation (Carney et al. 2009; Almeida et al. 2014; de Koning et al. 2016). One pilot study (Bambling et al. 2015) did find reductions in depressive symptoms using SAME as an adjunctive to antidepressants, but showed no significant improvements in outcome upon an increase in dosage. This could possibly

be explained by the fact that the initial dose already exceeded the threshold for SAME to be effective, and therefore higher dosages did not exert additional responses. Still, the variability and unpredictability of results of the different studies decreases the potential of nutritional interventions to treat depression.

In addition, the overall efficacy of nutraceutical interventions is difficult to determine as a result of the different nutritional supplements used. Examination of the previously mentioned randomised controlled trials shows that the three studies that did not find a significant effect had sample sizes of over a hundred participants, increasing their validity (Carney et al. 2009; Almeida et al. 2014; de Koning et al. 2016); the two studies finding significant improvements in depression symptomatology and remission had fewer participants (Mozaffari-Khosravi et al. 2013; Bambling et al. 2015), and due to lack of difference in dose-response in their study, the effect found by Bambling et al. (2015) remains to be validated.

Only one study, thus, actually shows a significant and relevant effect with a mean three point difference on the HDRS rating scale, an instrument to assess changes in depression severity (with 8–13 indicating mild depression, 14–18 moderate depression, 19–22 severe depression, and >23 very severe depression) compared to the placebo group (Mozaffari-Khosravi et al. 2013). This result could suggest that most participants went from moderate depression to mild depression as a result of the intervention. This was not the case though, because only 28.6% of the participants in the treatment group responded to the treatment, but almost all of those achieved remission, while none in the control groups responded to treatment or achieved remission. This suggests that this nutraceutical intervention has a very person-specific effect, which is not unusual in interventional studies (Zeevi et al. 2015).

Regarding the long-term effects of the interventions, one study that did not find an immediate effect of nutraceuticals in the treatment of depression still showed that B vitamins enhance and sustain responses to antidepressants for over one year (Almeida et al.

2014). Conversely, the results of de Koning et al. (2016) showed no significant improvements for treatment based on vitamin B over a two-year follow up. Their participants were only adults aged 65 and over, which might have influenced the relationship.

Overall, it is possible to conclude that the short- and long-term effects of nutraceutical interventions are questionable. There is some support for both short- and long-term effects of the interventions, but other, more valid, studies contradict these results. Additionally, the effect found seems to be person-specific, which is disadvantageous for the general population of people suffering from major depressive disorder. Still, the results could be of great importance for patients who are unresponsive to other types of treatment.

Safety and Accessibility of the Interventions

In case that overall diet interventions or nutraceutical interventions would be implemented as a viable treatment for depression, the safety and accessibility of the interventions should also be taken into consideration. Safety does not seem to be a relevant issue for dietary interventions, since they involve adopting a healthy diet. Regarding the accessibility of overall diet interventions there are a number of considerations. Firstly, there is a general belief that consuming a healthier diet is more expensive, which could be problematic for patients of a low socioeconomic status. However, according to the study of Jacka et al. (2017), the estimated costs of the recommended diet were less than the average amount participants used to spend on personal consumption before the start of the study. Secondly, an overall diet intervention might be difficult to implement for those dealing with the symptoms of clinical depression; to change habits is, in practice, a difficult task for many people. This is further accentuated in people with depression, who suffer from fatigue and lack of motivation and will likely have difficulty in achieving these changes in dietary habits.

When it comes to nutraceutical interventions, safety appears to be a more important consideration. There is experimental ev-

idence that some supplements may have a damaging effect on the human body. Supplementation of DHA, an omega-3 fatty acid, potentially causes harm to the nervous system (Mozzafari-Khosravi et al. 2012), and a small proportion of SAME users have reportedly experienced gastrointestinal cramps as a result of the treatment (Bambling et al. 2015). Another key point is that the nutraceuticals are meant to be given as an adjunctive to antidepressants, which are already associated with medication-related side effects, such as headaches and nausea (Anderson et al. 2012). The accessibility of nutraceuticals as treatment strategy is not very problematic: nutraceuticals are affordable and easy to implement as an adjunctive (Bambling et al. 2015). In essence, both overall diet and nutraceutical interventions do not have significant issues regarding their accessibility, but nutraceutical interventions score slightly lower on safety.

Comparative Analysis and Conclusion

At first sight, clinical randomized controlled trials of overall diet interventions and nutraceutical interventions show similarity with both having (1) inconsistent results, (2) relatively low scores on efficacy, and (3) relatively high scores on accessibility. On closer look, however, there are some important differences. Firstly, in the field of overall diet interventions, the most relevant study shows significant improvements in the group of people with clinical depression regarding symptom severity and remission, whereas in the field of nutraceutical interventions, all trials that score highly on study validity do not show significant improvements for the treatment of depression. Secondly, considering the person-specific effect of nutraceuticals, overall diet interventions might have greater potential as a treatment strategy for the whole population of patients suffering from depression. Thirdly, nutraceuticals need to be used in combination with pharmaceutical medication, which might not be the patient's preferred way of treatment, due to, for instance, their personal beliefs, religion, and the occurrence of (possibly) severe side effects from the medication. Furthermore, the use of nutraceuticals them-

selves can also be damaging for a patient's health, which is antithetical to what should be accomplished. These problems do not occur for overall diet interventions, which are both safe and easily accessible, particularly in comparison to current treatment strategies.

Therefore, it is possible to conclude that using overall diet interventions is the preferred strategy in the treatment of depression in comparison to nutraceutical interventions. Nutraceuticals might be more useful as an adjunctive treatment for patients with suboptimal responses to pharmaceutical medication. The study, however, is limited by the absence of sufficient evidence for the efficacy of both interventions; hence, this conclusion needs to be interpreted with caution.

Certainly, to effectively implement nutritional interventions to prevent or treat depression, more research into the clinical efficacy and the exact mechanisms underlying the effects is necessary. Multiple elements, such as the immune system, metabolic pathways, and stress system, play an important role in neural development, and are known to be influenced by nutrition (Hoeijmakers et al. 2015). A more in-depth understanding of how all these factors relate to and influence the aetiology of depression would contribute to the designing and the tailoring of better interventions. In addition, as diet does not consist of single foods or nutrients, the interplay of different dietary elements should be assessed more thoroughly.

Further, when implementing these overall diet interventions, it is important to consider the different modes of delivery. Studies suggest that minimal support and supervision is necessary for the treatment to be effective, as also follows from the fact that depressive patients will likely have difficulty in achieving changes in dietary habits. Depressive patients do not seem to benefit when lifestyle recommendations are delivered in written form only – a more personalised mode of delivery has greater effect (Serrano Ripoll et al. 2015). However, it might be more cost-efficient when the treatment does not always require the presence of a dietician. This is feasible in instances where a substantial part of the meetings could take place via telephone or Skype.

Other points that should be examined in follow-up studies are the potential roles of other types of therapies and nutrients; fermented foods are considered to have a beneficial effect on the brain and cognitive functioning, while sugar, on the other hand, seems to increase the risk for depression and thus have an adverse effect (Kim et al. 2016; Knüppel et al. 2017). Further, these follow up-studies should address the difficulties in establishing accurate measurements of both dietary intake and depression. There is a variety of methods for capturing dietary intake, as well as methods that examine the relationship between diet quality and health outcomes, which leads to a high level of measurement errors. This problem should be overcome to enable a more accurate study of nutritional interventions.

All in all, the present study brings several noteworthy contributions to health care into focus. Nutrition as a treatment strategy could be a very cost-effective option for reducing depression symptomatology and prevalence, which is valuable in light of the increasing cost of health care in general. Furthermore, the ease of accessibility could also increase the number of people receiving adequate treatment. Further still, this study provides a framework for the exploration of overall diet interventions in novel clinical trials and possibly in clinical practice itself. Altogether, it plays an important role in developing interventions for the treatment and prevention of depression, which would help to avoid the burden that depression brings upon individuals and society as a whole.

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Social Sciences

The Viability of Tesla Powerwall 2 Peak Shaving in the Netherlands

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Abstract

In order to foster private investment in solar panels, the Dutch government currently allows photovoltaic (PV) solar panel owners to sell excess energy back to the grid to counter the intermittent nature of solar energy generation. However, as an alternative to this costly form of governmental subsidy, residential battery storage is becoming more attractive for home solar PV systems as a result of increasing battery efficiency rates and energy capacities. This paper sets out to take a closer look at the financial benefit and discharge time of the Tesla Powerwall 2 for a Dutch household capable of perfect peak shaving. MATLAB is used to analyze the average energy consumption of a Dutch residence and to evaluate the battery usage and discharge time of the PV and battery system. In addition, the net present value and payback period of the investment are calculated, under the scenario of consumption from Tesla Motors and the Eneco Crowdnett deal. It becomes clear that the Tesla Powerwall 2 is technologically and financially attractive for self-sufficient households that consume more than 9,39 kWh during peak-hours on a daily basis.

1 Introduction

Among the many renewable energy technologies, solar photovoltaic (PV) power has a particularly large potential for electricity generation due to its wide applicability and comparably high efficiency. Despite these advantages of residential solar PV, there remain three major barriers that obstruct a more widespread implementation of grid-tied solar PV panels. Because of the dependence of PV panels on solar irradiance, solar energy generation is limited to daytime, highly dependant on local weather conditions, and fluctuates strongly over the course of a year. As a consequence, this irregular generation of renewable energy often creates a mismatch between energy harvested and energy used (Lakatos et al. 2011).

In order to make solar panels more attractive, the Dutch government currently offers a net-metering subsidy to PV system owners, which enables consumers to sell remaining energy back to the grid. Recently, the combination of battery storage systems with solar PV systems has been recognized to play a fundamental role in making more efficient use of residential solar panels, as batteries allow excess energy to be stored for later use (Zeh 2016). In addition, battery storage is becoming more attractive for residents, as a result of lower prices, smaller battery sizes and higher efficiency rates. Therefore, residential battery storage could provide a more effective solution to the barriers of solar PV panels, since the current form of the net-metering subsidy is costly and only guaranteed by the Dutch government until 2020.

In the summer of 2017, Tesla released the Powerwall 2, a home battery storage system with an

energy capacity of 14 kWh, which is expected to change the dynamics of residential battery storage (Mot Tesla powerwall 2). This paper sets out to take a closer look at the viability of feeding solar PV energy to the Tesla Powerwall 2 for households in the Netherlands. The technological and economic parameters of the Tesla Powerwall 2 will be explored, through an analysis of the battery usage and discharge time of the battery system, while also calculating the net present value and the payback period of the investment, all of which will be done under the assumption that there is no possibility of net-metering. This is achieved for the scenario of the purchase of the Tesla Powerwall 2 from Tesla Motors, as well as for the purchase of the battery under the Eneco CrowdNett deal.

2 Theoretical background

Currently, it remains unclear when and under which conditions residential solar PV panels could effectively be used in combination with energy storage. Hence there is a lot of relatively old literature that limits the discussion to the benefits of different energy storage techniques (Chen et al. 2009; Beaudin et al. 2010; Zahedi 2011).

In contrast to these broad studies, Mulder et al. (2013) were one of the first to take a closer look at the economic feasibility of different battery storage and solar PV combinations (Mulder et al. 2013). The authors create a model that determines the financially optimal PV and battery size based on three scenarios that consider subsidies, market prices and no fees at all. However, a similar research conducted by Hoppmann et al. (2014)

¹Cover image retrieved from <http://mysolarpanelsnow.com/tesla-powerwalls-solar-panels-sent-to-puerto-rico/>

does not take subsidized scenarios into consideration, as they believe subsidies will be phased out in the foreseeable future (Hoppmann et al. 2014). In addition, as opposed to a strictly financial model, the authors attempt to increase the reliability of the model by including technological parameters such as electricity generation, electricity storage and the electric load profile of the battery system. They found that investments in battery storage are already profitable for small residential PV systems.

Khatib et al. (2016) stress the significance of a more inclusive evaluation model in the process of increasing the reliability of an assessment. The authors argue that evaluation criteria for PV and battery systems should not only be based on the economics but also on technological, social, and political parameters (Khatib et al. 2016). In a more specific case study, Vasseur & Kemp (2015) confirm the merit of a more inclusive research framework by looking at the different motives for the adoption of solar PV in the Netherlands (Vasseur and Kemp 2015). The authors argue that apart from the costs of the system, the actual efficiency of the system and the possibility of self-sufficiency also play an important role. The research conducted by Mulder et al. (2013), Hoppmann et al. (2014), Khatib et al. (2016), and Vasseur & Kemp (2015) shows that the implementation of battery storage systems in combination with solar PV has a high potential and should be explored in greater detail through a multidisciplinary approach.

3 Methodology and Research parameters

The Tesla Powerwall 2 is a stationary Lithium-ion battery manufactured by Tesla Motors, designed for residential energy storage. In contrast to an earlier version of the Powerwall, which has a capacity of 6.4 kWh (Motors Datasheet Tesla powerwall), the Powerwall 2 is of smaller size, has an energy capacity of 13.5 kWh and includes a built-in direct current (DC) to alternating current (AC) converter (Mot Tesla powerwall 2). The storage of excess energy during off-peak hours for later use during peak-hours, which is also known as peak shaving, is considered to be the main consumer benefit of the Tesla Powerwall 2. In combination with solar PV this enables a more efficient use of the solar-generated energy (Wimmler et al. 2017). In order to find the

maximum benefit of energy storage, it is necessary to consider perfect peak shaving, where all the excess energy that is generated by solar panels during off-peak hours equals the amount needed during peak hours. As a case study, this paper focuses on the average daily energy consumption pattern of a Dutch household, which is then scaled to evaluate the benefit over a year. Figure 1 displays a graph of the daily energy consumption of a Dutch household.

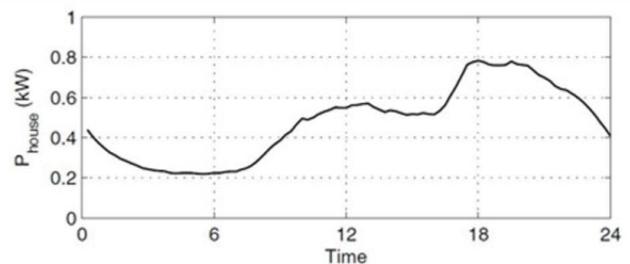


Figure 1: This graph displays the daily energy consumption cycle of an average Dutch household (Simons 2012).

3.1 Energy Generation and Energy Consumption

Assuming that the an average household located in the Netherlands has enough solar panels for perfect peak shaving and is self-sufficient on a winter day. This would mean that all the excess solar energy stored in the off-peak time period between 8:00-17:00 (during sunrise and sunset), is used in the peak period between 17:00-8:00 when residents are at home. The amount of energy generated by solar panels on a daily basis can therefore be taken to be a simple parabola between the limits of the off-peak time period. This data is then translated into MATLAB, which enables the calculation of the energy consumption during the peak-time period. Under the assumption of perfect peak shaving, it was found that the energy consumed in the peak period equals the excess energy generated and stored in the battery in the off-peak period in the aforementioned setting.

