STRUCTURING SOMNOLENCE: SLEEP SCIENCE TECHNOLOGY AS A MEDIUM FOR DRAWING WITH THE BODY AT REST

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In December 2010, three volunteers participated in a two-week sleep study conducted by artist Lisa Carrie Goldberg and administered by a certified sleep technician. It was through these nocturnal events that the process of employing the body and the mind during sleep as a means of art making was realised. This paper, therefore, will investigate the fields of sleep science and art.

INTRODUCTION

At present, there is no universally acknowledged definition of sleep. While the science of sleep remains nebulous, now is a time rich with possibilities for artistic intervention and interpretation. According to William C. Dement, a forefather of medical sleep science, the modern incarnation of the field was aided by advances in sleep science technologies and the availability of imaging tools to visualise the brain. [1] Through this advancement in technology, sleep appears more tangible, or at least more visible and more measurable, to researchers. Yet at present, while the production of technological devices is ever increasing, there still exists no unified definition of this corporeal state. In the Structuring Somnolence project, I was not concerned with categorising or labelling sleep. Rather, my investigation is a striving for the comprehension of sleep through various modes of observation and my interest lies in looking at how sleep is being perceived by science today.

The Structuring Somnolence project is an investigation into the points of intersection and commonalities between the fields of sleep science and art, drawing particular attention to the semantic and diagrammatic parallels between sleep science, art, architecture and infographics. Over two years of research, I have seen how aspects of contemporary sleep science warrant highlighting and probing. These aspects pertain to the sleep science's strong reliance on technology and quantification as a means of visualising 'truth' or 'optimum health' or 'disorder' in the endeavour to understand the phenomenon of sleep. A component of this research consisted of a performance event wherein three participants slept over in a sleep laboratory. This act helped to demystify the nocturnal facility by introducing foreign media and 'healthy,' 'non-disordered' sleepers into the space.

SLEEP AS REPRESENTED THROUGH SCIENCE

The study of sleep is a learned language. In its contemporary form, it is composed of an alphabet that can only be acquired and deciphered by an acutely trained eye. Therefore sleep is also an exclusive language. [2] The graphical interpretation of sleep seems to have become the sine qua non for professionals working in sleep research, linking symptom and diagnosis. It remains, at its core, a human-made device that may or may not completely and faithfully reflect the workings of sleep, much less its essence. Without the materialisation of an image either to prove or disprove medical predictions, technologists and clinicians would be hard pressed to find solutions for 'sleep-related issues' with any certitude.

The application of lines as inscription identifiers for sleep research has undergone many incarnations, with each technological development adding to the visual dictionary of sleep throughout history. In its

scientific qualification, sleep is given a written language consisting of a variety of expressive line drawings ranging in thickness, shape and colour – each feature corresponding algorithmically to a physiological process. This contrasts with painterly depictions of sleep, traditionally represented in the fine arts as a scene from a nightmare or as a body lying tranquilly supine, eyes shut and no movement.

In the sleep laboratory, when a patient makes a claim concerning a condition relating to his/her sleep, the claim may only become valid once a data image is produced. The lines in a sleep graph wield tremendous amounts of scientific credence. These lines represent the health of the subject as it pertains to sleep. There appears to be an almost unquestioning reliance on, and trust in, the machine. One aim of the Structuring Somnolence project was to debunk this notion. By constructing drawings with the body using sleep science technology, I bring about a rupture with its normal purpose and highlight the possibility that the computer or 'inscription device' [3] can lie; even when it seems to be all that meets the eye. Theorist Don Ihde makes reference to imaging technologies as 'truth-telling' devices, stating that they "carry this 'eyewitness' quality" and an "aura of seeing-believability." [4] This reliance on visualisations through a "framed space" [5] or "technological mediations," [6] reduces sleep research to an almost monosensory approach.

