PERIPHERAL NEEDS

Enabling the unmet needs of marginalized society through design.

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AN INTERACTION DESIGN MASTERS THESIS

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ABSTRACT

Peripheral Needs: Enabling the unmet needs of marginalized society through design.

The condition and quality of being human includes a vast array of peripheral needs: dispositions, motives and sympathies outside the mainstream definition of "normal" and "desired," that cannot be addressed simply through user-friendliness. My thesis will enable a series of peripheral needs from established contexts, addressing the social acceptability of those needs, and considering the psychological, social, and cultural experiences that the design experiences mediate.

The primary intention of this thesis is to design for individuals whose needs are not addressed by mainstream design—or any design at all. Using similar design principles and techniques as the design for mainstream needs, designing for peripheral needs declares that those needs are acceptable, worthy of being addressed in the same context as the mainstream. The second intention of this thesis is to call attention to the influence that design has to affect—or at least perpetuate— ideas of social acceptability, and take advantage of that influence.

BACKGROUND

(a). About the Exploration of New Technology

While shaping my thesis in the beginning weeks, I was drawn to the link between technology and ideas of social acceptability that technology mediates. This approach was wound up in my personal interest in the model of technology assessment and adoption developed by the Amish.[1] Having read literature that criticized the lack of attention the relationship between technology adoption and its implications, from Theodor Adorno to Neil Postman, I thought it best to direct the design aspect of my thesis toward providing a physical manifestation of this relationship—to clearly call attention to implications of new technology adoption. This seemed reasonably attainable while striving also for designs that satisfied a peripheral need, and also extremely relevant given that what makes the needs I desire to enable "peripheral," is the needs' status in terms of social acceptability.

This dual approach clouded the ability of the design ideas to address the need they were aimed at in a truly pragmatic fashion. Instead, ideas were expressing a personal perspective in regards to adopting new technologies. Design that addresses a peripheral need will by default have to pay attention to how it is situated socially and thus the social and cultural themes that are promoted. The technology employed, as with any tool or medium, will contribute to these themes. Thus, to make the implications of technology at the core of the thesis is not necessary, as it is ever present in any design experience. This said, my background research begins with critiques of technology.

(b). On Technology

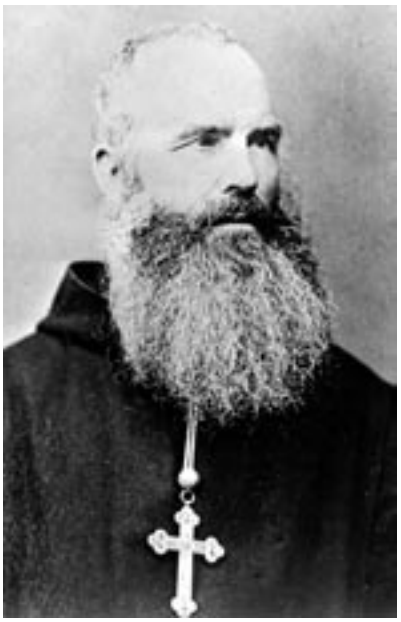
One of the defining principles for addressing a historical period is to determine the technology used. Whether referred to as the Stone, Bronze, Iron, or Steel Age, or the Oral, Cinographic, Typographic and Electronic Ages,[2] technology defines history. In America, there is a history of dividing periods in relation to the technology of transportation: Horse, Railroad, Car, Airplane, and Space. However, these American definitions of the ages are never autonomous but always advertised with the false promise of a new and enlightened age—automobile, telephone, television and nuclear energy all made such claims.

> In its full development, electricity can yoke a whole continental economy into something like one unified machine, one organic whole. The parts may be small, flexible, located where you please, but with their central station connections. Electricity can give us universally high standards of living, new and amusing kinds of jobs, leisure, freedom and an end to drudgery, congestion, noise, smoke, and filth. It can overcome the objections and problems of a steam civilization. It can bring back many of the mourned virtues of the handicraft age without the human toil and curse of impending scarcity that marked the age[3]

In chapter one of *Taming the Tiger: The Struggle to Control Technology,* Witold Rybczynski asserts that if fire was one of mankind's first tools, the out-of-control forest fire set accidentally was probably one of mankind's first examples of technology out of control.[4] There are many historical examples of "technology gone awry," and for each there are examples of new technologies introduced to deal with the initial problems—thus perpetuating a problematic cycle.

The invention of the mechanical clock by Benedictine monks, who desired to mark the seven canonical hours of devotion, provides Lewis Mumford an early example of technology gone awry. According to Mumford, "Time-keeping passed into time-serving and time-accounting and time-rationing. As this took place, Eternity ceased gradually to serve as the measure and focus of human actions."[5] The clock had become an instrument of capitalist gain rather than an instrument for the service of God.

Interaction designers are consistently innovating through the use of new technology, masking the growing complexities of products, systems and services for large, consumer product and service companies. To situate technological solutions to human problems in a context of mainstream or minority we need to establish the unconscious assumptions guiding, first, activity in a liberal capitalist society and, second, the mainstream design practice in general. The following chapter will explore these assumptions through the critiques of some influential individuals.



Isidore Robot, the man who was the founder of the Catholic Church in what is now Oklahoma, was a 38-year old Benedictine monk when he entered the Indian Territory. He was an intense, energetc priest of formidable faith dedicated to near contradictory ideals of austere monasticism and the missionary apostolate.

(c). Influential Individuals

Theodor Adorno (1903–1969)

Adorno states that capitalism fed people with the products of a culture industry, which is the opposite of "true" art, to keep them passively satisfied and politically apathetic. Culture industries churn out a debased mass of unsophisticated, sentimental products, which according to Adorno replaces the more 'difficult' and critical art forms[6] which have the potential to lead people to question social life. The culture industries thus cultivate false needs which can be engineered by the capitalist system and then answered by it. Adorno asserts that these false needs replace people's 'true' needs, which he describes as freedom, full expression of human potential and creativity, and genuine creative happiness. The false needs cultivated by the capitalist system are promoted by the marketing and media industries, which turn cultural experiences into commodities—delight being equal to cost or something's ability to be exchanged.

Adorno first drew these conclusions in relation to art: "For consumers the use value of art, its essence, is a fetish, and the fetish—the social valuation which they mistake for the merit of works of art—becomes its only use value, the only quality they enjoy."[7] Adorno claims that even capitalism itself is shifted when the value of commodities, whose base was determined by use, is replaced by the value of exchange.

Interested parties explain the culture industry in technological terms. It is alleged that because millions participate in it, certain reproduction processes are necessary that inevi-

tably require identical needs in innumerable places to be satisfied with identical goods. The technical contrast between the few production centers and the large number of widely dispersed consumption points is said to demand organization and planning by management. Furthermore, it is claimed that standards were based in the first place on consumers' needs, and for that reason were accepted with so little resistance. The result is the circle of manipulation and retroactive need in which the unity of the system grows ever stronger. No mention is made of the fact that the basis on which technology acquires power over society is the power of those whose economic hold over society is greatest. A technological rationale is the rationale of domination itself. It is the coercive nature of society alienated from itself. Automobiles, bombs, and movies keep the whole thing together until their leveling element shows its strength in the very wrong which it furthered. It has made the technology of the culture industry no more than the achievement of standardization and mass production, sacrificing whatever involved a distinction between the logic of the work and that of the social system.[8]

Marshall McLuhan (1911–1980)

Marshall McLuhan, in *The Medium is the Massage,* regards the media as extensions of the human body, a perception that relates to the Instrumental Theory of Technology.[9] However, as articulated in his view of electronic media as an extension of the nervous system, he believed that the media imposed their own assumptions on the psyche of the user.

McLuhan believed that Gutenberg's printing press, with the consequence of fragmenting society, was the predecessor to the industrial revolution. The printing press "created the portable book, which men could read in privacy and in isolation from others."[10] The following excerpt from *The Medium Is The Massage* provides another example, this time the railway, of technology and its direct impact on, and relationship to, society.

> The railway radically altered the personal outlooks and patterns of social interdependence. It bred and nurtured the American Dream. It created totally new urban, social, and family worlds. New ways of work. New ways of management. New legislation.
>
> The technology of the railway created the myth of a green pasture world of innocence.It satisfied man's desire to withdraw from society, symbolized by the city, to a rural setting where he could recover his animal and natural self. It was the pastoral ideal, a Jeffersonian world, an agrarian democracy which was intended to serve as a guide to social policy. It gave us darkest suburbia and its lasting symbol: the lawn mower.
>
> The circuited city of the future will not be the huge hunk of concentrated real estate created by the railway. It will take on a totally new meaning under conditions of very rapid movement. It will be an information megalopolis. What remains of the configuration of former "cities" will be very much like World's fair—places in which to show off new technology, not places of work or residence. They will be preserved, museumlike, as

> living monuments to the railway era. If we were to dispose of the city now, future societies would reconstruct them, like so-many Williamsburgs.

Marshall McLuhan and his son Eric outline a fourfold process of assessing the interaction of human and artifact:[11]

> More of the foundation of this New Science consists of proper and systematic procedure. We propose no underlying theory to attack or defend, but rather a heuristic device, a set of four questions, which we call a tetrad. They can be asked (and the answers checked) by anyone, anywhere, at any time, about any human artifact. The tetrad was found by asking, 'What general, verifiable (that is, testable) statements can be made about all media?' We were surprised to find only four, here posed as questions:
>
> - What does it enhance or intensify?
> - What does it render obsolete or replace?
> - What does it retrieve that was previously obsolesced?
> - What does it produce or become when pressed to an extreme?

The McLuhans' Tetrad, above, are the very questions this thesis uses to evaluate ideas. Rather than looking at the task of problem solving, the Tetrad investigates the periphery of any solution in an effort to weigh the cause an effect relationships of a design idea.

Arnold Pacey

Arnold Pacey furthers the McLuhan model of assessment by leading us to recognize non-understandable forms for the answers to questions. He contends that the overall progress and impact of technology are expressed through quantitative measures, through volumetric graphs and statistics. He says that this linear, one-dimensional interpretation of progress based on generalized fact is dangerous and misrepresents the overall impact. Pacey asserts that "a technocratic value system... gives rise to what is often called a 'technocratic' outlook that is single-mindedly insistent on an unambiguous view of progress, of problem-solving, and of values."[12]

Pacey's critique inspires the very needs that this thesis aims at. Instead of wrote problem analysis and solutions, the decision to focus on emotional satisfaction helps bring attention to the loss of complex emotional criteria that should be considered with any design idea or exercise.

Victor Papanek (1927–1999)

Papanek's classic text Design for the Real World addresses the influence of design and the relative lack of moral responsibility felt and expressed by designers. He condemns consum-

erist design and likens it to doctors practicing only cosmetics and plastic surgery.[13] Papanek feels that design should address the majority of people in the world, living in sub-human conditions, and that it is thus senseless to design for the consumption of the affluent and advantaged of major industrialized nations. He developed six design goals as an alternative to the aims of consumerist design:

- Design for the Third World.
- Design for the teaching of disabled individuals.
- Design for the medical practices
  medicine, surgery, dentistry, and hospitals.
- Design for experimental research
  improvement of research equipment.
- Design for sustaining human life under marginal conditions
  space, underwater, deserts, etc.
- Design for breakthrough concepts
  revisiting basic problems.

These ideas about moral obligation help illustrate the lack of support that mental/emotional health issues receive. The very idea of the "periphery" of needs that are addressed in this thesis can be directly linked to the idea of marginal conditions, peoples and needs that Papanek asserts are truer goals for design than those of consumerism.

Neil Postman (1931–2003)

Neil Postman, media critic and past chair of the Department of Culture and Communications at New York University, furthers McLuhan's perspective on media and technology. He asserts:

> Anyone who has studied the history of technology knows that technological change is always a Faustian bargain: Technology giveth and technology taketh away, and not always in equal measure. A new technology sometimes creates more than it destroys. Sometimes, it destroys more than it creates. But it is never one-sided.
>
> The invention of the printing press is an excellent example. Printing fostered the modern idea of individuality but it destroyed the medieval sense of community and social integration. Printing created prose but made poetry into an exotic and elitist form of expression. Printing made modern science possible but transformed religious sensibility into an exercise in superstition. Printing assisted in the growth of the nation-state but, in so doing, made patriotism into a sordid if not a murderous emotion.
>
> Another way of saying this is that a new technology tends to favor some groups of people and harms other groups. School teachers, for example, will, in the long run, probably be made obsolete by television, as black-

> smiths were made obsolete by the automobile, as balladeers were made obsolete by the printing press. Technological change, in other words, always results in winners and losers .[14]

Postman's assessment of technology as a Faustian bargain coincides with Jacques Ellul's view that, "All technical progress has three kinds of effects: the desired, the foreseen, and the unforeseen."[15] If one were to find the "unforeseen" as controversial, Heisenberg's uncertainty principle would support its relevance.

Postman, reacting to Frederick Winslow Taylor's *The Principles of Scientific Management* of 1967, illustrates his ideas of "technopoly" in his 1993 publication *Technopoly: The Surrender of Culture to Technology.* Postman defines technopoly as "The idea that society is best served when human beings are placed at the disposal of their techniques and technology, that human beings are, in a sense, worth less than their machinery." He argues that:

> Technopoly is a state of culture. It is also a state of mind. It consists in the deification of technology, which means that the culture seeks its authorization in technology, finds its satisfactions in technology, and takes its orders from technology. This requires the development of a new kind of social order, and of necessity leads to the rapid dissolution of much that is associated with traditional beliefs. Those who feel most comfortable in Technopoly are those who are convinced that technical progress is humanity's superhuman achievement and the instrument by which our most profound dilemmas may be solved.[16]

Postman's sharp definition and critique of our techno-centric society provide support to the very notion that design can influence psychological, social, and cultural experiences. Through the very presence of technology that answers the needs of a problem, previous solutions (both technological and people-based) are removed from existence, taking with them their impact on society—both the bad and the good.

The Luddites

Known for their uprising against technology in England, the Luddites organized against technological advances in the textile industry during the Regency (1811–1816). The movement ended when Parliament dispatched 12,000 soldiers, and its leaders were either executed or transported to Australia. A similar but separate uprising in 1830 led to the destruction of threshing machines by farm workers.

The Luddites are assumed to have rejected all technology—which is not the case. Their original uprising was more against the free market economy than technology. Prior to the notions of the free market, an artisan would work for a set price, irrespective of materials cost, labor time, and profit. The change in this model and the degradation of the products involved caused the initial uprising. The Luddites provide an example of what Neil Postman refers to as the "Faustian bargain" of technological change, it giveth and taketh away.

(D). Thinking About Needs

Determining need is not a value-free process—it reflects ideologies of the need-determining body. In Western society, the individual has generally been the unit of need. Abraham Maslow in 1954 divided human needs into five categories, hierarchically, (1 being at the bottom of a triangle, 5 at the top): (1) Psysiological, (2) Safety and security, (3) Belonging and love, (4) Esteem, and (5) Self-actualization[17]

John Bradshaw in 1972 suggests four types of social needs: normative, felt, expressed, and comparative.[18] The following are drawn from his conclusions:

> *Normative:* Knowledge based and usually professionally defined. The desirable standard is determined against which the actual standard is compared. Individuals existing below the standard are in an undesired abnormal state.
>
> *Felt:* What people want. Defined by asking the users/potential users what they want. Ignorance can deflate the need.
>
> *Expressed:* The unmet demand. According to the practice of most policy makers, no demand is equated to no need.
>
> *Comparative:* Need determined upon other users being compensated for the same need. Removed from the need for new services .

(D, 1). Identifying User Needs

Experience design and interaction design have developed some direction in terms of identifying user needs. For example, Alan Cooper and Robert Reimann note that an accounting clerk's goals are not that of the employer (to process invoices efficiently) but to appear competent at his/her task and remain engaged while performing repetitive tasks.[19] They propose addressing personal goals along with business and/or functional goals:

> In recent years, the business community has come to recognize that user research is necessary to create good products, but the proper nature of that research is still in question in many organizations... Quantitative market research and market segmentation... falls short of providing critical information about how people actually use products.[20]

This lack of information regarding actual use of products or services, on the part of the developing organization, can be ratified by involving designers in the research process. Cooper and Reimann feel that designers bring empathy to the research table. This premise is built upon the conclusion that designers, more so than researchers, are trained to be more

empathic. Whether this holds true or not it is often the case that involving the designers in the research "gets them thinking about users long before they propose solutions."[21]

(D, 2). User-Centered Design

One of the practices that gets the designer involved in the research process, getting beyond quantitative market research and segmentation, is user-centered design. User-centered design is defined as:

> a philosophy and a process. It is a philosophy that places the person (as opposed to the 'thing') at the center; it is a process that focuses on cognitive factors (such as perception, memory, learning, problem-solving, etc.) as they come into play during peoples' interactions with things.[22]

Originating in the HCI (Human-Computer Interaction) discipline, user-centered design aims at ease of use and "meeting the users' expectations."[23] Usability principles in the field of HCI aim at experiences that do not challenge, confuse, displease or require the user to have to learn anything—in this sense, minimum effort and happiness equals success. For example, the following "global usability principles"[24] are quoted from Raïssa Katz-Haas:

> *Visibility:* Visibility helps users form correct mental models of the 'thing'—models that help users predict the effect(s) of their actions. Important elements (such as those that aid navigation) should be highly visible. Users should be able to tell at a glance what they can and cannot do.
>
> *Memory Load:* The site should reduce user memory load. Screen elements should be meaningful and consistent across the site so users can recognize, instead of remember, what elements mean from one page to another. New items and functions should relate to ones the user already knows.
>
> *Feedback:* When a user performs an action, she should receive immediate feedback. For example when a user clicks a button, something on the screen should change so the user knows the system has registered her action.
>
> *Accessibility:* Users need to find information quickly and easily:
>
> *Errors:* An error is an incorrect action by the user such as clicking the wrong link. It is important to minimize user errors and provide users with mechanisms that allow them to recover quickly from errors.
>
> *Satisfaction:* The site should be pleasant to use and look at.
>
> *Clarity:* Short sentences; 'Everyday' words (instead of jargon or technical

terms); Active voice, active verbs; Verbs (instead of noun strings or nominalizations); Simple sentence structure.

These principles have been carried over to the disciplines of product and interaction design—perpetuating the imperative that experiences on the part of the user should be easy, pleasant and not challenging. What is missing are the experiences that encourage the diverse qualities and dispositions of being human and especially the complex emotional responses that users have. Promoting memory, challenging mental perception and cognitive practices or displeasing the user are all examples of practices that have value in themselves.