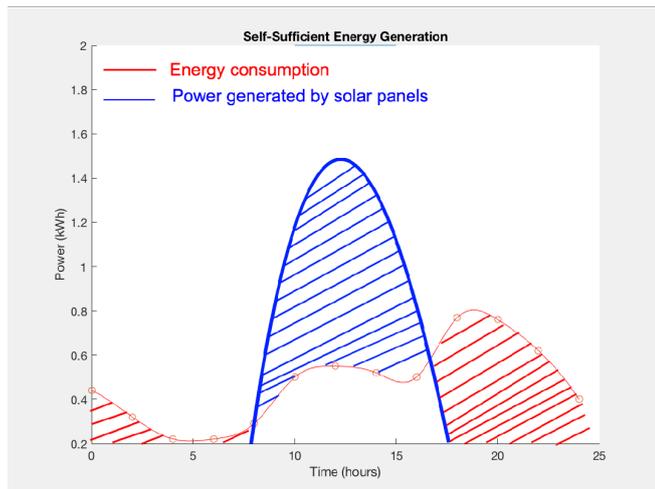


Figure 2: This image illustrates the red area of the daily energy consumption during peak hours that matches the blue area of excess energy during off-peak hours.

3.2 Physical aspect: Discharge Time

In order to evaluate the physical aspects of the Powerwall 2 from the perspective of the consumer, it is essential to look at the time it takes for the battery to discharge. This discharge time can be calculated using the definition of average power:

$$P = \frac{\Delta E}{\Delta t} \quad (1)$$

In this equation, the change in energy is equal to the energy lost in a full discharge of the energy contained in the Powerwall 2. Writing equation 1, taking time into account, leads to the following result:

$$\Delta t = \frac{\Delta E}{P} \quad (2)$$

To calculate the discharge time of the battery, this equation can be solved for time Δt by calculating the average power usage of a household P in MATLAB.

3.3 Economic model

A classic investment calculation is used to quantify the financial benefit of the Powerwall 2 for an average household under a non net-metering scheme. According to Michael (2015) and Davis and Hiralal (2016), the calculation of the payback period and the net-present value (NPV) of the investment are essential to reflect the benefit of

the investment from the consumer's perspective (Michael 2015; Davis and Hiralal 2016). The payback period refers to the amount of years it takes for the consumer to recoup the funds expended in the consumption of the Powerwall 2 and is calculated in the following way:

$$\text{Payback period} = \frac{\text{Initial Investment}}{\text{Cash flow}_i} \quad (3)$$

While the payback period provides the consumer with a rough indication of the time scale of the investment, the NPV provides the consumer with a more precise overview of the anticipated profitability of the investment, as it discounts the yearly cash flow under consideration of the real interest rate. The net present value can be calculated with the following equation (Mulder et al. 2013):

$$\text{NPV} = \sum_{i=1}^n \frac{\text{Cash flow}_i}{(1 + \text{Real Interest})^i} - \text{Cash Flow}_0 \quad (4)$$

A positive NPV indicates that the project will generate a profit, while a negative NPV indicates that the investment will result in a net loss. To complete the economic analysis and calculate the net present value and payback period of the investment, the definitions of the following data are necessary:

1. Cash flow₀ = battery system price 7500 euro (Moters Datasheet Tesla powerwall)
2. Cash flow_i = Yearly cash income
3. Real interest in 2020 = 0.5 (European Central Bank 2017)

3.4 Eneco CrowdNett

To have a complete overview of the financial benefit of the consumption of the Tesla Powerwall 2 in the Netherlands, it is necessary to take a closer look at the Eneco CrowdNett deal. The energy company Eneco currently offers a special deal to households that own a minimum of six solar panels. In exchange for 30 % of the energy stored in the Powerwall 2, Eneco provides the consumer with a yearly fee of 650 Euro's for a period of five years. After

these five years the consumer receives a 100 % ownership of the Powerwall 2 (Ene Eneco crowdnett actievoorwaarden). The payback period and the net present value are calculated for the consumption of the Tesla Powerwall 2 under the Eneco CrowdNett deal.

4 Results

4.1 Physical properties

The total amount of excess energy in an average household in the Netherlands, considering perfect-peak shaving is equal to the red area in Figure 2, can be calculated in MATLAB with the following integral of the spline interpolation:

$$\int_{24:00}^{08:00} \text{spline1}dt + \int_{17:00}^{24:00} \text{spline2}dt = 6.9117 \text{ kWh} \quad (5)$$

Assuming all this excess energy is stored in the battery, this result provides the consumer with a percentage of the battery used:

$$\text{Battery Usage} = \frac{6.9117 \text{ kWh}}{13.2 \text{ kWh}} = 52.36\% \quad (6)$$

To be able to calculate the discharge time, MATLAB is used to compute the average output during peak hours $P = 0.4797$. This produces the following

5 Discussion

According to these calculations, a single Powerwall of 13.5 kWh is sufficient to store all the excess energy during off peak periods, provided the excess energy generation for average Dutch households amounts to 6.9117 kWh. This result is not optimal, since only 52% of the battery space is exploited on a daily basis. The associated battery discharge time of the this energy is fifteen hours, which means that this is precisely long enough to supply the assumed fifteen peak hours of energy consumption of the average Dutch household. However, households that consume more energy than 6.9117 kWh will not be autonomous, as the Powerwall 2 will not be able to fully supply the energy required during the peak hours.

The results for the calculation of the payback period show that the Tesla Powerwall 2 has differ-

result for the discharge time:

$$\Delta t = \frac{\Delta E}{P} = \frac{6.9117 \text{ kWh}}{0.4595} = 15h \quad (7)$$

4.2 Payback period and NPV - Tesla Motors

Table 1 shows the parameters of the calculation of the Payback period and the net present value of the investment in the Tesla Powerwall 2 when purchased directly from Tesla Motors. The results displayed in the second row show a negative NPV of -2.9196 for average energy consumption and a payback period of 13 years. The third row of the table presents the minimum energy consumption of 9,39 kWh required to output a zero NPV.

4.3 Payback period and NPV - Eneco CrowdNett deal

Table 2 displays the parameters used in the calculation of the payback period and the NPV of the purchase of the Tesla Powerwall 2 under the Eneco CrowdNett deal. The output of the NPV calculation for both average energy consumption and above-average energy consumption is a positive number, which indicates that the earnings exceed the investment costs. The payback period related to both type of energy consumption are a payback period of 9 years and 8 years.

ent payback periods depending on the supplier and peak hour energy consumption level. The warranty provided by Tesla on the Powerwall 2 is 10 years (Motors Datasheet Tesla powerwall). Therefore, every payback period below 10 years is reasonable. The calculation of the net present value shows that the consumption of the Powerwall 2 from Tesla only has a financial benefit for Dutch households that consume more than 9,39 kWh during peak hours, as this outputs a zero net present value and a battery usage of 71%. However, when considering consumption through the Eneco CrowdNett deal, the net present values are positive, which means that a profit can be made on the investment. The pattern that can be seen in these results reveals that the investment becomes more profitable as the battery usage gets closer to 100%. While the investment price remains the same, a high battery usage reflects the amount of energy that is now

Type of consumption	Energy Consumption (kWh)	Required number of Powerwalls	Cash flow (euro)	Payback Period (Yrs)	NPV (euro)
Average energy consumption	6.91	1	580	13	-2.9196
Minimum energy consumption	9.39	1	788	9.39	0

Table 1: This table shows the NPV and Payback period of the purchase of the Powerwall 2 from Tesla Motors.

Type of consumption	Energy Consumption (kWh)	Cash flow year 1-5 (euro)	Cash flow year 5-13 (euro)	Payback Period (Yrs)	NPV (euro)
Average energy consumption	6.91	1056	580	8.83	109
Above-average Energy Consumption	9.39	1201	788	7.58	1790

Table 2: Table of the NPV and Payback period of the purchase of the Powerwall 2 under the Eneco CrowdNett deal.

self-supplied and does not have to be bought from an energy company.

There are some limitations related to the net present value calculation, since it relies heavily on expectations for the real interest and cash flow. It is assumed that the real interest does not change over the years, while in reality the real interest fluctuates and is difficult to predict. In addition, the energy company electricity prices used to calculate the cash flow are also subject to change. Another limitation is that this paper only focuses on the technological properties and financial benefit of the Powerwall 2; it ignores other relevant factors such as the battery's environmental impact and role during power outages. In a future research these factors could be taken into account. Furthermore, it would be of added value to analyze a situation in which the peak shaving is imperfect under a non net-metering scenario, since this applies to a large amount of households in the Netherlands. Ultimately, this paper aims to help improve energy policies, as well as prepare energy companies and solar PV owners for the possible transition to a scenario without net-metering.

6 Conclusion

This article provides an analysis of the financial benefit and discharge time of the Tesla Powerwall 2 for a Dutch solar panel household capable of perfect peak shaving. This study was conducted for both the consumption of the Tesla Powerwall 2 from Tesla Motors and consumption through the Eneco CrowdNett deal under a non net-metering scenario. In order to take a closer look at the technological and financial benefit of the Powerwall, MATLAB was used to calculate the average energy consumption during off peak hours. This enabled the calculation of the payback period and the net present value of the investment for both suppliers. The results show that the minimum battery usage for a positive net present value for the consumption from Tesla Motors amounts to 71%. However, from the perspective of the consumer it is a lot more profitable to purchase the battery through the Eneco CrowdNett deal, as this already shows positive net present values for average Dutch households with a corresponding battery usage of 50%. Given these points, we can conclude that the Tesla Powerwall

2 is technologically and financially attractive under both suppliers for self-sufficient households in the Netherlands that consume more than 9,39 kWh during peak-hours on a daily basis.

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Social Sciences

Providing Euthanasia to Advanced Dementia Patients

A Reflection on Ethical Dilemmas in the Use of Advance Directives

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Abstract

Although performing euthanasia has been legally permitted in the Netherlands for fifteen years, one patient group still has particular difficulty in obtaining physician-assisted suicide. The nature of late-stage dementia makes it very difficult for physicians to comply with a set of due care criteria that govern the administration of euthanasia. Physicians are reluctant to provide euthanasia to such patients, even when those patients have, in earlier stages of their disease, expressed in the form of advance directives explicit and legally-recognized wishes to be euthanized. This paper examines the key ethical dilemmas that arise regarding the permissibility of euthanasia in advanced dementia, traces their origin to ambiguities in legislation, and discusses the current inability of advance directives to respond to these dilemmas. Several solutions are speculated for fostering improved compliance with advance directives, and an analysis is provided of the potential for each of these solutions to provide a resolution on key ethical dilemmas. An analysis of these resolutions will focus on the preservation of patient autonomy in dementia and equal ability among patients to determine the time and manner of their death.

Keywords and phrases: Euthanasia, dementia, advance directives, ethical dilemmas, the Netherlands

Introduction

The 2002 Assisted Suicide Act decriminalized euthanasia in the Netherlands and specified a set of strict due care criteria that physicians must respect in administering euthanasia to patients. These criteria stipulate that a request can only be honored if it is made voluntarily by a mentally competent patient who is experiencing unbearable suffering. Honoring the due care criteria, however, becomes particularly complex for those suffering from a wide array of pathophysiologies that result in dementia, a progressive clinical manifestation which, in its later stages, severely impairs cognitive functioning. The number of people living with dementia worldwide is estimated at 50 million, and this number is expected to increase two-fold in the next 30 years (World Health Organization, 2015). In considering a dementia patient's euthanasia request, studies have drawn attention to difficulties in evaluating the voluntariness of a request and the degree of a patient's suffering as the key sources of ethical dilemmas for doctors (de Boer, Hertogh, Dröes, Jonker, & Eefsting, 2010; Pasman, Rurup, Willems, & Onwuteaka-Philipsen, 2009; van Delden, 2004). The ambiguity in assessing the circumstances of the patient's request is rooted in the deeper inability to communicate with patients whose cognition is severely impacted by dementia (Kouwenhoven et al., 2015). Particularly when patients lose the ability to reason clearly, their identity seems to become a matter of perspective, subject to interpretation, and the reliability of future preferences they voice comes into question (Hertogh, de Boer, Dres,

& Eefsting, 2007). Providing euthanasia is already a heavy decision, and consequently physicians in the Netherlands are generally unwilling to provide this service when such crucial ethical dilemmas complicate the situation (de Beaufort & van de Vathorst, 2016).

Advance directives are one of the frequently-suggested solutions to granting euthanasia to those suffering from late-stage dementia (de Boer et al., 2010; Gastmans & Denier, 2010; Gather & Vollmann, 2013). These directives constitute patients' written preferences, drafted ahead of time, that may be used to guide medical decision making if patients become incapable of making decisions on their own behalf in the future. Theoretically, advance directives could respond to ethical dilemmas facing physicians by allowing them to respect patient's autonomous wishes with greater certainty that due care criteria are being complied with (Yu, Brown, Kodner, & Ray, 2015). Moreover, the directives have been recognized as binding legal documents under the Assisted Suicide Act; yet initial studies that investigated the use of advance directives in the Netherlands found low compliance with them in care institutions (de Boer, Dröes, Jonker, Eefsting, & Hertogh, 2011; Hesselink et al., 2012). Specifically, these studies found that euthanasia was rarely performed on the basis of a valid advance directive in dementia patients, and therefore projected a dim future for advance directives to provide opportunities for dementia patients to seek euthanasia. However, since these early studies, efforts have become more focused on how autonomy could be maximized in this group of patients, and

¹Source: Daily News. Dementia - A threat to the Asian region

new opportunities were speculated for advance directives if amendments were made to their current state. In order to assess the viability of these proposed solutions, I will first discuss the ethical dilemmas that arise in euthanasia requests of dementia patients, then examine how ambiguities in legislation governing euthanasia generate these ethical dilemmas for physicians and diminish compliance with directives. Finally, I will present some of the proposed amendments to advance directives and analyze their ability to respond to the key ethical dilemmas present. Possible solutions will be discussed with regard to the maximization of patient autonomy and equal access among all eligible patients to euthanasia.

Ethical Issues Present at Evaluating Euthanasia Requests in Dementia

The first obstacle in evaluating the voluntariness of a euthanasia request is the long-standing debate on personal identity in dementia that makes it unclear how to promote the autonomy of the patient. Dworkin (1993) postulated the existence of critical interests in end-of-life decisions which take into account a person's life trajectory, personal goals, and notions of identity. These he distinguished from experiential interests, which address a person's subjective and transient experiences, such as feeling pleasure, or avoiding pain (*ibid*). He further stressed that patients should be given the autonomy to honor their critical interests by [pursuing] the kind of death they feel fits in with their life story and the character they have cultivated throughout" (as stated in Groves, 2006, p. 17). However, in determining which interests are the critical ones and honoring them, a paradox often arises between a dementia patient's former, competent self, and the current, incompetent self. It becomes unclear whose interests to respect, particularly if prior wishes set down in advance directives are in conflict with current wishes stated by the patient (Menzel & Steinbock, 2013). If the person at the start of the trajectory is considered the same as the person at the late stages of the disease, then it may be possible for that first person to, through an advance directive, make choices for their later self (de Beaufort & van de Vathorst, 2016). This is the view that Dworkin takes. Yet if

these are considered as two different people, then it becomes morally wrong for the person at the start of the disease to make choices for the person at the end of the disease, as there is prevalent consensus that making decisions about life and death on behalf of another competent individual is an intolerable form of paternalism (Groves, 2006). It is important to note that there has been opposition to defining dementia patients in terms of these two dichotomies, since there is little evidence that either of them correctly encompass the lived experience of dementia (Hertogh, de Boer, Dres, & Eefsting, 2007). Nonetheless, most ethical debate surrounding assessing the expression of autonomous and voluntary choices of dementia patients in seeking euthanasia centers on this question of personal identity and the critical interests associated with that identity.

