Design
& Dialectic

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Abstract

Designers occupy a critical role in the creation of artifacts, systems, and experiences, but often hold ambivalent positions toward status quo values within their work. Design, however, is not a value-neutral activity, and both designers and designs are often informed by values and norms with inherently negative personal and societal consequences. By maximizing characteristics such as ease, speed, and intuitiveness within their work designers may unwittingly contribute to the destruction of skill, unnecessary waste, lack of user choice, and other harmful outcomes.

While evidence suggests the benefit of embracing seemingly counterintuitive values such as challenge, slowness, and deliberateness in their work, these options often remain hidden to designers. It is clear that we require a means by which affirmative values can be identified, and a technique that aids in the exploration of alternatives.

In this research paper I describe historical conceptions of "good design" and how Critical Theory can contribute to the identification of status-quo values that inform the work of many designers. A case is made for envisioning the process of design through the lens of Hegelian dialectical argumentation and how this can be applied to, what, at first glance, may appear to be the paradoxical stances of affirmative and critical values.

Finally, I describe a design technique which aids designers in identifying affirmative values in their design context and in imagining how overlooked alternatives can contribute to greater social responsibility, increased user satisfaction, and more enriching user experiences.

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Bacchus, on a certain occasion, found his old schoolmaster and foster-father, Silenus, missing. The old man had been drinking, and in that state wandered away, and was found by some peasants, who carried him to their king, Midas. Midas recognized him, and treated him hospitably, entertaining him for ten days and nights with an unceasing round of jollity. On the eleventh day he brought Silenus back, and restored him in safety to his pupil. Whereupon Bacchus offered Midas his choice of a reward, whatever he might wish. He asked that whatever he might touch should be changed into gold. Bacchus consented, though sorry that he had not made a better choice.

Midas went his way, rejoicing in his new-acquired power, which he hastened to put to the test. He could scarce believe his eyes when he found a twig of an oak, which he plucked from the branch, become gold in his hand. He took up a stone; it changed to gold. He touched a sod; it did the same. He took up an apple from the tree; you would have thought he had robbed the garden of the Hesperides. His joy knew no bounds, and as soon as he got home, he ordered the servants to set a splendid repast on the table. Then he found to his dismay that whether he touched bread, it hardened in his hand; or put a morsel to his lip, it defied his teeth. He took a glass of wine, but it flowed down his throat like melted gold.

In consternation at the unprecedented affliction, he strove to divest himself of his power; he hated the gift he had lately coveted. But all in vain; starvation seemed to await him. He raised his arms, all shining with gold, in prayer to Bacchus, begging to be delivered from his glittering destruction.

(Bulfinch, 1867)

Introduction

It began with watching my children play with an Amazon Echo smart speaker in my kitchen. My daughter, Helena, and my son, Nathaniel, were asking Alexa questions, playing music, and requesting jokes, all with mixed results. Voice interfaces are notorious for their difficulty in interpreting the voices of children, and after a number of failed attempts to have Alexa play a song I intervened with a terse command that I knew would register with the device. I was correct – but I was also corrected – by my daughter. Helena was unhappy with the tone I used, and by my lack of manners (I forgot to say "please").

Besides feeling, for a fleeting moment, that I had succeeded in raising polite children, the exchange prompted me to consider questions that had not previously occurred to me. First, I had failed to anticipate how quickly my children would form attachments to a digital assistant. The children didn't call the device an Echo, it was named Alexa. It was not an "it", it was a "she". The fact that the device sounded vaguely human and could respond to their queries allowed them to picture it as a being, and this was why my behaviour was called out as unacceptable.

My first interactions with the Echo were decidedly more polite than they are now, and for practical reasons. Over time I have found that simple commands and an even tone are more likely to be understood. I have effectively trained myself to be rude to Alexa. Does it affect my behaviour with others? If so, how might we be trained by other anthropomorphic interfaces in the future? It is not difficult to imagine a near future where we are surrounded by a variety of devices

with humanistic interfaces, and how they may "train" us to be more selfish, less kind, and more demanding.

My next question was whether anyone was considering these effects when designing systems like Echo. Who makes decisions about how users should be behave with these devices, or how much abuse they should tolerate? Who was in a position to set limits for the good of users?

The questions that were first raised that opened my eyes to the problem of user affect that exists across all designed things. As designers, the things we make impact the behaviour of users, both positively and negatively; the issues inherent within voice-activated assistants are the same as those of a kitchen utensil. When designers abdicate their responsibility to consider user and societal effect they not only fail to execute an ethical obligation, they are playing lip service to notion of truly designing for users.

In short, it is time for designers to reconsider their relationship with the status quo, and to rediscover values that have been trampled over in the name of progress.

Overview

In this paper, I explore how designers can create more socially positive outcomes by questioning the prevalent affirmative stance that exists in current design contexts, and by adopting a dialectical method by which they can better consider alternatives to affirmative values.

For designers, an affirmative position is often one of ambivalence, not of malignancy. To affect positive change requires challenges to deeply-rooted assumptions and beliefs.

> *...design's ambivalent position towards culture and capital requires a critique of its role within everyday life so that new possibilities for a more meaningful social role for design may be revealed. (Cadle & Kuhn, 2013)*

As Richard Thaler and Cass Sunstein observe, 'neutral' design cannot exist (Thaler & Sunstein, 2009). As designers, we often unknowingly contribute to the issues such as environmental harm, social isolation, and decreased personal independence. It is imperative that we recognize the inherent values which we propagate, whether consciously or unconsciously, and that we imagine solutions which achieve balance in the best interests of users and society. These needs suggest a process that achieves two aims: the identification of hidden values, and a means of prompting alternative solutions. A successful methodology would be at the same time provocative and generative, allowing designers to question long-standing assumptions and to imagine new possibilities which place individual, societal, and ecological concerns at the forefront of their work.

In **Part One**, I aim to better understand the role of the designer in the creation of goods and services. I do so by exploring the greater context in which they operate as well as whether ethical frameworks and "good design" are enough to guide designers to positive outcomes. I find that critical theory provides a promising avenue for uncovering the societal forces which shape our designs, and look to the research methodology of critical design as a potential means of unearthing affirmative tendencies in design.

In **Part Two**, I propose that the act of design is an inherently dialectical process and, as such, provides designers with opportunities to identify and challenge affirmative values with the goal of creating things and experiences that are healthier for users, society, and the planet.

In **Part Three**, I illustrate the concept of dialectical design through the exploration of a series of affirmative and critical value sets. For each affirmative and critical value, I provide relevant research and theories, as well as examples, both positive and negative, that illustrate the values in practice.

In **Part Four**, I present a methodology which designers can use to uncover and challenge affirmative values within their work. Details of a workshop in which this methodology was tested are included.

Finally, in **Part Five**, I offer a summary of this research and suggest and future research directions.

The observant reader will note that within this research I tend to focus upon the detriments of affirmative values and the merits of critical values. This is very much intentional. My goal within this work is not to hold a stance of objectivity, but one of challenge. In shining a light upon the limitations of affirmative values and the virtues of critical values my intention is not to argue in favour of one or the other, but to reflect upon deep-seated notions our society currently holds, and to encourage readers to consider other approaches.

What Design, and Which Designers?

With a field as wide and varied as that of design it is necessary to offer some boundaries which can be used to frame this discussion. To define design, I will follow the lead of Charles Eames, who used the fairly broad definition, "A plan for arranging elements in such a way as to best accomplish a particular purpose. (Neuhart, Neuhart & Eames, 1989)". I believe that the themes that are explored in this research are nearly universal to those who set out to create something for a purpose, both professional and non-professional designers .

The role of designers varies considerably across disciplines, scales of projects, and collaborative structures, meaning that they

may experience differing levels of autonomy over the final outcomes of their work. Those who are creating something on their own may be able to implement ideas that are generated through this process completely. That will not be the case for many, especially within a commercial context. Notwithstanding this reality, I believe that all designers and other stakeholders could conceivably use the technique contained in this paper for the purposes of education and ideation. The identification and challenge of affirmative values can be an important step whether one is working on a large, complex project which involves a series of stakeholders or a small, constrained project executed by a team of one. This macro view can be used to inform and educate, or to aid in the process of "big picture" thinking.

Designers who work on large scale projects may find that the needs of actors such as clients, buyers, product owners, marketers, and suppliers, combined with market needs, can form considerable constraints which may leave them feeling powerless to effect change. I offer a challenge to this mindset; even small, incremental changes can make a positive impact.