Within the discourse of interaction design is a foundation in, and reflection upon, who determines which user needs to enable and often promote. Though the determinant of this subject lies often with the organizations and companies producing the goods and services that require designers, much emphasis, both in the corporate and educational sectors, is placed upon the interaction designer as an innovator. If interaction designers are to be innovators they need be responsible, which means recognizing the implications of a new technology and new interactions, considering not only what the technology and experience gives but what it takes away. Decisions about the experience thus need to consider the value of the diverse nature of the users and coincide with the ethical concerns of the user and their context. These considerations are primarily achieved through adopting an empathic approach. Empathy is the most crucial of all investigation tools employed in this thesis. When developing solutions for the mainstream, the designer is without the advantage of being able to enable the multitude of possible motivations involved when aiming at a one-size-fits-all goal. However, when approaching a single individual, their motivation/s and disposition can be at the forefront of the design process—and must be.

A Thousand Years *by Damien Hirst*
contents: rotting cow's head, sugar solution, fly eggs, fly zapper

(e). Art and Design

As I developed the theme of my thesis, questions quickly arose regarding whether or not design that would be considered so marginal, and thus provoking, was more along the lines of art, than of design. This question gained cogency from the increased visibility of art work from those like Eduardo Kac and Damien Hirst, whose design experiments are located in an art context.

Damien Hirst's *A Thousand Years* (1990) consists of a rotting cow's head, sugar solution, fly eggs and a fly zapper. The piece is self-perpetuating: the flies hatch and feed on the cow's head; the flies mate and lay eggs in the cow's head; the flies are consumed by the predator, the Insectocutor; the new flies hatch and feed on the cow's head and are eventually zapped. And so on… the entire life cycle of any animal represented in literal terms: life, food, sex, reproduction, and death. It represents life on the basest level. *A Thousand Years,* though a spectacle in a gallery setting, is the design of a highly controlled environment.

Alba *by Eduardo Kac*
Alba was an albino rabbit engineered by splicing the green fluorescent protein (GFP) of a jellyfish into her genome.

Technically Eduardo Kac's *Alba* (2000) is also a design experiment whose motivations and results were engineered. *Alba* was an albino rabbit engineered by splicing the green fluorescent protein (GFP) of a jellyfish into her genome.

Both examples, though technically design experiments, exist in the art world as their motivation is driven by self-expression, not the needs of one, or many, individuals. Thus, designing for peripheral needs is solidly positioned in a context of use, regardless of how marginal—enabling needs.

(e, 1). Critical Examples: Reflective Design and the Para-functional

In the first two chapters of *Hertzian Tales,* Anthony Dunne sets up the space for designers of electronic objects to work in the realms of metaphysics, poetics, and what he calls the "aesthetics of the post-optimal," where little research has been carried out.[25] This space is found not in the user-friendly, but rather in poeticizing the distance between people and electronic objects—through promoting awarness that design is always ideological.[26]

In chapter 3 of *Hertzian Tales,* Dunne rounds up a selection of design products and experiences that have begun to shape the space for what he calls "para-functionality." He defines "para-functionality" (drawn from J. Baudrillard) as a form of design where function is used to encourage reflection on how electronic products condition our behavior.

In his chapter "Para-functionality: The Aesthetics of Use," Dunne uses Jack Kevorkian's Suicide Machine and a Drinking Cane from a 1910 Saint-Etienne mail-order catalogue to illustrate a field of objects which embody provocative or poetic qualities that "suggest a role for design objects as discourse where functionality can be used to criticise the limits which products impose on our actions."[27] "Forbidden Emotions" continues with examples of this discourse, with more focus on the narrative as a tool for reflection and commentary—embodied best in Alienature by Philip Garner, in which the presence of real prototypes is replaced by narratives that the audience can associate with. Dunne also gives examples from literature, exploring "literary gadgets" that function in a subversive way, creating reflective dystopias. These literary examples find a parallel space with design, as articulated by Giulio Ceppi (Playing With Technology) who points out that the lack of "wonder" and "surprise" in the design of industrial objects leaves a space for "forbidden emotions." These forbidden emotions are found in "heterotopias" (Foucault), a form of dystopias that subvert the very tools that define them (Foucault cites the work of Jorge Luis Borges as embodying examples of heterotopia).

"Social fictions" focuses on how electronic products and experiences that emphasize innovation and cultural content can function critically. Diller + Scofidio's Para-site installation embodies this practice by creating architectural interventions with existing technology that is not redesigned but instead re-contextualized to comment on its impact in the architectural space. In Dunne's final section "Hertzian Pathologies," alternative conceptual models are addressed through devices like a radio scanner whose function defines an "invisible" structure, both legal and electronic. These devices allow consumers to "develop new conceptual models about our environment."[28]

Though Dunne's project categorization exhibits more overlap than differentiation, this does not detract from his selection of work and his critique which point to the strength of alternate narratives in allowing people to explore existing invisible boundaries and the potential for new ones. He asserts that:

Jack Kevorkian and his Suicide Machine.

***Para-site** by Diller + Scofidio*

> design thinking might re-enter everyday life in ways that maintain the design proposal's critical integrity and effectiveness while facing criticism of escapism, utopianism or fantasy. The challenge is to blur the boundaries between the real and the fictional, so that the visionary becomes more real and the real is seen as just one limited possibility, a product of ideology maintained through the uncritical design of a surefit of consumer goods.

He explains that the best model for developing this kind of believable fiction that functions critically are films and/or scenarios which do not require fully functioning prototypes. Relying only on the physical prototype, Dunne feels the prototype would be "assimilated into known patterns of behaviour, explained away, especially when presented in the frequent gallery context." However, this rational only supports experiences that would have different patterns of behaviour, ones innovated by the designer—what about existing patterns of behaviour that simply don't live in the mainstream? Though a film or scenario does the best job of contextualizing the designed experience, placing needs that are peripheral to the mainstream in a gallery setting or false "showroom" setting runs the risk of sensationalizing what is socially unacceptable.

(e, 2). Critical Examples: Design Noir

Anthony Dunne and Fiona Raby have developed a working area, inspired by film noir, in which they place the consumer in the role of the "anti-hero." This is contrary to the role of the consumer within mainstream electrical products—which are developed for a narrow range of human emotions. Critical of mainstream consumer products, they cite what they call "Hertzian space," an environment of electro-magnetic radiation, as an example of how electronic objects are not smart or self-contained. Dunne and Raby are interested in "how electronic products can function in intriguing ways which are more filmic, or narrative, than merely practical or aesthetic" (Sitza). Dunne asserts that it is hard to transgress societal rules through mainstream products.

Dunne and Raby attempt to address alternative human needs by developing of new products and experiences that raise questions and suggest dilemmas. They provide an example of a user needing to lie. However, they regard these alternative needs as dark and perverse, labeling them in a negative tone and segregating them from currently addressed mainstream needs. Here is Dunne defining a human need not met by mainstream design as "psychopathological" and "paranoid:"

> *Doors of Perception:*
> What would be an example of a noir product?
>
> *Anthony Dunne:*
> Well, one would be the *TruthPhone* from the Counter Spy Shop—this is a working telephone which can tell if the caller is lying using a voice stress analyzer. It's a real product, aimed at fulfilling a human need which is not

> normally acknowledged—OK, so it's a psychopathological need in this case, a paranoid need, but it shifts the emphasis from passive button-pushing to having some kind of psychological experience.[29]

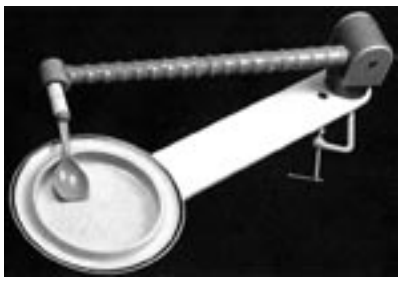
Addressing alternative human needs through design can support the needs in a positive and reinforcing manner, avoiding the stereotypes that pigeon-hole needs in a negative context. These needs could be answered while supporting a reflection upon and possible assessment of new technologies in our society.

(f). London Innovations

London Innovations Limited believe that "conventional market forces ignore a huge social market of unmet needs for products and services and that the public can and should contribute to the design and development of useful products to supply this social market." Their priorities range from designing products for the elderly, children and handicapped people to products which reduce alienation by involving the intended user in the design process—with a last priority of products that retain or enhance skills in production while taking advantage of modern materials and methods.

Their *Neater Eater* is a device for helping people with intention tremor feed themselves and make meal-times more convenient and less degrading. Another of their designs, the *Wheelchair gym* helps individuals in wheelchairs exercise. The process involved in these products involves rigorous research and development which would be far too cost-intensive for profit-driven consumerism.

London Innovations' work, especially with the disabled, is a direct inspiration for this thesis. Their designs support the varied and complex forms of tasks that are usually considered basic and have single, established criteria for evaluating success in respective design solutions. Although their work addresses the periphery, the formal characteristics of their solutions often bring to mind equipment for the disabled, which could potentially be avoided to help promote social acceptability.



Neater Eater *by London Innovations Limited*

Wheelchair Gym *by London Innovations Limited*

PERIPHERAL NEEDS

(a). What are Peripheral Needs?

If mainstream design products and services are intended for the mass consumer market—from easy-to-use microwaves and computer desktop programs to one-size-fits-all airplane seats—then design products and services that meet the specific needs of individuals—however complex or socially unacceptable—are on the periphery. Peripheral needs are those found outside the mainstream—needs that are not addressed by the large producers of consumer goods and services. Whether deemed too difficult or simply without a large enough margin for consumption with profit, peripheral needs are overlooked and/or avoided. Tailored design products and services could enable narcoleptics, manic-depression, masochists or electro-phobia.

The medium of film has a long history with exploring the periphery of the human condition. Much like the showing rooms in a circus with the bearded-lady, sword-swallower or midgets (fig. 4), many Hollywood epics exploit what is strange and abnormal for its value as sheer spectacle. However, there are also numerous films whose exploration of alternative narratives help demystify the seemingly obscure and relate it to the complex human motivations and dispositions in all of us. The following are examples of film characters with peripheral needs:

Melvin Udall from the film ***As Good As It Gets***

Truman Burbank from the film ***The Truman Show***

Donnie Darko from the film ***Donnie Darko***

1. Melvin Udall (obsessive-compulsive disorder), *As Good As It Gets*
Acerbic and outwardly despicable pulp novelist Melvin Udall lives in a haze of obsessive-compulsive behavior patterns, avoiding cracks in the sidewalk and rigidly adhering to his regimen of daily breakfasts in the cafe where harried single mom Carol Connelly is the only waitress he'll accept.

2. Truman Burbank (aquaphobia), *The Truman Show*
Truman Burbank is the unknowing star of a hugely popular 24-hour, real-life TV show. His town is a camera-rigged set, his wife and friends actors, the sky above his head a planetarium-like simulacrum. His emotional constitution and character, including aquaphobia, are manipulated by his show creators. Having been born into this, Truman is happily oblivious until he witnesses a few production gaffes and becomes clearly obsessed with a dead-on conspiracy theory.

3. Donnie Darko (paranoid schizophrenia), *Donnie Darko*
Donnie Darko seems a typical maladjusted teenager. Actually, he is borderline delusional, beset by visions of a monstrous rabbit which is trying to keep him under its sinister influence. Prompted by this apparition, Donnie commits antisocial acts while undergoing psychotherapy, surviving the vagaries of high-school life and romance, and fortuitously escaping a bizarre death from a falling jet engine

4. Barry Egan (manic-depression and bi-polar), *Punch Drunk Love*
Barry Egan is an awkward, volatile bathroom-supply salesman who collects pudding in his spare time, is harassed by his seven sisters and ensnared in a phone sex extortion scam.

5. Roy (obsessive-compulsive disorder), *Matchstick Men*
An obsessive-compulsive, chain-smoking agoraphobe with no personal relationships to call his own, Roy is barely hanging onto his wits, and when his idiosyncrasies begin to threaten his criminal productivity he's forced to seek the help of a psychoanalyst just to keep him in working order.

6. James Ballard (sex and car crashes), *Crash*
Based on the 1973 novel by J. G. Ballard. James and Catherine Ballard are a married couple whose sex life has been reduced to recounting tales of mutual infidelity to turn each other on. One night, James causes a head-on collision with a car carrying Helen Remington, killing her husband and severely injuring her and himself. Subsequent encounters with each other find that they are oddly sexually aroused by the danger of car accidents and potential accidents and, with Catherine, they soon fall in with a cult of car crash fetishists. The group is led by Vaughan, a former scientist twisted by his own disfigurement in an accident and, as a result, obsessed with car crashes as a liberation of sexual energy. Vaughan inducts the Ballards and Remington into his surreal world of sex in the back seats of cars, re-enactments of famous car crashes (like those of James Dean and Jayne Mansfield), viewing photos of accident victims and screenings of collision videos as pornography, and fender benders as mating rituals.

Barry Egan from the film ***Punch Drunk Love***

Roy from the film ***Matchstick Men***

Still image James Ballard's film ***Crash***

COMPULSIONS, PHOBIAS AND MUTANTS

(A). Obsessive-Compulsive Disorder (personality disorder)

*from the **Coloured Picture Bible for Children** by the Society for Promoting Christianity. The Bible describes King Nebuchadnezzar's compulsion to eat grass "like cattle" as his punishment for transgressions against God.*[30]

Obsessive-compulsive disorder (OCD) is a condition in which a person has repeated and uncontrollable thoughts (obsessions) accompanied by persistent urges to perform repetitive rituals (compulsions). The rituals serve to counteract the anxiety precipitated by the obsessions.[31] The obsessions are not simply excessive worries about real-life problems.

Most individuals with OCD who seek treatment realize the irrational nature of their thoughts and compulsions but feel helpless about controlling them.[32] OCD can impair all areas of functioning, and despite its devastating effects on individuals, families and friends, may be unrecognized by physicians because of the individual's secrecy about their embarrassing disorder.[33] More than 25% of OCD cases that have undergone treatment—which does not account for the countless others that go undiagnosed and/or untreated— are affected lifelong.

(A, 1). Causes

*Shakespeare's Lady Macbeth from **Macbeth** persistently washes her hands to remove imaginary bloodstains after her participation in the murder of King Duncan*

Classic psychoanalysis, as pioneered by Freud, interprets OCD as caused by unconscious conflicts that are defensive and punitive and that lead to regression to the anal phase of development.[34] In modern psychoanalysis, OCD is described as a portrayal of ambivalence, with confusion of thoughts and actions that is paradoxically manifested by rigidity and an overwhelming need for control.[35] By comparison, behaviorist teachings view obsessive-compulsive disorder as a maladaptive pattern to reduce threats, fears, and anxiety. Dynamic psychiatry interprets Obsessive-compulsive symptoms as a reflection of feelings and thoughts that provoke aggressive or sexual actions that might produce shame, weakness, or loss of pride.[36]

Probable biological explanations of OCD include heredity, brain lesions, abnormal brain glucose metabolism, and serotonergic dysfunction. All are considered as mutually nonexclusive causes.[37] Studies showing that serotonin plays a role in the pathophysiology of OCD have led to new and highly effective treatments.[38] Although a definitive cause of OCD has not yet been found, it is considered the product of interactions between biologic predisposition and various developmental and psychosocial influences.[39]

(A, 2). Epidemology

The lifetime prevalence of OCD in the general population is estimated at between 2% and 3% worldwide. Approximately 2.3% of the United States population of age 18 to 54 (3.3 million) have OCD. Epidemiologic studies in Europe, Asia, and Africa have confirmed these rates across cultural boundaries.[40] This suggests that one of every 50 people seen by a physician is likely to have it.[41] In 1990, in the United States, OCD cost 8.4 billion dollars—6% of the

total mental health bill. A recent 2-year study showed that appropriate cognitive therapy program has had a 12% chance of full remission and "success."

The World Health Organization lists obsessive-compulsive disorder as one of the five major causes of disability throughout the world. It is considered the fourth most common psychiatric condition, ranking after phobias, substance abuse disorders, and major depressive mood disorder.[42] Obsessive-compulsive behavior affects males and females equally but is more common among adolescent boys than adolescent girls.[43] The mean age of onset is about 20 years , but cases have been reported in children as young as 2 years.[44] OCD can occur with other psychiatric conditions, including major depression, social phobia, alcohol abuse, pain disorders, and eating disorders, among others.[45] A recent 2-year study in the United States showed that appropriate cognitive therapy program has had a 12% chance of full remission and "success."

(A, 3). Symptoms associated with obsessive-compulsive disorder[46]

Obsessions	**Compulsions**
Concern with cleanliness (dirt, germs, contamination)	Excessive and ritualized bathing, washing, cleaning
Concern about body secretions *saliva, urine, stool*	Rituals to remove contact with body secretions, avoid touching, etc
Religious obsessions	Excessive religious rituals (praying or repeating the rosary all day long)
Obsessions with health *something terrible will happen and lead to death*	Repeating rituals (checking and rechecking vital signs, rigid dietary intake, constantly checking for new information about health, death, and dying)
Obsessive fears *harming self or others*	Repeated checking of doors, electrical appliances, locks, and emergency brakes; when driving, retracing route for fear of having run over someone
Intrusive thoughts about numbers, sounds, words, or music	Counting, repeating, writing, the excessive playing of musical instruments

Men with unlicensed beards once lived in fear of the "beard-in-the-sky." Once a high-speed chase after an illegitimate beard-wearer began, Airborne Beard Patrolmen, such as Joshua Beardmore, pictured here, ensured there was no escape, even if they tried to shave themselves on the run

(b). Phobias

Phobias are a high-anxiety response to an object, situation, or even a thought. Because the phobic trigger can be anything, phobias can seem ridiculous or absurd. For the phobic person though, the intensity of terror can be disabling and horrific. About one in ten people have a specific phobia, an intense fear (or panic attack) triggered by a particular object or situation. A non-specific phobia, a more generalised fear such as agoraphobia (fear of open spaces), works in a similar way to specific phobias in that the fear appears to be "attached" to something less discrete. Since phobias often cause people to be scared of non-threatening objects, they are often seen as irrational—and in a way this is true. A phobia has nothing to do with the thinking, rational part of the brain. The phobic can often see the irrationality of their phobic reaction. This, however, rarely helps the sufferer. Well-meaning attempts to talk someone out of a phobia nearly always fail.

Unconscious or emotional learning takes place to keep us safe. In primitive conditions, when coming into contact with something dangerous the mind/body would create the optimum state for survival—a panic attack. This type of learning is not intellectual or rational but takes place at an emotional level so that the response can bypass the thinking brain. In the past, an immediate phobic response to a predatory or poisonous animal would have been exceedingly useful.† We therefore evolved with the ability to become phobic. In today's complex world, however, this learning mechanism often works inappropriately. To become phobic, all you need is a high anxiety state paired with an object. The object does not have to be causing the anxiety. You can also generate a phobia through misusing the imagination. Children often get phobias this way, or by seeing a phobia parent. Non-specific phobias can come about either through a "spreading-out" of panic attacks, or through a person's level of general anxiety becoming so high that panic is easily triggered whenever stress levels are raised even slightly.