What complicates this further is that even when a patient comes to be deemed incompetent due to their dementia, they continue to have subjective experiences, as well as wishes and preferences for the future (de Boer et al., 2010). Physicians report this to be an especially complex ethical issue, particularly if the patient appears to be enjoying their life in their new, demented state (Schoene-Seifert, Uerpmann, Gerß, & Herr, 2016). In this case, advance directives are of little use in guiding physicians' actions as they give no resolution to the dilemma of honoring critical versus experiential patient interests and preserving patient autonomy. It has further been argued that advance directives are not equipped to deal with the changing nature of diagnoses and too rigidly confine patients to their former choices, again violating autonomy to change decisions about treatment (Muramoto, 2011). What these different views have demonstrated is that low compliance with advance directives can thus be attributed at least in part to the problem of determining personal identity in dementia, which makes the evaluation of voluntariness of euthanasia requests, and promotion of patient autonomy, particularly difficult. But arbitrating on the personhood debate is not the only ethical dilemma that stands in the way of compliance with these directives.

Judging suffering is one of the most ethically complex responsibilities of a physician who wishes to assess a request for euthanasia. There is difficulty in communicating with dementia patients in general, and in identifying their true needs

(Kouwenhoven et al., 2015). Pasman, Rurup, Willems, and Onwuteaka-Philipsen (2009) found that even competent patients who indicated a strong and persistent wish to die did not always consider their own suffering to be unbearable. But beyond this, the problem of defining suffering arises. Pasman et al. (2009) found that patients focus more on psychosocial suffering in dementia, while physicians focus more on physical suffering. Further, it has been remarked that the one who is suffering unbearably may not be the future person, but the current person who fears losing competence as dementia progresses (de Beaufort & van de Vathorst, 2016). In this sense, the suffering that someone experiences as dementia progresses is the fear of dependence on others, the fear of losing dignity, and the fear of being a burden (Gastmans & De Lepeleire, 2010). But this particular conception of suffering is complicated further by the fact that people sometimes overestimate how unbearable they will find a particular development of their disease (Dresser, 2014; Hertogh et al., 2007). Physicians' awareness of this phenomenon ultimately has the effect of giving advance directives less weight (Hertogh et al., 2007). It is evident that the ethical dilemmas that arise in judging the suffering of another person, especially one with whom direct communication is not possible, are not currently resolved by advance directives, and explain the low incidence of euthanasia in dementia patients.

Legislative Ambiguity as a Source of Ethical Dilemmas

In examining the roots of the ethical dilemmas that euthanasia requests prompt, it appears that the low compliance with advance directives can be traced to the inherent ambiguity that exists in current euthanasia legislation. The lack of specificity in legislation places too large a burden of responsibility on the physician in decision-making regarding euthanasia eligibility, leading many physicians to shy away from this decision (Hertogh et al., 2007). For this, the ultimate result is a contradiction between what the law provides – a right to a self-determined death – and what occurs in practice – a near complete exclusion of dementia patients from a possibility to obtain euthanasia (de Boer, Hertogh, Dröes, Jonker, & Eefsting, 2010; Hesselink et

al., 2012).

A study by Rurup et al. (2005) exemplified this by noting that in two thirds of cases, attending physicians agreed that due care criteria may have been met, and even identified that the patient had reached a point that was explicitly referred to in their advance directive as the time at which euthanasia was desired, but euthanasia was still not carried out. The reason for this decision to withhold treatment was that doctors and nursing home policies often regarded advance euthanasia directives as an invalid request for euthanasia, or considered euthanasia in dementia never to be acceptable (ibid). This clearly contradicts the law, which made explicit the right of doctors to follow advance directives in euthanasia, as well as to provide euthanasia to demented persons, if due care criteria could be maintained (Hesselink et al., 2012). Rurup et al. (2006) and de Boer et al. (2010) went on to point out that while many Dutch physicians do not grant euthanasia on the grounds of dementia, they do consider following an advance directive if the patient suffers severely from a comorbid physical illness. When a patient is experiencing severe physical suffering in addition to the mental distress of living with dementia, physicians are less hesitant to follow advance directives. Based on the observation of this phenomenon, Menzel and Steinbock (2013) remarked that a dilemma regarding honoring advance directives arises only in those cases where the critical interests conflict with the experiential interests of the patient. The fact that physicians implicitly stipulate these additional requirements for obtaining euthanasia illustrates one of the ways in which the lack of legal guidance for physicians results in an inability of dementia patients to fully exercise their rights.

Hesselink et al. (2012) further deemed the Dutch due care criteria to be a poor guide to physicians' decision-making due to difficulty ascertaining if criteria was being followed. A study by Tomlinson et al. (2015) found that even medical professionals who fully supported assisted death for dementia patients found it very difficult to decide for an incompetent person the exact moment at which to provide the lethal injection, and found no guidance in existing legislation. In the Dutch setting, Rurup et al. (2005) also found that, in about three-fourths of cases in which physicians denied euthanasia to dementia patients, it was the reluctance or non-acceptance of advanced directives or

euthanasia by relatives of the patient that led to this. In fact, the only circumstances in which advance directives were found to be carried out in this study was when a comorbidity was present and caused additional unbearable suffering. Even then, however, it was very often the case that, in place of providing euthanasia, there was withholding of life-sustaining treatment instead. A decision to forgo life-sustaining treatment for a patient does not contribute as directly to their death as does actively performing euthanasia, and it is therefore often seen by physicians as a lesser, more morally justifiable form of paternalism (Gastmans & De Lepeleire, 2010). This willingness to withhold life-sustaining treatment, but hesitation to allow euthanasia, was similarly observed by de Boer et al. (2011). Their study noted that life-sustaining treatment was far more frequently withheld from dementia patients who had an advance euthanasia directive than from those who did not, implying that these directives effectively replaced do-not-treat directives. This is a clear instance of misattribution of the law, as do-not-treat orders exist, but are not covered by advance euthanasia directives, and should not be equated with them. It can be speculated that the current legislation leaves ambiguities about how to honor due care criteria, making it difficult to arbitrate on ethical dilemmas and assess compliance with the law. It is, therefore, necessary to investigate ways in which compliance with advance directives could be improved in a way that respects patients and is acceptable to physicians.

Improving Compliance with Advance Directives

In exploring methods that foster compliance with advance directives in an ethical way, several proposed strategies merit further investigation. Einterz, Gilliam, Chang Lin, McBride, and Hanson (2014) suggest using decision aids – which help decision-makers factor risk, uncertainty, and personal values into care decisions – to facilitate conversations between physicians, patients, and surrogate decision-makers and to align treatments with ultimate goals of care. Their pilot study found that these decision aids helped dementia patients to prioritize goals and improved the communication and the quality of decision-making for these patients. It may be possible to extrapolate from this that, even

in cases where physicians feel uncomfortable complying with advance euthanasia directives, decision aids may still provide a way to align treatments with the goals of care, which could be equated to honoring the patients' critical interests.

Several others have similarly looked at ways to promote the patient's right to choose end-of-life treatment options. Dresser (2014) and Menzel and Chandler-Cramer (2014) propose formulating directives that explicitly instruct withholding of food and water if a patient is showing signs of distress at being fed or appears to be severely suffering otherwise. These directives cannot be equated with euthanasia directives, yet they constitute a form of refusing life-sustaining treatment that has the added assurance that death should follow relatively quickly, which is lacking in many current do-not-treat orders (Menzel & Chandler-Cramer, 2014). Importantly, there is already legal recognition of a patient's right to refuse medical treatment and these directives capitalize on that opportunity afforded by the law. Menzel and Chandler-Cramer (2014) argue that such directives should begin to take on greater authority as the patient's apparent enjoyment of life and capacity to generate critical interests diminishes, as very often happens toward the end of a dementia patient's life. Still, this solution leaves many questions unanswered regarding how to judge when such a directive should take effect, and does not aid physicians in addressing the ethical dilemmas they face in dealing with this group of patients.

Another approach that seems particularly promising was proposed by Schoene-Seifert et al. (2016) and involves adding more specificity and concrete anticipatory cases to advance directives. This empirical study demonstrated that physicians are more willing to comply with an advance directive if there is greater specificity in the situation the directive was intended for. By combining this with regular updates and reviews of existing directives in light of changing health diagnoses or circumstances, Muramoto (2011) argues that there is a possibility for advance directives to hold greater weight with physicians by resolving some of the ambiguity surrounding voluntariness of requests.

With an appropriate directive, it seems that euthanasia and withholding of life-sustaining treatment could be deemed ethically acceptable if the experiential value of the patient's survival has decreased to the point where the critical interests

expressed in the directive outweigh it (Menzel & Chandler-Cramer, 2014). Yet regardless of the existing efforts on these fronts, some have postulated that there will always be cases in which advance directives are much less likely to be followed. These include cases of late-stage dementia in which a patient has made no verbal request for euthanasia at an earlier point; cases in which no comorbidity is present; cases in which the family neglects to inform physicians about an advance directive; or cases where a patient is not seen by a physician until an advanced stage of dementia (Hertogh, 2009). Each of these cases raises specific concerns regarding conflicts with due care criteria and leaves physicians with insufficient tools to commit ethically permissible acts of euthanasia. For this reason, it appears unlikely that there will be an equal ability of all dementia sufferers to access euthanasia in the near future. Nonetheless, the above studies speculate that there are avenues by which it may be possible to improve compliance with advance directives and improve patient autonomy through means that feel ethically justified to medical professionals.

Conclusion

The combined effect of a growing population of dementia patients and increased legal avenues for obtaining euthanasia indicates that there will be building pressure to discuss this divisive issue and arrive at an ethically sound resolution. Current euthanasia legislation suffers from a critical ambiguity in regard to evaluating the presence of a voluntary request motivated by truly unbearable suffering. Because of this, advance directives are unable to fully accomplish the task with which they are charged – increasing autonomous decision-making – in the growing population of dementia patients. The ethical dilemmas that physicians are confronted with in granting euthanasia to dementia patients are so significant that advance directives seem in many cases unable to adequately respond to these dilemmas. Despite this, empirical studies have demonstrated that advance directives should not be discounted as a possible solution; they need to be amended, both in the ways in which they are written, and the ways in which medical professionals apply them.

With euthanasia legislation in its current condition, the key to maximizing the utility of ad-

vance directives is in designing an appropriate directive, such that euthanasia and withholding of life-sustaining treatment can be deemed ethically acceptable to physicians. Attempts to amend directives should be focused on increasing their ability to respond to the ethical dilemmas surrounding evaluating the voluntariness of requests and the suffering of the patient. For this to be done effectively, efforts on both the patients' part and the medical professionals' are necessary. In the Netherlands, it appears that advance directives will likely never be applicable to the entire population of dementia patients, and there will still need to be a considerable change in how end-of-life care facilities view demented persons before these changes can take effect. Nonetheless, by acting on time, making as many affordances for the future as possible, and maintaining communication between all parties involved, there is an ability to increase compliance with directives in the current Dutch setting. Dementia patients can still maintain hope that there will be increased compliance with their advance directives in the near future, and increased opportunities to provide them with the same rights as are afforded to other patients seeking euthanasia.

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“I am not only the Muslim woman”

Constructing Hybrid Identities and Articulating Religious Agency through Clothes
in a Home Country which is “mine also, as it is yours”

A Case Study of the Clothing Practices of three Dutch Muslim Women

Domiziana Turcatti (AUC)



Abstract

This paper presents a qualitative case study conducted in the month of January 2017 on the clothing practices of three Dutch Muslim women who choose to wear the hijab. The purpose of the case study was to (1) investigate the heterogeneity of these women's clothing practices in their everyday life, (2) explore how these women express meanings and values through their clothes and (3) discover how their clothing practices are a means by which multiple identities in a Dutch context are constructed and expressed. Data was collected through three semi-structured interviews with a native Dutch convert, a Dutch convert with Bosnian background and a Dutch young woman of Moroccan background. The qualitative research revealed how these women's clothing practices are heterogeneous and cannot be reduced to the mere practice of wearing the hijab. Furthermore, the process of negotiation between cultural and religious norms expressed through clothing revealed the construction of a hybrid identity which brings together cultural, national, religious, as well as gender dimensions and values. It also revealed how clothing practices are a source of religious agency, for clothes allowed them to act on their religious beliefs although this led to differential treatment from non-Muslims that evolved into socio-cultural exclusion for the two Dutch converts who cover their whole body. This case study challenges the assumptions regarding the clothing practices of Muslim women, at least with regard to the three participants, and critically considers the role of the majority of Dutch non-Muslims in establishing intercultural communication for the construction of a multicultural society.

Introduction

In Dutch political and public debate, the clothing practices of Dutch Muslim women have often been presented as an example of multiculturalism's failure (Duits and van Zoonen, 2006; Vasta, 2007). In particular, the Dutch public debate has been ascribing narratives of gender inequality and "multicultural excess" (Duits and Van Zoonen, 2006, p. 109) to the practice of wearing the veil. These discourses have been depicting the veil – disregarding all its forms and shapes – as a symbol antithetical to the country's secular and liberal values and therefore constituting a threat to Dutch society and culture (Duits and van Zoonen, 2006; Leurs, 2015; Patti-Crocker and Tasch, 2015). Thus, the veil has been used to construct Muslims as the unwanted and dangerous 'Other' (Duits and van Zoonen, 2006; Patti-Crocker and Tasch, 2015).

It is in light of such a political context that the presented qualitative research was carried out. Conducted in the month of January 2017, the qualitative case study investigated the clothing practices of three Dutch Muslim women wearing the hijab. The research aimed to contribute to the deconstruction of the aforementioned discourse regarding Muslim women and their clothing practices which helped shape and strengthen the rise of Islamophobia (Romeyn, 2014). Furthermore, the research aimed to contribute to the Dutch literature on the issue as most of the analyzed studies

conducted in the Netherlands on the matter dealt with Muslim women's veiling practices in relation to the expression of religious and political values and the construction of a Muslim identity (Hoekstra & Verkuyten, 2015; Duits & van Zoonen, 2006) while only few studies have investigated the whole range of Dutch Muslim women's clothing practices extensively (Unal, 2013).

It is for these reasons that this study aimed at investigating the heterogeneity of these women's clothing practices in their everyday life. It focused particular attention to how these women express meanings and values through clothes; and how these become means through which multiple identities are constructed and expressed within the Dutch context.