SLEEP AS A VISUAL LANGUAGE

The imagery and text in the Structuring Somnolence project play with semantic and diagrammatic appropriations across various disciplines. I am interested in the juncture at which seemingly opposite fields meet. The term 'sleep architecture' is commonly used by sleep researchers and technologists to describe a patient's period of sleep. Visually similar to that of a natural or built landscape, it reflects the stages of sleep and awakenings that take place across the night of a study. In the 1980s, Alexander A. Borbély depicted sleep patterns as diagrams, presenting the stages of sleep as the "Sleep Staircase" and REM as Doric columns. [7] Body positioning, as recorded in sleep also produces images that resembles structural landscapes. With this notion in mind, I felt compelled to explore the possibility that the science of sleep is malleable both in its definition and in the application of its designated technologies.

STRUCTURING SOMNOLENCE

In December 2010, I conducted a two-week performance study in collaboration with both SymbioticA, the art-science research laboratory and the Centre for Sleep Science at The University of Western Australia. I was aided by Stuart King, manager of the sleep centre, who was also the head technician for the entire series of performances.

As part of the experiment, three participant sleepers selected a copy of one architectural/landscape image that appealed to him or her in a significant way. Throughout the development of the project, the participants were made aware that together we were attempting to mirror this image through their body positioning in sleep. From the onset, it was explained to the participants, that this project was not about 'sleep hygiene,' sleep efficiency or even a good night's rest. In fact, I would be interfering with their sleep.

The participants were chosen based on their interest in sleep as well a confirmation that they had never been inside a sleep laboratory and had no identified sleep disorders. These volunteers were given the

rare opportunity to see documentation of their sleep in addition to having access into the inner, nocturnal workings of a sleep laboratory. For me, as the lead researcher and conductor of the studies, I was interested in finding participants who wanted to share in exploring and embracing the strangeness of sleep.

Each participant was required to sleepover in the laboratory over two nights. For their first night, the control experiment, the participants took part in a basic, standardised sleep study. This served not only as a baseline study for the entire experiment but also as an aid in familiarising the participant with the laboratory environment and protocol.

The second night, the Somnolence Structuring, involved my intervening with participants throughout the night. It was my responsibility to place the participant's body in a set positions that mimicked their chosen architectural/landscape image. The aim of this animation was two-fold. It was to have the participant's chosen image mirrored in the body position graph depicted within the computer software, which is conventionally used for measurement and diagnosis. At the same time, it would call upon the notion of sleep as an 'active state.' In addition, it would play upon the term 'sleep architecture' through architectural forms built by the body. The Contour Diagram was employed as a draft or map, which was used throughout the studies. It was a booklet comprising a series of structure outlines or contours superimposed on the participant's chosen image. I then plotted the timescale of the entire study, approximately 11:30 pm to 6:00 am, against their chosen image. This booklet was used as the template directing the repositioning of bodies through the night.

Once the participant was in his or her allocated room, electrodes were set in various positions on the body along with the sensor, which was placed on the chest. The electrodes indicated when the participants were asleep and their stage of sleep throughout the night. These sleep indicators included: Electroencephalogram (EEG) for brain waves, Electromyogram (EMG) for chin muscle movement and Electrooculogram (EOG) for eye movements. An Electrocardiogram (ECG) as a heart monitor and a Transducer belt as a breathing monitor were employed as a safety precaution. A body sensor, which was fastened to the Transducer belt that sat around the chest, was responsible for collecting data on the participant's various body positions during sleep. The sensor captured four types of body positions: right, back, left and front. Each position is represented as four coloured bars in the body position graph: red, blue, green and pink. In order to produce the artistic outcome of the experiment, each movement of the body was predetermined by a timescale that spanned the participants' entire sleep period throughout the performance study. This was outlined in the Contour Diagram.

SLEEP AS A FORCE TO BE RECKONED WITH

Much of this project has been about playing with invisible forces, whether they be the nature of sleep or our internal, intangible circadian rhythms. Recognising that sleep is a powerful force, I invariably experienced a sense of urgency when repositioning the bodies. This was because the body position sensor tracked and recorded every allocated posture it sensed every 30 seconds. Sometimes I was unable to move the body fast enough or, in a few instances, I had found repositioning difficult on account of resistance from the sleeper's body. Also, if the participant's body were to move of its own accord, which is a natural submission of the human body to sleep, I was responsible for gently restraining it and expediently repositioning it. This became a mediated guidance. On other occasions, the body position sensor

became loose on the belt. The result was a calculation configuring and recording of the 'wrong' body position, not the one planned and outlined in the sleeper's Contour Diagram. Because of these features, my position and role within the room was crucial.