Phobia	Subject of phobia
electrophobia	electricity
aviophobia	flying
motorphobia	cars/automobiles
clinophobia	going to bed
ablutophobia	bathing
nyctophobia	crowds
achluophobia	darkness
hypnophobia	sleep
chronophobia	time
agorophobia	enclosed spaces
dendrophobia	trees
pogonophobia	beards
rhytiphobia	wrinkles
herpetophobia	reptiles

(c). Mutants

Human mutations reach back as far as storytelling, from Homer's Polyphemus to the Monster of Ravenna in 1512. From Huntington disease (neurodegenerative sydrome) to conjoined twins, the genetic mutation of the body informs not only the range of diversity that is ever-present, but also forecasts trends and exceptions to come. There are numerous cultural expressions of mutation, from aesthetic manipulations, like body adornment (piercing, cosmetic surgery, tattoos, etc.), to the performance enhancing use of drugs and steroids. Mutation is defined as:

> (a) change of the DNA sequence within a gene or chromosome of an organism resulting in the creation of a new character or trait not found in the parental type, (b) the process by which such a change occurs in a chromosome, either through an alteration in the nucleotide sequence of the DNA coding for a gene or through a change in the physical arrangement of a chromosome, (c) any event that changes genetic structure or any alteration in the inherited nucleic acid sequence of the genotype of an organism.[47]

Thinking about mutants is useful because they provide the most literal description of the opposite of the mainstream. Mutants and the needs that mutation demands help us consider the range of possible human experiences.

Homer's Polyphemus from a painting titled ***Polyphemus*** *by Annibale Carracci*

Circus broadside for Barnum and Bailey's spectacle ***Madonna: The Whore of Babylon***

Rare disease makes girl unable to feel pain.

http://www.msnbc.msn.com/id/6379795/
http://www.general-anaesthesia.com/congenital-insensitivity/nopain.html

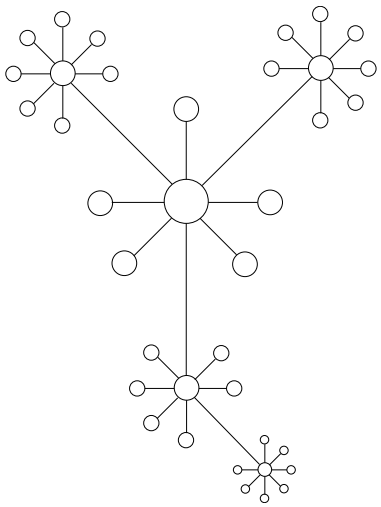
Genetic mutation turns tot into superboy.

http://www.msnbc.msn.com/id/5278028/

Every human being lives in loneliness. You don't know what it feels like to be me, and I don't know what it feels like to be you… And yet such isolated beings are the only ones on earth who can communicate. This is what a mere animal can't do. He can't say "I," can't enter into himself in isolation. So he has nothing to say. We can communicate, paradoxically, because we are completely different from one another. We do know one another by a kind of empathy, it's true. We know and we don't know what it means to be the other person… When knowledge gives out as a bridge, we make up for it with love. That is what you have to call it—love. Not only between husband and wife, or friends, but even in the more casual or routine kinds of social situations, love must be present. If I am going to communicate with anybody at all, in language or otherwise, there must be a certain love between us or communication won't work… It's seldom that the love is pure, unmixed with other attitudes or reactions. But some love must be there. You have to give yourself to the other person, assuming that the other person understands you and that you understand him.[48]

—*Walter J. Ong*

DESIGN CONCEPTS



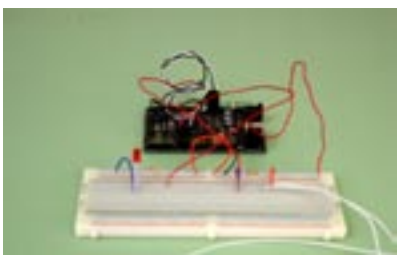
Conceptual model of iterative design process where ideas generate from initial ideas

(A). Developing Design Criteria

Enables/supports individual's need:
Enabling the user's need is an important way of looking at the design work. In the instances and needs being addressed in this thesis, "solutions" are not the primary focus of the work. This thesis does not aim to "solve problems," but rather to enable the need/s of the user—needs that potentially, from an onlookers point of view, may seem problematic. Problem enabling. This idea of the "problem" is where the second point of criteria comes in.

Promotes a re-evaluation of social acceptability of need and surrounding motivations:
The needs of an individual with OCD—being compelled to wash every hour of the day or having extensive rituals to check the electrical appliances in one's home—may seem problematic to an outsider. This thesis aims to influence those outside perspectives. To provide audiences (both outsiders and insiders to the needs) with a point of departure with which to begin re-evaluating the acceptability of such needs in society.

Engaging:
The thesis must be engaging to its potential audience. Within enabling a user's need, the level of engagement must be high to sustain functionality. The value of the engagement for the user is not based upon a value of entertainment, but rather on a value of functionality. This functionality is the ability for the design work to fit into the life of the individual. Engagement must also be present for the potential audience of the thesis itself. It must allow the audience to relate to the need and draw out their empathy.



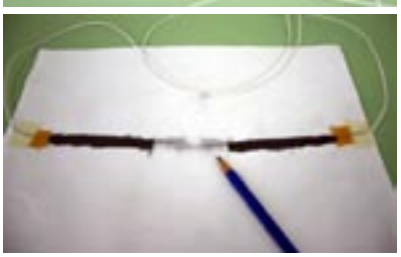


Image of Wiring prototype for the drawn switch. Wiring recognizes the resistance in the graphite line between two copper lines.

(B). Two-dozen Ideas

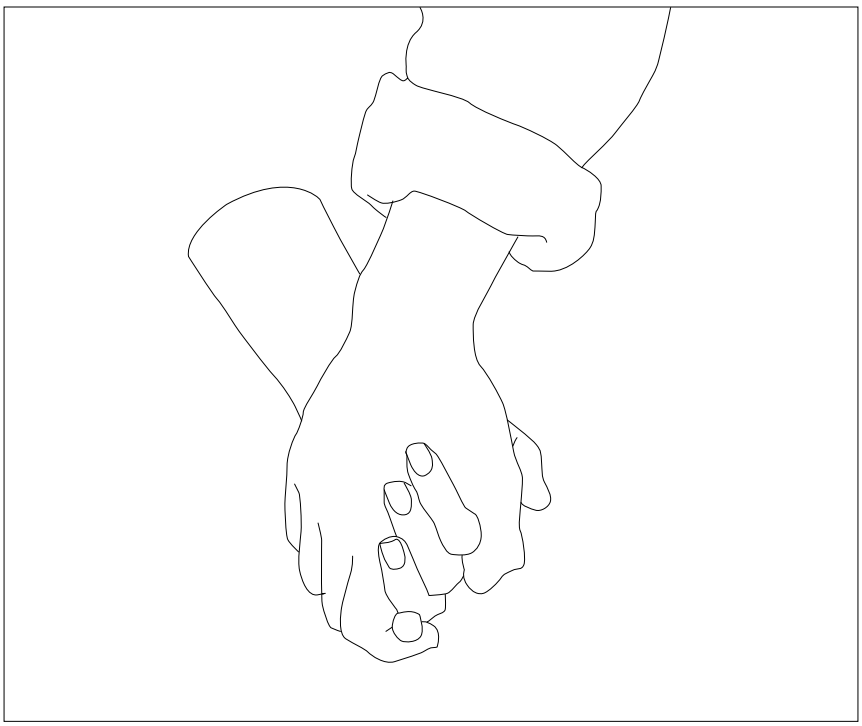
The following 24 ideas were generated after the design criteria and focus on peripheral needs was established. These ideas represent a sample of the conceptual stage of the thesis—ranging from bad ideas to good ideas, effective ideas to ineffective ones. The ideas herein are representative of different stages of an iterative design process where ideas are generated and then sub-ideas of those ideas are generated, and so forth.

In certain cases, for example number 11, the Drawn Switch, short-term prototypes were generated to test the functional or contextual feasibility of an idea. Figure 2 shows a Wiring[49] based exercise in which a circuit is completed through drawing a literal connection with a graphite pencil.

HAND HOLDER

(to enable nyctophobia)

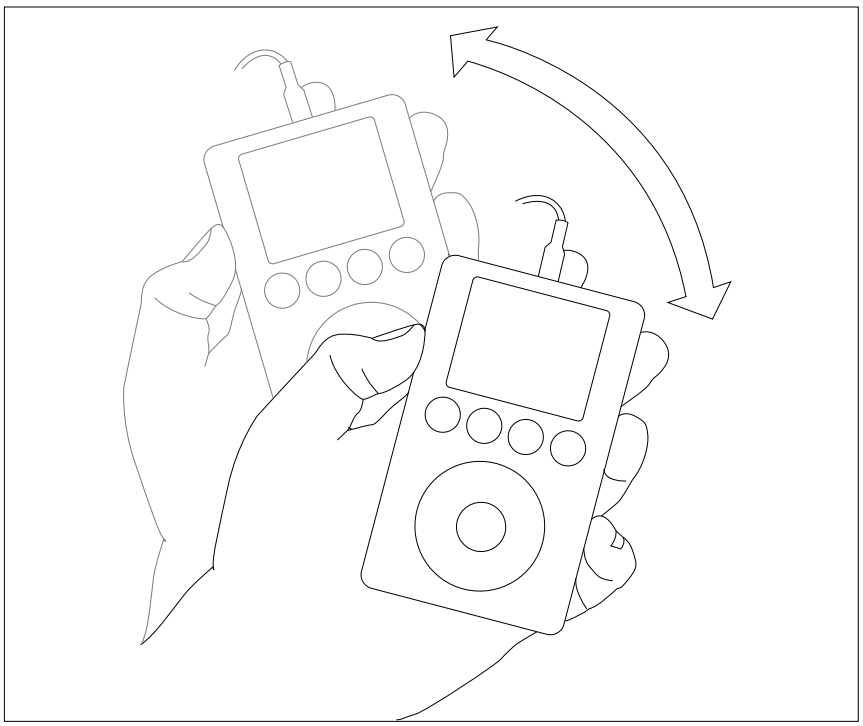
For individuals who fear strangers and have difficulty with crowds—a hand to hold, whose holding pressure increases with the number of people in the environment. Easily retro-fitted to enable the individual with a fear of electric appliances—responding to the number of devices in the immediate area



SOAP THAT WASHES ITSELF

(to enable compulsive cleanliness, OCD)

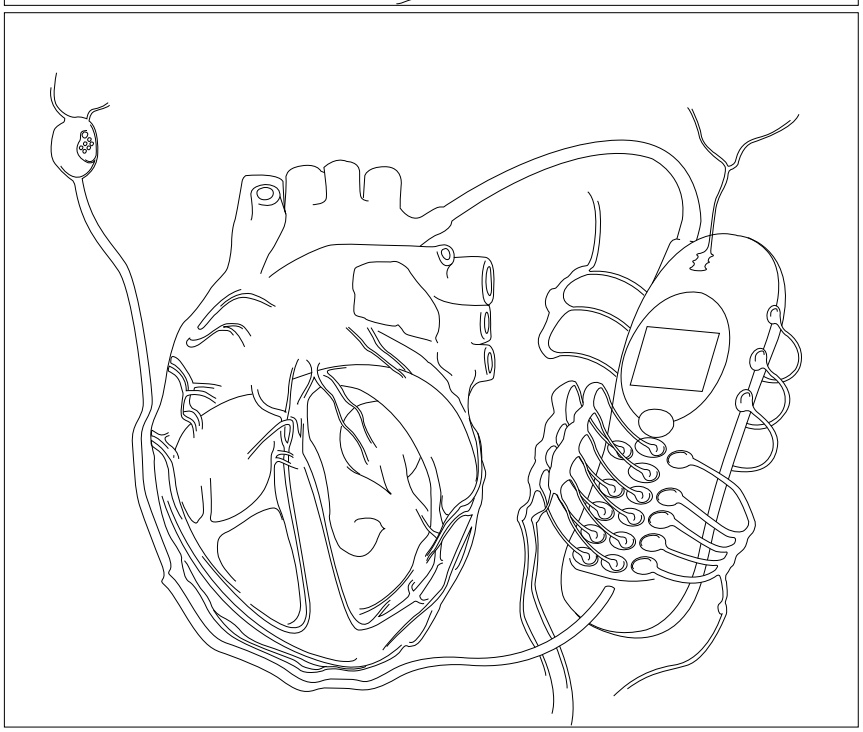
Soap that washes itself when you are finished with it, removing fears of contamination



ANGRY IPOD

(to enable anger/violence)

Individual songs are rated/marked with emotional criteria. The amount of force and the way in which you shake the device generates and selects an appropriate playlist for the current emotional state of the user.



MOBILE TELEPHONE ORGAN

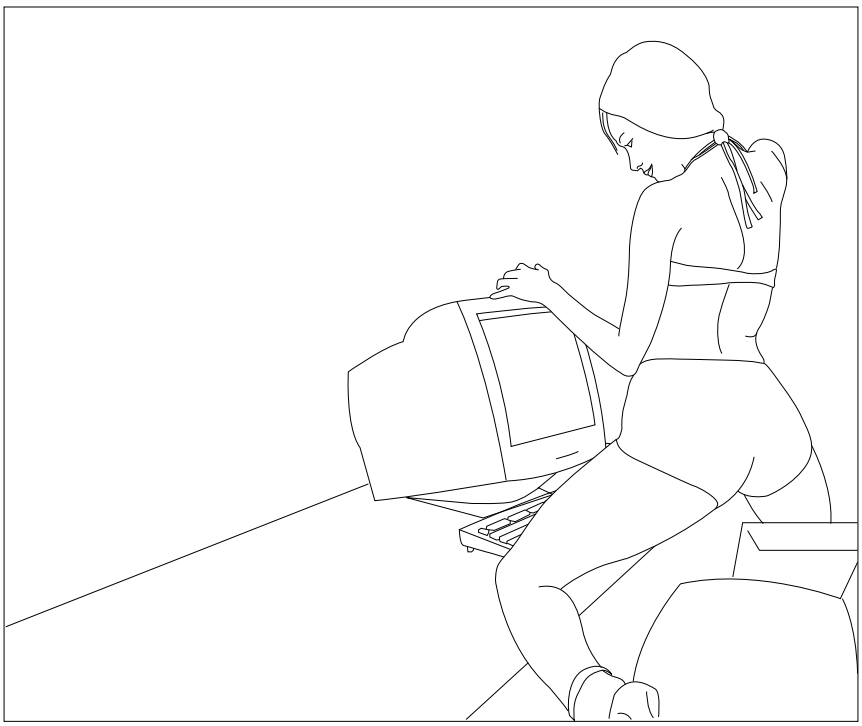
(to enable the mobile phone dependent)

Implanting cellphones in the body. Using the body's electricity for power and reception and sensory organs for to replace artificial ones.

AFFECTIONATE COMPUTER

(to enable tecnophiles)

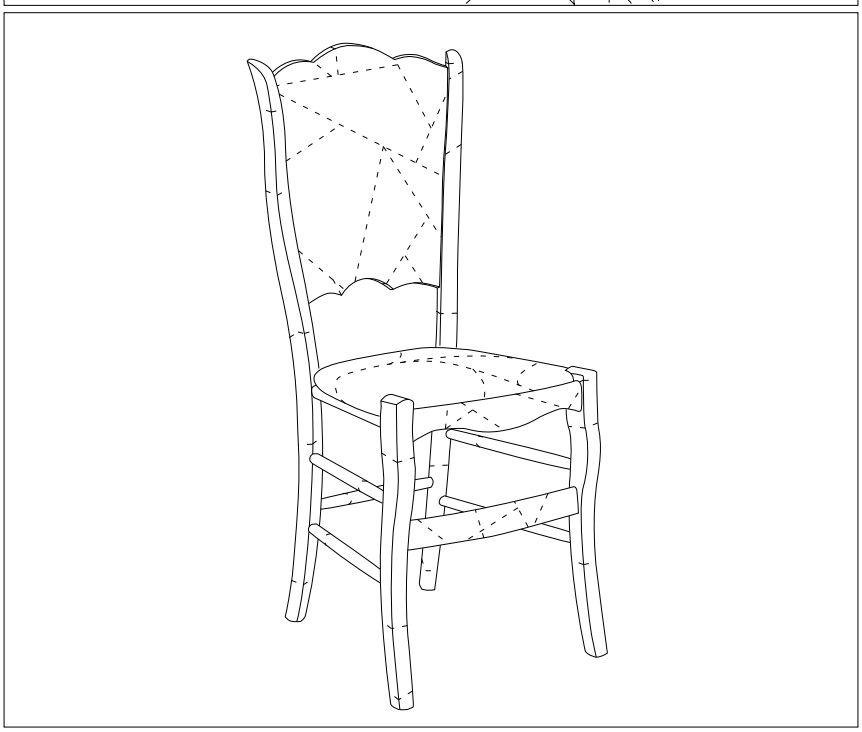
While standard computers respond to key strokes and fingering techniques, the affectionate computer performs tasks only when engaged through foreplay—whisper sweet sentiments in the receiver or rub up against some senstivie zones



BREAKABLE FURNITURE

(to enable anger/violence)

Arm chairs and tables, shelves and desks, lamps and vases—all built to be torn apart and broken and then reassembled again



MASSOCHISTIC COPUTER

(to enable anger/violence)

A computer that invites physical abuse. Help the computer perform better tasks and functions through physically beating its form. Ideal for the lonely sadist with a distaste for computers