Literature Review

Clothing practices have long been considered part of the material artifacts through which a culture can express and construct its values and identities (Albrecht, Jacobs, Reief and Adamski, 2015; Kuper, 1973; Saucier, 2012). Kuper (1973) defines clothing practices as "part of the total structure of personal appearance which includes hairstyles, ornaments, masks, decorations and mutilations" (p. 348). These practices may be regarded as statements or forms of nonverbal communication as highlighted by Simmel in the early twentieth century (Ritzer and Stepnisky, 2014). In Kuper's words

¹Source: Clothing Practices of Dutch Muslim Women – Google Search

(1973) clothing is a “universal and visible cultural element consisting of sets of body symbols deliberately designed to convey messages at different social and psychological levels” (p. 348).

Thus, clothing becomes part of a structure whose different aspects are “consciously manipulate[d] to assert and demarcate differences in status, identity and commitment (support or protest) at the level of person[al], national and international relationships” (Kuper, 1973, p. 349). It follows that clothing is more than a necessity, rather it becomes an important means of displaying identity (Saucier, 2012). As Woodward writes, “identity is marked out through symbols [. . .] there is an association between the identity of the person and things a person uses” (Woodward, 1997, p. 9-10).

Literature examining Muslim women’s dress practices in relation to identity focuses mostly on veiling. The study conducted by Wagner et al. (2012) offers meaningful insights on how for Muslim women in India, wearing the veil becomes part of the means by which they construct and affirm their cultural and religious identity as members of the Muslim community, distinguishes them from the predominantly Hindu community. Similar findings also come from the study conducted by Zempi (2016), where it was found that the niqab was a symbol signifying belonging to the Muslim community and a means of differentiation from the non-Muslim majority. In the Netherlands, Duits and van Zoone (2006) reported how Moroccan school girls in the Netherlands wear the headscarf as a form of political agency to counteract and fight against the hegemonic discourses depicting Muslim women as the ‘oppressed’ and the pressure to assimilate. These are also experiences reported by Rana (2007), whose article reports that wearing the hijab in the Canadian context is, for some women, an expression of agency, an “empowering way to create an identity” (Rana, 2007, p. 172), and therefore a form of agency that is part of the process of “subject-constitution” (Bilge, 2010, p. 23). From the above studies, it seems that, in the Dutch context, little research has been conducted on the relationship between the expression of values through clothing practices other than the veil. Furthermore, little attention seems to have been given to values other than the political and the religious as expressed through clothes by Muslim women. In addition, the body of literature examined focused

mostly on the veil, which is not the only symbol with which Muslim women can identify with, as Rana (2007) observed. Rana (2007) conveys the idea that a whole range of clothing practices may be relevant for the making of one’s identity. It is due to this that the present research focused not only on the veil, but on the clothing practices of the participants as a whole. It remained open to the investigation whether the whole range of values expressed through clothes while investigating how identities are construed and expressed through these practices or not. Thus, the guiding questions of this research were:

1. What does a target group of three Muslim Dutch women have to say about their clothing practices, and how do they describe these (e.g. veil, dresses, makeup, accessories)?
2. What clothing practices do these women engage in and consider important?
3. What are the values and meanings that these women ascribe to specific clothing practices?
4. What relationship may exist between clothing practices and the construction of these women’s multiple identities?
5. What can be learnt from what these women tell?

Methods

The research was conducted with a qualitative and interpretive approach originating from Geertz’s approach to ethnography (Tracy, 2013). According to Geertz (1973), “man is an animal suspended in webs of significance he himself has spun” (p. 4) and the ethnographer has the task to uncover and interpret such constructed webs of meanings that engender reality. Such an approach was combined with a critical perspective on the issue aiming at deconstructing the already mentioned ‘othering’ discourses.

To investigate the clothing practices of Muslim women in the Netherlands, three Muslim Dutch women wearing the hijab were included through convenience sampling. The three women were found using my personal network of friends and acquaintances. The three women participating in the research were Alice², a 33-year-old Dutch convert

²To guarantee confidentiality and anonymity, the names that are featured in this paper are pseudonymous

living in a small town close to Amsterdam; Hannah, a 29-year-old Dutch convert of Bosnian background living in Utrecht and Lara, a 23-year old Dutch Muslim woman of Moroccan background, who lives in Amsterdam. Before conducting the interviews, I explained the research goals and introduced the letter of presentation as well as the consent form, guaranteeing confidentiality and anonymity.

Qualitative data were collected from the different sources during the month of January 2017. Three individual, semi-structured interviews of approximately 45 minutes were carried out and recorded. Furthermore, as they are all active Facebook users, the participants' pictures on Facebook and their profile were compiled with the field notes. This was done in order to gain a better understanding of the participant's social context by comparing what these women said about their clothing practices with their daily life as presented on Facebook.

The data were analyzed through thematic coding. I followed the 14 stages of thematic analysis proposed by Burnard (1991) which allow to move from open coding to axial and finally selected coding and in this way it allows not to jump to interpretation but to look for evidence. However, I skipped the sixth stage, whereby I was supposed to have two peers coding the same transcript, but, due to limited available time and resources, this was not achievable.

The study has some methodological limitations that need to be addressed. It is heavily based on the semi-structured interviews, few participant observations were conducted, and there was no opportunity to test inter-code reliability due to limited time and resources. I consider these strong limitations of the current case study. Indeed, given my limited experience in conducting ethnographic research and in light of my own position within the fieldwork as a white, Italian woman raised in a 'secular' context, the possibility to discuss my analysis with someone else engaged in the field for a longer time would have been particularly valuable in further deepening the process of self-reflexivity.

Findings

Alice, Hannah and Lara and their clothing practices in the Dutch context

In the Netherlands, Muslims account for approximately 6 per cent of the total population (Patti-

Crocker and Tasch, 2015). Muslims in the Netherlands belong to different ethnic groups who started to migrate to the Netherlands from the 60s onwards, first as 'temporary guest-workers' and later settling (Bujs, 2009; Forum, 2010; Forum, 2008). The most over-represented groups are Turks, who in 2007 made up 38 percent of the total Muslim population, and Moroccans, who constituted another 31 per cent (Van Harten, 2007). The Dutch Muslim population also includes people of Moluccan, Surinamese, Bosnian, Somalian, Iranian, Pakistani and Afghanistani backgrounds (Buijs, 2009). Of the Muslim population, only 1 per cent represents the so-called native Dutch, which in 2007 amounted approximately to 12.000 people (Van Harten, 2007).

Alice, Hannah and Lara are part of that 6 percent of the Dutch population, and yet their life stories are diverse and heterogeneous. Alice, who defines herself as a "home mother" is one the 12.000 so-called native Dutch converts. Born and raised in a small town close to Amsterdam by white, Dutch, middle-class parents, she graduated in with a degree in law from the University of Amsterdam. She also took a minor in world religions, where she started learning about Islam. It is then that she discovered that Islam was "her religion" and converted in 2008. Hannah, mother of three daughters of Bosnian background, is also a Dutch convert. Born and raised in Utrecht by her Orthodox Croatian mother, Hannah had a Catholic upbringing, but it was only when she read about prophet Mohammed that she felt "like a puzzle that came together", eventually converting to Islam when she was sixteen years old. On the contrary, Lara, the youngest of the three, has been Muslim from birth. Born and raised in Rotterdam, Lara now lives in Amsterdam with her parents, who are both Moroccan, where she studies accountancy and trains in kick-boxing.

Their life stories are as diverse as their clothing practices. Indeed, even if Alice, Hannah and Lara share the fact that they wear the hijab, they differ (1) in the type and way they wear the hijab; (2) in the extent by which they cover their bodies; (3) in the kind of clothes that they wear. Indeed, while Lara wears the hijab in such a way that the underscarf is not visible, this is not the case for Alice and Hannah. Furthermore, Alice and Hannah tend to wear fashionable long clothes that cover the whole body, while underneath usually wearing

casual H&M clothes. They usually buy the long clothes with which they cover everything with the exception of their hands at Umm Sarah or Hazanah, high fashion Muslim boutiques in the Netherlands. Lara, on the other hand, does not wear designed clothes, but prefers more practical and comfortable ones. Furthermore, she does not cover the whole body as Hannah and Alice do, but she covers her "female parts": that is to say, her "ass, her breasts and her hair" with clothes that she sometimes buys from H&M, Zara or Bershka.

Constructing a Hybrid Muslim, European, Dutch, feminine identity

In this section, after having introduced how clothes serve the construction of a Muslim, European, Dutch and feminine identity separately, it is presented how Alice, Hannah and Lara, construct and fuse together ethnocultural, religious, national, and gender dimensions into their own hybrid identity through their clothing practices.

Muslim identity

Clothes are one of the means by which Alice, Hannah and Lara define themselves as Muslim. In particular, for Hannah and Alice who are both Dutch converts, clothes become the means by which they reaffirm their conversion. Indeed, as Dutch converts, Alice and Hannah differentiate, through clothes, between a non-Muslim 'self' who used to wear short pants and the present 'self' as a Muslim woman. Slightly different is the experience of Lara. She was born Muslim, but the act of covering what Lara defines "female parts" becomes also one of the means by which she completes the construction of her own identity as a "good and convinced Muslim".

European and Dutch identity

Clothes seem to be part of the means by which Alice, Hannah and Lara express their cultural identity as Europeans as well as their belonging to the Netherlands. Indeed, they deconstruct the idea that their clothing practices communicate only their religious identity. As Hannah recalls: "I am not only the Muslim woman". Culturally, they all feel that they dress as Europeans do, since they are and feel European. Indeed, Alice and Hannah think that the Islamic fashion boutiques where they buy

their clothes are very different from other Islamic boutiques in the Middle East or Africa. Similarly, as Lara buys clothes from H&M, Bershka or Zara, she says "I still look like a people from Europe, only just more covered up". Furthermore, clothes become a source for national identification. Alice, as a so-called native Dutch, specifies that becoming Muslim does not mean becoming a Saudi Arabian woman, and therefore does not mean dressing as Muslim women from Arab countries do, for "you can still be modest and wear clothes that you normally wear in Holland". Similarly, Hannah defines her multiple nationalities through her clothes. Indeed, although Hannah feels she is also Bosnian, she does not dress as Bosnians do and, thus, through clothes, also constructs herself as Dutch. Also for Lara clothes become the means by which she defines herself as Dutch. She highlights how her clothes make her different from other women living in Morocco, and therefore she also establishes herself as being Dutch. "When I go to Morocco, I don't think we are the same. The[ir] way of dressing is very different [from mine] if you compare with Morocco in this case" Nevertheless, for Lara, clothes become also the means by which she displays one or twice a year that "I definitely feel Moroccan" by wearing Moroccan traditional clothes.

Gender and feminine identity

Clothes become also the means by which they seem to set the standards of what it means to be a woman, or as Hannah says, "a lady". It seems that for these women, being feminine means, primarily, taking care of and respecting their bodies by not undressing themselves to attract male attention. Such conception of femininity expressed through clothes seems to prevent their subordination in relation to males. This becomes particularly important for Lara, who seems to have most contact with males of the three, as she also trains kickboxing, which she acknowledges to be a male-dominated sport.

"For instance, when I go to a place with a lot of noisy guys I am not the one who gets the attention, I am not the one who gets disturbed, because they see me with a scarf, and they are like, 'oh, I don't have to bother her because she doesn't want me'. When I look in front of me, and I see a curly hair with a lot

of make-up, and short dress [...] they always get really bothered and annoyed and everything. So I really see the effect it has, the result ... the outcome of dressing like this, covering"

Once the body is respected – and “you don’t have to be a Muslim woman for that” (Hannah) – they feel that a person can be more or less feminine, or rather, fashionable, by the kind of clothes that one buys and the kind of aesthetic preferences and interest in fashion. Indeed, covering the body does not equate with being unfashionable or backward. For instance, Hannah and Alice prefer fashionable clothes, and through fashion, they express their aesthetic values. Alice and Hannah, for example, highlight how they like “long beautiful dresses” made of cotton rather than fake silk of bright colors. Lara, on the other hand, would rather wear comfortable clothes such as sneakers, hoodies and trousers. She does not like designer clothes, and she prefers jeans over skirts. She says that, although these clothes might be less fashionable, wearing these does not deny the fact that she is feminine in the first place, for she respects her body.

Hybrid identities

These identities – the Muslim, European, national and gender – are constructed and brought together into a hybrid identity. This process whereby such a hybrid identity is constructed through clothing practices seems to be connected to an ongoing negotiation of Dutch cultural and gender norms as well as religious norms. All of them negotiate what it means to be a Dutch woman, deconstructing the idea that a Dutch woman cannot be Muslim and cover her body, thus challenging “the normal standard here in Holland [which] is pants or skirts and something on top” (Lara). Similarly, they also negotiate the rules of their religion according to the context in which they have grown up. Lara’s words are particularly powerful in recognizing and describing this process, which is also shared by Hannah and Alice, who paradoxically cover their whole bodies and might be thought of not engaging in such negotiation of religious norms:

“What the book says [...] is actually what you have to pursue. But I don’t think it works if you live in a country that

[is] not Muslim. There’s also another side in our religion that says that you have to adapt to [a] certain level to the country that you are living in. As long as it doesn’t take away your religion or goes against your rules, you can adapt. I think it’s possible to combine those two things together. So, actually cover everything you have to cover [...] and do it in a fashionable way, which can be admitted by people in the West”.

Lara negotiates, for example, the concept of female parts. She does not cover her whole body, but only the parts which she associates with femininity, namely, “the breast, the ass” and the hair. She does not consider the forearm and the calf “that attractive”. Also Hannah and Alice, although they cover their whole bodies, negotiate the religious norm and what the Qu’ran says. They wear colorful clothes, rather than only black, although some say that “colors will distract you”. They also express the willingness to “follow the rules”, but in their own way.

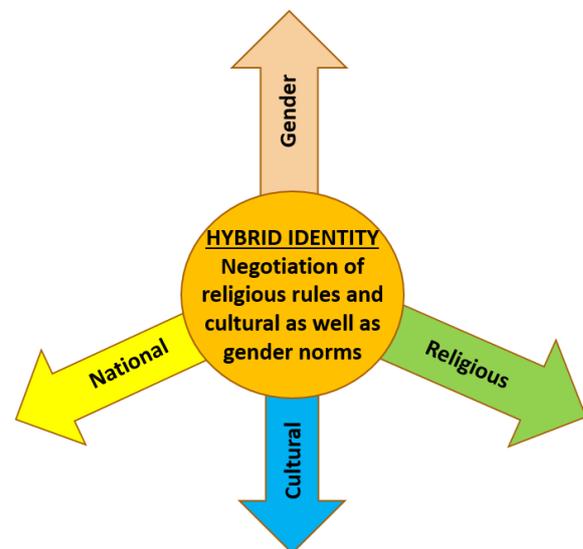


Figure 1: Representation of the four dimensions which come together to form a hybrid identity supported and based on the continuous negotiation of gender, cultural and religious norms. Figure made by the author.

Articulating agency through clothes in a hostile context

In this section, it is presented how, through their clothing practices, Alice, Hannah and Lara articulate a form of religious agency, which seems to lead to a 'different treatment' which for Alice and Hannah evolves into feeling socially excluded.