If it is not possible to challenge affirmative values through the central concept of a work, can it be used in some of the details? To this end, I believe that designers can also apply what they learn from this technique

to make more thoughtful decisions in their day-to-day work.

A Note on Design Storytelling

Each of the chapters exploring affirmative and alternative values are preceded by short graphic stories which I both wrote and illustrated. These pieces of speculative fiction explore future scenarios in which everyday life is affected by the unmitigated application of affirmative values within designs.

In sharing these stories, I have two aims. First, they are intended to prime readers with questions about the hidden values that lay within the things we use in everyday life. In many of the stories we typically read, watch, or hear it is typical for designed things and experiences to recede to the background and function as mere set dressing for characters. By making designs to a more central place in there narratives we can better focus on how they affect users.

Secondly, I believe that storytelling is a powerful means of sharing in an experience of speculation. It allows readers to step outside of the world of fact and into the world of possibility. The addition of stories allows readers to try some of the ideas from this paper "on for size", opening their minds to the research that follows. I sincerely hope you enjoy them.

Research Methodology

During the course of this research project, I employed a number of methods from which were garnered insights and evidence, and which helped me build the case for the role of a dialectical approach to design:

- An exploratory literature review, on a series of topics including:
  - Social Design;
  - Critical Design;
  - Design movements and methodologies from across a variety of disciplines, such as Slow Design, Reflective Design, and Behavioural Design;
- Interviews with designers working in the fields of industrial, environmental, and graphic design, as well as a design educator;
- A generative workshop, in which participants were briefed on the ideas behind dialectical design, and asked to re-imagine everyday objects using a dialectical approach.

Interview Participants

Interview participant quotes and insights are used within this document. I conducted a series of semi-structured interviews with designers and educators on the topic of social values in design. Questions were aimed at understanding the dynamics of the role of a designer within a corporate context, as well as their views on the social responsibility of designers. The following participants were interviewed:

- Participant 1 is an Industrial Design Lead at a Canadian housewares company;
- Participant 2 is a Creative Director at an agency which specializes in environmental and wayfinding design;
- Participant 3 is a freelance graphic designer and former agency co-founder;
- Dr. Mauricio Mejia is an Associate Professor of Design at University of Caldas in Colombia.

Part 1

A Complicit
Conundrum

What's a Designer to Do?

Designers occupy a unique position as creators who influence almost every aspect of life in modern western society. Consider for a moment the sheer number of interactions a person might have with designed things and experiences throughout the course of a day. We wake up in our beds, which are designed, put on our clothes, which are designed and walk through our designed hallways to make breakfast with designed appliances which we put in designed plateware.

It might be tempting to think that this level of interaction would provide designers with a sense of agency, a pervasive belief that they are able to make significant contributions to society. But this is not necessarily the case.

Consider the *First Things First* manifesto, written by Ken Garland and a group of 20 graphic designers in 1963. In this short piece the authors lamented the effort that designers "wasted" in the promotion of striped toothpaste, fizzy water, and the like, instead of "...more useful and lasting forms of communication (Garland, 1963)." Then there is Victor Papanek, an influential industrial designer who once lamented that "There are professions more harmful than industrial design, but only a few of them. (Papanek, 1971)"

This is an odd dilemma. On the one hand designers occupy a position of great influence, but at the same time feel powerless to do anything to actually make the lives of users better. How then might we, as designers, take a more active role in creating things that are

healthy for individuals, society, and the planet? To answer this fundamental question, we can look at a number of ways that past designers and theorists have attempted to answer that very question.

Design Ethics

Since there is an ethical component to the issues we are discussing, it is natural to first look to the field of design ethics for potential answers. In the field of design ethics, designers seek to create guidelines for conduct, and, ultimately, the outcomes of the things and experiences which they create.

Many designers belong to professional organizations with mandated codes of conduct that bind members to particular ways of working that protect clients, ensure some consideration of sustainability, and, most of all, maintain the integrity and trustworthiness of the profession. Not all designers, however, are required to join an association and thus are not bound to these codes. Furthermore, the items that comprise the codes can be highly interpretive, and mainly address the "what" without considering "how" and "why". Design ethics may point the way by articulating desired behaviours and practices, but defining what is ethical and what is not, without overriding principles, can be problematic.

As an example, Alliance française des designers, a French design association, maintains a code of conduct with 37 articles that leave a great deal to the imagination of the

member such as, "Article 4: Favor quality and virtue in the designer profession" (AFD | Code of Ethics for Professional Designers. (n.d.). It is unclear how such a rule can be put into practice or enforced.

Former Google design ethicist Tristan Harris, takes a different approach to the advancement of ethics by attempting to create a bottom-up call for change in the digital industry. Primarily concerned with the subject of digital addiction, his movement, Time Well Spent, is a call for designers to take responsibility for their role in designing experiences which addict users (Harris, n.d.). What Harris does not address are the structures within which designers make these choices, which, to my mind, must precede a conversation about ethics. For example, designers who work on addictive digital products often do design interactions which fulfill goals which are set at higher levels within an organization, and are often meant to contribute to shareholder value. If we do not understand the choices available to us, how do we make the correct ones?

Then, of course, is the reality that, in many cases, designers are merely in a position to influence, not dictate, ethical conduct. In some cases the only ethical choice a designer might make is whether or not they wish to be involved in a project or a company. Oftentimes this is of little consequence to the end result of the design. There are other designers who are all too willing to do the work that others refuse.

Good/Social Design

Another way in which designers might look for guidance is by interrogating the concept of "good design". If generally accepted design principles can provide a framework by which designers can create more positive things and experiences, perhaps we can approach the same problem from a practice-based perspective and in doing so may bring new considerations to light. Designers have often asked the question, "what is good design?" and in answering it have developed unexpected and innovative answers in the form of theories, manifestos, and movements. These movements, however, often fall within the boundaries of individual disciplines. Thus, an architect's version of good and/or ethical design may be bounded within the considerations of architecture.

A prime example of this phenomenon can be found in the work of Adolf Loos, a Czech–Austrian architect who practiced at the turn of the 20th century, and who was highly influential in both his contribution to modern design and theories of aesthetic purism. Loos illustrates how aesthetics and ethics interact in the form of unnecessary ornamentation in his essay, Ornament and Crime, in which he argues that ornamentation causes burdensome expense and subjects producers and end users to the whims of fashion, leading to the waste of materials, health and labour (Conrads, 1970). He advises designers to avoid ornamentation for the good of all society, as "Freedom from ornament is a sign of spiritual strength (Conrads, 1970)." Loos' condemnation of ornamentation can be seen as a precursor to later movements in which principles are largely formed by aesthetic concerns that are based on ideological or symbolic foundations. The De Stijl movement, for example, used pure abstraction composed of rectilinear form and a limited palette of colour to bring users to spiritual truth (Denker, 1982). It would be difficult to argue that any particular design school or movement could maintain any exclusive hold on "good design" any more than any musical style could be thought to define "good music".

Some designers have taken a more direct approach to defining "good design". Dieter Rams, an industrial designer who is best known for his pioneering work with the company, Braun, created his *10 Principles for Good Design* after wondering if his own work could be so characterized. His ten principles are:

1. Good design is innovative
2. Good design makes a product useful
3. Good design is aesthetic
4. Good design makes a product understandable
5. Good design is unobtrusive
6. Good design is honest
7. Good design is long-lasting
8. Good design is thorough down to the last detail
9. Good design is environmentally-friendly
10. Good design is as little design as possible

(Dieter Rams, n.d.)

Rams' principles, borne of many years of practice, consider a range of topics such as aesthetics, sustainability, and utility and contain a great deal of hard-earned wisdom. In many cases, the conscientious designer could use them to create things that are truly positive. It is also possible to argue, however, that these same principles could be used to design a deadly weapon, or a tool to aid in oppression. I would argue that (despite the nod to environmentalism) Rams' principles substitute craftsmanship for ethics. While craftsmanship is indeed a worthwhile goal, and may contribute to higher user satisfaction and less unnecessary waste, it is not in itself a sufficient answer to the variety of social problems designers must confront.

Rams' *10 Principles for Good Design* does touch on social concerns, which lead us to a third way in which designers aim to create socially positive artifacts and experiences, namely Social Design.