PERSONAL EMP FIELD

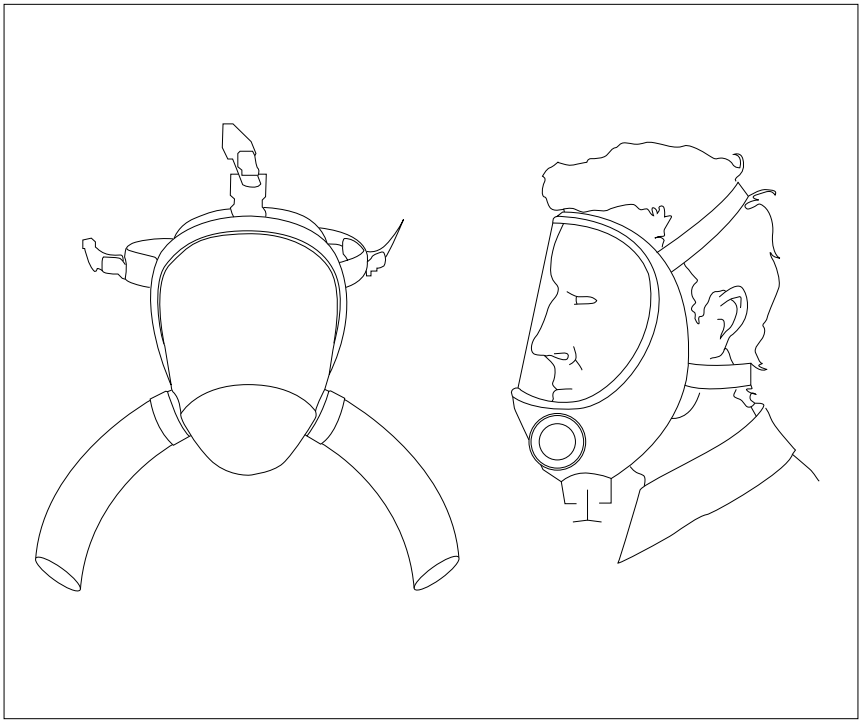
(to enable electrophobia)

Your own personal Electro Magnetic Pulse field which disables electrical circuitry withing a given immediate area

CONFESSIONAL MOBILE TELEPHONE

(to enable compulsive confessions, OCD)

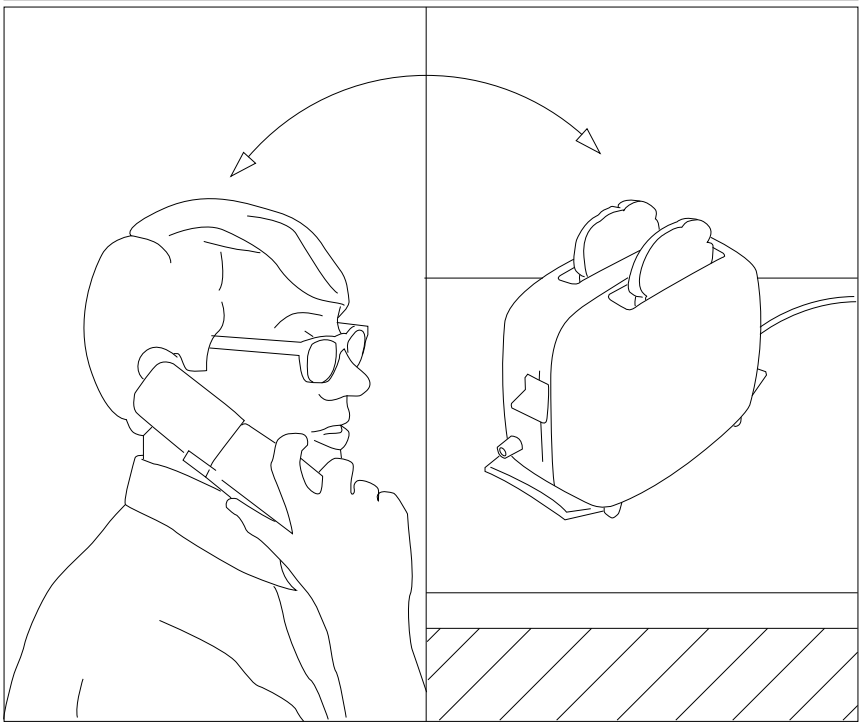
Comntemporary headset controls the flow of out-going speech through offering multiple channels to dedicate to different forms of communication— the listener can then choose between confessions ro non-confessional related speech.

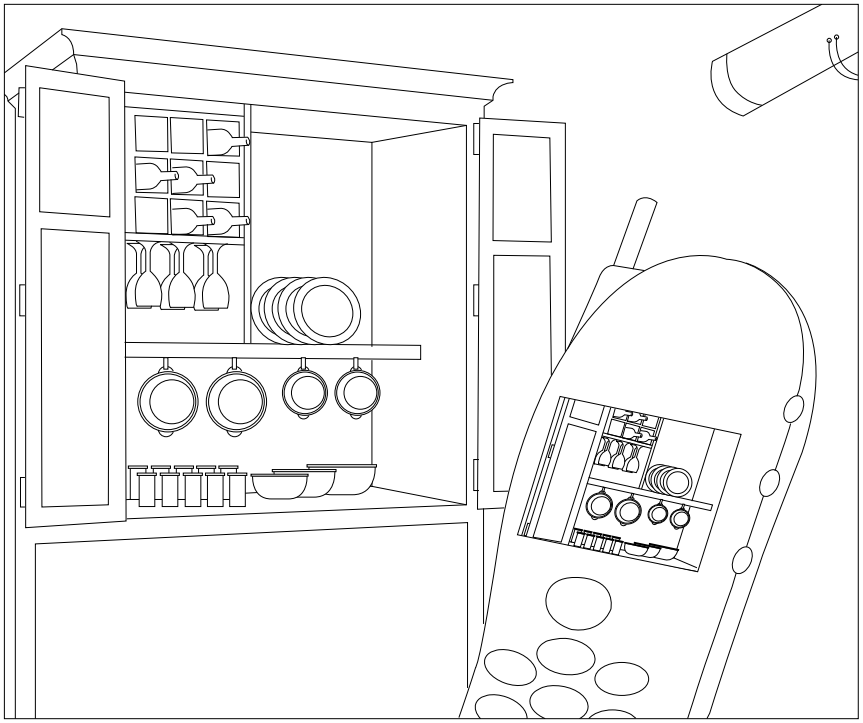


PHONE-PAL APPLIANCES

(to enable compulsive checking, OCD)

Phone your electrical appliances to discuss and gain assurance of their current status— Hello toaster, how are you?

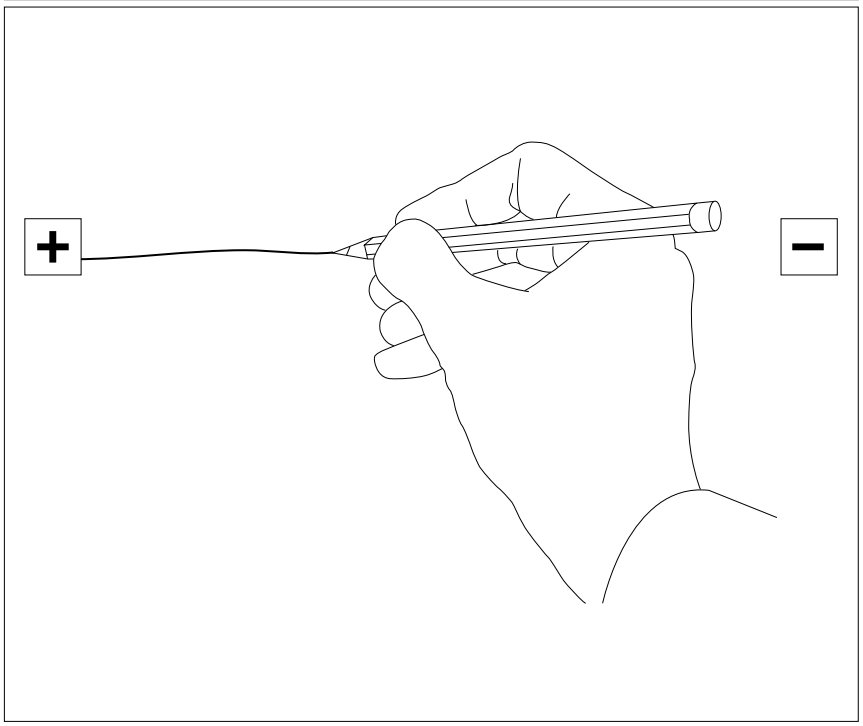




CUPBOARD SURVEILLANCE

(to enable compulsive organization, OCD)

Monitor one's cupboard or pantry remotely using a mobile phone—making sure everything is in its right place.



DRAWN SWITCH

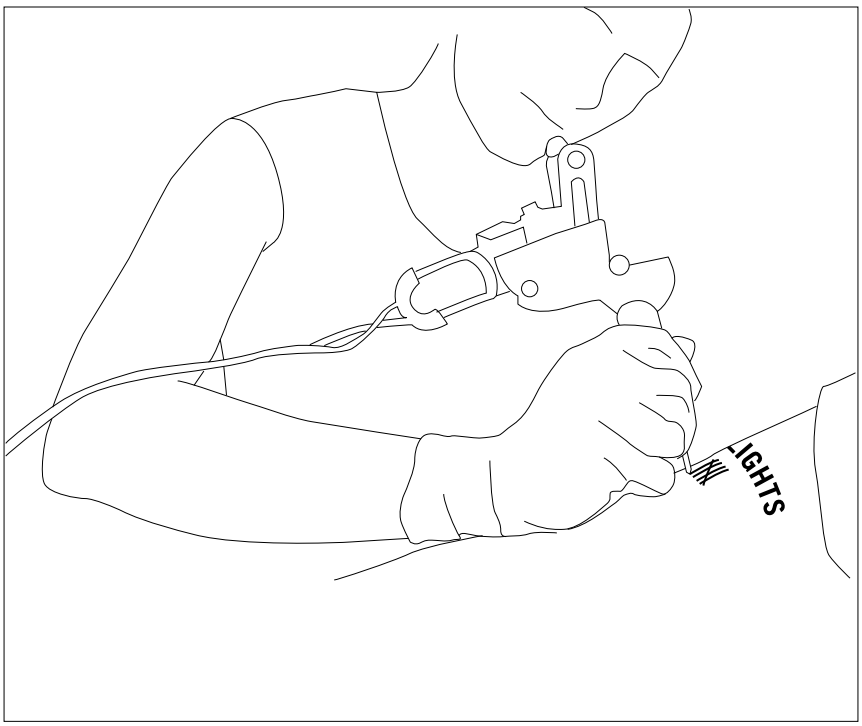
(to enable compulsive checking, OCD)

Using a graphite or metal based marking tool, such as a pencil, draw the connections between devices and power sources—allowing for quick visual assurance of the state of the appliance.

TATTOO SWITCH

(to enable compulsive checking, OCD)

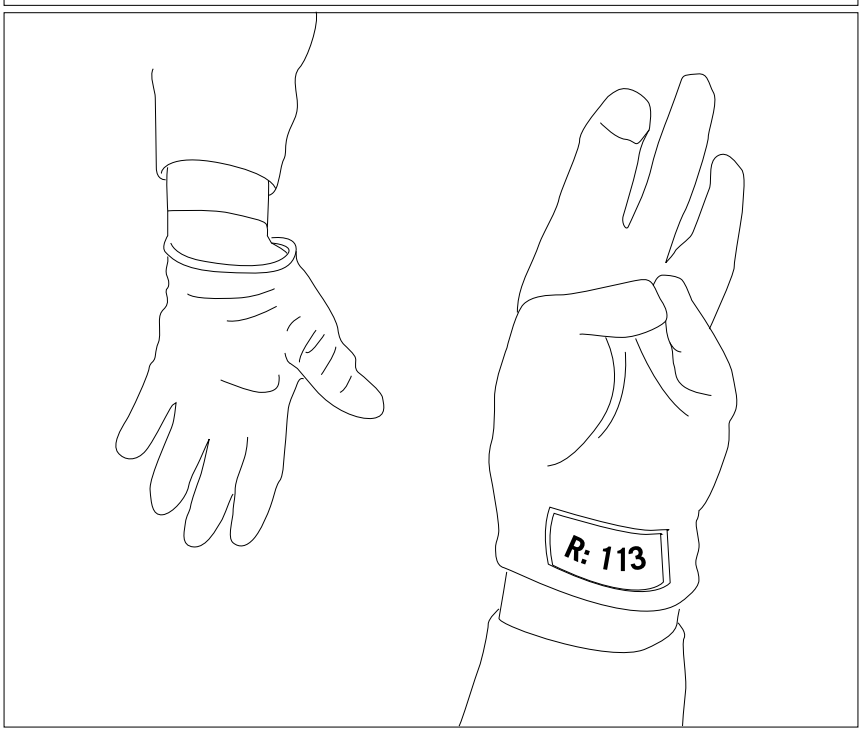
Through tattooing the status of one's electrical appliances on their arm, the user has a permanent record with them at all times regarding the status of their appliances.

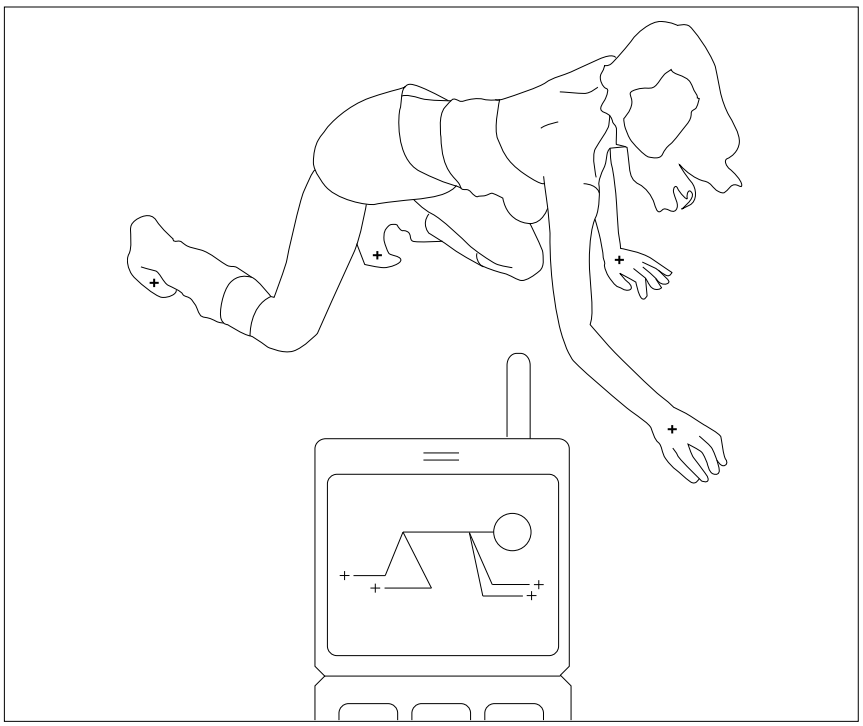


COUNTING GLOVES

(to enable compulsive counting, OCD)

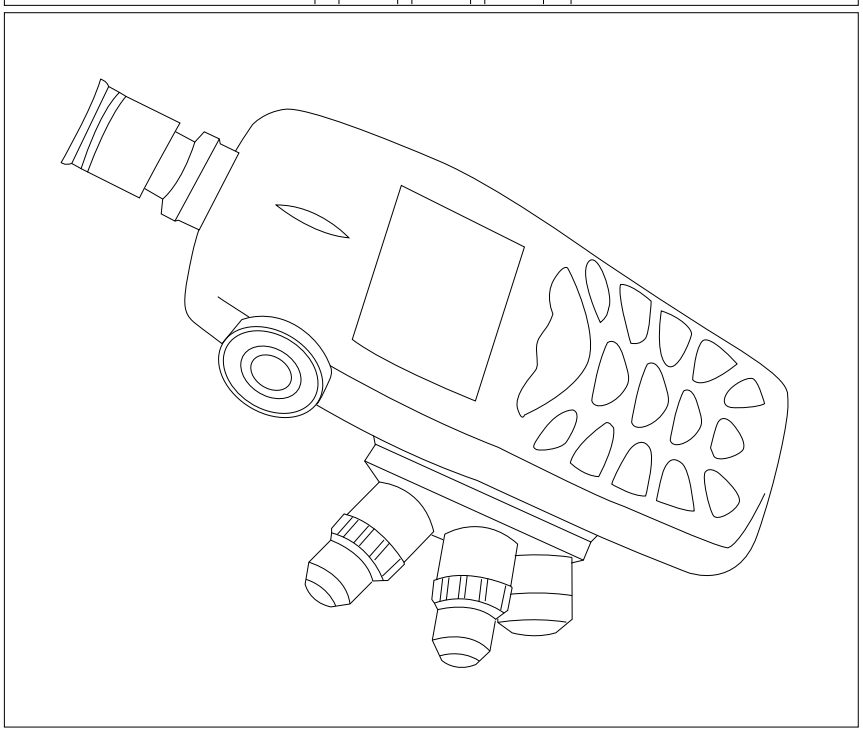
Keep track of the number of times you have done something on either side of your body—through touching the thumd and little-finger of these gloves togethe they register the sequential count of an activity





REMOTE SUBMISSIVE SUIT

(to enable dominant-submissive relationships)
When separated by distance, one member of a couple can influence the physcial position of the other individual through remote sensors worn on the body and controlled via a mobile phone



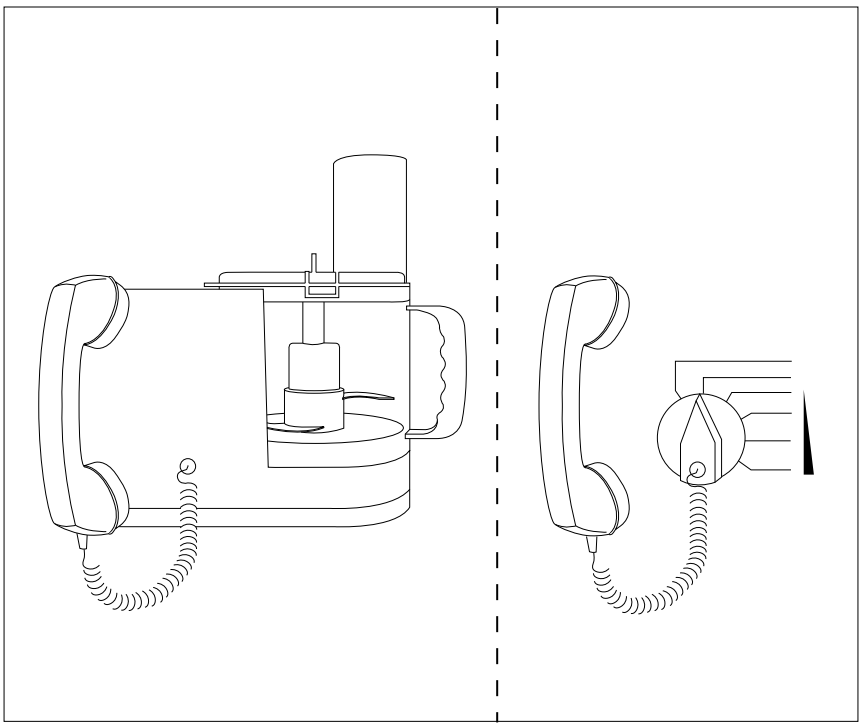
MICROSCOPE MOBILE PHONE

(to enable compulsive cleanliness, OCD)
Inspect the state of the bacteria in your environment while on the go through a microscope attachment for your mobile phone that helps you to see what's really there