Technically speaking, if the body position sensor was placed in one position for more than 30 seconds, that position would be recorded on the sleep position graph. This then equated to a race against time, in that if the sensor was off kilter in some way, I had no more than 30 seconds to remedy the situation before it would be imprinted on the graph forever. And since one of the objectives of the studies was to create a replicated image of the participant's chosen structure within the sleep graphs, every second – the equivalence of a line – counted. Working within this zone of urgency kept me alert and sustained my concentration throughout the night. Leaving a major factor of the project up to chance significantly aided my alertness and awareness, both of which were imperative in such a situation: struggling to stay awake, in a dark room, while watching someone sleep, throughout a night and into the early morning. What can be seen as the final product of each Somnolence Structuring is a graphic depicting coloured lines that match and those that do not. It is in these 'happy mistakes,' these moments of missing coordination, that the force of sleep is exemplified.

SLEEP ARCHITECTURE AS SOMNOLENCE STRUCTURING

The three architectural/landscape images chosen by the three different participants were the Parthenon, Monument Valley and the Perth city skyline. Each image had its own unique challenges and intricacies. Enacting the Parthenon involved an acute awareness of timing and a repetitive, simple motion. This consisted of only two moves, right and front, implemented precisely every half-hour for the entire night in order to give the shape and look of the iconic columns.

The vast expansiveness of Monument Valley, Utah, as enacted by the Somnolence Structuring, was translated into long stretches of time – periods of two hours occasionally – where no engagement with the sleeping body was required. And yet, in these lengthy durations were moments where alterations to positioning had to be conducted in precise 2–4 minute blocks of time. These motions were required for the final graph to reflect the intricate detail of the rocks silhouetted against the Utah sky.

The Perth city skyline is an image that most closely resembles that of 'sleep architecture' or a body position graph in its original form. Because most of the buildings on this horizon are flat rectangles, coordinating this structuring involved a relatively even balance of time spent positioning the body and time of non-engagement.

Along with observing sleep as an experience embodied within others, for me the Somnolence Structurings entailed comprehending sleep viscerally through a phenomenological approach. [8] Sleep, most often, just comes upon us, or over us; it sweeps through us. However, when it is taken away from us, it is, a form of a debilitation. Thus I come closest to understanding the essence of sleep when I deprive myself of it. The very lack – the very need – allows me to approach, as near as I now can, to grasping sleep, as that is when it visits us (while we are still in consciousness) in its most concrete and tangible incarnation. This could be said to be a universal experience, however, as long as we have not grasped its essence, its lack gives us a visceral experience and one way to attain a sense of it.

Rejecting notions of sleep as 'an inactive state' or 'life's little death,' these body focused works became intimate engagements between artist and subject, who performed together while teetering between

transient states of consciousness – the artist being awake, tempted to sleep, and the participant asleep, waking slightly with every body reconfiguration. This duet emancipated the sleep laboratory bedroom from its purely scientific function.

Sleep, being outside conscious awareness, always escapes the observation of the sleeper. It can only ever be observed from without. There is a strong link between the impossibility of pinning down the lived experience of sleep and the unending variations and immense diversity in its representation within the arts. Like much art, Structuring Somnolence is playful as it is serious; it is a game played with nature in that I set up parameters and regulations as a sort of organisational tool or framework for the piece, knowing very well that in the end these will be ineffective as science and irrelevant to anything of a utilitarian nature. The act of carrying out an unconventional sleep study experiment as a performative artwork is, in and of itself, a reminder of the artificiality, the theatrical staging quality, of the sleep laboratory bedroom. With the data that emerged from the sleep technology commonly used to calculate and measure patient's sleep, together artist and participant forged a new configuration of graphics.