As an approach, social design is not well defined, but can be said to be based on the ideas of influential designers such as Victor Papanek and Victor Margolin, who have written extensively on the need for designers to consider and respond to the social context of their work. That said, there is no clear consensus on what the term means, with definitions ranging from social entrepreneurship, socially responsible design, and design activism (Chen, Cheng, Hummels, & Koskinen, 2016).

What Then?

If ethics, good design, and social design only answer parts of the question of how we can use design as a positive force, what are they missing? In both approaches there is an admission that designers are part of the problem. The question, then, is what problem?

When a designer contributes to a commercial product, such as a teapot, they are indeed in a privileged position from which they may inform choices regarding materials, form, technology, and user impacts. Despite this position of privilege, however, designers rarely make choices alone. The decision to use a known or suspected toxic material within glassware could easily be dictated by others with more authority, or even by the demands of the market itself.

According to Dr. Mauricio Mejia, whom I interviewed for this project, the problem, in Part, lays in the relative lack of authority of the designer. He noted that, "it's not about how the incentives...it's how you go up in the pyramid and influence the decision-making." This position is consistent with those of theorists who believe that while designers are in a position of influence, they are severely bound by their context. As Grant and Fox observe, "we cannot understand the role of the designer in society unless we examine the context in which the designer practices (Grant & Fox, 1992)."

Within the interviews I conducted, designers offered differing opinions regarding their role in shaping social and environmental outcomes. For some, the goal of a designer is to meet market needs, which are made apparent through user research, the input of retailers, and consumer behaviour.

Commercial viability provides a simple metric which can indicate a product's usefulness. If a product, for example, can meet a user's need at an affordable price it is logical to consider it to be user-centered. Conversely, products that might support behaviour that is more socially or environmentally responsible may not be made because they are not seen to be commercially viable. Participant 1 shared a story about a product they wanted to bring to market:

"We're looking to go after the biggest slice of the pie in the market...I wanted to design a compost bin to go with a system of garbage cans but I can't get approval on doing that because not enough people are composting in North America. So we'd rather go after a garbage can that appeals to all of North America as opposed to a garbage can that maybe appeals to half of North America."

Consumers, informed by financial constraints, attitudes, and preferences, to a large degree, drive product offerings. In the case of sustainably produced products, for example, price tolerance creates a ceiling to which manufacturers must work, which limits the

degree in which products can be sustainably produced. Participant 1 added:

"Lots of people say they want sustainably designed products, but the truth of the matter is that they're not willing to pay for it."

While this may not be indicative of all consumers, it is telling indicator that for a company that aims toward the middle of the market. Participant 1 has been more successful in the area of sustainability by creating consumer items that are well designed, affordable, and well constructed, which he argues are more less disposable.

Participant 2, a designer who specializes in graphic design, wayfinding, and environmental design, discussed how well-designed mass-produced items were once seen as the solution to a significant social problem. He recounted conditions in Germany following the Second World War that left many without basic necessities, and how one role of the designer was to help meet these needs:

"I grew up in Germany, and the social idea of how we can improve society was hammered into us. When I came here I was shocked that it was not a topic at all...But things were much simpler then. Now, consumer pressure is very much a yoke for our society."

It is notable that both Participant 1 and Participant 2 have discussed the design of consumer goods produced in market-driven economies and with similar constraints, but with divergent contexts into which a designer contributes. In one scenario, a designer does their best to limit wastefulness in a society where materialism has become rampant. In another, a designer aims to create affordable necessities.

It is true that designers who work in areas such as industrial design which have complex requirements set by the market and corporate priorities tend to possess less influence on final products. Being truly focused on positive user and social outcomes, however, is not necessarily incompatible with financial reward. To push the matter a little further, perhaps if enough designers start asking questions perhaps the answers will start to change.

Although it is tempting to point solely to the financial incentives inherent within the commercial design practice as the root of the problem, the aforementioned stories point to the importance of context when discussing social responsibility in design. To do this, designers must become aware of the values that set the context of our society. For inspiration we might look to critical theory and the Frankfurt School, which have influenced a wide variety of thinkers and can point the way with methods of thinking that are aimed at challenging our conception of social order.

Critical Theory...to the Rescue?

Critical theory stands in contrast to what philosopher Max Horkheimer labeled "traditional theory", which aims to understand and codify society while maintaining an interest in the preservation of the status quo. Critical theory, on the other hand, aims to create social change by exposing and challenging oppressive structures which may be previously unseen (Horkheimer, 2002).

Central to critical theory is an underlying position of skepticism toward the structures on which much of western society is based, and which preserve existing power through such things as mass media, consumer culture, and social institutions. (Bardzell & Bardzell, 2013) These societal constructs are then objectified, so as to seem as unquestionable, in a process called reification. According to Berger & Luckman (1966),

> *"Reification is the apprehension of the products of human activity as if they were something else than human products — such as facts of nature, results of cosmic laws, or manifestations of divine will. Reification implies that humans are capable of forgetting their own authorship of the human world."*

Designers are an essential component in the reification process of consumer products, of advertising, fashion, architecture, and the products of other disciplines because they are essential in their creation. We, as designers, are

quick to point out our mastery of aesthetics, user empathy, problem solving, and creative thinking. These very skills are used to create many of the things which, according to critical theory, aid in our enslavement.

In short, as designers, we contribute to work that perpetuates harmful values, and as such have an ethical choice to make: do we choose to support or to resist? If we choose to resist, how do we do it?

Critical Design as an Alternative

Design, as a whole, has not embraced critical theory to any significant extent. The outlier, of course, is critical design. Originated by Anthony Dunne and Fiona Raby, critical design is a research methodology in which designers create transgressive works to provoke questions that surface hidden ideological forces that form the basis of commercial design, and to suggest alternative values. By the originators' own admission, it does not fit squarely into any reasonable definition of a movement as it does not have a prevailing style. Instead, they refer to as "more of an attitude than anything else, a position rather than a methodology" (Dunne & Raby, 2013 Location 262–263).

Although Dunne and Raby deny any connection to Frankfurt school critical theory (Dunne & Raby, 2013), they share a number of undeniable parallels including the fact that they are both research methods, share similar views on the nature of society and culture, and use similar vocabulary (Bardzell & Bardzell, 2013). It must be pointed out that critical design also has historical precedent in conceptual and avant garde practice, such as the radical design and anti-design movements (Malpass, 2012).

The Two Ethical Principles of Design

Design can be described as falling into two very broad categories: affirmative design and critical design. The former reinforces how things are now, it conforms to cultural, social, technical, and economic expectation. Most design falls into this category. The latter rejects how things are now as being the only possibility, it provides a critique of the prevailing situation through designs that embody alternative social, cultural, technical, or economic values (Dunne & Raby, 2001).

In their simple manifesto A/B, Dunne and Raby juxtapose "design as usual" with the work they embarked upon in the area of critical design in order to create discussion and propose alternative dimensions (Dunne & Raby, 2013). We can think of this process of reification as a simple reinforcing loop. Products and services are typically designed based on normative value systems. The designs then reinforce these systems in the behaviour and experiences of users, leading to the continuation or exaggeration of normative value influences in future design.

Users demand products &
experiences that align
with values

Design brief based on
market demand

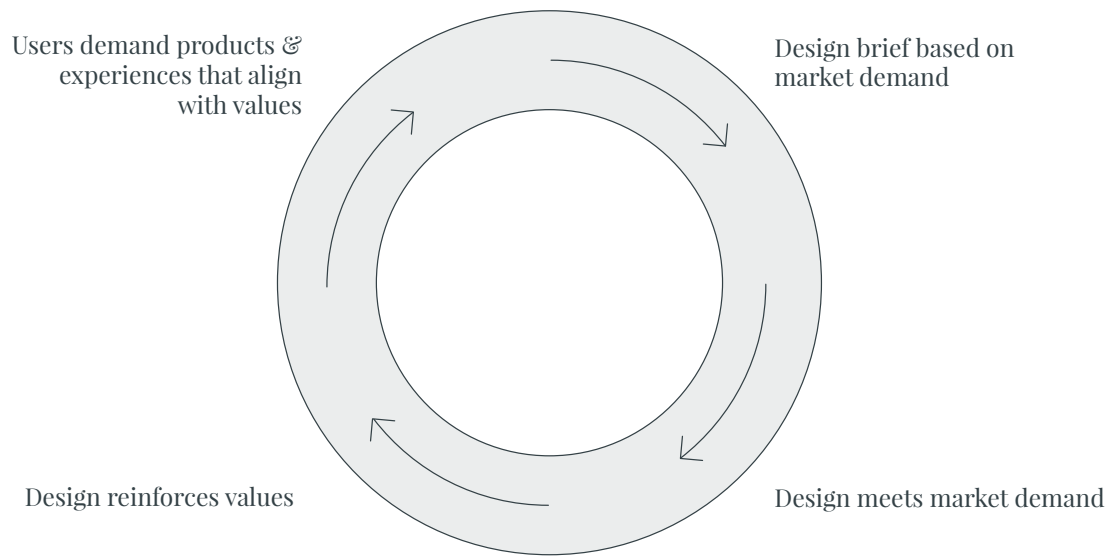Design reinforces values

Design meets market demand

Figure 1: Reification in design is a reinforcing process where market demand seemingly dictates design solutions, which reinforce consumer expectation and demand.