Clothes as a source of religious agency

The practice of wearing the veil and dresses that cover all parts of the body in the case of Alice and Hannah or only the "female parts" in the case of Lara becomes one of the means by which these women act on their religious beliefs within and despite their subjective and socio-cultural context. Indeed, Alice, Hannah and Lara express in multiple instances how they submit themselves to their religious beliefs, which becomes a form of agency in itself. As Hannah powerfully illustrates, she dresses the way God would love her to dress:

"This is what I love, this is what my religion wants from me, what God would love from me and I love to do it back. How many things he gave me in life, I would give one thing back. It's not that hard to put a piece of clothes on, it's easy. I am not doing anything, I am just wearing it. But I know God loves it."

This very condition whereby they constrain their clothing practices constitutes the conditions of agency that allow Alice to say "it's my free choice", that enable Lara to define herself as "also one person that just choose for it" and leads Hannah to say that "I want to wear it, that's my right and I love it, since this is my finer gift to the world". Indeed, wearing the veil and covering the female parts becomes a "beautiful" form of agency in a context within which they didn't find the approval of their families.

From being treated differently to not feeling accepted

Because of their clothing practices, Hannah, Alice, and Lara have been experiencing 'different treatment' in the form of occasional discrimination from non-Muslim Dutch people. While Lara explains how she feels accepted (although sometimes

she gets "rude comments" in the street because of her headscarf), Alice and Hannah recount and explain how they are subjected to systemic discrimination, which they consider "unfair", for they are both Dutch and they feel that they have a right to belong to a country that "is mine also [. . .] as it is yours" (Hannah).

Alice and Hannah recount a narrative of social exclusion and systematic discrimination. As Dutch women who converted and wanted to cover their bodies, they have been often addressed as "crazy". This meant losing some of their non-Muslim friends and having to negotiate their inclusion within their own families as well as with some other friends who, at first, did not want to accept them. Alice highlights in a very powerful way how being "crazy" means losing the privilege to be accepted:

"You know white privilege? You have the white privileged and when you start wearing the veil and marrying my husband who is Somali, you give it away. You don't have the white privilege anymore. I never noticed discrimination. . . you have your parents, your village, everyone is just white. So, you never notice it, but when you start wearing the veil and you start noticing it you think. . . wow . . . it's really bad".

They feel that they have been socially ostracized and demonized by Dutch society. "They think you are oppressed by [your] husband, but I think there's more oppression from society than from the husband", to the point that Alice feels more understood and "safer" in Somalia. Hannah also feels more accepted in Bosnia, where "they understand where I got it from", in reference to the hijab and the practice of wearing long clothes.

When the lack of intercultural communication becomes a burden

In such a context of discrimination, albeit to different degrees, Alice, Hannah and Lara feel a need for intercultural communication, which is currently lacking. For Alice and Hannah, the lack of intercultural communication and understanding becomes a burden, since they feel they have to defend their identities and the fact they are Muslims. Hannah's words, broken by tears, are powerful in addressing this aspect:

“You have to explain everything to everyone and you always have to look happy, very nice . . . terrorist . . . why do you think like that . . . I am just Hannah, just me, you have to meet me [. . .] Why do I even have to think about it [implying the clothes she wears]? If I want to wear pink hair they would look at me as a punkie, but they think about me as a terrorist not as a person of the humankind”.

Lara, however, does not feel she has to defend her own identity. She does talk to others who are puzzled about the fact that she wears the hijab, but in case of misunderstanding, she does not “care”. Rather, Lara feels she has to prove herself, she has to prove that she is a strong Muslim woman worthy of “double” respect in different social contexts. Lara did not explain why she doesn’t feel the need to defend herself in this.

Discussion and Conclusion

The current research reveals how these women’s clothing practices are heterogeneous and cannot be reduced to the mere practice of wearing the veil. It also showed how these Muslim women’s diverse clothing practices come to constitute “a flexible symbolic system [that] convey a variety of meanings” (Mossière, 2012, p. 130). Such a process, whereby multiple meanings are combined into a coherent symbolic system expressed through clothes, seems to be producing and constructing a hybrid identity, which incorporates gender, religious, cultural and national dimensions.

This process poses questions and calls for more extensive research on how the identities of Muslim women need to be conceptualized in the 21st century when all areas and ways of life are becoming increasingly globalized and fused together. More specifically, further investigation is necessary on how this process of negotiation manifests itself in the Dutch context. Indeed, this research showed only the presence of negotiation, but could not describe the mechanism by which this process emerges and unfolds in the Dutch context, under which circumstances, and whether it develops differently according to the socio-cultural backgrounds of individuals. Investigating this further in the Dutch context could reveal insights in the

process of acculturation and integration of Dutch women converted to Islam as well as for second generation Muslim women of diverse backgrounds. Yet, the current research deconstructs several discourses in the bound setting of the case study, as indeed the findings cannot be generalized given the sample size and the qualitative nature of the research.

Firstly, the presented case study challenges the idea that covering the body is an example of multiculturalist excess. Rather, the act of covering the body with clothes as well as with the hijab becomes an important aspect of identity construction in a country in which they are a minority, as Wagner et al. (2012) and Zempi (2016) already found. This, however, does not represent an unwillingness to integrate, rather shows a willingness to retain one’s culture which, as Berry (2005) shows, is not in opposition to integration.

Secondly, although the “Islamic veiling as a symbol of religious submission and gender segregation becomes a reminder of a pre-feminist past” (Gole., 2012, p. 111), this case study deconstructs the association between the act of veiling and gender inequality within the context in which these women live. Indeed, through these women’s clothing practices, “alternative ways of linking femininity and sexuality in public” (Gole, 2012, p. 111) are introduced and, although these are different from the “secular feminist modes of self-fashioning” (Gole, 2012, p. 111), they should not be discarded and delegitimized as oppressive or violations of human rights.

Thirdly, covering the body and the hair is not antithetical to the enjoyment of fashion and the expression of aesthetic values, which is a discourse often used to justify the supposed secular superiority of the so-called ‘West’ over the supposed backwardness of ‘Islam’ (Gole, 2012; Unal, 2013). This complies with the findings of Bouvier (2016) and Mossière (2012) showing how Muslim women use clothes to communicate their fashion preferences.

What also emerged is that these women’s agency could not be framed in terms of liberation or oppression from ‘Islam’ or resistance to the ‘West’. Rather, in this case study, agency assumed a religious form and was part of the process by which these women constitute their identities and subjectivities as religious women (Rana, 2007; Bilge, 2010). This form of religious agency, is defined by Bracke as “not driven by a desire to resist so-

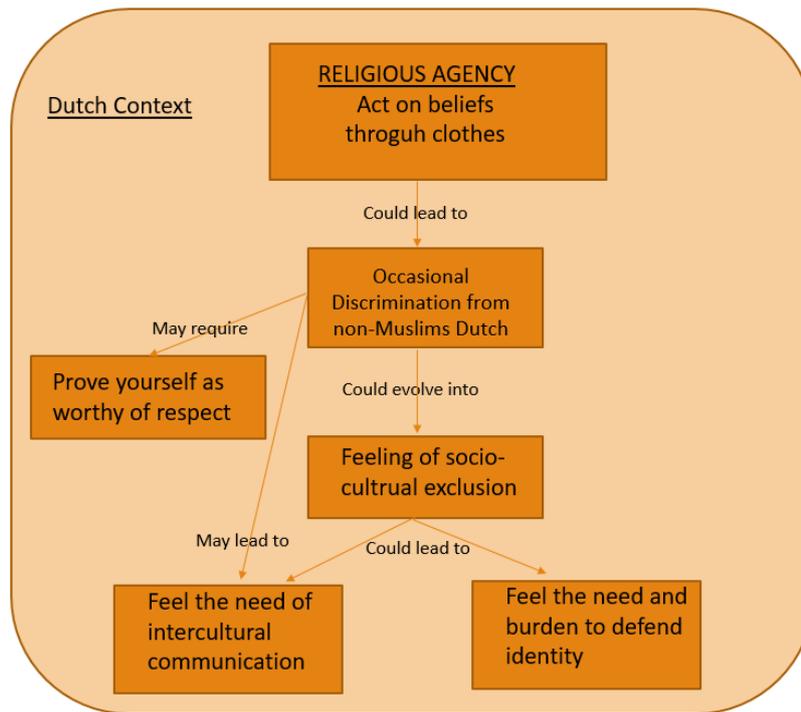


Figure 2: Flowchart illustrating the context in which religious agency takes place and the mechanisms that such agency engenders. Figure made by the author.

cial pressure, but by a desire to submit to God” (as cited in Bilge, 2010, p. 21). The desire to submit to God is actualized despite the obstacles that the relationships these women have with others may bring about, and is therefore to be taken seriously (Bilge, 2010; Mahmood, 2005).

Fundamentally, this case study reveals the need of intercultural communication, mutual understanding and empathy as a two-way process in which Muslim and non-Muslim people need to engage in. Indeed, it revealed the detrimental consequences that the lack of mutual understanding and empathy might bring about for the feeling of inclusion of Muslim women. Such consideration becomes particularly relevant given the fact that discrimination towards Muslims in the Netherlands has been largely documented by qualitative and quantitative studies (Prins, Van Stekelenburg, Polletta, & Klandermans, 2013; Savelkoul, Scheepers, Van Der Veld, & Hagendoorn, 2012; Visser, 2015; Ghorashi, 2016; Andriessen, Fernee & Wittebrood, 2014). Therefore, this case study invites a critical consideration the role of the majority of Dutch non-Muslims in establishing intercultural communication and for the construction of a multicultural society. Ultimately this leads us to rethink the way

we engage with the ‘Other’ and moreover ask ourselves if the ‘Other’ is truly an ‘Other’, or an ally not yet discovered and appreciated.

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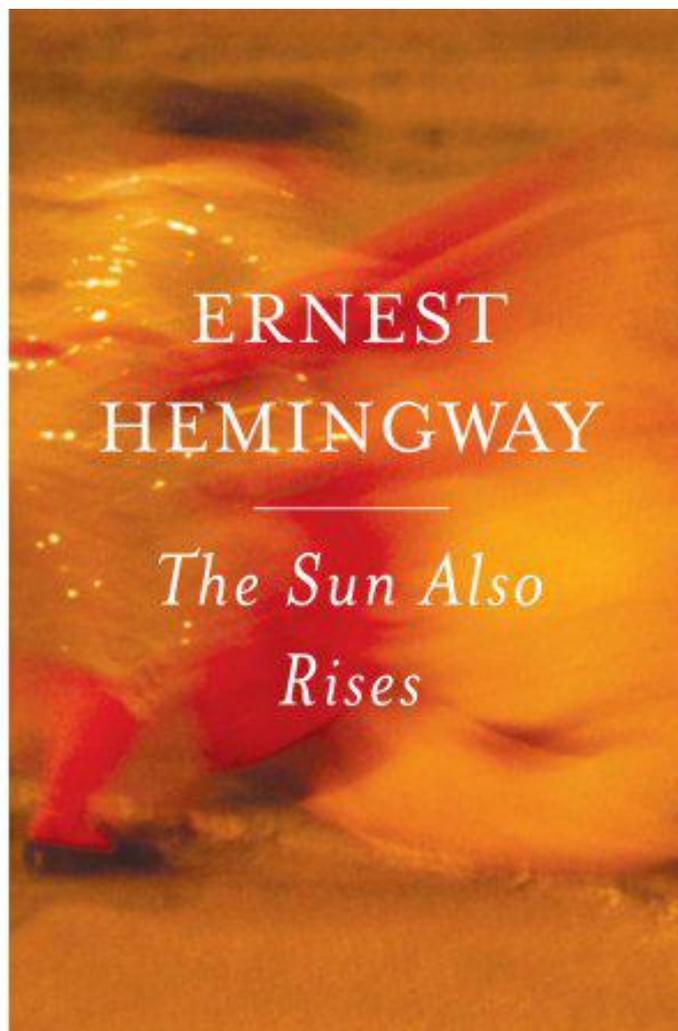
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Humanities

Not So Masculine Anymore: Castration and
Emasculation in *The Sun Also Rises*

Malou Miedema



With his themes not limited to but largely summed up by the key-terms booze, bulls, and boxers, Ernest Hemingway, Modernism's big game-hunter of the literary landscape, is best known for his sparse prose style and machismo-idealism. Around the 1960s, feminist critics such as Fetterley and Rogers came to contest the underlying tone of misogyny which they saw as inherent to Hemingway's writing, and after that, his repertoire of female characters was understood to be merely a dyad comprised of 'the bitch' and 'the helpmate' (Fulton 62, Sanderson 171). Some twenty years later, in the face of a growing feminist movement, 'Papa Hemingway' was accused of perpetuating negative gender stereotypes (Sanderson 171). While Hemingway's reputation may be irreparably damaged, this early feminist criticism paved the way for new research into the manifold gender complexities in his writings and has pointed towards gender issues within Hemingway's own persona which were previously unrecognized (Sanderson 171). The critical reception of Hemingway's 1926 novel, *The Sun Also Rises*, has been especially turbulent over the years. Interpretations of the relationship between Hemingway's modern star-crossed lovers Lady Brett Ashley and Jacob Barnes, replacing actual death for sexual death, have oscillated back and forth due to continuously changing outlooks on gender-complexities in Hemingway's oeuvre, and as such reflect changing takes on Hemingway's own complex relationship to gender and sexuality. Recent research has started to allot more significance to the role that Lady Brett Ashley inhabits in *The Sun Also Rises*. By conducting a Lacanian reading of *The Sun Also Rises*, this paper aims to shed new light on the significance of Lady Brett Ashley's relationship with Jake Barnes, especially with regards to his physical castration. In doing so, this paper postulates that their relationship can be read as a break-down of gender binaries and the conflict that arises out of these shifting power-dynamics.²

Readings of Lady Brett Ashley range from "bitch-goddess" to "a nymphomaniac self-induced-suffer" (Fulton 62). Whomever Brett 'is', it remains uncontested that Brett and Jake typify the new gender relations in the modern age (Sanderson 177).

¹Cover of the Paperback edition of *The Sun Also Rises*.

²This analysis has been done keeping in mind that Lacanian psychoanalysis as much as Freudian psychoanalysis is deeply gendered and biased as they have arisen from patriarchal contexts: however, keeping in mind that *The Sun Also Rises* has arisen from that same context, Lacanian psychoanalysis might prove useful in exploring such patriarchal biases inherent to this text.