STRUCTURING SOMNOLENCE AT VISCERAL: THE LIVING ART EXPERIMENT

I was offered the opportunity to present my research at an exhibition entitled Visceral: The Living Art Experiment, which ran from January 25 to February 25 2011, held at Science Gallery at Trinity College in Dublin, Ireland. In essence, this rendering of Structuring Somnolence was similar to the experiments held in Perth: an all-night performance that produces certain outcomes – both intended and unintended ¬– including a body position graph that mimics the outline of an architectural/landscape structure. As with the laboratory experiments, a volunteer sleeper and a sleep technician were required for this adapted version. On this occasion, variations to the experiment consisted of the environment in which it was situated and the technology used to conduct the study.

Structuring Somnolence at Visceral was an exercise that purposely invited unknowingness and happenstance. How would this live sleep event unfold amongst the myriad variables as a juxtaposition to the studies of the private, protectively encased sleep laboratory? Bedrooms specifically designed as sleep research facilities are crammed with technological apparatuses. However, with the advent of portable sleep measuring devices, also known as portable PSGs, it has become possible to gather data on a patient's sleep while that patient is removed from the laboratory setting by using Bluetooth wireless technology. The same technology was employed for this rendition of Structuring Somnolence.

This sleep study was to serve as a public performance event, a single nine-hour performance from January 28–29 2011, wherein people passing on the street became witnesses to the experiment taking place in real time, 9:00 pm to 6:00 am to be exact, only inches away from the glass façade of the Science Gallery. The portable PSG, was used to measure a basic electrode application set-up for a sleep study. In this gallery study, the participant sleeper chose to replicate the street block directly across from the Science Gallery. He liked the idea of mirroring what he saw and what he knew would be right beside him as he slept.

It was neither my main objective nor my main concern to wholly replicate the studies held at the Centre for Sleep Science inside Science Gallery. While the plan was to follow loosely the processes of conducting a sleep study with an artistic outcome, the concept behind Structuring Somnolence at Visceral, stemmed from a desire to see what would happen when we transported the sleep laboratory systematisation into an art space.

CONCLUSION: SOMETHING TO SLEEP ON

The investigation put forth by way of Structuring Somnolence was not to detract from the empirical values of science, but rather to highlight other ways of knowing and experiencing. Far from being a motionless and passive state, sleep has its own unique form of energy and dynamism. While scientific research has been among the ways of discovering this, one crucial role of art and my practice, is to defamiliarise all that we have named and categorised. This defamiliarisation serves as a reminder that sleep is a phenomenon, and that it is a lived, felt, forceful experience and one which can be expressed and interpreted in a multitude of ways.

The overriding demand to seek this 'truth' has led to evaluations carried out in artificial conditions (laboratories) with the subjects adorned in a plethora of clinical paraphernalia. As a way of approaching and addressing these matters anew, the development of this creative process focuses on harnessing the sleeping body as a means for drawing so as to repurpose sleep measuring and diagnostic devices for artistic gains.

References and Notes:

1. *William C. Dement and Christopher C. Vaughan, The promise of sleep: a pioneer in sleep medicine explores the vital connection between health, happiness, and a good night's sleep (New York: Delacorte Press, 1999), 18.*
2. *Kenton Kroker, The Sleep of Others and the Transformations of Sleep Research(Toronto: University of Toronto Press, 2007), 4.*
3. *Bruno Latour, Science in Action (Cambridge, MA: Harvard University Press, 1987), 68.*
4. *Don Ihde, Expanding Hermeneutics: Visualism in Science (Evanston, IL: Northwestern University Press, 1999).*
5. *Ibid., 91.*
6. *Bruno Latour, "Where are the Missing Masses? The Sociology of a Few Mundane Artifacts," Shaping Technology/Building Society: Studies in Sociotechnical Change, ed. Wiebe E. Bijker and John Law, 225-258 (Cambridge: MIT Press, 1992).*
7. *Alexander A. Borbély, Secrets of Sleep (New York: Basic Books, 1986), 25.*
8. *Maurice Merleau-Ponty, introduction to Phenomenology of Perception, trans. Colin Smith (London: Routledge & K. Paul, 1962), ix*.