(a)	(b)
affirmative	critical
problem solving	problem finding
design as process	design as medium
provides answers	asks questions
in the service of industry	in the service of society
for how the world is	for how the world could be
science fiction	social fiction
futures	parallel worlds
fictional functions	functional fictions
change the world to suit us	change us to suit the world
narratives of production	narratives of consumption
anti-art	applied art
research for design	research through design
applications	implications
design for production	design for debate
fun	satire
concept design	conceptual design
consumer	citizen
user	person
training	education
makes us buy	makes us think
innovation	provocation
ergonomics	rhetoric

Figure 2: Dunne and Raby's A/B Manifesto (Dunne & Raby, 2013)

Dunne and Raby called design that perpetuates existing values and norms "Affirmative Design" (Cadle, 2013). Practicing Affirmative Design, however, is not necessarily a conscious choice that designers make. In fact, many designers believe their work to be divorced from ideological concerns, and some believe their work to be "post-ideological" in nature. According to continental philosopher Slavoj Zizek (2006), however, there can be no such thing as post-ideological design. A designer is either perpetuating or rebelling against existing values:

"...in today's epoch which presents itself as 'post-ideological,' the disavowed ideological dimension is inscribed precisely in what may appear as a 'mere design.' This externality, which directly materializes ideology, is also occluded as 'utility.' In everyday life, ideology is at work especially in the apparently innocent reference to pure utility - one should never forget that, in the symbolic universe, 'utility' functions as a reflective notion, i.e. it always involves the assertion of utility as meaning (for example, a man who lives in a large city and owns a land-rover, doesn't simply lead a no-nonsense, 'down to earth' life; rather, he owns such a car in order to signal that he leads his life under the sign of a no-nonsense, 'down to earth' attitude)."

Affirmative Values in Practice

To better understand affirmative values it is helpful to see them in context. Consider the case of the Keurig beverage system, first introduced to the office market in 1998. The inspiration for Keurig was both simple and deeply user-centered: office coffee is terrible because it is brewed in large quantities and sits for an indeterminate amount of time before being consumed. A single-serve coffee maker avoids these problems because it brews fresh coffee on demand.

Keurig went a step further. Not only could coffee be brewed in smaller quantities, but users could also choose from a variety of pre-ground beans sealed in individual pods called K-Cups. Users do not need to worry about grinding beans or cleaning up. Brewing coffee with Keurig is as simple as selecting a K-Cup, selecting a setting on the machine, placing an empty cup under the nozzle, and waiting a short amount of time. The results are rapid and the quality of the coffee is high, with no skill or cleaning required.

By 2004, the success of Keurig in offices lead to the introduction of a home machine, which quickly resulted in market dominance ("Keurig," 2017). The system steadily grew in popularity and became a common fixture in both office and residential kitchens.

Despite the level of convenience the Keurig system offers consumers, there are obvious issues that counteract that benefit.

To start, the price of convenience is high. A New York Times report calculated that, converted into pounds, K-Cups cost roughly $50/lb (USD) compared to comparable bagged beans, which cost between $10-$13/lb (Strand, 2012).

The most worrisome impact of Keurig, however, is in its environmental impact. As of 2015, over nine billion K-Cups had been sold, and, at of the time of writing, only 8 out of 180 varieties of K-Cups that Keurig sells in Canada are recyclable. As John Sylvan, Keurig's inventor, told The Atlantic in 2015, "I feel bad sometimes that I ever did it." (Hamblin, 2015)

How could a product that was so obviously expensive and harmful become so dominant? The issues of price and environmental impact must have been clear from the very start, but the product not only succeeded, it changed an entire industry. The Keurig system succeeded because its design affirmed the important societal value of convenience.

Whether or not Sylvan himself anticipated the consequences of his invention is open to debate. Let us, however, for the purposes of illustration, accept that he did not consider these effects. Might Sylvan have benefited from practical means of identifying harmful affirmative values and considering alternatives? I believe he would have.

Part 2

Two Sides of the Same Side

Applying Hegelian Dialectics

What, then, is the designer's alternative to the perpetuation of affirmative values? What theories and methods exist that address the nature of change? As an attempt to answer this question, I looked to German philosopher Georg Wilhelm Friedrich Hegel and his influential method of dialectics. Hegel argued that everything (concepts and things) follows a dialectical approach. Every logical concept, according to Hegel, has three sides which are best characterized as moments: fixity, the dialectical, and the speculative.

First is the moment of fixity, in which a concept or form is stable. The second, dialectical moment, by contrast, is one of instability, in which the limitations of the moment of fixity become apparent and that which was fixed becomes its opposite, which is described as "self-sublation". Sublation (a translation of the German aufheben) is a process of negation and preservation at once; the moment of fixity engages in self-sublation because of its own limitations, at which point it both negates and preserves itself - change is not introduced from the outside.

The third and final moment, the speculative moment, recognizes the inherent unity between the two determinations. Although the speculative moment results in negation, it is not empty; it has content because it comes from the first two determinations; the earlier determinations are preserved and carry on within newer ones. The speculative moment unifies the first two determinations, and the cycle of fixative, dialectical, and speculative continue, leading to more and more comprehensive determinations that

drive to the absolute, the highest concept of any particular subject In Hegel's argument, nothing can come from nothing. Instead, an established concept (the thesis), by its own limitations, forces itself to become its opposite (the antithesis), and the new concept (the synthesis) embraces both the old and new, becoming more universal and comprehensive, continuing to, what Hegel termed, "The Absolute Idea" (Maybee, 2016).
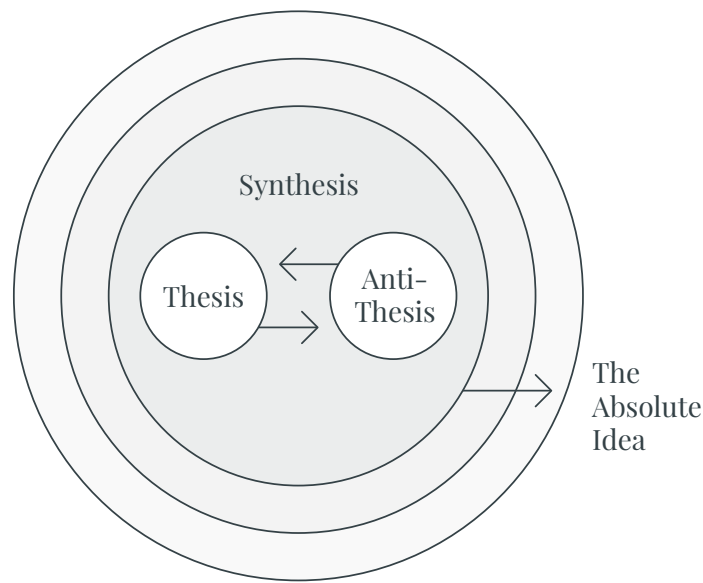

Figure 3: The process of thesis, antithesis, and synthesis continually builds to what Hegel termed "The Absolute Idea"

Put simply, a concept is simultaneously positive and negative. For example, in saying that a car is red, one is also saying that the car is not any other colour. In synthesizing these oppositional aspects the car is both red, and not not red.

Design as a Dialectical Process

Dialectics can be readily applied to a number of facets of design, including the nature of the problem/solution paradigm, the process of designing, and the ways in which social concerns are embedded within the design discourse.