DOMINANT-SUBMISSIVE SWITCH

(to enable dominant-submissive relationships)

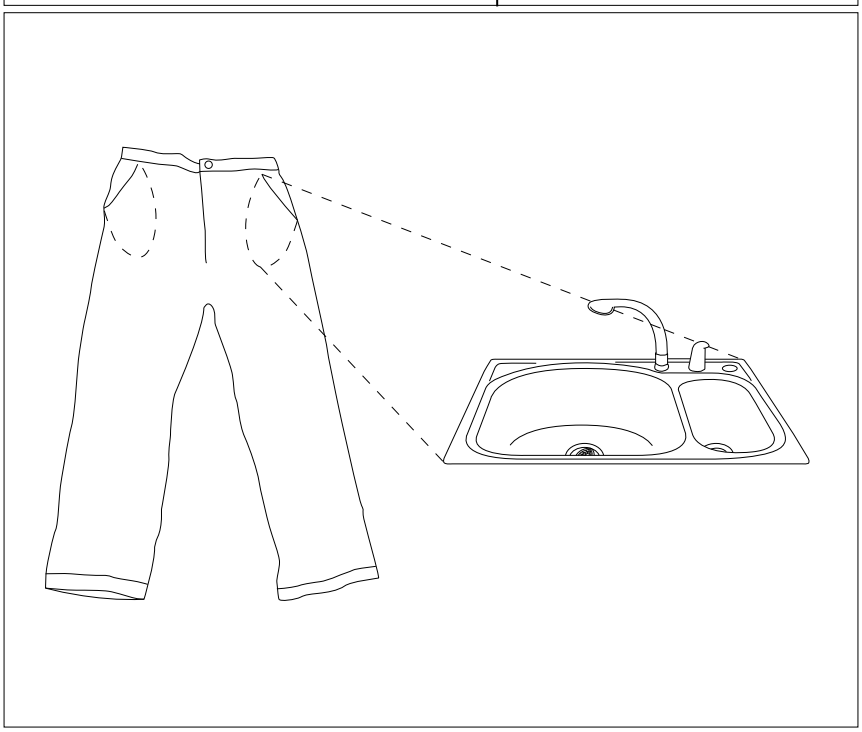
Couples can remotely engage in dominant-submissive activity through allowing one individual to contact the other individual and ask them to control the function of their electrical household appliances

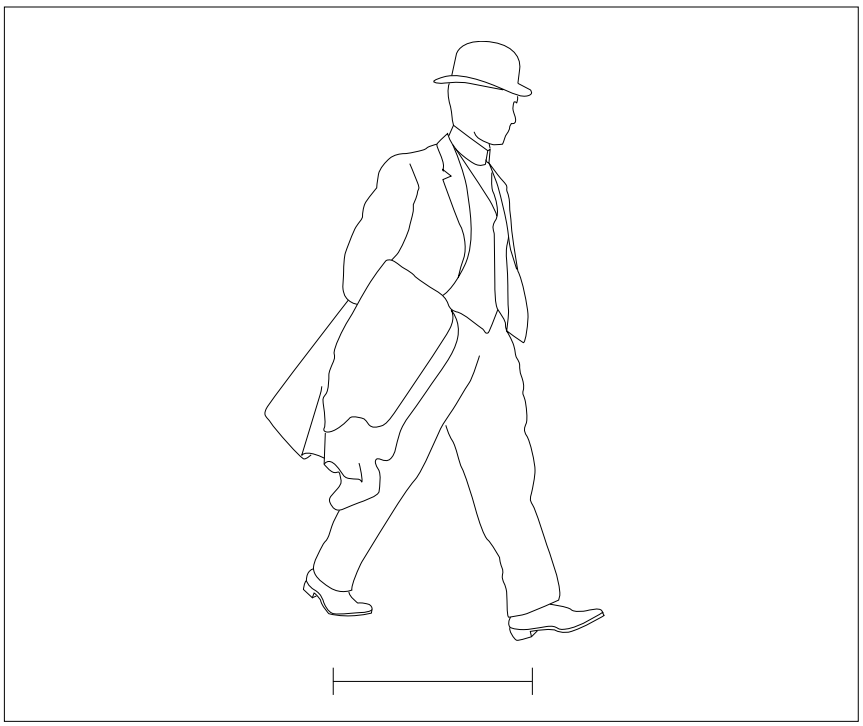


SINK POCKETS

(to enable compulsive cleanliness, OCD)

Avoid feeling uncomfortable with your washing needs—wash your hands any time, in any context, through casually placing your hand in your pocket

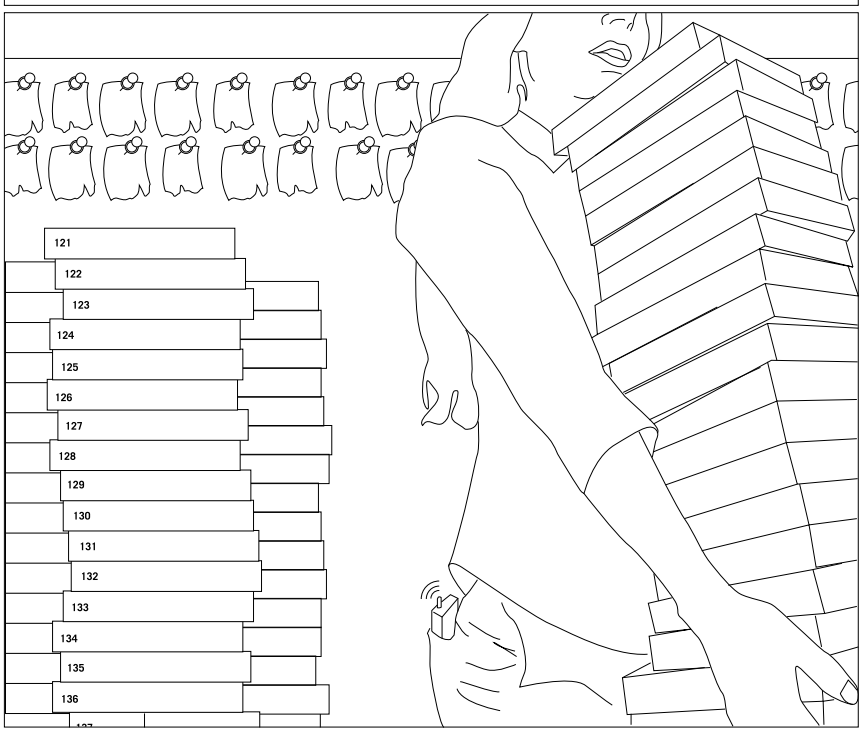




OBSESSIVE-COMPULSIVE HUMAN SCALE

(to enable obsessive-compulsive behaviour)

Step between cracks in the tiles on the floor with assurance and traverse staircases that only have even number of steps through applying an OCD-based architectural scale to one's environment



HOARDING AND TAGGING

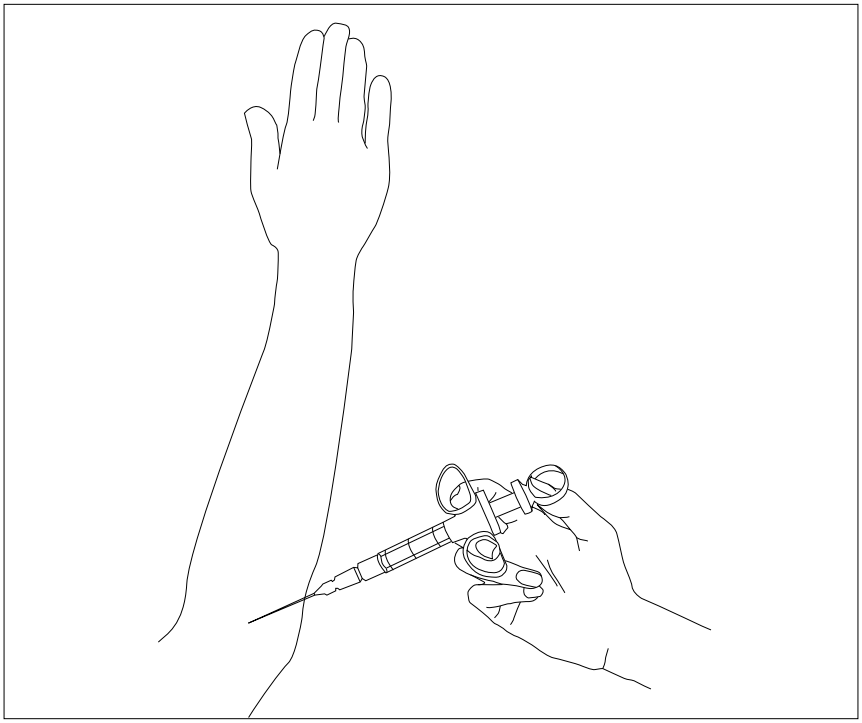
(to enable compulsive hoarding, OCD)

Through supplying an individual who hordes things with an RFID-based (Radio Frequency Identification) cataloguing system, users can find things they have stashed away and be assured of their presence consistently

DRAWN BLOOD SWITCH

(to enable compulsive checking, OCD)

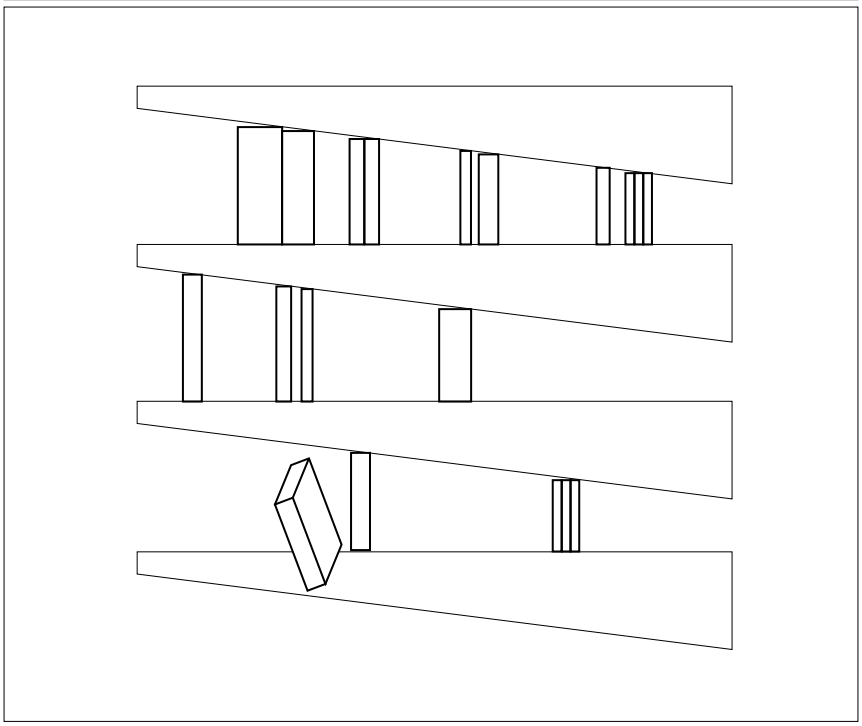
Make the experience of turning on and off electrical appliances more memorable through using switches that require the user's blood to activate and disengage

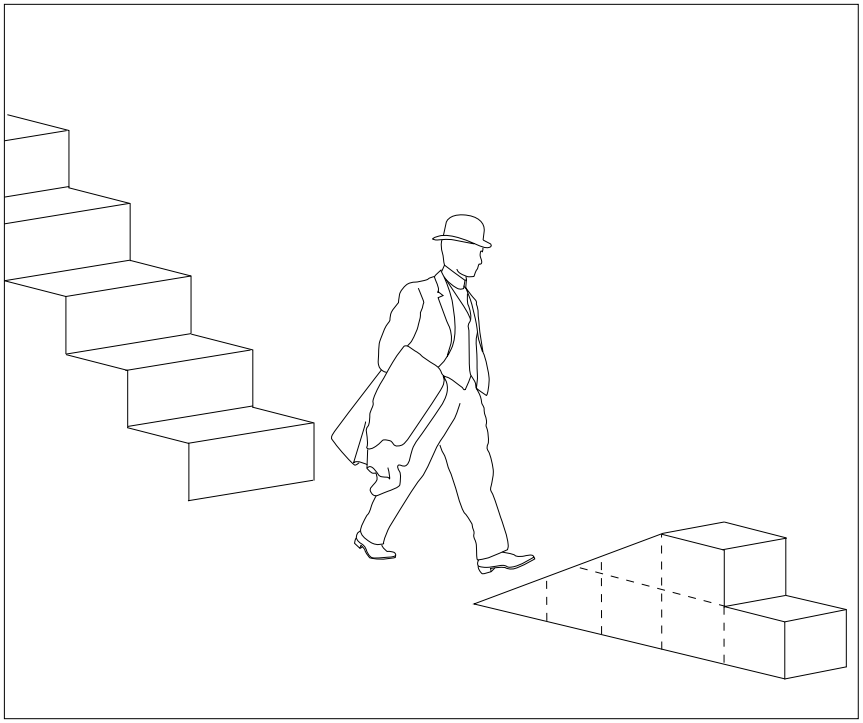


COMPULSIVE ORGANIZTIONAL SHELVING

(to enable compulsive organization, OCD)

Arrange books based on their size rather than subject or alphabetic categorization

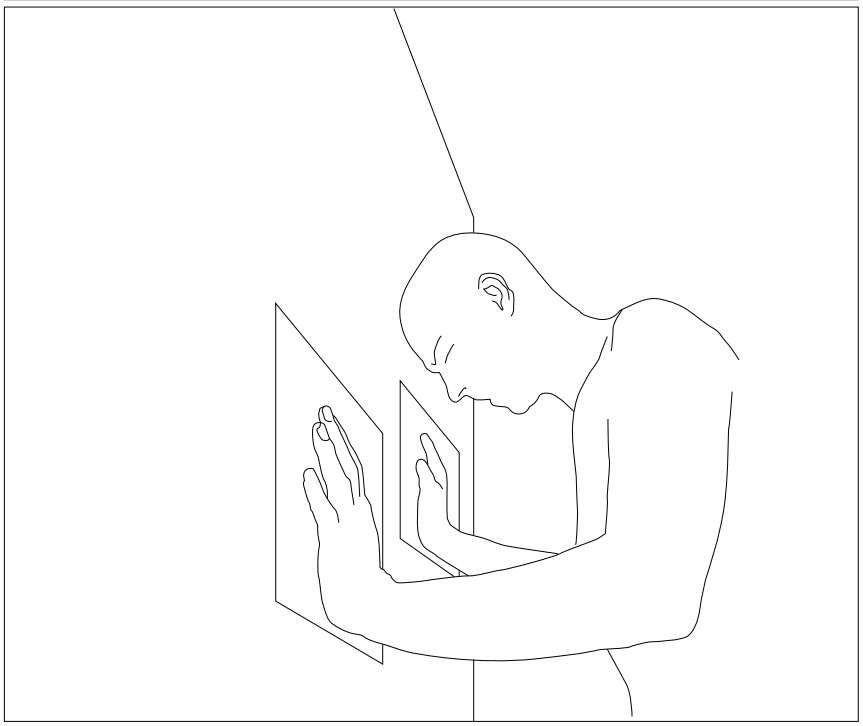




PORTABLE STAIR

(to enable compulsive counting, OCD)

Even out any stair traversing experience through carrying an extra set of steps with you



TOUCHING SWITCHES

(to enable compulsive touching, OCD)

Supporting the compulsion to touch objects in one's environment, switches that require specific, and cutomizeable, physical contact to be engaged

(c). Focus on Obsessive-compulsive Disorder

After generating a series of ideas addressing a host of peripheral needs, a decision was made to focus on individuals with obsessive-compulsive disorder, in an effort to gain consistency in developing further design criteria and establishing evaluation criteria. The next task was to meet and interview individuals with obsessive-compulsive disorder to understand one or two individuals' specific needs.

(d). Obsessive-compulsive Disorder Interviews

The following excerpts are taken from interviews conducted with individuals from the Obsessive-Compulsive Foundation of Greater Boston. Much care has been taken to retain the individuals' privacy and confidentiality—as such, their names have been replaced.[50]

Michael *(38)*
Has lived with OCD since he was 12 (he thinks). Was officially diagnosed when he was 29. Michael needs "things to be clean" and finds he spends more than a couple hours each day "protecting" his things, or the things he uses.

Could you describe "protecting?" Michael described that he routinely places any objects that touch his skin, especially his face, in plastic bags before using them. Each time he uses an object, it is cleaned for 2 minutes on each side, dried with a clean towel and placed in a new plastic bag. Things like forks and knives, plates, cups, clothes, sheets and linens.
He also wears non-allergenic gloves when he is out in public (Michael removes his outdoor glove to reveal a latex glove underneath). Additionally, he had several other pairs of gloves, in a plastic bag, in his pocket.

How are the towels handled to keep them clean? Michael handles the towels, as does he handle the object being dried, with non-allergenic latex gloves, the same kind he is wearing now. He places the towels after washing and drying them into plastic bags until he uses them. "I wash towels and clothes everyday"—Michael lives alone.

Does this practice influence the other activities in your lives? Admittedly, Michael spends more time than he would like protecting and cleaning. When in public, "I have to wear gloves all the time… to keep my hands clean." But he claims that the sweat that comes from his hands is not clean either, and causes him to change his gloves often.

Reflection: Michael seems extremely conscious of his condition. He described his needs calmly and humorlessly. Though wearing gloves (under his outdoor gloves, which I could not see) indoors, there were no other signs that would seemingly cause him trouble or label him in public. Extremely well groomed.

Margaret *(44)*
She has two children, a 7 year old girl and a 9 year old boy. Margaret has lived with OCD since she was in her early twenties—sometime in college. She was diagnosed when she was 39. Margaret explains "When I was in college I would dwell on little parts of my work, single

sentences or pages… and never actually finish what I was doing." Many of the thoughts she persistently has and cant eradicate are related to her ex-husband and abusive mother. Her husband left her because of the compulsive nature of the way she treated their home and her sense of "duty" to these actions.

She is a constant checker and has difficulty leaving the house until things are "finished." When shopping, she used to have to look at every item in an aisle, and check the price. She currently only needs to look at every item in the aisle pertaining to her purchase, checking the prices—a practice that takes her hours.