Kawada argues their controversial relationship can only be understood through a developed understanding of Brett, who he takes to be the real central character of the narrative (Kawada 175). For Kawada, Hemingway's decision to omit the first one-and-a-half chapters of *The Sun Also Rises*, which focused mostly on Brett and her background-story, has created an "artificial incompleteness" which destabilizes Brett as a character, resulting in inconsistencies both in Brett's persona as well as the novel at large (Kawada 20). Jake Barnes being the lens through which we perceive Brett and whose opinion on her is colored through the masculine/impotent duality of his character, understanding Brett can only follow after an understanding of Jake, the latter requiring an understanding of the "psychological and physical judgment, action, and diction that construct his moral axis" (Kawada 21). Kawada is certainly right by foregrounding Brett's role in the narrative. However, while Kawada contends that the difficulties that Brett's character poses are an intellectual exercise on Hemingway's part, constructed to demonstrate the inefficacy of a human tendency towards "binary thinking" (Kawada 29), I would argue that the relationship between Jake and Brett does not so much demonstrate that such binary thinking does not work *at all* but rather, that its inefficacy for understanding both Brett and Jake in *The Sun Also Rises* has to do with the changing gender relations that *The Sun Also Rises* attempts to comment on. As such, the "artificial incompleteness" articulated in Brett's contradictory character signals an incapability to interpret Brett through Jake by virtue of the irreparable connection between the New Man and Woman of modernity.

The Sun Also Rises documents the relationship between Jake Barnes, a writer/war-veteran, and Lady Brett Ashley. Jake is deeply in love with Brett, but cannot consummate with her due to a war-inflicted physical wound. This wound functions somewhat paradoxically; while the war-wound itself can be considered an emblem of masculine heroism, it simultaneously castrates him and extinguishes his masculinity. This wound in combination with Brett's sexual liberation and refusal to accept sexual deprivation hinders their relation-

ship and subverts the classic man/woman power-structure. Thus, Jake's wound can be considered a reflection of sexual attitudes and gender conflicts of the time (Sanderson 178). Brett's reluctance to settle is only one among a long list of masculine traits and characteristics, such as her hat, her own self-chosen and gender-neutral name and her self-referential usage of the male term 'chap'. Moreover, Brett's sexual promiscuity has emasculating effects on those who desire her. That is, Cohn, who calls Brett a modern Circe, the famous Homeric witch who turns men into swine; Michael, who loses his fiancée to her affair with Pedro Romero; and most notably, Jake, who of all men has the most meaningful relationship with Brett yet for his lack of sexual potency will never be with her. Brett's philandering and Jake's mimicry of "traditionally female" passivity have been considered as a reversal of traditional gender-roles by Sanderson (179) and Spilka. Yet, this might be oversimplifying the gender-complexity within *The Sun Also Rises*. Brett's sexual independency is short-circuited by her continued financial and sexual dependency on men, thus undermining her masculine agency. The roles have not been simply reversed, but rather, the walls between the sexes have broken down and crumbled into one another's territories. Traditional gender identities have been displaced by gender identities that aren't quite either-or, but that have adopted characteristics of one another.

In the face of the displacement of traditional masculinity resulting from the competition posed by assertive femininity, masculinity as a value continues to be upheld, as seen in Jake's encounters with those who come to know of his injury. Ruminating upon his physical condition, Jake recalls the liaison colonel who visits him in the hospital. The colonel's remark, "You have given more than your life" (Hemingway 39) reflects the grave importance ascribed to masculinity implied in the contention that dying would be more honorable than castration. In addition, Brett's admittance that "it seemed like a hell of a joke" (Hemingway 34) underlines the irony of his condition and reflects a ridiculing and stigmatizing position towards men who are not stereotypically masculine. This remark is especially poignant because it comes from Brett, as she seems to adopt, in some sense, a mirror of societal values against which Jake's emasculation becomes especially clear. Cohn is called a steer when he is ridiculed for following Brett around (Hemingway

146). On the surface, the lost phallus reflects the conflicting position of the modern man, who is in between the continuation of traditional ideals concerning masculinity and the emasculation of man in the face of assertive femininity, leading to a climactic battle between the sexes. Yet, the phallic signifier can be read more broadly as the destabilization of a society structured around masculine potency, meaning a patriarchal structure. Whilst many critics have isolated gender as the central area of complexity in *The Sun Also Rises*, many have approached the topic historically rather than through a psycho-analytical perspective (Sanderson, Spilka, Onderdonk, Rudat). Lacan's expansion of the Freudian Oedipus complex situates the subject into a system of rules, especially those as pertaining to gender difference and societal relations. Lacanian theory takes the phallic signifier as the main symbol for the formation of sexual identity, considering masculinity and femininity not as biological essences but rather as symbolic positions within socio-linguistic structures, as well as a main component in the formation of societal values. As such, a Lacanian reading of the phallic signifier will be employed to unpack how traditional gender-roles are displaced.

Lacan's pre-verbal and pre-social realm of experience is called 'the Imaginary' (Wright 108). In this pre-oedipal stage, children experience their own existence through their own literal or figurative mirror-image, which instils in them a fantasy of completion and unity. The child considers its mother to be a mirror of itself, responding to its every impulse. This has two implications: firstly, it considers itself to be all that the mother desires, and secondly, the child desires the mother as that part of its experience which satisfies its needs (Wright 108). However, the child does not completely fulfill the mother's desires. When it is confronted with his mother's actions, the child persistently questions her desire and her experiences of lacking that which she desires. The phallus thus symbolizes both desire and need. Scholars have acknowledged Brett's "mothering qualities" (Fulton 64; Onderdonk 79) as Brett nursed Jake throughout his recovery and got together with Michael when she was "looking after [him]" (205), however, they have not situated this within psycho-analytical theory. Mike asserts: "Brett's rather cut up, but she loves looking after people" (Hemingway 205). Brett, as such, may be considered the pow-

erful Lacanian Mother. Her relationship with Jake, similar to the relationship between the Lacanian mother and child, does not exhaust her desire as she craves to be with someone who can fulfill her sexual needs and desires. The traditional masculine sexuality is thus epitomized within the phallus, and its opposite in the lack thereof. Jake's castration signifies the child's apparent lack of the phallus as a signifier of omnipotent masculinity representing autonomy and wholeness (the "ideal" established in the mirror stage). The phallic signifier thus has a dual role, in both mother and child. For Jake, it functions as an imaginary signifier of desire for and lack of a phallus which he does not have but wants by virtue of Brett's desiring it. Jake's assertion that Brett "was built with curves like the hull of a racing yacht" (Hemingway 30) implies two things: describing the soft feminine body with a term associated with sharpness and sturdiness seems to point towards a rather masculine ideal of feminine beauty. Secondly, comparing Brett to a yacht, which is strange in relation to the feminine body, implies that there is a desirability in Brett's character that is to be possessed. It is Jake's lack of assertive masculinity which drives him to Brett in the first place. Jake's lack/need of the phallic signifier thus not only inhibits his ability to be with Brett, but is the very condition for his desire to be with Brett – what drives him to Brett is her fulfilment of a certain definition of masculinity, which he cannot finalize due to his lack of sexual potency and of masculine authority. For Brett the phallus symbolizes an absence as well: she is incomplete because she desires the phallus which she does not and cannot possess. Firstly, this desire indicates a desire for male-female companionship, which is complicated by the second issue, the desire for sexual fulfilment, which represents a longing for masculine authority which articulates itself in female assertiveness or an attempt to dominate.

Brett's sexual promiscuity translates itself to a rather dominating character, and the "artificial incompleteness" resulting from her attempts to cope with her lack of masculinity result also in a re-shifting of the sexual identities of those around her. Brett agrees with Jake that she will inevitably be unfaithful to him if they were to live together (Hemingway 62). Brett's rejection thus functions as a mirror of masculinity in which Jake truly comes to realize his own defects: "I never used to realize it, I guess. [...] Probably I would never have had any trou-

ble if I hadn't run into Brett when they shipped me to England" (Hemingway 39). Thus, Brett stands as the omnipotent matriarch, the Lacanian Mother, who imposes a standard of masculinity upon her lover – yet, it is Brett herself who problematizes the lack of phallus through the interplay of her female desire and her male dominance. The character of Brett thus articulates the impossibility of fulfilling this standard. Assuming a certain continuity between Jake and Lacan's archetypal child, he will let go of his dream and the accompanying anxiety to be the sole object of the mother's desire upon the realization that he will never get her. In this process of giving up the dream to be the Imaginary phallus, issues of rivalry, fear, and humiliation all rear their head as the presence of the Father is felt (Hook 76). Hook adduces that "this desire of the mother increasingly comes to be experienced only with reference to a rival object/person or incarnation of the mother's desire" (Hook 74). As such, desire is only ever experienced within a structure, in relation to other [gendered] subjects. It is this humiliation which is brought to bear in the episodes with the other men. Indeed, when Brett first meets the count, Jake dashes off to return home, where he goes through an episode of grief over his impotency (Hemingway 39). Similarly, Cohn's affair with Brett sparks severe jealousy in Jake: "I was blind, unforgivingly jealous of what had happened to him. [...] I certainly did hate him" (Hemingway 105). What these men seem to possess as a common denominator is the phallic signifier. Brett's relationships with the count and Cohn are thus instrumental to Jake's growing awareness of the impossibility of their relationship. It is at the end of this process of giving up the fantasy of the phallus that ambiguous sexual identity is formed (Hook 73).

In spite of their possession of the phallic signifier, Brett emasculates all of the men in the book, psychologically castrating them with her assertion of female dominance. The lack of satisfaction which Brett experiences in these relationships suggests that modern relationships require a different dynamic due to the assertive nature of the modern woman. In this context, Romero is the only one who fulfills a traditionally masculine autonomous identity, most notably in his ability to sexually fulfill Brett (Rudat 43). Moreover, Romero embodies the autonomy which Brett herself desires. This fulfilment of the desire for the phallus asserts Romero as the embodiment of mascu-

line authority. Pedro thus personifies the Lacanian father-figure who “stands for the ideal exigency of the law” (Hook 77), this law being society’s conditions for true masculinity: authority, artistry, autonomy and most notably, resistance against feminization. Upon the realization that Pedro embodies this notion of masculinity, Jake comes to understand his inferior position. This surrender is concluded through one final look shared between Jake and Pedro Romero: “He looked at me. It was a final look to ask if it were understood. It was understood all right” (Hemingway 190). This act marks Jake’s resignation to the power of the father, his inability to fulfil the machismo ideal, and concludes the transition from the Imaginary into the Symbolic, a network of relationships and rules in which Jake has to reformulate his identity.

As for the mother, this act briefly exhausts her desire. Brett’s infatuation with Pedro Romero shortly shuts down Brett’s quest for fulfilment, as she feels “altogether changed” and happy after their night together (Hemingway 210). Rudat points out that, whereas Brett used to refer to herself as “chap”, in Madrid she distinctly says “Would you buy a lady a drink?” (Hemingway 248), arguing that the brief affair feminized Brett temporarily. It has failed, however, as Brett’s assertive femininity and desire to effeminate her suitors, traits which stand for her modernity, inhibits the relationship. In the scene where Jake helps Brett to be with Romero, Brett expresses she would like to “get a hat like [Romero’s]” (Hemingway 190). Rudat notes that Brett’s hat-wearing symbolizes her desire to dominate men. However, Romero is not overwhelmed by Brett’s dominance and withstands her attempt to reverse the roles. Corresponding to the Lacanian father, Romero successfully retains the phallus, the symbolic position of masculine autonomy and authority, as his own special privilege (Hook 74). Brett’s modern position complicates the issue as the modern woman does not accept being pushed back in the classical power structure while the traditional man does not accept her defiance. Because Romero “wanted to make sure I could never go away from him, after I’d gotten more womanly” (Hemingway 246), Brett returns to Mike, whom she can dominate more easily with her femininity. The modern woman is thus wholly irreconcilable with the traditional man because, not only does she want sexual fulfillment, but she also wants to exert her newly acquired authority.

Seeing as the female has inhibited a new symbolic position within the societal structure, the Lacanian reading of *The Sun Also Rises* is compromised by the changed relationship between the symbolic father, mother and child. A Lacanian reading would emphasize that “the symbolic order ... [is] upheld by a “Symbolic father”, and that the Name-of-the-Father comes to represent the ideal exigency of the law (Hook 77). However, considering Brett’s symbolic position undermines the Name-of-the-Father, the phallic signifier as a point of reference for the child is undermined, too. Traditionally, Lacanian theory argues that, upon realizing he will never be the phallus, the child has to reposition itself in relation to the phallic signifier (Hook 76). This results in a dichotomy of potentially having the phallus versus potentially being the phallus, that is, to have the object of desire or to be the object of desire. “The question of the other’s desire and how we try to be that other’s desire is exactly, to reiterate, what underlines how we come to identify sexually as men or as women (Hook 80). However, firstly, Jake’s lack of the phallus compromises his sexual identification with the father as the representation of traditional patriarchy, and of masculine authority and autonomy. Secondly, the incompatibility between the modern Brett and the traditional Pedro Romero, whom we have taken to be the representation of the Father, signals a displacement of the authority of the Father. Where the Name-of-the-Father used to stand for the ideal exigency of the law, the new assertive dominance of Brett as the mother rejects the patriarchal structure of the law and thus displaces the traditional gender differences that ensued by virtue of identification with either the phallus or the lack thereof. As such, the act of identification with either sex has gone awry, in turn undermining a classical societal structure which has deep-rooted effects on the relationship between the modern man and woman. Interestingly, Hemingway’s Jake is very much aware of this change, and regards it with a high level of irony: after their dinner in the final scene, Brett and Jake step into a car, when Brett says to Jake that they could have had such a good time together, to which Jake replies: “Isn’t it pretty to think so?” (Hemingway 250). By using the gendered term pretty, Jake as such seems to vocalize his feminization yet at the same time acknowledges that believing in the alternative ending proposed by Brett would be an improbable illusion, a

feminine yearning for a happy ending. In doing so, Jake attempts to adopt an authoritative, masculine position in relation to Brett, one which fails due to his own emasculation implied within his adoption of the term “pretty”. The usage of this term thus heralds as much proximity as distance from femininity. Indeed, it seems that the only way to counter the relentless feminization of female dominance is to accept it, and accept it ironically, so as to be able to reassert oneself, not quite masculine, not quite feminine.

The relationship between Jake and Brett may be read as an expression of the displacement of the traditional relationship between man and woman. The figure of Brett problematizes traditional notions of masculinity, as she desires masculinity in her partners while her masculine traits express an eagerness to acquire masculine dominance and to feminize men. Jake Barnes’ desire to be with Brett signifies a yearning for the female, as much as it signifies a desire for masculinity and male autonomy by virtue of his own lack thereof. This lack seems to be the result of an incapability to identify with the phallic signifier and a classical patriarchal structure which has been displaced by the new symbolic position of the modern woman. However, out of this predicament spawns the possibility for a new kind of relationship between man and women, something which relies less on the passivity of the woman and more on the willingness of the man to accept the loss of his power-position. Ultimately, it seems that the roles haven’t been simply reversed, rather, the traditionally masculine and traditionally feminine have overflowed into one another. Whether *The Sun Also Rises* expresses Hemingway’s nostalgic yearning for traditional gender relationships or not, the only way to work around the predicament is to accept that the binary has collapsed and its

constituents have flown into one another.

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Humanities

Still Life?