Firstly, dialectics can help us better understand the problem/solution duality which is a central concern of designers. Many theorists, including Kees Dorst, have explored the nature of this paradox, attempting to understand how the design process acts as a means to both identify and solve problems.

Dorst argues that many of the problems that designers address are, due to factors such as ambiguity and the capabilities of the problem-solver themselves, not "well-structured", challenging the traditional rational problem solving paradigm (Dorst, 2006). Instead, as Kees Dorst observes,

"In creative design, the designer is seeking to generate a matching problem-solution pair, through a coevolution of the problem and the

solution. Creative design involves a period of exploration in which problem and solution spaces are evolving, and are unstable until (temporarily) fixed by an emergent bridge, which identifies a problem-solution pairing." (Dorst, 2006 p.10)

The conception of a problem-solution pairing that is ultimately applied retroactively challenges the notion of the design problem/solution paradigm. Although design does contain aspects of problem-solving, there must be other processes and considerations at play.

Dorst instead forwards another theory of design based on paradox and discourse. He argues that discourses, in the Foucauldian sense, form the basis of a design solution. A designer must rationalize these discourses to come to an end result:

"In most design disciplines, there are many discourses that somehow have to be linked in the creation of a design solution. In product design practice, for example, relevant discourses include the bodies of thought about technology, form an aesthetics, ergonomics, etc...Discourses also can be embodied in a design situation by the roles and the value systems of the different stakeholders involved in the project. The creation of a solution to the paradoxical design situation thus also becomes a social process." (Dorst, 2006 p.15)

Stephen Beckett, an Associate Professor at Honkiat University, argues that Dorst's approaches to theorizing the design process do not sufficiently address the temporal and formal paradoxes of the design problem/design solution duality. From a logical standpoint, the paradox is temporal because a problem must precede a solution, and formal because a conclusion must be drawn from a premise. Beckett sees this a logical fallacy, because "the design solution appears to determine the premises from which it is deduced. (Beckett, 2017)"

Instead, he suggests that the key to understanding this paradox is to not conceive of problem and solutions as separate entities, but as a single concept, applying Hegelian dialectic theory to argue that the design problem and design solution are moments through which the design concept passes. He states that, "the best way to approach the logic of the design problem is dialectically; that is, by viewing the design problem and its solution as moments of a concept undergoing a dialectical process. (Beckett, 2017 p.8)" The design concept includes the thesis of the design problem and negation of that design problem in the form of the antithesis, or the design solution. The synthesis occurs when the designer recognizes the solution as antithesis (Beckett, 2017). Beckett goes on to characterize this as the "aha!" moment when a designer becomes aware of the solution to their problem.

This may be, however, a simplistic conception of the design process. In my experience as a practicing designer, no design concept is comprised of one problem and solution, but rather a series of considerations akin to Dorst's theory of dialogues. It is nonetheless beneficial to consider how dialectics to the process of design can be applied in a "messier" way by adopting Dorst's view of dialogues within the design process, each being dialectical in nature. Each of these dialogues contributes to a teleological concept, which comprises the final design solution. Common dialogues may include a series of aesthetic choices, functional and material concerns, the wishes of a client, etc.
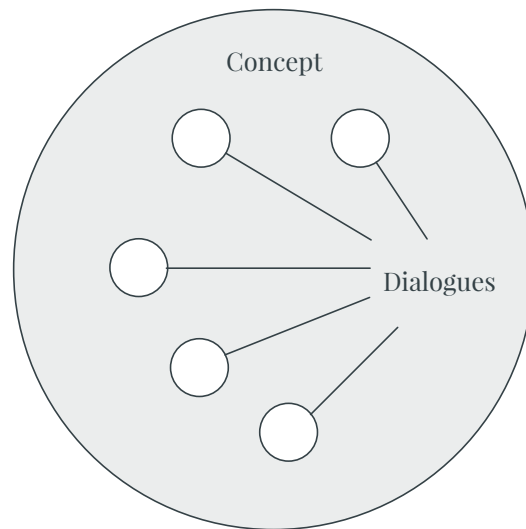

Figure 4: A concept can contain a series of dialogues, each built upon its own dialectical process.

Each of these dialogues is built upon its own dialectical process, becoming increasingly comprehensive until it reaches its ultimate conclusion, or, as Hegel described, its "absolute idea".

Among the dialogues embedded within a design are the social values which both inform and are informed by the design and it is here that I wish to focus the main argument of this paper. By understanding and addressing the dialectical nature of these values the designer can achieve more comprehensive and universal concepts within their work.

A designer might begin by identifying an affirmative value which, by necessity, is countered by an antipodal value. To use an example I will revisit in this paper, the value of ease is not only ease, but not-not ease, which may otherwise be called challenge. Instead of negating these concepts, they are synthesized to create a new concept that preserves both of the original values.
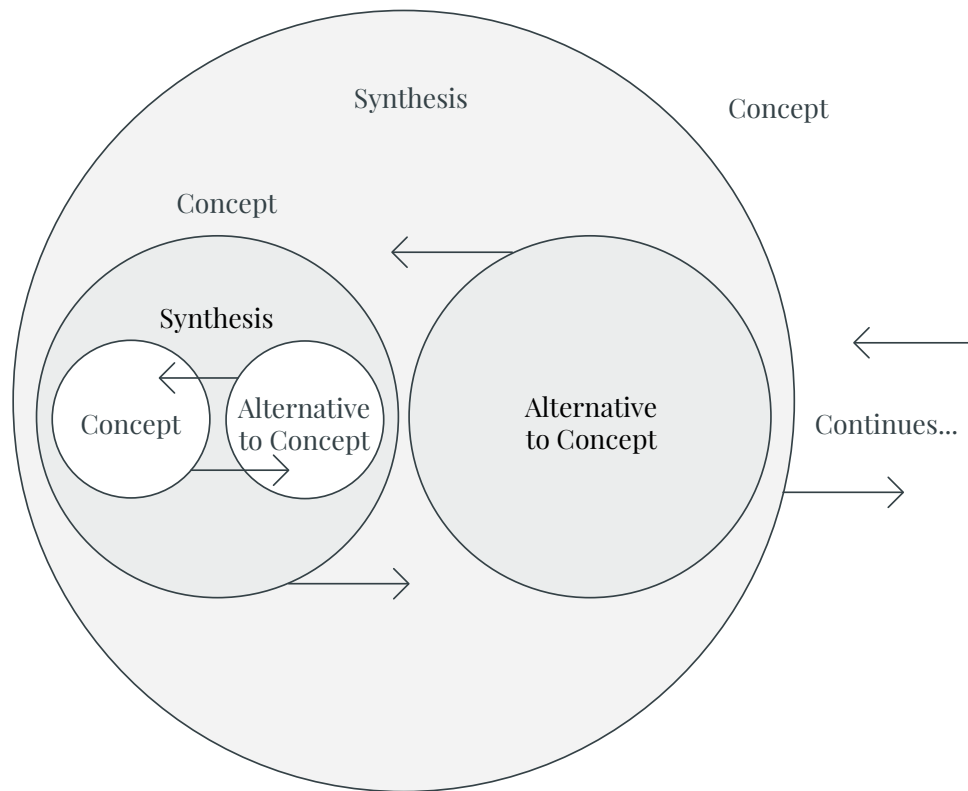
Synthesis

Concept

Concept

Synthesis

Concept

Alternative to Concept

Alternative to Concept

Continues...

Figure 5: The design process can be conceived as dialectical in nature, progressing from simple to universal concepts.

In dialectical terms, affirmative values formulate our theses, and those which stand in opposition to these principles, which I call anti-principles, represent our antitheses. The designer must understand the affirmative values which are at the heart of many design decisions (the thesis), whose inherent limitations lead to sublation by alternative values (the antithesis), and, finally, are replaced by a more universal and coherent set of practices (synthesis) that better consider the needs of users.

By embracing a synthetic process we can embrace both affirmative values and critical values to form coherent approaches to design.

It is important to keep in mind that theses and antitheses are not inherently moral or immoral. It is through the negotiation between these determinations that the designer is fully able to make choices that consider the intent and impacts of a design vis a vis the needs of the users, the sponsor, and society.