Could you describe what "finished" means? Margaret cleans her floors extensively, often sweeping, then with a vacuum, then mopping with antibacterial solution, then vacuuming and finishing with another mopping, and on occasion spending time on the floor moving spot to spot—often this is done 5 to 6 times a week (on rare occasion more). Before leaving the house or going to bed, she repeatedly has doubts that she switched off electrical appliances and locked the doors and windows. For example, Margaret has developed a ritual for shutting off the stove which involves first staring at each knob to make sure it is aligned in the "off" position, repeating the phrase "off." She then places her hand on each hotplate and counts to 30. If she is interrupted, or loses concentration, she has to begin the ritual again. She then checks the toaster, microwave, blender, iron, televisions, radio, lights/lamps to make sure they are all turned off. She does not let her children at home (or her husband when she was married) use the appliances when she is away.

Does this practice influence the other activities in your lives? Margaret articulated again that she blames the break up with her husband to her behaviors. She has lost two jobs, one due to tardiness the other she believes was due to the extensive nature of detail she provided her tasks with, often inhibiting the other tasks that needed to get done.
She has been treated for depression and was wrongly diagnosed with Manic-Depression after the separation from her husband.

Reflection: Margaret though somber at times, seems well adjusted. Her concerns are for her children and their well being in relation to her needs—she had mentioned recently discussing her behavior with her children. She has gone through extensive cognitive therapy sessions and medication to no success in "curing" her. She now expresses that her behavior is not a curable situation, but one of reality and joins a support group to discuss her feelings surrounded by individuals with similar concerns and behaviors.

Jennifer *(22)*

She has lived with OCD since she was 14. She was diagnosed when she was 20. Jennifer describes that she visited her physician when she was 20 with a complaint of dry, flaking skin on her hands and arms. She explained to her doctor that she felt the need to wash her hands when they come into contact with something foreign. Jennifer feels that she gets nothing done each day, except for washing. Her mother was likely living with OCD as she was always locking the doors and re-checking them. She was on a Selective Serotonin Reuptake Inhibitor (SSRI) for 1.5 years—with side affects of blurred visions, nervousness and sexual dysfunction—with which she was told to avoid operating heavy machinery and foods with tryptophan such as meats, eggs, nuts and some others. The SSRI was not effective for her.

Could you describe what your "washing" needs are like? Jennifer said that she often washes her hands three to four times an hour. Occasionally she wakes from her sleep to wash her hands, but not often. Jennifer has been given a technique of saying "Stop" aloud when she feels the need to wash, however she claims that this only causes her to repeat herself "obsessively" with what she regards as mild Tourettes (from my research, this is a common practice to deal with other anxiety disorders, but not with OCD). She was given a mild-moisturizing soap and a hand cream to apply several times a day. Jennifer says that she has a hard time carrying these items around and using them regularly, and instead often washes with whatever soap is available and not moisturizing.

Does this practice influence the other activities in your lives? Jennifer states that she spends a lot of time attending to her need to wash—and that when she is in public, her need not to touch foreign objects and people often becomes embarrassing. Though a close friend and her close family know of her OCD, she has a hard time explaining or reasoning her behavior with other people close to her in her life—she is very scared that her friends will think less of her if they know of her OCD as would her colleagues at work.

Reflection: Jennifer is a well spoken middle-class young woman. She seems embarrassed about her OCD and at the same time feeling like there is no "cure" for her.

DAVID *(34)*

Has lived with OCD since he was in his mid-20's. Was officially diagnosed when he was 32. He lives alone and works as an accountant. David needs to count. He is compelled to count objects that appear in patterned forms both in his personal environment and in public.

Could you describe your counting habits? David explained that he has to count certain kinds of objects. Brick facades, tiled floors, concrete sidewalk pavement stones… He explained that knowing the number of objects gives him a sense of immediate satisfaction. This activity of counting is one that David both seeks out, when his level of anxiety is high, and tries to avoid. In other instances, he needs to remain "balanced" on either side of his body. If he performs a task on one side of his body, such as a number of steps included in a staircase, they must be an even number so that he will have stepped an equal number of times with each foot. David mentioned that there have been occasions where he has traversed a set of stairs only to determine their odd number at the end causing him to re-traverse the stairs (creating an even number of steps) and then find an alternate route.

Could you describe why you need to avoid counting? He describes needing to avoid counting that would slow his other tasks down. For example, David explains that if he needs to get somewhere quickly or within a certain time frame, for example a meeting, he can be delayed when walking to or from the T [Boston subway], sometimes drastically by having to stop in transit and count. In fact David could recall a few below-ground stations that have tiled walls that he avoids and instead finds above-ground stations to use.

(e). Disclaimer: This thesis is not about therapy

Designing for peripheral needs that are currently deemed as medical "disorders" or "problems" comes with certain stigmas based upon their labeling and public perception. As many persons with OCD have it life-long[51] this thesis aims at looking at OCD as a state of normalcy for some individuals. Treating the compulsions of these individuals as tasks that have to be performed—or needs. The design ideas presented herein do not attempt to cure or perform therapeutic functions. Solutions to the obsessions are not the main goal. Instead, the designs try to enable the needs of these individuals, extending the faculty of their compulsions.

(f). Obsessive-compulsive Checking

As noted above in the interviews, Margaret needs to check the appliances in her house before she leaves or goes to sleep. The routine she's developed is one that provides her with some more assurance of her interaction with the particular appliances through making the experience more memorable. Further conversations with Margaret revealed that while able to leave her house she often returns home, in the process of leaving, to re-check and gain some assurance that her appliances are disengaged.

The need that Margaret has to check her appliances, even after having left them, presents a clear design opportunity. Margaret's need for assurance, when she is away from her appliances, does not stop. To be away from the house and perform other tasks in her life she needs to be able to check her appliances, being assured that they are turned off, wherever she may be. This suggests that Margaret needs a switch that she can take with her.

(f, 1). The Portable Switch

The portable switch should accomplish three things. To be an experience that is more memorable than the small, short interactions of current appliance switches, allow her to still engage in her checking routine, as well as have the ability to be physically taken away from the appliance. The idea of engagement was easily addressed by experiences that called for large physical movements or objects with such physical scale or personal impact (figures 1–3) that the experiences are more memorable and powerful than small toggle or dial switches. However, the portability of these interactions becomes difficult.

There are portable switches present in other contexts. Door keys, both in their conventional metal form and in the more recent credit-card-like plastic form, are a form of switch. They control the on/off function of a door, however they do not provide their user with a sense of the functional state when away from the door itself. The switch needs to be engaging, having a thorough interaction that addresses the senses (ideally the senses of touch and sound), and give the user an indication of the status of the appliance through its presence.

Through an investigation of a number of household appliances, including a toaster, electric stove, blender and conventional wall-mounted light switch, it is apparent that the electric circuitry of the basic household appliances could be easily interrupted to include a kill switch—a master on/off switch that would control power flowing to the device. A switch whose presence turns the device on and whose lack of presence turns the device off could be easily facilitated with a low range RFID (Radio Frequency Identification) tag and reader. Through placing an RFID tag reader in the appliance, when the RFID tag is on the appliance (on the reader) the circuit is turned "on," while whenever the RFID tag is away from the appliance the circuit is turned "off." This means that when the RFID tag is away from the appliance, the appliance can not possible be turned on. In addition through including an RFID switch, as a master switch, in addition to the interfaces that already exist on the appliances, Margaret still has the ability to perform her checking routine as it exists currently, when in the presence of the appliances.

The final decision addresses the form of the RFID tag switch. If Margaret is going to be able to take the switches from her appliances with her, they should be easily carried and have the ability to be concealed, when outside context would be negotiated easier through not broadcasting the presence of the switches to others, and revealed. To make the introduction of these new switches easier to adopt, consideration should be given to introducing new articles or items for Margaret to carry.

(F,2). The Switch Specifics

The switch is made of a soft fabric case than encloses an RFID tag. The case is lined with velcro on one side to be easily applied and removed from a variety of surfaces that can be retro-fitted. On the opposite side, a label identifying the appliance that the switch belongs to is present. On the interior of the appliance, the RFID tag reader can be enclosed, reading through the surface material.

RFID or Radio Frequency Identification is a technology that uses radio waves to identify an object, or tag. There are several methods of identifying objects using RFID, commonly a serial number is stored that identifies the antenna (tag). The antenna enables a chip to transmit the identification information to an RFID transponder (or reader). The reader converts the radio waves returned from the RFID tag into a form that can be passed on to computers/computer chips that can make use of it. The way the system works is that the reader sends out electromagnetic waves form a magnetic field when they couple with the antenna on the tag. A passive RFID tag draws power from this magnetic field and uses it to power the microchip's circuits. The chip then modulates the waves that the tag sends back to the reader and the reader converts the new waves into digital data.

(F,3). How Does Margaret Use the Switches

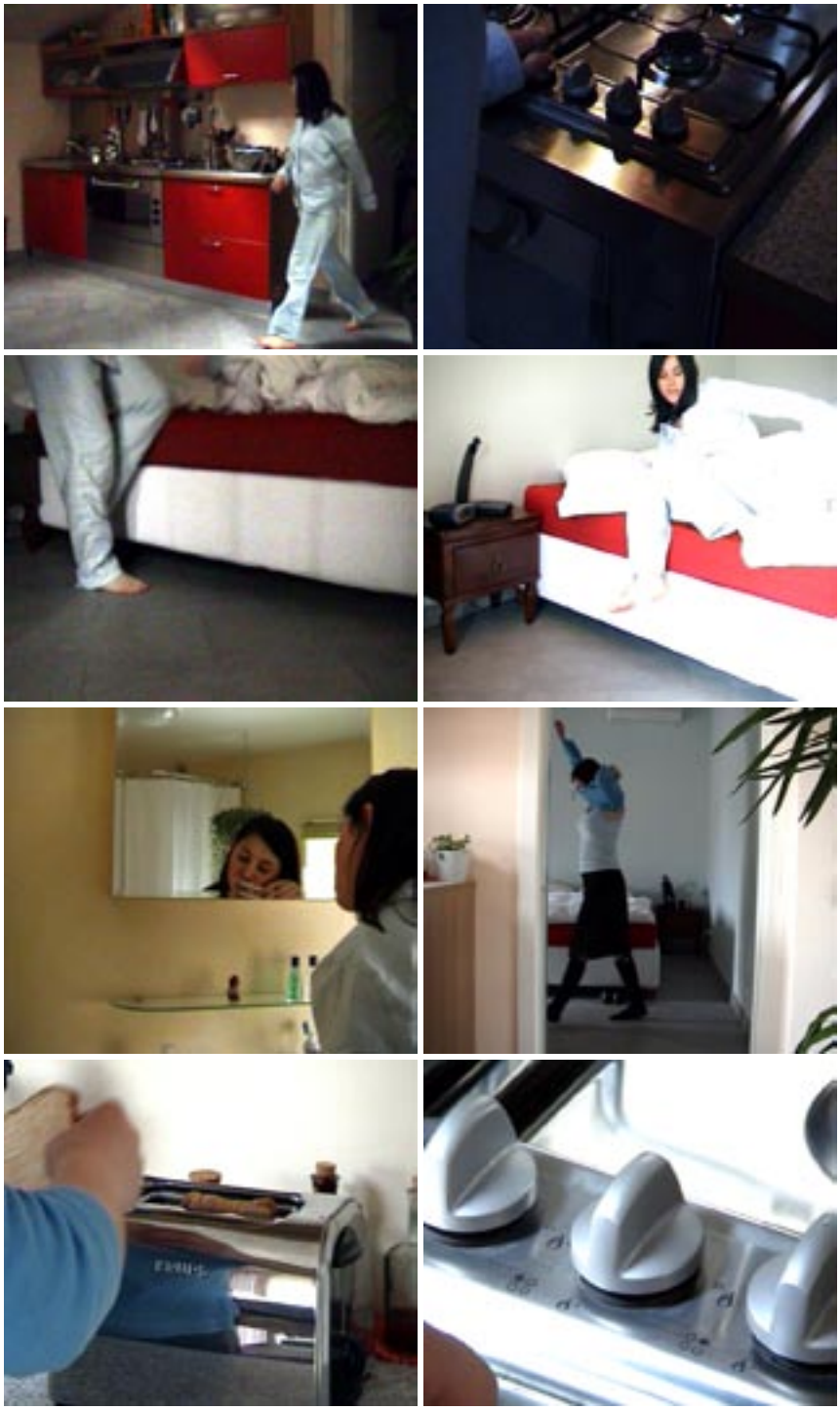
The following storyboard presents screen grabs from a film scenario in which we encounter Margaret and her daily routine and then encounter Margaret and her daily routine while using the checking switches.

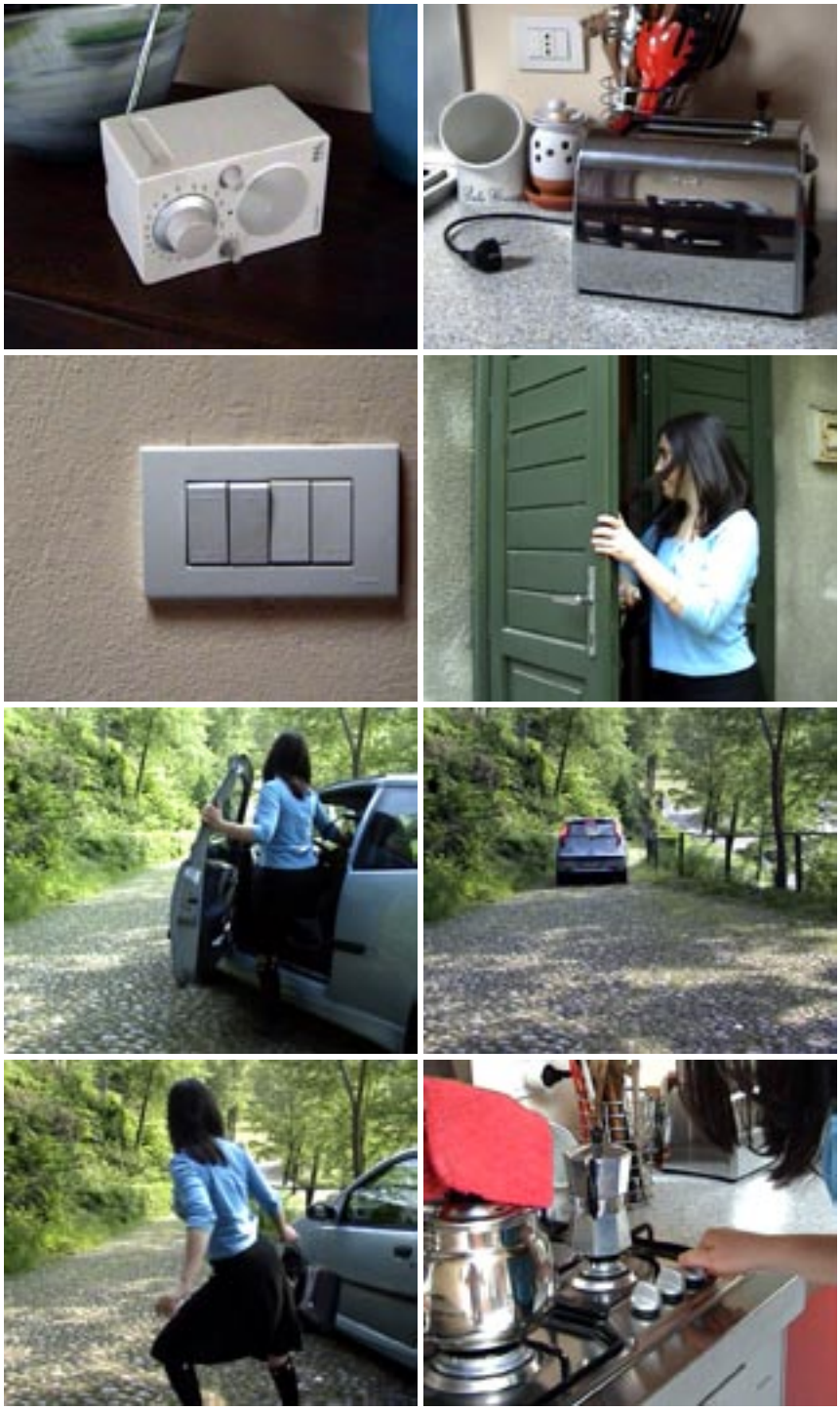
In the first scenario, Margaret awakes in the middle of the night to check her stove switches in the kitchen. The following morning she awakes, goes through her daily routine including checking her electrical appliances at length, and then leaves the house to catch a train. She has to return home halfway down the driveway to check on her stove once again which inevitably makes her have to rush eccessively to catch the train.

In the second scenario she collects the portable master switches to her electrical ppliances and takes them to bed with her. In the morning she awakes to go through her same routine, this time with the influence of the checking switches. Having left the house Margaret is, as before, nervous about having left the stove on. In this scenario however, she is able to open her bag and consult the switches that she has with her which saves her some time and helps her to catch the train without rushing.