The Claim of Portraiture in Pre-Natal Imagery

Nina Klaff

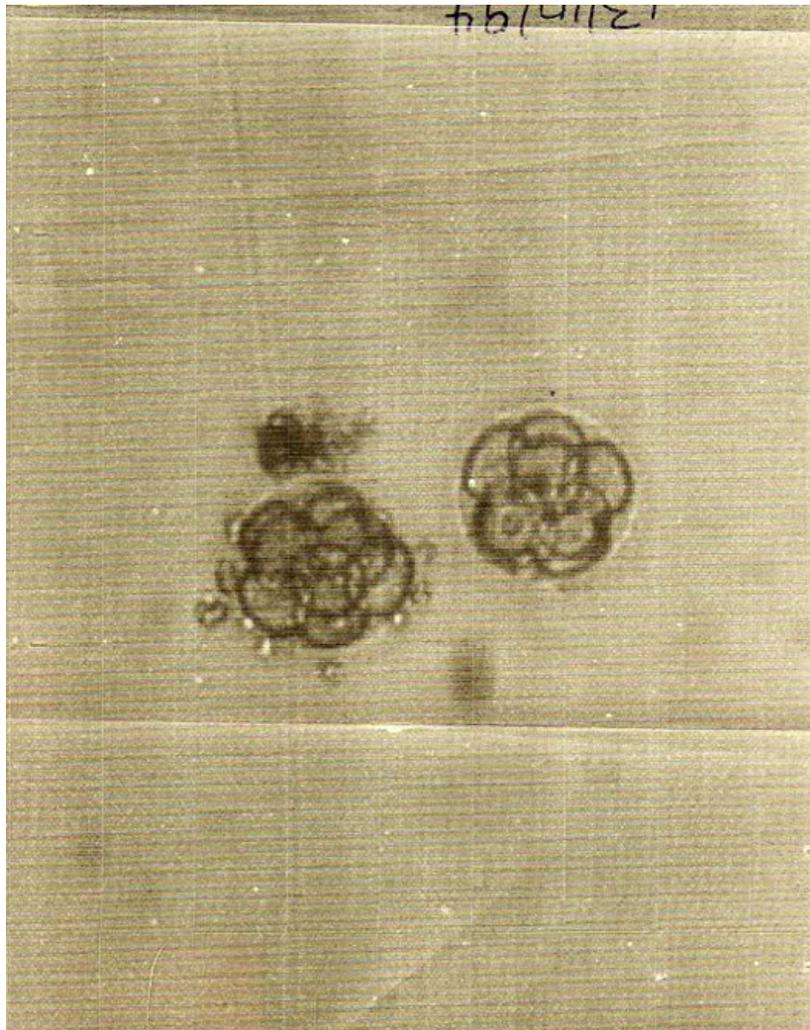


Figure 1: Unknown Author, Anna Furse's Pre-Embryo at 48 Hours, Hammersmith and City Hospital, London, 13/10/1994

This scan (Figure 1) of a forty-eight-hour-old pre-embryo hung on our fridge long before I was *compos mentis* enough to understand its significance. It had always been spoken of as the first one of me ever taken. I was not yet conscious, not yet born, not yet me. Germaine Greer states that “whatever else we are or may pretend to be, we are certainly our bodies” (Greer 29). As an image of the first cells that made me up, it represents the start of my body. If I am my body, and this is an image of my body, then it is an image of me. Whether it can be considered a portrait or not depends on how we interpret the term: the OED defines it as “a painting, drawing, photograph, or engraving of a person,” (Portrait, OED) the Tate as “a representation of a particular person” (Art Terms, Tate). A pre-embryo this early is generally not to be considered a person, but one of these did become one. I have always considered it a portrait of me: my first. However, it was one of the last of my twin. They unfortunately didn’t survive. For all my parents’ dreams of pushing a double pram down the pavement, spurred on by images such as the one above, the other little cluster never did become a “person.” Does this mean the image is not a portrait of them? Unequivocally considering pre-embryos as people is in direct conflict with pro-choice ethics. However, in this case, my parents chose to consider us both equally and love our possibility just as much, so to remove the identity of my twin from the image is partly to undermine the reality of the grief of their unsuccessful pregnancy. In *in vitro* fertilisation (IVF) especially, when the stakes are so high, “grown men have broken down into tears: they mourn the lost eggs like the loss of a child.” (Kevles 246). Nonetheless, no two pregnancies are the same. While there may be no biological difference between a wanted and unwanted pregnancy, the way they are felt and perceived by the parents can be very different, and they should be treated as such. In order to amend the desire to recognise identity in prenatal imagery with pro-choice politics, the agency of the decision must be returned to the parents. Just as it should be their choice to carry the pregnancy to term, it is for them to decide how to interpret the images that document it.

Medical imagery itself is by no means devoid of identity. Historically, doctors relied on illustrations for visualisations of the body. The one below by Henry Gray has been hand drawn (see Figure 2). It is a diagram, a universal interpretation of what

pre-embryonic cells might look like, made before imaging technology became ubiquitous in medical practice.

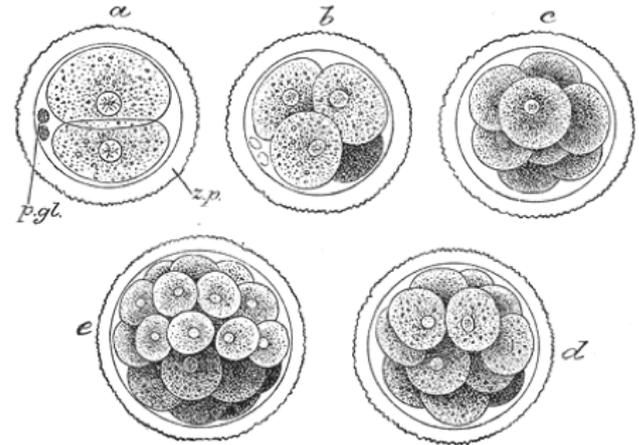


Figure 2: Henry Gray, First stages of segmentation of a mammalian ovum. (From a drawing by Allen Thomson.) 1918

With the 20th century came significant advancements in medical imaging techniques. Pregnancy screenings in the form of X-rays were reported as early as 1926. These “could take as long as an hour” (Kevles 245) and Kevles reports that “the patient had to lie on her back with her pelvis elevated with between 1.5 and 2 litres of carbonic gas injected into her peritoneal cavity” (Kevles 245). This was no light matter, for “occasionally it killed the fetus, and maternal death, even, has resulted from this procedure.” (Kevles 245) The advent of safer ultrasound technology made medical imagery universally accessible and has facilitated the tailor-made, individualised representations we have today.

Richard Brilliant claims that in portraiture, “the immediate family of the person represented, or his most intimate friends, are, indeed, as a general rule, the best judges as to whether the artist succeeded in achieving a faithful likeness.” (Brilliant 25). This would well be true of this photograph of Marilyn Monroe (see Figure 3): those closest to her would be most familiar with what she looked like.



Figure 3: Henry Gray, First stages of segmentation of a mammalian ovum. (From a drawing by Allen Thomson.) 1918

In the X-ray below, however, she is unrecognisable.

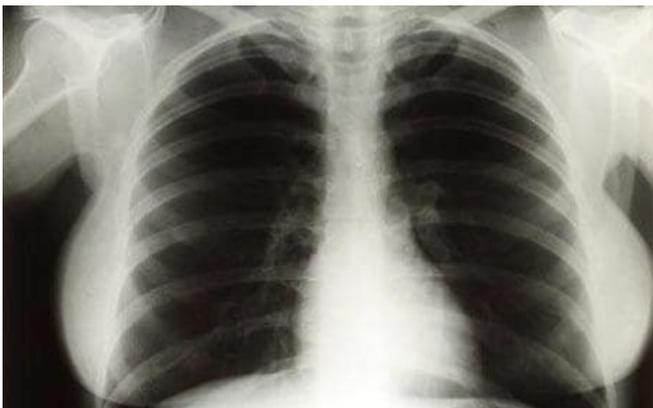


Figure 4: A Chest X-Ray of Marilyn Monroe, 1954, *The Telegraph*

This is because this version of her does not exist. The image has been heavily doctored – pardon the pun. There is a reluctance to acknowledge the limits of “the camera as mechanical eye” because we trust these technologies to create faithful visualisations (Wells 180). We are deceived into taking the images as faithful representations because of the accuracy of the information they provide; but, in fact, they are inauthentic. If we consider Jean Baudrillard’s theory of simulation versus simulacra, images drawn by hand are more authentic because they do not claim complete accuracy (1050). They make no claim of being anything more than representations, while these mechanically produced images are presented as true simulations of what the body looks like. In fact, they are

largely mediated. Firstly, they are two-dimensional. They do not – perhaps, cannot – depict the body accurately, because, as Cartwright argues, “bodily depth causes “disturbances” in the image field; thus the body must be corrected (rendered flat)” to be read (Cartwright 89). Secondly, they are hugely distorted. Pre-embryonic cell-structures like me, *ex-utero*, in October 1994 are invisible to the naked eye. They must be magnified to render them visible, and, with every mediation, their representations further from their organic form.

Nonetheless, while technologically mediated images are perhaps inauthentic, they are undeniably crucial tools in medical practice. An image’s relationship to a body enables the inference of a diagnosis of its subject; however, a reading of these images of course necessitates a specific training. In Western medicine, there is a tendency to observe each area of the body in isolation from every other. Anatomical dissection is a foundation of medical training still today. The term “literally means “separating the body into pieces”” (van Dijk 118). Reproductive biology is no exception: Kevles illustrates this in her report of Cecil Jacobson, a “geneticist,” (Kevles 230) who committed thousands of dollars worth of fraud in medical care by assuring them of their pregnancy while he was in fact ultrasound illiterate: he himself “did not know himself what an embryo looked like. [...] Only gynecologists did” (Kevles 230). While the tradition of separation is generally “justified because it results in an entirely new body – a body of knowledge,” (van Dijk 119) in prenatal imagery, this isolation has been one of the causes for feminist debate. Stabile condemns the fact that “for the embryo/fetus to emerge as autonomous – as a person, or individual in its own right – all traces of a female body (as well as the embryo’s presence as a parasite within that body) must disappear” (Stabile 180). She argues that verifying the health of the fetus comes at the expense of the mother’s agency during the birth. While the documents that trace a pregnancy are stored under the mother’s name, in her medical file, the framing of these images disembodies the woman. Stabile argues that “the maternal space has, in effect, disappeared, and what has emerged in its place is an environment that the fetus alone occupies” (Stabile 180). The visual focus then lies on the potential life: pre-natal images portray it in total isolation from the body that contain it. Duden urges us to “retrieve the embodied woman as the site of preg-

nancy" (Duden, quoted in Michaels 130). In IVF, the mother and father are disregarded as the sites of conception in favour of hormone injections, latex gloves, and pipettes. Retrieving the embodied woman is impossible because the conception itself occurs *ex-utero*.

Moreover, as Stabile points out, many of the images we have been shown are still embryos that had been amputated from the mother. She points out that, in pictures such as the Life Magazine cover in Figure 4, "what has been patched together [...] to simulate "life" is - ironically - death" (Stabile 185). The term simulation is key here. To refer to Baudrillard's theory of *Simulation versus Simulacra*, the inauthenticity of these images as purported simulations has in no way undermined the widespread fascination they spark. These images are everywhere, from pro-life banners to the cover of *Life* magazine, disregarding the conundrum they incur.

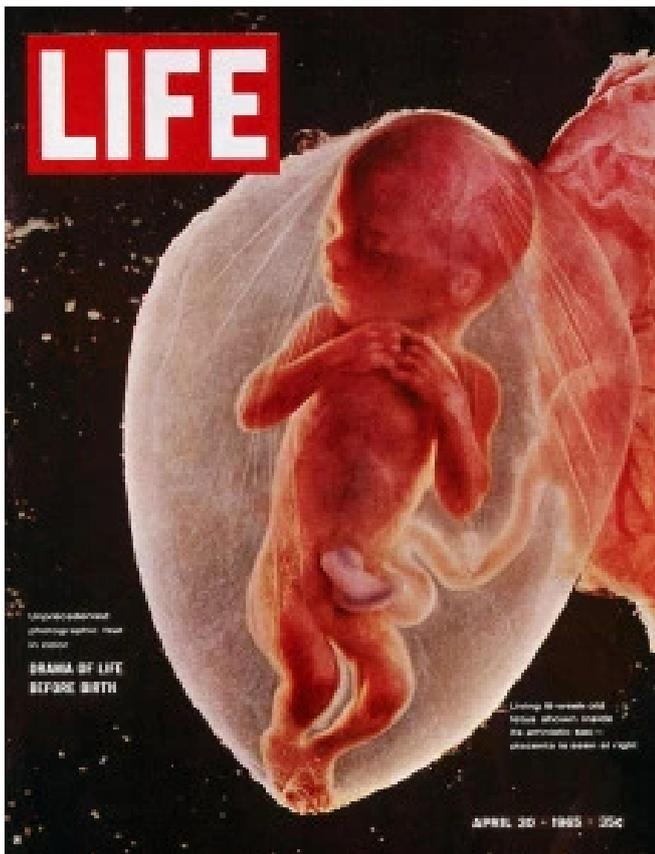


Figure 5: Lennart Nilsson, "The Drama of Life Before Birth', *Life Magazine*, 1965

The notion that capturing the unborn could kill them is age old: studies were published in 1956 on "the impact of fetal exposure to X-rays on the deaths of children younger than ten from leukemia

to malignancies" (Kevles 245). The potential of capturing life to kill is a paradox indeed.

This paradox, however, does not undermine the worth of the images in our eyes. As Brilliant argues is the case in art, "for some viewers the portrait was no art object but a living being" (Brilliant 20). The affordability of modern technological medical imagery incurred a "tremendous yet unexpected "side effect": women loved seeing images of their fetuses moving around in the uterus, on the screen, even if they were quite incapable of interpreting them correctly" (Van Dijk 103). In his Mirror Stage theory, Lacan argues that the child's acknowledgement of their independence from their mother is crucial in their construction of the ego (Lacan 501). It seems pertinent to mention that his statement is permeated with natal lexicon, with terms like "pregnant" (Lacan 506) and "fragmented body" (Lacan 504) at the crux of his thesis.

Our notions of consciousness and identity themselves are challenged in the context of our conception of childbearing. The experience of expectant mothers and fathers is similar when they are presented with the image of their unborn child. It is at the moment when they are presented with the visual conception of pregnancy that its existence is realised for them, their doctors, and family and friends. Of course, the prime function of pregnancy imagery is to track the health and growth of a fetus. However, as Brilliant argues, in portraiture, "every picture is an increase of being and is essentially determined as representation, as coming-to-presentation" (Brilliant 17). With every image captured, the foetus increases in being, and prospective mothers and fathers become closer to being parents - this enables them to construct their own identity within those roles. Perhaps, then, it is precisely the fact that these images are framed in isolation from the female body that enables a woman to recognise herself as a mother. This is potentially the reason for their popularity. Kevles reports that "for 70 percent of American parents today, the baby album may begin with a sonogram" (Kevles 246). The scans have become "the "show-and-tell" object of parental pride," (Kevles 247) and they are now "concurrently a medical diagnostic check-up, a psychosocial event, and a photographic ritual" (van Dijk 101). They have permeated popular culture as signifiers of the advancement of a storyline: films and television shows with a plot involving a pregnancy will more often than not include an ul-

trasound scene as a pivotal moment in the tracing of the protagonist's journey into motherhood. An example of this is a scene in *Friends* (2001) in which Rachel and Ross, two of the main characters, are at the hospital for their first scan. Both look in awe at the image on the screen they are being shown, exclaiming tearfully "It's beautiful!" However, as soon as the Doctor leaves the room, Rachel cries out "I don't see it!" The image is unrecognisable, but the reason this scene is considered so humorous is because of Rachel's honesty that, as a prospective mother with no medical background, she was simply unable to interpret what she was seeing.