In the same way, I would argue that affirmative values are not necessarily negative. While it can be tempting to focus on the shortcomings within our society we must similarly consider its virtues as well. A closer look at many affirmative values may reveal that many problems are those of context or scale. In the case of Keurig K-Cups, are efficiency and convenience inherently problematic? Or is it that an overemphasis on these values can lead to problematic ends?
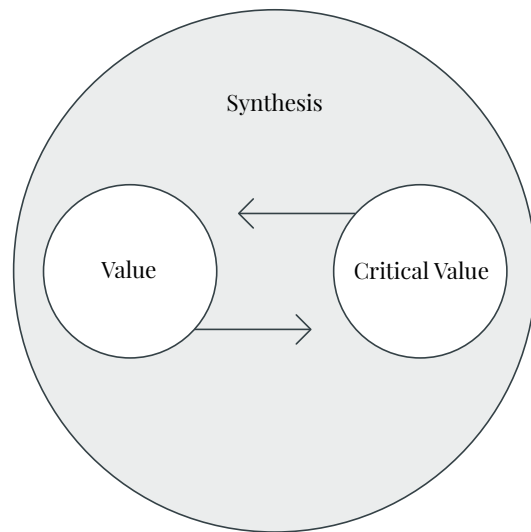

Figure 6: The dialectical process is also evident when applied to identification and challenge of critical values in the design process.

How, then, might a designer embrace the inherent dialectical nature of design to create things which are good for users? I propose that a designer may start by consciously seeking affirmative values present in the things that surround us.

Affirmative Values and Critical Values

In this research, I have aimed to find values that are inherent within affirmative design. While the number of possible dialectical values and critical values certainly exceeds those described in this paper, I have chosen to focus on four that demonstrate the concept of dialectical design and have broad application.

Easy and Challenging

I define ease as the reduction of barriers to use, as a means by which new users can gain competency in a system with little to no experience or training, and the replacement of human effort with automation or mechanization. Ease is often achieved via user-centered design methods that are based on user insights.

I define challenge as the placement intentional barriers or learning paths that are put in place to build skill or a sense of satisfaction within a user, and the use of labour intensive methods that are in some way satisfying to the user or create superior results to those of mechanization.

Fast and Slow

One challenge in the definition of fast is the ever-accelerating nature of areas such as technology. I have chosen, instead, to focus on fast as the intention to accomplish a given task in a minimal amount of time rather than the absolute speed of task performance.

Slow, by contrast, is a refutation of speed. Instead, a designer might attempt to slow users to encourage reflection, to allow them to savour a particular experience, or to provide comfort.

Intuitive and Deliberate

Intuitive design is the designer's attempt to understand and anticipate the needs of the user to the extent that the user can reply less on thought processes that require concentration and choice. By contrast, design for deliberate thought requires the focus of the user, and emphasizes the importance of user choice.

Other Values

In this paper, I have purposely focused on a small number of dialectical values. This is not, however, an exhaustive list, and there are a variety of other dimensions which might be explored in future research. These dimensions could include:

- Obedience
- Independence
- Beauty
- Safety
- Availability
- Specialization
- Hygiene

Part 3

For & Against

Ease & Challenge

Misunderstood

REGENT

LIVE MUSIC TONIGHT

I'm so nervous to be going on a first date again. I don't know how to date anymore.

Well, you look ready to me. You must be excited.

You can do this, Grace. I'm just so proud that you're moving on. It's time.

Thanks ... I just never envisioned myself with anyone but Simon.

Look, you were just as nervous back when you started dating him, you know?

He seems so nice. I just don't know how much we have in common. I mean, he's an "efficiency consultant." What does that even mean? Does he just go around firing people all day?

I want to give him a chance though. Plus, it's not like we don't have Harmony to help. He's going through the same things as me.

Wife died three years ago. Cancer. Just like Simon. Maybe it's fate or something.
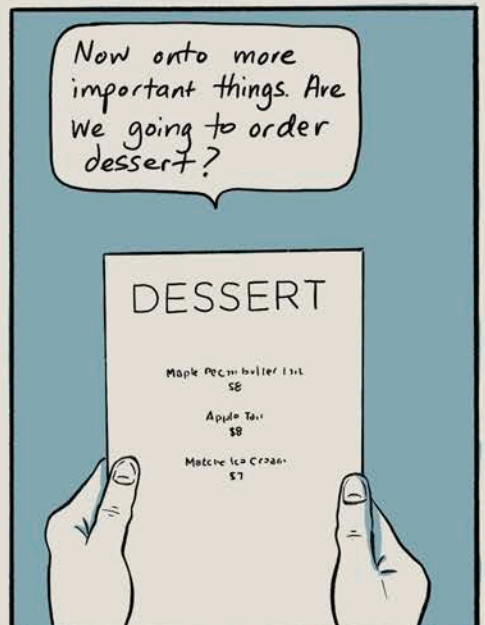
The first date.

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Speaking of spitting it out, do you know you've been talking with your mouth full for like the past five minutes straight? Because I've had a front row seat to that show. And the entire time you've been giddy with excitement because you're going to put a bunch of people out of work, as if that's some sort of noble cause or something. And you know what? It's not. You can rationalize it all you want but you _know_ it's just so some fat cat can make a little more money. And I don't ever say anything about it because I can _tell_ you don't think it's right either. You don't. Every time you bring work up I get some stupid Harmony message to support you. And you SNORE...

and I... I oh God. Drew I'm... what the hell am I talking about?

Grace... it's not working.

I knew it. Here we go.

Harmony. It stopped a week ago and I don't want it anymore. I don't want to share you with a device. I want to know you for who you are. And you're incredible. I just care about you so much.

I know it sounds crazy but I liked that. Because it's you. The real you.

And we can talk about my job, okay?

So do we just switch off and wing it for awhile?

It's a bit weird at first but mostly manageable.

Okay, so how loud is my snoring, anyway?

I'm not gonna lie, it's pretty bad.

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Ease

To start our journey into affirmative and critical values, I will explore that of ease. The relentless drive of humanity to overcome hardship is a defining characteristic of our existence. Just as the transition from hunting and gathering to agriculture made it easier to feed growing populations and establish permanent communities, the industrial and technological revolutions have reduced manual and tedious labour for many.

So it may come as no surprise that, at this very moment, it is likely that a designer is focused on making a product easier to use, a teacher is reminding design students that a user should never require a manual, and a pundit is ranting about how user hostile a product is. Our products and services can never be streamlined enough. We need to push further, to find simple, to find easy.

In this chapter we will explore how design conventions such as usability and the elimination of friction can lead to unintended consequences that can work contrary to the best interests of users. Then, in the next chapter, we will explore how the corresponding critical value of challenge can offer designers an unexpected means of addressing user needs.

Usability: A New Orthodoxy

One only need read current design literature to recognize that usability has become a primary consideration of designers and one of the most recognized design considerations of the public at large. This contrasts starkly with only a short time ago, when the term usability

had not entered the public consciousness. Jakob Nielsen defines usability as, "a quality attribute that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process. (Nielsen, 2012)"

In his classic book, The Design of Everyday Things, Nielsen's business partner, Donald Norman, suggests two fundamental principles for usable design:

1. Provide a good conceptual model
Conceptual models allow users to anticipate the results of their interactions with an object. When a conceptual model is not accurate, users can become confused and make mistakes.

2. Make things visible
Visibility allows users to understand and find the options available to them, and reduces the need for user memory. Good visibility includes the adequate mapping of controls to functions, and feedback when the user takes action (Norman, 1988). Usability, to be achieved, requires a user-centered mindset. A successful design must provide users with the means to: quickly accomplish basic tasks, maximize efficiency, quickly establish and reestablish user proficiency, minimize the number and severity of errors, and maximize user satisfaction (Nielsen, 2012).

On its surface, usability would appear to have no downside - it is difficult to argue that a designer should not mitigate difficulty and challenge wherever possible. The virtues of improved usability are numerous and well documented: faster learning, fewer errors, and greater efficiency are all potential benefits.

One area where usability practitioners have been especially welcome has been in the area of web design, where usability consulting and testing has become common, if not core, practice. Common ways of measuring web usability demonstrate congruence with common business goals, namely: time to task, success rate, accuracy, and subjective user satisfaction (Nielsen, 2001). Strangely, none of these measures necessarily reflect why a user would visit a website in the first place, nor do they reflect other potential advantages of a design that may not fit squarely into common testing practices. Did a user learn a new interaction pattern while using a website? Were users highly engaged in the content? Was an element of surprise used to enhance the user's experience? Web usability often focuses on aspects of an experience that are inherently measurable, while ignoring other critical outcomes.