Obsessive-compulsive checking

Film scenarion A: film stills 1–8





Obsessive-compulsive checking

Film scenarion A: film stills 9–16

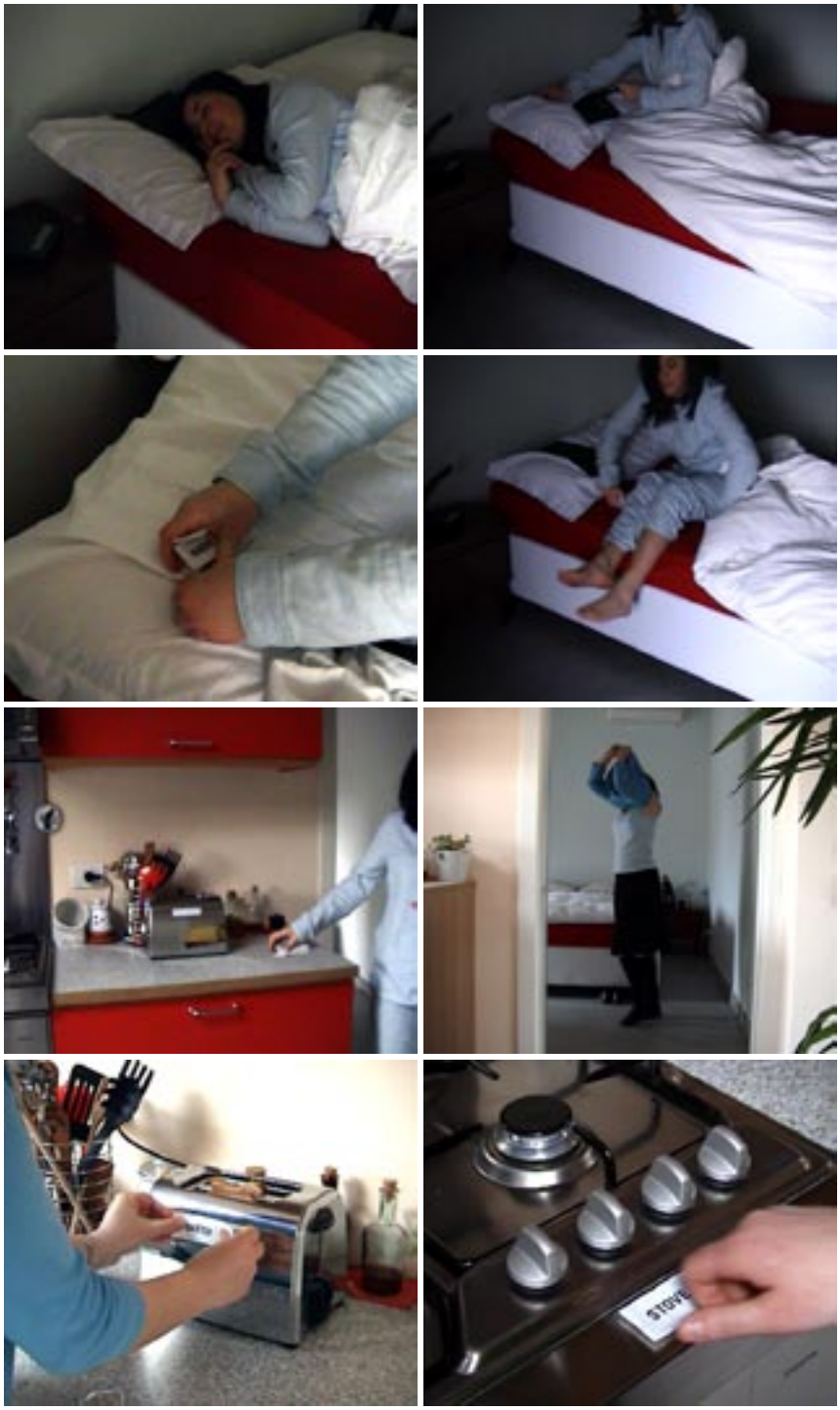
Obsessive-compulsive checking

Film scenarion A: film stills 17–21

Obsessive-compulsive checking
Film scenarion B: film stills 1–8

Obsessive-compulsive checking

Film scenarion B: film stills 9–16



Obsessive-compulsive checking

Film scenarion B: film stills 17–24

Obsessive-compulsive checking

Film scenarion B: film stills 25–28

(f, 4). Analysis

In this design study, enabling Margaret to engage in her compulsion has the potential to improve the way in which the compulsion interfaces with the rest of her life. For example, as discussed previously, Margaret feels a kind of satisfaction when performing her compulsions—which help to eradicate her anxiety in regards to her driving obsession—whose need to perform is not limited to a particular time and place. When Margaret would leave her house she would be troubled by not having any reference with which to extend her checking compulsion, no way to know whether her switches had been turned off, and supply her with the satisfaction she needs to perform other tasks in her life. In initial interviews Margaret expressed that her tardiness because of needing to return home to check on her appliances causes several problems for her directly. Having provided Margaret with a physical artifact that communicates the status of the appliances she needs to check and can be with her at any given time, Margaret has the opportunity to fulfill her compulsion in a form without returning to the house.

There are some further steps to complete the analysis of this design study. Though the principles of the way in which the checking switches function and are used are derived directly from user investigations with Margaret, the design has not yet been provided to her in physical form to use. Although Margaret, upon seeing the scenarios and having the objects themselves, articulates that she feels that the switches would help her refrain from returning to her house, they would need to be tried out first hand to evaluate accurately.

Overall, the experience of identifying an individual's need that is outside the mainstream and enabling it in an effort to improve her quality of life has been extremely rewarding. Margaret expressed many thanks for first considering her OCD as a need and secondly considering that it could be addressed, and enabled, through design.

The design results aim to provide individuals without OCD a starting point and personal situation from which to understand that OCD is normalcy for some people. For designers, looking toward the periphery outside of needs currently addressed by design provides us with opportunities to not only extend our skills into new markets, but to consider the vast number of needs that can be considered and potentially improve lives.

(g). Obsessive-compulsive Counting

As an individual with OCD whose compulsions manifest themselvf through counting, David lives with the need to count everyday. Through counting he is able to cope with the anxiety of an obsession he has which he has found to be likely connected to excessive religious or moral doubt. As uncovered in interviews with David his counting needs are sometimes manageable and sometimes disruptive, given the context. For example there are times when he seeks out things to count when he feels compelled and has the time. In other instances David has other tasks to perform and when encountering objects with counting potential for him, he is drawn to having to fulfill the need for counting before moving on. This dual motivation, to count and not to count, provides clear parameters for a design that could enable David's counting.

The need to count could be enabled through providing David with an outlet or resource in which to perform his counting rituals—promoting the activity itself. The challenge then is to use the counting to his advantage when it would be detrimental. Through giving David a resource in which to count, his counting could supply information that would help him to avoid counting situations when need be—by recording the counting and mapping it so that he knows where contexts to be avoided are—and potentially provide that information to other individuals in the same situation aiding them in a similar manner.

(G, 1). Counting Maps

The counting maps aim to do a number of things. They are an experience that David can engage in, both publicly and privately, that supports his ritual through providing him a way in which to count. Secondly, through giving him a resource in which to count that asks him to record any information he deems appropriate based on his current location when he needs to count, David can be creating a location-based archive of counting obstacles or opportunities. This archive can then be contributed to or accessed by other individuals with similar motivations—making something useful out of a practice that once seemed problematic or valueless.

The idea with the counting maps is to give David an instrument in which to record counting information when he encounters such contexts—whether the number of objects, a note about their presence, or an illustration of a relevant detail. This instrument is intended to be an object that would not be cumbersome or have a negative connotation in public—personalized maps. Through designing maps specifically tailored to David's needs that are shareable, personal information can be recorded whenever desired and archived, or shared, when desired.

Text-based information such as handwritten notes and illustrations can be shared when mobile through taking advantage of Anoto technology[52]. Anoto technology provides digital pen and paper resources that allows handwriting to be translated and sent to any digital location while mobile. This technology would be employed through designing custom maps in a notebook fashion that would use Anoto functionality when desired to transmit the information recorded in the notebook to a server. The server could then communicate that information to a map-searching website that could be searched with counting criteria as well as standard map searching criteria. David could then have maps that are designed to support his counting rituals and share the information he has recorded with other individuals who may need to find locations that have things to count or avoid certain locations with things to count.

The final decision addresses the form of the personalized maps. David feels that to be able to conveniently use the maps when he is on the go, they should be formatted in a way to be intuitively used and hand-held. The format of a notebook is one that meets these formal requirements and at the same time is inconspicuous enough not to broadcast the behaviour publicly if need be.

(G, 2). The Personalized Map specifics

The design of the maps is developed solidly on the foundation of conventional map books. A legend is presented up front, breaking the overview map into sections that can be explored at street-level on individual pages (fig. 1). Each individual street-level map includes sub-sections, structured in the same way as the overview legend, that allow the user to note what region/street area they are referring to (fig. 2). The maps are accompanied by a number of areas in which to write or draw respective information. The information is then noted using one of two desired methods. The user can either denote the address that the notation belongs to (fig. 2) or use the sub-sections structure to note the area of the map the notation pertains to (fig. 2). While the latter may be quicker to note, the prior offers the user the ability to apply any notation area in the book to any map area/address, allowing the user an unlimited number of entries for any one area/address.

The Anoto technology works to record and communicate the information noted as follows. The pen used to make notations contains a tiny camera that registers the pen's movement across a grid on the paper's surface and stores it as a series of map coordinates—coordinating the exact location of the page being written on. When making a mark in the "send" box with the pen the information gets sent as a sequence of map coordinates, registering the address or sub-section of the map specified. These coordinates are then translated into an image, resulting in an exact image of the handwriting. The notation is then coded on the server side and implemented into a database, allowing it to be accessed through an online interface which implements map searching functionality including the notations about specific locations when they are part of a search.

fig. 1: Overview legend of maps found in front of book. For example the street-level map for B, 3 would be found on page 6 in the book of maps.

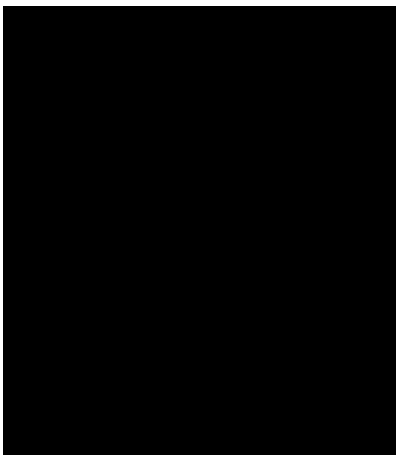


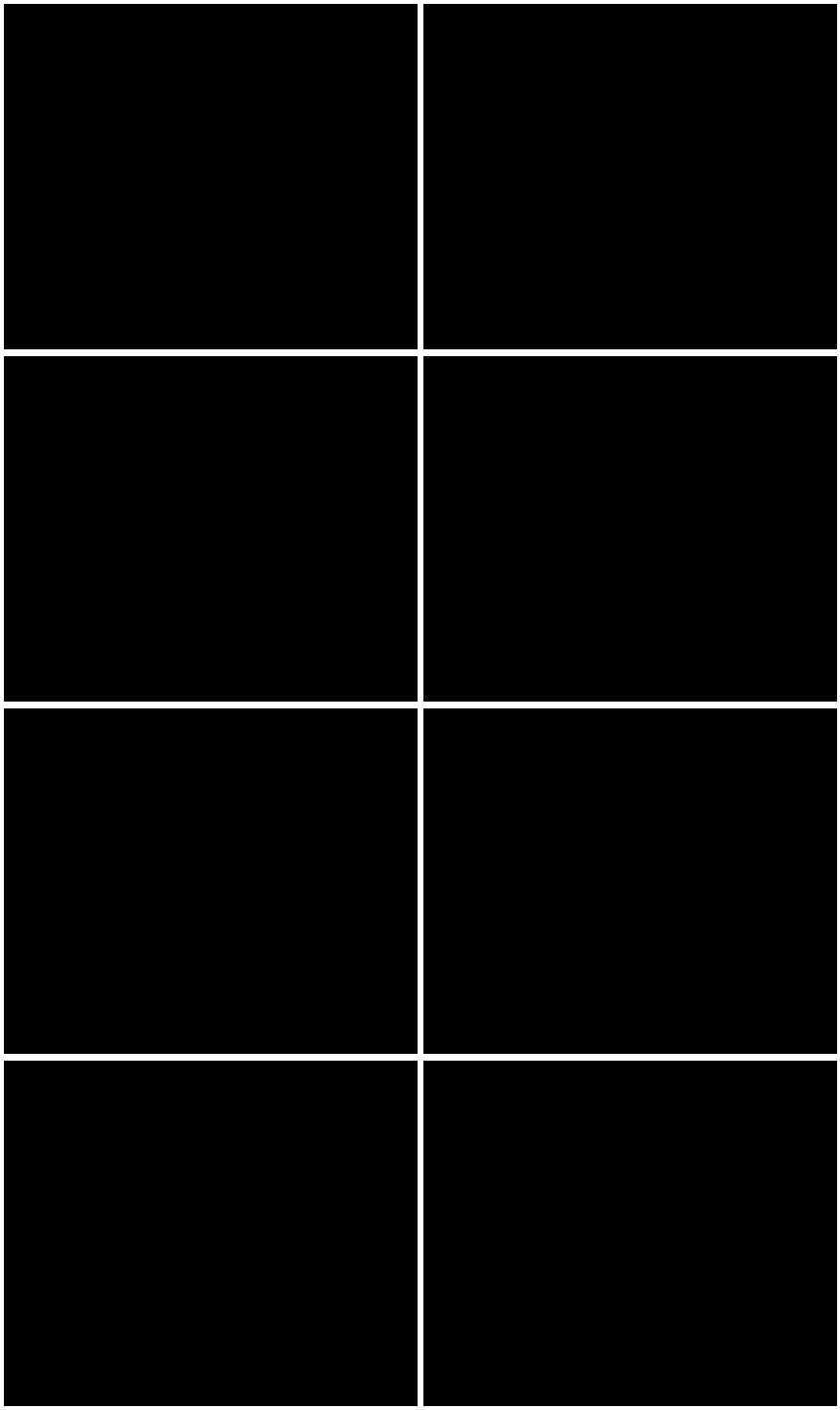
fig. 2: Example of page with street-level map

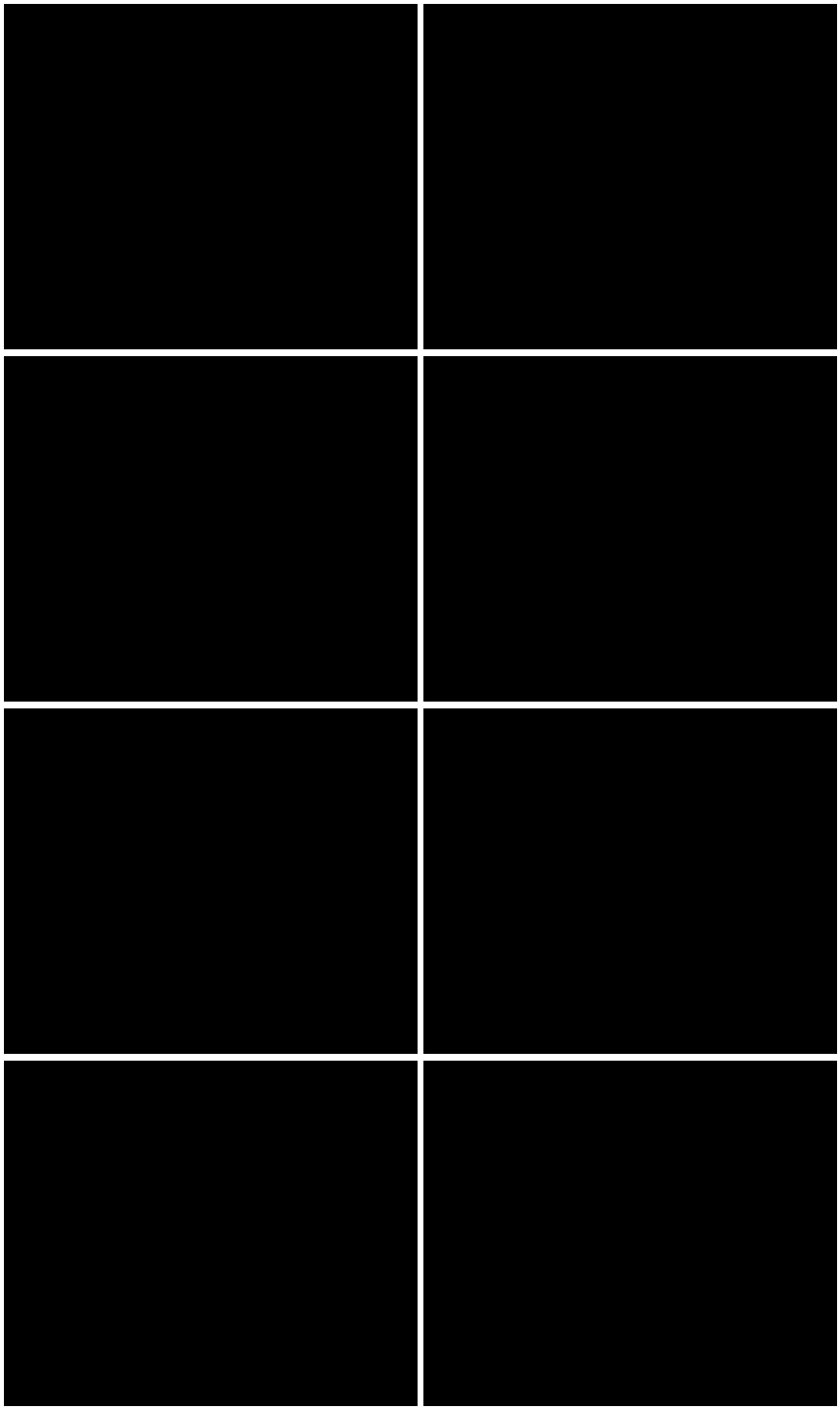
(G, 3). How Does David use the Counting Maps

The following storyboard presents screen grabs from a film scenario in which we are introduced to David and his counting needs. In the second half of the film we see him using the counting maps to record countable patterns in his surroundings. These notations are then sent to a server database that supports a map-location web interface which we see being used by another individual who is seeking information, regarding counting, about the location where David has been.