In some cases, this means that the absence of ultrasound images, which are important landmarks in consolidating pregnancy, can be a painful reminder of failure. Kevles notes that "women unable to bear children have come to feel almost as deprived of the defining experience of pregnancy as they do from having children to rear" (246). Just as the nature of IVF conception is different, so too are the images those undergoing the process receive. Their scans are done much earlier than the usual ten weeks for natural pregnancies, their images more abstract and even harder to interpret. At that stage, it is hardly possible to say whether the embryo will take, let alone if it would be carried to term, and it is too early to predict the type of pregnancy, gender, or even health of the embryo. This bereavement evidently encompasses feeling your body change as life grows within you, but also all the milestones of carrying a child, from the first scan to the first kick. IVF as a solution restores many of these experiences, but the pregnancy is observed in a notably more scrupulous manner; as a result, the images IVF parents receive, such as the one of my twin and I, are much less recognisable.

This, however, does not make them any less affecting. For my mother, in her own words, "when I first set eyes on my own fertilised embryos on a computer screen, minutes before three of these (proscribed as the maximum by U.K. law at the time) were transferred to my womb during IVF treatment, the poignancy was overwhelming" (Furse 96). Barthes, in *Camera Lucida*, states that the *punctum* of a photograph is that which is "poignant." In prenatal imagery, *punctum* is the promise of life (Barthes 27). It is crucial to note that each body, each pregnancy, and each image

is different. Pregnancy is not always expected or wanted. In many countries, it is thankfully at the woman's discretion to carry it to term or not. In the same way, the imaging processes for each remain the same. In the U.K., those opting for abortions are warned that "an ultrasound scan may be done to check how many weeks pregnant you are" (Abortion: What Happens, NHS). The images they produce will contain inherent similarities. However, their meaning, their significance, is entirely dependent on how the mother feels. Barthes, in *Camera Lucida*, says: "I feel that the photograph creates my body or mortifies it, according to its caprice" (Barthes 11). In the case of prenatal photography, both can be true. Without the image my mother was given, she may never have known she was pregnant with twins. The image created our bodies in her mind's eye. When my twin didn't survive, these images most certainly mortified them - not in the modern sense of humiliation, but in the sense of putting something to death. The images gave my parents something tangible to mourn, but also something visible to celebrate.

None of this was contained within the image itself. The *punctum* will be different every time, and to every viewer. Therefore, whether to consider a prenatal image as a portrait depends on how the parents regard it. My mother desperately wanted to see the potential in the cells that made up both my twin and I. She gave us both identities, and considered these images to be portraits of her future children. Despite one of our premature losses, I myself have the privilege of being here today to, albeit retrospectively, agree.

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Humanities

Friendship, Happiness, and their Relation in Aristotle's
Nicomachean Ethics

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Introduction

Aristotle's *Nicomachean Ethics* is famously concerned with the Why and the How of achieving a flourishing human life. In spite of this great theoretical theme, the classic text pays, perhaps surprisingly, much attention to practical matters. One of these practical matters is the notion of friendship, to which two of the *Ethics*' ten books are devoted. In this paper, I will inquire into the link between Aristotle's notion of friendship and his concept of the flourishing human life that is so central to his ethical treatise. I will start my exploration with an analysis of Aristotle's idea of the nature of friendship, as it is sketched in the *Nicomachean Ethics*. Next, I will address his definition of happiness (or human flourishing), after which I will try to uncover the specific connection Aristotle envisioned between friendship and happiness. Finally, I will turn to the question whether friendship can be of purely intrinsic value within Aristotle's doctrine.

Friendship

On the very first pages devoted to the notion of friendship, it already becomes clear that the Greek word for the concept, *philia*, has a much broader scope than the English word friendship. Whereas, today, the word friendship is associated with a relationship between two comrades, not bound to each other's company by anything else than their mutual consent to be friends, Aristotle's notion *philia* comprises far more sorts of relationships. Father and son, husband and wife, civilians amongst each other; even certain business interactions are counted as manifestations of *philia*, in Aristotle's terms (Cooper 301-2). Still, I will, for the sake of readability, use the common translation friendship for *philia* in what follows.

Within this broad meaning of the word, Aristotle distinguished three types of friendship, "equal in number to the things that are lovable" (NE 1156a7-8). The three loveable things on which these three kinds of friendship are based are mentioned in the preceding chapter: the "good, pleasant, or useful" (NE 1155b19). In this next chapter Aristotle specifies the nature of each kind of friendship further:

"those who love because of utility love because of what is good for themselves" (NE 1156a14) and "those who love because of pleasure do so because of what is pleasant to themselves" (NE 1156a14-5). Aristotle goes on to conclude that, since friends in a "utility-friendship" or a "pleasure-friendship" do not "love each other for themselves" (NE 1156a11) and "not for their character" (NE 1156a13) and "not because of who the loved person is" (NE 1156a16), these friendships are therefore "only incidental" (NE 1156a19), implying a certain superficiality and imperfectness.

The perfect friendship, however, Aristotle argues, is of a third kind and is "the friendship of men who are good, and alike in virtue" (NE 1156b7-8). Friends of this kind wish well to each other "by reason of their own nature and not incidentally" (NE 1156b10-1). In other words, perfect friends love one another for some good character trait, a virtue, in each other, which is essential and not incidental to who they are². Because this last kind of friendship is based upon good qualities of character, which are enduring, virtue-friendship is also of a lasting nature, or at least more so than are its relatives, utility-friendship and pleasure-friendship, which are based upon transitory traits which only in certain situations offer pleasure or profit.

But, with regards to virtue-friendship, Aristotle acknowledges, "it is natural that such friendships should be infrequent; for such men are rare" (NE 1156b24-5) and "such friendship requires time and familiarity" (NE 1156b25-6). So, virtue-friendship, the perfect friendship, is of a rare kind since it is time-consuming and it can only arise between good men (being a rarity), since "bad men do not delight in each other unless some advantage come of the relation" (NE 1157a19-20). So, although it is the best kind of friendship, it is also the hardest to obtain, since it requires people who "wish well alike to each other qua good, and [who] are good in themselves" (NE 1156b8-9) and who will be "friends without qualification" (NE 1157b4).

Now, it is clear that a virtuous character is essential to Aristotle's idea of the perfect friend, but what are the characteristics of the perfect friendship itself? In the first book on friendship, Aristotle states that "there is nothing so characteristic

¹Picture made by the author.

²This is also the reason why John M. Cooper in his essay on Aristotle's conception of friendship decides to refer to this kind of friendship as "character-friendship" (308). For the purposes of this paper, however, I will use the term "virtue-friendship", following the translation of David Ross.

of friends as living together (...)” (NE 1157b18-9), to which he adds another four characteristics in the second book on friendship, all of which “seem to have proceeded from a man’s relation to himself” (NE 1166a1-2): wishing each other well, wishing each other to live and exist for their sake, having the same tastes as one another, and, finally, grieving and rejoicing with each other (NE 1166a3-9). Since these are all characteristics based upon man’s self-love, Aristotle continues to argue, “the good man should be a lover of self (for he will both himself profit by doing noble acts and will benefit his fellows)” (NE 1169a12-3). Furthermore, Aristotle notes: “[we] should endeavour to be good; for so and only so can one be either friendly to oneself or a friend to another.” (NE 1166b28-9). Here we seem to hit upon the link between human goodness and the notion of friendship Aristotle uses. Before I discuss this topic in further detail, however, let me address the notion of human goodness more thoroughly.

Happiness

As was stated in the introduction, the theme of achieving *eudaimonia*, human happiness or flourishing, is the main subject of the *Nicomachean Ethics* and is immediately discussed in the first book of the work. Aristotle defines happiness as “something final and self-sufficient, and (...) the end of action” (NE 1097b20). Happiness is final because “we choose [it] always for itself and never for the sake of something else” (NE 1097b2)³. Furthermore, happiness is self-sufficient since it abides by Aristotle’s definition of the self-sufficient as “that which when isolated makes life desirable and lacking in nothing” (NE 1097b15-6).

Human happiness, as Aristotle defines it, however, must not be understood as an ideal end state, but rather as an “activity of soul exhibiting virtue” (NE 1098a16-7). It is the realization of the human *ergon*, the human function, which is defined as “a certain kind of life, and this to be an activity or actions of the soul implying a rational principle” (NE 1098a12-3). According to Aristotle, this life lived according to a “rational principle” will ultimately result in virtuous action, shaping someone into a vir-

tuous being. Hence, “[h]appiness (...) is the best, noblest and most pleasant thing in the world” (NE 1099a24-5). Now, there remains a problem when one tries to reconcile the current conception of happiness with the emphasis Aristotle places on friendship. For, if happiness is final and self-sufficient, why would a happy man still need friends? Could a man also be happy without friendship? And if so, why does Aristotle deem friendship such an important notion?

Friendship and Happiness

The connection between the two terms discussed above is thus twofold. Firstly, as was shown at the end of the section on friendship, being able to form friendships, according to Aristotle, is dependent on being a good human being. This idea is also expressed by his insistence upon the perfectness of virtue-friendship, which requires the people involved to be of good and virtuous character. Secondly, at the end of last section, I showed how the claim that happiness is self-sufficient raises a problem when one wishes to reconcile it with the importance Aristotle attributes to friendship⁴. This second connection I will discuss more thoroughly in the remainder of this section.

Indeed, Aristotle claims that happiness is final and self-sufficient, but he nuances this claim further on in book I when he asserts that “happiness seems to need [a] sort of prosperity in addition” (NE 1099b7). He explains: “[i]n many actions we use friends and riches and political power as instruments; and there are some things the lack of which takes the lustre from happiness” (NE 1099b1-2, sic), seemingly implying that friendship is an instrument which provides a “lustre” to happiness. In fact, later on in the book, Aristotle states that “of the remaining goods, some must necessarily pre-exist as conditions of happiness, and others are naturally co-operative and useful as instrument” (NE 1099b27-8). Now, if friendship is one of these remaining goods, the non-trivial question remains whether it must be regarded as a *sine qua non* of happiness or as a mere useful instrument on the way towards happiness.

To answer this question, I turn to book IX.9

³Whereas “honour, pleasure, reason, and every virtue we choose indeed for themselves (...), but we choose them also for the sake of happiness (...)” (NE 1097b3-5)

⁴“(...) it is a virtue or implies virtue, and is besides most necessary with a view to living” (NE 1155a2-4).

where the relevance of friends in the life of the happy man is directly discussed. Firstly, Aristotle expresses the unfitness of a happy person for a solitary existence, since “no one would choose the whole world on condition of being alone, since man is a political creature and one whose nature is to live with others” (NE 1169b17-9). Moreover, the need for friends, even for a perfectly happy man, is simply stated when Aristotle continues: “plainly[,] it is better [for the happy man] to spend his days with friends and good men than with strangers or any chance persons. Therefore the happy man needs friends.” (NE 1169b20-2). Aristotle further grounds this need in the *telos*, the purpose, of the happy man:

The supremely happy man will need friends of this sort [i.e. of good character], since his purpose is to contemplate worthy actions and actions that are his own [Gr. *oikeia*: familiar] and the actions of a good man who is his friend have both these qualities.
(NE 1170a2-3)

In addition, Aristotle argues that, for a perfectly happy man, “with others (...) his activity will be more continuous, and it is in itself pleasant” (NE 1170a7-8) and “friendship of good men is good, being augmented by their companionship; and they are thought to become better too by their activities and by improving each other” (NE 1172a10-3). Thus, friendship complements the good man’s life and is, therefore, a valuable and necessary condition for happiness.

The Intrinsic Value of Friendship

In this final section I want to shed some light on the question whether friendship, as conceived by Aristotle, is capable of having any intrinsic value. In the previous section I demonstrated that Aristotle regarded friendship a necessary condition for human happiness, providing the happy man with people to care for and to engage with in philosophical intercourse. In this view, friendship seems to gain an almost purely instrumental value, as being a necessary, but otherwise worthless key to open

⁵ “[B]ecause it is only in and through intimate friendship that we can come to know ourselves and regard our lives constantly as worth living” (Cooper 332).

⁶ See footnote 2

the door to happiness. This image, however, seems to clash with Aristotle’s positive expressions and explicit devotion to the term. Can there be room for an intrinsic value to friendship within this instrumental account of it in relation to happiness?

John M. Cooper, in his essay *Aristotle on Friendship*, argues that there is no objection against there being an intrinsic value to friendship. He correctly points out that Aristotle asserts the value of friendship itself multiple times and adds that he sees no trouble in something intrinsically good, such as friendship, being valued for other reasons apart from its intrinsic goodness, such as its being of instrumental value to happiness (Cooper 332).

Cooper argues that someone who thinks that a person who lives his or her life perfectly happy without any friends still misses something intrinsically in his or her life “will not find in Aristotle anything to support his view” (Cooper 333). According to Cooper, Aristotle explains why many people think of friendship as being of a certain intrinsic value⁵, but does not assert whether there is, in fact, an intrinsic value to friendship or not (Cooper 332).

Cooper’s claim that intrinsic and instrumental value can easily coexist is supported by a passage from the *Nicomachean Ethics* I quoted before⁶. The easiest solution to the apparent discrepancy between friendship having an intrinsic value and being a necessary condition for happiness is thus to conclude, in line with Cooper, that friendship is one of these goods, like “honour, pleasure, reason, and every virtue”, that we choose for themselves, “for if nothing resulted from them we should still choose each of them” (NE 1097b2-3) and that in this sense friendship is of intrinsic value. But we also choose those goods – as we do with friendship – in order to arrive at happiness, and in that sense friendship is instrumentally valuable. In any event, the importance and valuableness of friendship in Aristotle’s philosophy – whether it is for its own sake or for the sake of happiness – are indisputable.

Conclusion

I opened this paper with an analysis of two important terms in Aristotle’s *Nicomachean Ethics*, namely friendship and happiness. I showed that

Aristotle classifies friendship into three kinds: respectively based on utility, pleasure and virtue, of which only the last one bears real intrinsic value. Secondly, happiness, according to Aristotle, is the final and self-sufficient end towards which all action is aimed, it being the most desirable activity to be engaged in. Concerning the linkage of these terms, I demonstrated that Aristotle regards friendship a necessary condition for happiness while he understands goodness to be a necessary condition for friendships of the perfect kind. Finally, I discussed whether this conditionality of friendship means that it cannot bear an intrinsic value. As I have noted, Cooper argued that there was no conflict present, which was supported by an earlier passage in Aris-

totle's work. I conclude that friendship is both of instrumental and intrinsic value and at all times an important element in Aristotle's philosophy of human existence.

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