As an established field of design practice, web usability is not immune to the establishment of dogma. Jakob Nielsen, since the early days of the World Wide Web has advocated for the establishment of best practices for web usability. As such, he is considered by many to be guru of web usability, with a brand of design that has been criticized for overemphasizing usability at the expense of other creative and communication considerations. ("Jakob Nielsen (usability consultant)," 2017)

As a usability advocate, Nielsen certainly believes that his view of design is one that will be universally embraced. He noted to Wired Magazine in 2000, "In the future, first of all, websites will be designed by my guidelines … for the simple reason that if they don't, they are dead. ("Web Guru: It's the User, Stupid!," 2000)"

Eighteen years later, this has not turned out to be an entirely correct prediction, but many of Nielsen's guidelines have, in one form or another, become common practice for designers. In my own practice, it is commonplace for clients to discuss usability as a goal for websites and web-based applications, and is one of the drivers for initiatives to rebuild legacy systems.

Zero Friction

Another term that has become increasingly used in the User Experience Design (UX) field is "Frictionless Design".

The concept of design friction is, at its most simple, anything that delays a user from reaching their goals, or, more pointedly, what the designer interprets as the user's goals. To confuse matters somewhat, a designer is typically working within the context of sponsored project, so the achievement of sponsor goals will often come at the expense of the user.

With this in mind, designers are encouraged to create frictionless products and experiences; the fastest, easiest way for users to complete tasks. The promise is alluring. After all, who wants to deal with added complexity in order to get something done?

Applying a more critical lens reveals some problematic aspects to the concept of frictionless design. Who defines friction? The user, or the company who makes a product or experience?

To illustrate this point, we might imagine customer seeking a book at an online bookstore. While the user's priorities would include finding the book and determining the price and delivery date for the purpose of comparison with other stores, the store is primarily concerned with making the sale. The goals of the user and the store are not completely aligned.

As the store endeavours to reduce friction within their online purchase flow it is possible that they will privilege innovations that improve conversion activities and discourage price comparison and shopping cart abandonment (Merholz, 2010). Amazon's "One Click" checkout may make purchasing easier for users, but the lack of friction could very well result in impulse purchases that customers will later regret.

Examples of Ease

OXO Good Grips

There are few spaces that contain more designed "things" than a kitchen, and many are conceived to be as easy to use and efficient as possible. OXO, a New York City-based designer and manufacturer of household items has been noted for its "Good Grips" line of kitchen utensils and small appliances, which are born of OXO's human-centered design approach. In fact, OXO claims that "Good Grips pioneered the application of user-centered design to tools for the home. ("Our Brands," n.d.)"

The hallmarks of the Good Grips line are a focus on ergonomics, smooth lines, and the use of Santoprene, a polymer that is flexible and ages well ("Santoprene," 2017).

In small appliances, such as the can opener depicted here, designing for ease helps a user fulfill a task with increased speed and safety, and where there would be little reward for more manual solution.

Above: Oxo Good Grips kitchen tools

Slap Chop

It is possible to design for ease with little regard for the user, however. The Slap Chop, a kitchen gadget made famous by its notorious pitchman Vince Shlomi, promises consumers an easier way to chop food. A well-known infomercial claimed that the device could perfectly chop onions, carrots, nuts, and other foods by a few short slaps on its handle.

Putting aside performance issues, of which there are many, there are other reasons that Slap Chop fails its users. First, for the price of this gadget, a consumer could instead purchase a quality chef's knife, which with minimal maintenance, would last many years. The Slap Chop's blades are not as durable as that of a quality knife and are more likely to wear without any potential of sharpening. Additionally, using a knife regularly can build skills that, in time, can render devices such as Slap Chop unnecessary. A knife affords a variety of cuts such as slice, chiffonade, julienne, and dice. The dark side of designing for ease is that easy products and experiences can deprive users of opportunities to build skill.

Above: Slap Chop

Challenge

Is it possible that in the pursuit of ease designers may be neglecting the benefits of challenge? The balance between ease and challenge can be an important consideration for keeping users engaged, building skill, facilitating learning, and instilling within them a sense of satisfaction.

Finding Flow

Much of the knowledge on the balance between existing skill and new challenge is based on Mihaly Csíkszentmihályi's theory of flow. Csíkszentmihályi suggests that people are at their happiest when in a state he describes as "flow". This state is characterized by intense concentration and immersion; individuals can lose track of time and experience fulfillment while engaging in a given task. To reach a flow state, it is essential that a balance between the skill of the actor and the challenge of an activity be achieved. When actors possess high levels of skill, they can only reach a flow state when challenge levels are also elevated (Csíkszentmihályi, 2008).

As the attainment of flow is dependent on a balance between ease and challenge, this suggests that the mainstream ideal of designing products and experiences which eliminate challenge may leave users disengaged and unsatisfied.
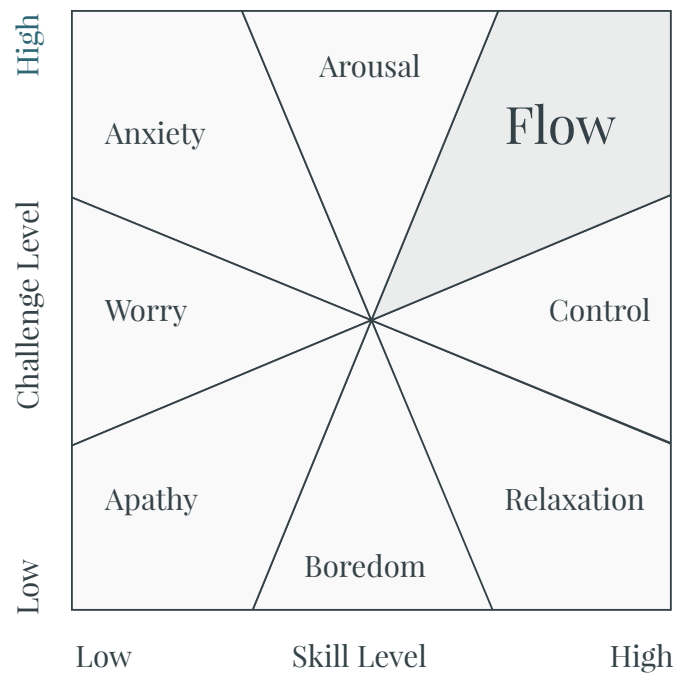
Figure 7: Mental states vary depending on challenge and skill levels related to a task, according to Csikszentmihalyi's flow model.

Cognitive Ease and Strain

Another theory that points to the importance of challenge is that of cognitive ease and strain, argued by psychologist Daniel Kahneman. Cognitive ease is characterized as a state in which the mind can carry on with its tasks effortlessly. These are situations which seem familiar and which contain little ambiguity. Cognitive strain, on the other hand, occurs in situations that feel unfamiliar or unclear.

While Systems 1 and 2 will be discussed in greater detail in a forthcoming chapter, it is helpful to know that Kahneman posits to two systems of the mind, System 1, which is associated with subconscious thought, and System 2 which is associated with choice and deliberate action (Kahneman, 2011). Kahneman explains cognitive ease using a series of causes and consequences, as demonstrated in the Figure 6. We can build upon Kahneman's graphic to illustrate the inputs and outputs of cognitive strain in Figure 7.
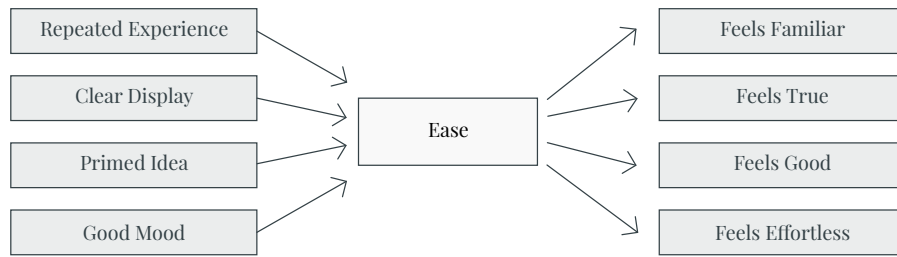
Figure 8: Causes and consequences of cognitive ease, according to Daniel Kahneman. (Kahneman, 2011)

Figure 9: A similar model can be applied to the causes and consequences of cognitive strain. Source: The author

States of cognitive strain can contribute to behaviour that is more critical and less error prone, but also less intuitive and creative than those exhibited in a state of cognitive ease. This might be beneficial in situations that require users to be alert and vigilant. Cognitive "speed bumps" may be an effective means of ensuring users fully engage with a problem (Kahneman, 2011).