Obsessive-compulsive counting

Film scenarion: film stills 1–8

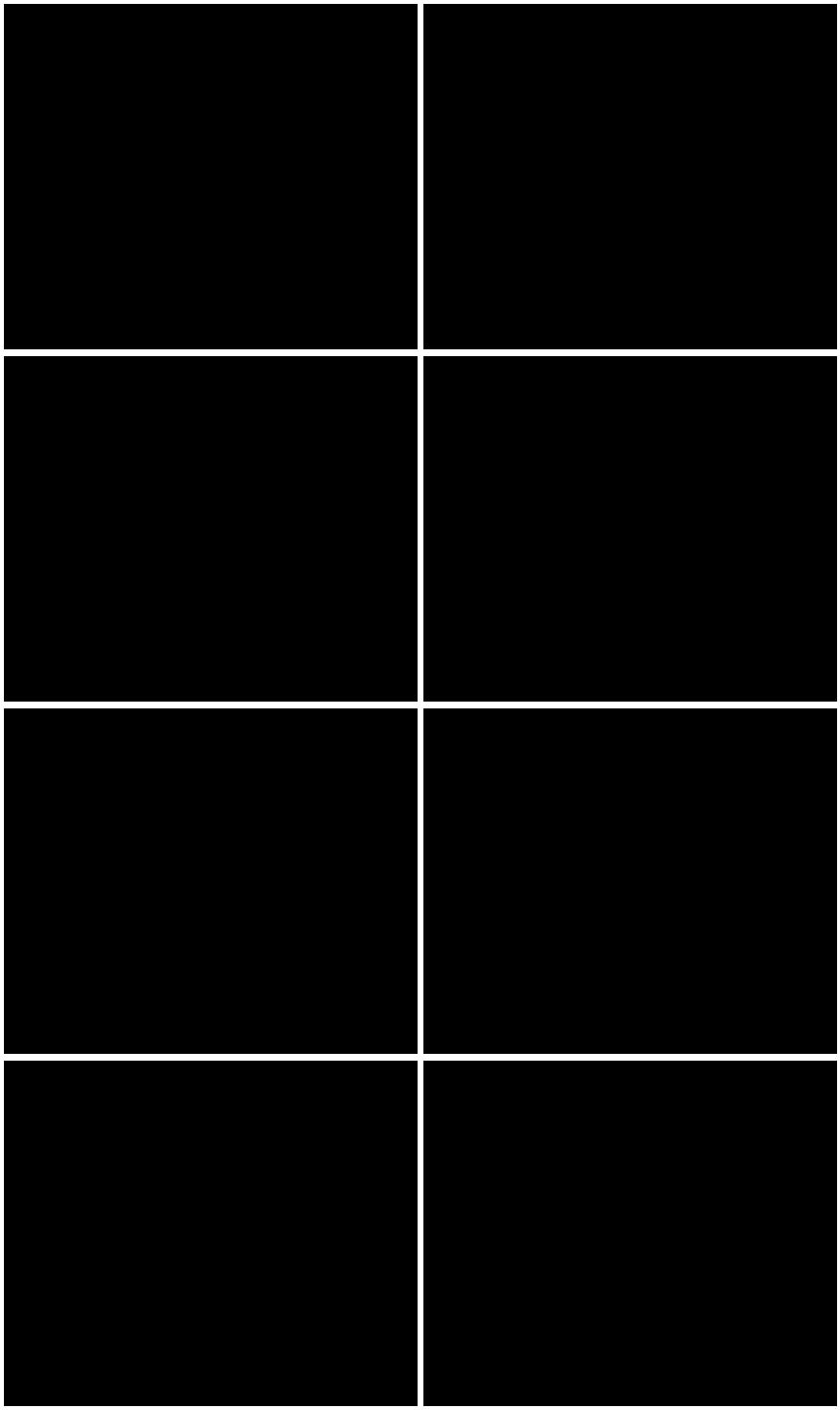




Obsessive-compulsive counting
Film scenarion: film stills 9–16

Obsessive-compulsive counting

Film scenarion: film stills 17–24



(G, 4). Analysis

The counting maps support the compulsion that David has to count, through both providing a venue for his counting and giving previously unexplored value to the act. He claims that having something designed for what is normally seen as a dysfunction that he has makes him feel more comfortable attending to his counting need. Previously he described situations in which he would need to travel from one place to another but would temporarily be detained by contexts that compelled him to count—including times when his detainment was detrimental to reaching his final destination. When he now searches for directions or feels that he needs a route from one location to another with specific counting criteria in mind, David has the opportunity to consult his previous counting notations and those of his peers for the information he needs.

The generation of the personalized maps were finalized in an effort to communicate the idea clearly, however the online interface and respective database were prototyped with sample data. There are further steps required to establish how large a population is needed to support the online application portion of this design study. Given that the need to count is quite strong in individuals with counting compulsions, critical mass could potentially be met with lower numbers than in other opt-in models where users contribute content—but this remains to be tested. Though even without alternate users, the archiving system works for the individual user, allowing him/her to make notations and access them independently. David's feedback regarding the way the design made him feel satisfied the aims of the project—through enabling the compulsion that he has.

ANALYSIS AND CONCLUSION

The development of this thesis has been rewarding. What began as an assessment of new technology adoption became an investigation into pragmatic solutions for marginalized individuals in society.

One of the earliest findings in regards to the method applied was that when assessing technology within the design process it is best to begin with the question "what does this experience take away?" Though this question is simple, its implications can be incredibly complex. From the loss of eternity with the introduction of the mechanical clock, or the fragmenting of society with Gutenberg's printing press, to the loss of independence with mobile telephony—asking the question of what is lost early in the design process helps to reveal potential undesired casualties .

Another approach pursued in this thesis is the idea of problem enabling. While problem solving is about remedies, problem enabling is about supporting problems and making them possible. Through taking those motivations, dispositions and experiences that are seen as problematic in mainstream society and supporting them, design has the ability to influence the public perception of those problems.

When addressing needs that are considered problems in mainstream contexts there is great potential for controversy. One of the most valuable lessons learned while developing the communication aspect of this thesis was that the language used to address both users and audiences is of the utmost importance. For instance the original categorization of needs that this thesis was working with prior to the use of "peripheral," was "alternative." However, alternative has a negative connotation as something secondary. Another such example of the importance of language arose when conveying the goals of the thesis amidst the decision to work with enabling the compulsions of individuals with OCD. It became immediately apparent that to avoid misaligning the thesis a declaration had to made up front that the design ideas were not aimed at therapeutic solutions—that the thesis is about enabling compulsions and not trying to solve the problem of obsessive motivations.

Because OCD is considered a mental illness, individuals are much more apprehensive to speak honestly about their personal ordeal. One of the most valuable experiences involved in developing the thesis was the interview process. When approaching a room of individuals with OCD, in an effort to try and design something for their needs, empathy is the tool that matters most. Only through empathizing with the individuals and understanding what their experience is like and how you can relate to it can a designer appropriately address these complex human needs.

One of the challenges presented in the thesis was to have access to users, individuals with OCD, that speak English. The necessity for communicating in the same first language is due to the topic of conversation, which while being extremely personal is also one of emotions. The decision to contact users in Boston meant a limited number of first-person interactions with the users. This meant that initial research had to have a number of assumptions addressed early in the process. While this early direction was advantageous, the lack of presence during prototype investigations was difficult to work around.

For designers, this thesis aims to promote ideas of social responsibility. If left solely to the profit-driven sector of techno-centric societies, interaction design will easily serve the

needs of the mainstream, churning out masses tof echnological solutions for problems that are well established as socially acceptable. However, if we can recognize and take advantage of the power design has to mediate psychological, social, and cultural experiences, and approach all potential users with empathy and compassion, we can influence ideas of social acceptability through our craft.

For the audiences of this thesis whom are not designers, the studies herein have been created with the hope that individuals with Obsessive-compulsive disorder—or anymotivations or dispositions that seem at first glance unpleasant—can be seen as individuals like any other, with complex human qualities and conditions, that contribute to the very diversity of our species.

ENDNOTES

[1] see *Theories of Technology* in the Appendix

[2] Ong, Walter, J. *Why Talk? A Conversation About Language with Walter J. Ong.*

[3] From "A Vision in Kilowatts" by Stuart Chase, *Fortune Magazine,* 1933.

[4] Rybczynski, W. *Taming the tiger: The struggle to control technology.* Page 5.

[5] Mumford, L. *The Lewis Mumford Reader.* Page 326.

[6] Adorno, Theodor. *The Culture Industry.*

[7] Adorno, Theodor and Max Horkheimer. *Dialectic of Enlightenment.* Pages 129–130

[8] Adorno, Theodor. *The Culture Industry.*

[9] See *Theories of Technology* in the Appendix for further writing on theories of technology.

[10] McLuhan, Marshall with Quentin Fiore and Jerome Agel.

[11] McLuhan, Marshall and Eric McLuhan. *Laws of Media: The New Science.*

[12] Pacey, A. *The Culture of technology.* Page 127.

[13] Papanek, Victor. *Design for the Real world.* Page 247.

[14] Postman, Neil. *Technopoly: The Surrender of Culture to Technology.*

[15] Ellul, Jacques. *The Technological Society.* Page 61.

[16] Postman, Neil. *Technopoly: The Surrender of Culture to Technology.*

[17] Maslow, A. H. *Motivation and Personality.*

[18] Bradshaw, J. "The Concept of Social Need." *New Society.* March, 1972.

[19] Cooper, Alan and Robert M. Reimann. *About Face 2.0*

[20] Cooper, Alan and Robert M. Reimann. *About Face 2.0*

[21] Cooper, Alan and Robert M. Reimann. *About Face 2.0*

[22] Katz-Haas, Raïssa. "Ten Guidelines for User-Centered Web Design." *Usability Interface.*

[23] IBM. http://www.306.ibm.com/ibm/easy/eou_ext.nsf/publish/2

[24] Katz-Haas, Raïssa. "Ten Guidelines for User-Centered Web Design." *Usability Interface.*

[25] Dunne, Anthony. *Hertzian Tales.* Page 28.

[26] Dunne, Anthony. *Hertzian Tales.* Page 30.

[27] Dunne, Anthony. *Hertzian Tales.*

[28] Dunne, Anthony. *Hertzian Tales.* Page 54.

[29] *Design Noir* http://www.doorsofperception.com/Features/details/9?page=4

[30] Daniel 4:29-34.

[31] Rasmussen SA, Eisen JL. Pages 67–73.

[32] Khouzam HR, McCarthy PJ. Page 12.

[33] Khouzam HR, McCarthy PJ. Page 14.

[34] Rapoport JL, Leonard HL, Swedo SE, et al. Page 27.

[35] Rapoport JL, Leonard HL, Swedo SE, et al. Page 28.

[36] Baer L. Page 14.

[37] Khouzam HR, McCarthy PJ. Page 72.

[38] McGuire PK, Bench CJ, Frith CD, et al. Page 460.

[39] American Psychiatric Association. Page 422.

[40] Rasmussen SA, Eisen JL. Page 70.

[41] [41] Rasmussen SA, Eisen JL. Page 72.

[42] American Psychiatric Association. Page 420.

[43] Rapoport JL, Leonard HL, Swedo SE, et al. Page 29.

[44] Rasmussen SA, Eisen JL, Pato MT. Page 2, 9.

[45] Khouzam HR, McCarthy PJ. Page 22.

[46] Adapted from Rasmussen et al, Khouzam and McCarthy.

[47] Leroi, Armand Marie. *Mutants.*

[48] Ong, Walter, J.

[49] *Wiring,* developed by Hernando Barragan at the Interaction Design Institute Ivrea: http://wiring.uniandes.edu.co/

[50] Obsessive-Compulsive Foundation of Boston http://www.ocfboston.org

[51] More than 25% of OCD cases are affected lifelong. A recent 2-year study showed that appropriate cognitive therapy program has had a 12% chance of full remission and "success." http://www.ocdfoundation.org

[52] http://www.anotofunctionality.com/

[53] Feenberg, Andrew. *Critical Theory of Technology.*

[54] Bagrit, Leon. *The Age of Automation.* Page 38.

[55] Heidegger, Martin. trans. W. Lovitt. *The Question Concerning Technology.* Page 17.

[56] Feenberg, Andrew. *Critical Theory of Technology.* Page 7.

[57] Hostetler, John A. *Amish Society, Fourth Edition.*

[58] Kraybill, Donald B. *The Riddle of Amish Culture.* Page 26.

[59] Kraybill, Donald B. *The Riddle of Amish Culture.*

[60] Kraybill, Donald B. *The Riddle of Amish Culture.* Page 86.

[61] Kraybill, Donald B. *The Riddle of Amish Culture.*

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APPENDIX

(A). Theories of Technology

(A, 1). Instrumental Theory of Technology

The instrumental theory of technology, as illustrated by Andrew Feenberg, argues that technology is neither inherently good or bad—it can be used for any political or social ends by the institution in control.[53] He outlines the four basic claims of the instrumental theory below:

- Technology is "indifferent to the variety of ends it can be employed to achieve."
- It is "indifferent with respect to politics."
- Its neutrality is due to some universal rational character.
- The same standard of measurement, usually efficiency, can be applied to technology across situations.

Leon Bagrit, the distinguished engineer and a proponent of the Instrumental Theory, provides an explanation. He feels it "is not a question of machines replacing men: it is largely a question of extending man's faculties by machines, so that, in fact, they become better men, more competent men"[54]

(A, 2). Substantive Theory of Technology

The Substantive Theory of Technology, in contrast to the Instrumental Theory, states that technology is not neutral but instead has a substantive value bias. Previously Feenburg illustrates that in the substantive model "technology constitutes a new type of cultural system that restructures the entire social world as an object of control." Thus, the computer is a collection of cultural/ideological forces, which are determined by their context as either good or bad. Feenberg uses the example of fast food as a technology that helped degrade the traditional family dinner, to support the argument of the substantive model. Background on Feenberg and his contemporaries.

(A, 3). Critical Theory of Technology

The Critical Theory of Technology, which Feenberg promotes, states that technology is not a "thing" but an "ambivalent process of development." This process, though similar to neutrality in its potential for good or bad, differentiates itself from the Instrumental Theory by recognizing the role of social values in design.

The Critical Theory of Technology This theory sees humans as an essential part of the process of technology and underlines the parallels between technology and social action. This theory seems most viable, as there is no rationalist split between humans and the technology they create.

Heidegger claimed that we, and the world, are "standing reserves," raw materials waiting to be used up in the process.[55] According to Feenberg, "Heidegger asserts that the technical restructuring of modern societies is rooted in a nihilistic will to power, a degradation of man and Being to the level of mere objects... The issue is not that machines have 'taken over,' but that in choosing to use them we make many unwitting cultural choices. Technology is not simply a means but has become an environment and a way of life: this is its 'substantive' impact."[56]

(b). The Amish and Technology

The Amish movement was founded by Jacob Amman, a Swiss farmer and bishop. Initially a reform group in the Mennonite movement in 1693, its split with the Mennonites was mainly over:

> The frequency of communion. Amman advocated twice a year instead of once. Believers preceded communion with a time of spiritual introspection. Amman felt that this might help the membership to be more diligent in their Christian life if it were performed every six months.
>
> The practice of foot-washing, which Amman reintroduced. It had fallen out of use by most Mennonite groups.
>
> The shunning of non-conforming members.

Amman felt that the Mennonites were too lax and had allowed the practice of shunning non-conforming members to fall into disuse. He treated shunning very seriously and took it one step further. He required the spouse of a person under the ban to neither sleep nor eat with the sinner, until they had repented and changed their behavior or beliefs. Hans Reist, a leader of the main Mennonite body, argued that Jesus had socialized with known sinners and had kept himself pure; he reasoned that Christians in the late 17th century could do the same without resorting to shunning.[57]

In 1681, William Penn, an English Quaker, received ownership of the land which was to become the state of Pennsylvania. He established a colony of religious tolerance which provided a haven for Amish, Quakers, Mennonites, Moravians, Schwenkfelders and other European settlers.

The most important factor of Amish life is Gelassenheit, or submission to the will of God. Through giving up individuality and selfishness, the Amish embrace God's will by serving others and submitting to Him. To the Amish, Gelassenheit is seen in all of the following aspects[58] of Amish life:

personality: reserved, modest, calm, quiet
values: submission, obedience, humility, simplicity
symbols: dress, horse, carriage, lantern
structure: small, informal, local, decentralized
ritual: baptism, confession, ordination, foot-washing

The modern day Amish follow a set of rules called the Ordnung that help the community live their lives in accordance with the Scriptures.

A respected Ordnung generates peace, love, contentment, equality, and unity. It creates a desire for togetherness and fellowship. It binds marriages and strengthens family ties to live, work and worship together and to commune secluded from the world.[59]

These principles outline the use of technology in their society. The Amish, contrary to popular belief, are not anti-technology or "stuck in the past" but prefer to slow the process of technological adoption to assess its impact on their community and way of life. Often, a new technology will be introduced by an individual and tried for a period of time. The community will then evaluate how it reflects their beliefs and practices, and thus make a communal decision on its position in their society. For example, many technologies that are deemed unacceptable are so because they lead to self-exaultation and/or over-manipulative power.

The following fourteen cultural regulators[60] determine whether or not the Amish will accept a technology into their society:

1. *Economic Impact:* If the technology is likely to create higher profits, it is more likely to be accepted by the Amish. A mower on a hay baler is more likely to be accepted than a lawn mower.

2. *Visible Changes:* A change that is noticeable is more likely to be rejected than a less noticeable one. A rubber band is more likely to be accepted than a Ford minivan.

3. *Relationship to Ordnung:* Changes that reverse or contradict the Ordnung are less likely to be accepted.

4. *Adaptability to Ordnung:* Changes that are adaptable to previous Ordnung specifications are more acceptable than those that are not.

5. *Ties to Sacred Symbols:* Changes that threaten ethnic identity are less acceptable than ones unrelated to key symbols.

6. *Linkage to Profane Symbols:* Changes linked to profane symbols are less acceptable than those without such ties.

7. *Sacred Ritual:* Changes that threaten sacred ritual are less acceptable than those unrelated to worship.

8. *Limitations:* Changes with specified limits are more acceptable than open-ended ones.

9. *Interaction with Outsiders*: Changes that encourage regular interaction with outsiders are less acceptable than fostering ethnic relationships.

10. *External Influence:* Changes that open avenues of influence from modern life are less acceptable than those without such connections.

11. *Family Solidarity:* Changes that threaten family integration are less acceptable than those that support the family unit.

12. *Ostentatious Display:* Decorative changes that attract attention are less acceptable than utilitarian ones.

13. *Size:* Changes that significantly enlarge the scale of things are less acceptable than those that reinforce small social units.

14. *Individualism:* Changes that elevate and accentuate individuals are less acceptable than those that promote social equality.

For example, telephone service, introduced to the Lancaster County area of Pennsylvania in 1879, was officially banned within the Amish community in 1909. "Contrary to the spirit of Gelassenheit," the telephone was seen as promoting "individualism and pride."[61]

The use of the telephone was not banned. Community telephones can be found in separate structures where several families have access to it without disrupting social order. These parameters for community telephone usage bring influence and control to the technology that goes beyond the industries that promote them. The term, automatic mobility, suggests a worldliness that is not acceptable to most Amish—thus the automobile has long been rejected. However, if the Amish must use an automobile, whether to visit distant relatives or travel beyond the range of their horse and buggies, they are allowed to ride in one. But the Ordnung forbids the Amish to operate automobiles: a driver must be hired. Many groups rent buses to take them on mass excursions to old meeting houses or cemeteries. The Amish have also been known to use airplanes for long distance travel. As long as they are not operating the machines, they are not breaking the laws of the Ordnung. Long-distance traveling is not promoted though, as the Amish feel that this could lead to the separation of their community.

The Amish do use modern farming equipment. The use of horse-drawn equipment in the field is required by the Ordnung. Therefore, many Amish have adapted hay balers, sprayers, spreaders, and reapers for use with horses. Many modern machines are run with diesel or steam engines or used electrical generators. Tractors are allowed, as are chemical fertilizers and insecticides.[62]

The Amish choose to introduce new technologies on a need basis. They do not rush into technology adoption for the sake of profit or in an effort to assimilate to the cultures

around them. Their practice of considering the advantages and disadvantages of technologies in relation to established values enables the Amish to address the needs of their community and their individuals on a case by case basis. Within this method mainstream needs are not defined by the mass cultural biases that determine technology introduction based on capitalist value. Instead, those needs that may seem peripheral in a general industrialized, Western society are possible mainstream needs for the Amish.

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COLOPHON

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I dedicate this thesis to Jonathan,
lost in our home on the ocean.