Kahneman recounts an experiment that centered upon Shane Frederick's Cognitive Reflection Test, which is made up of questions which lead users to intuitive conclusions that are incorrect. A group of 40 Princeton students were given the test, with half the tests layed out in a small, washed out font that

was legible but caused cognitive strain. The other half were given a version of the test that used a "normal" font. 90% of the students who completed the test in the normal font made a mistake, compared to only 35% of those who were given the less legible version.

This points to the possibility of using cognitive "speed bumps" which can lead users to engage their System 2, or deliberative, processes. In practice this might include design features such as unlock sequences for dangerous machinery or the use of small or obscure typefaces in situations where it is critical that users process the information they are reading.

Challenge in Education

For another example where excessive ease may not be in the best interest of the user we can look at the field of education, where evidence suggests that making things "as simple as possible" is not an effective strategy for learning. This can be demonstrated in a recent study involving educational methods used by The Khan Academy, which is seen by some as the future of education.

The Khan Academy was built upon a fascinating idea. While tutoring his cousin in mathematics, Sal Khan used Yahoo! Doodle notepad to create simple lessons that she could access remotely. After numerous requests from others who also wanted to benefit from his tutoring he created a series of videos on YouTube and The Khan Academy was born ("Sal Khan," 2017). It has since grown to an international not-for-profit organization that has delivered over 1 billion free lessons to students since 2006 ("Khan Academy," 2017).

What if these videos, however, are not as effective as proponents believe? What if, in order to learn, "making things easy" makes it less likely that a student will learn? Derek Muller, a recognized science communicator and analyst, researched this very topic as the subject of his PhD, conducting a series of experiments that aimed to better understand the role of cognitive load on learning in the sciences.

Test participants were pre-tested to establish baselines for their level of knowledge in a specific area of science, then were randomly assigned to treatment groups that differed in their approaches to multimedia learning.

Participants in the exposition group were exposed to content that presented scientific concepts in a simple and straightforward manner. Participants in the dialogue group, however, were exposed to content that presented a series of alternative conceptions of the scientific concepts, which was known to be associated with higher cognitive load in the learner (Muller, D.A., Sharma, M.D., Reimann, P., 2007). Participants in the dialogue group reported higher levels of confusion, but achieved significantly higher post-test scores than members of the exposition group. Muller believes that members of the exposition group did not have to challenge preconceived ideas, nor did they need to make sense of the content. Said Muller, "They feel like they are learning and become more confident in their answers, but tests reveal they haven't learned anything."

Education that distills concepts to their most simple bases does not necessarily improve a student's ability to learn. In fact, in Muller's tests, reducing the cognitive load of students yielded substandard results. In short, making lessons "simple" was detrimental to understanding.

If learning is less efficient when concepts are "made simple" for users, designers might consider techniques that increase the cognitive

load of the learner. In the area of education design this could be a fundamental concept, but also has application in other areas where users must learn. For example, when faced with the prospect of orienting users who are new to a product, can we encourage exploration instead of strictly showing the facts?

Game Balancing

Video games provide an excellent example of systems that use both ease and challenge to encourage a players to enter and maintain a state of flow. It is common for such games to start with a tutorial, where users learn the basic game mechanics in a safe and non threatening format, before moving onto the "real" levels. Once started, a game will become increasingly difficult, and may introduce new skills, opponents, and tasks to keep players entertained and challenged. Game designers attempt to keep players in a "zone" where the game is neither too easy, leading to boredom, nor too difficult, leading to frustration (Falstein, 2004).

Finding this equilibrium in games is called balancing, a fundamental component of game design (Andrade, Ramalho, Gomes, & Corruble, 2006). Although game balancing can be achieved using play testing and data analysis, this is done in the aggregate, and does not address the needs of all players. Dynamic Balancing, however, can allow a game designer to better achieve the objective of player immersion.

Designers may draw inspiration from the previously-mentioned concept of flow, a state in which users can build skill when ease and challenge are perfectly balanced (Nakamura & Csíkszentmihályi, 2009). Can the skill of users be incrementally built as a user continues to interact with a design?

The IKEA Effect

Can labour, something that many people try to avoid, add value to a product or service? Common wisdom indicates that do-it-yourself practices are an acceptable trade-off for lower prices. In effect, consumers trade labour in order to save money on products. Yet in a series of experiments, researchers found that the effort of a consumer can lead to increased product valuation.

The IKEA Effect is a cognitive bias named after the Swedish home furnishing retailer, IKEA, which is well known for offering low priced goods which often require assembly.

In a series of three studies, Michael I. Norton, Daniel Mochon, and Dan Ariely found that "labor alone can be sufficient to induce greater liking for the fruits of one's labor: even constructing a standardized bureau, an arduous, solitary task, can lead people to overvalue their (often poorly constructed) creations" (Norton, Mochon, & Ariely, 2011).

The studies in question required a group of participants to assemble IKEA boxes, fold origami, and construct Lego sets. Each subject

was paid a sum of money for their participation. Members of both builder and control groups were then asked to bid on finished products, some created by participants, and others created by experts. Throughout the studies, builder bids indicated they placed values on their own products that rivaled those of similar products constructed by experts.

When considering the psychological mechanisms behind this behaviour, the researchers suggested that social utility, effectance (control over outcomes), and task enjoyment were all factors depending on the type of item being created. Interestingly, this phenomenon runs counter to the expectations of those who did not construct the products. When the researchers asked participants drawn from the same pool as the main study whether, "In general, what would you be willing to pay more for, products that you buy already assembled, or products that you buy with some assembly required," 92% indicated that they would pay more for pre-assembled products. It is significant that these participants were highly likely to avoid work as they would also lose the opportunity to gain the advantages that result from their labour (Norton et al., 2007).

These studies indicate that co-creation can indeed create satisfaction, but also suggest that the value is only recognized retrospectively. Is it possible to make users aware of the benefits that can accompany products and services to which they must contribute labour?

Examples of Challenge

Progressive Challenge in Game Design

When discussing the balance of skill and challenge, it is difficult to not immediately think of video games. Try to remember playing a game for the very first time. At its beginning, a game must orient the player and provide them with achievable goals. With each passing level, the game must continue to build on the user's skills, while introducing new challenges.

A good example is Tetris, an extremely popular game that requires players to fit a series of seven falling shapes into rows. Complete rows disappear, but incomplete rows stack up, and once the rows reach the top of the play area the game is over. Users are rewarded with points for "clearing" a row, but receive far more points for achieving a "tetris", which is when a user completes four rows at one time.

At the beginning of a game, users will need to learn how the shapes relate to one another, and to develop strategies for clearing rows. The speed of the falling shapes is slow enough for players to make conscious decisions about how to use each piece. As game play progresses players may wish to score more points, at which time scoring a tetris becomes much more important. All the while the speed of the falling shapes is increased.

Tetris uses point accumulation, risk, and speed to provide challenge for beginners and experts alike, and to create a truly immersive gaming experience.

Child-Resistant Packaging

There are situations where ease is of use can lead to danger, for example, the ability for users to delete computer files without safeguards, or to access flight navigation controls that could have serious adverse effects. In order to prevent errors and accidents, designers can make products and experiences safer by introducing barriers that slow down or constrain user behaviour.

One classic example of an intentional barrier is the child-resistant lid. Although there is evidence of similar lids going back to the Mayan culture (early lids that introduce barriers are thought to have protected pots of chocolate) (Dreiss & Greenhill, 2008), Dr. Henri Breault of Tecumseh, Ontario is credited as the inventor of the modern format.

Inspired by numerous cases of poisoning that resulted from bottles that were too easy for children to access, Breault introduced a lid that required a user to simultaneously apply downward pressure while turning, a feat of manual dexterity that is difficult for most children, but simple for most adults (Wharry, 1997).

The introduction of a physical challenge does not come without drawbacks, however. Some children are dexterous enough to open these lids, and some adults, especially seniors, are not. While not a perfect solution, Breault's introduction of challenge within his lid design has saved many lives. Future innovations in this area could attempt to understand the age or circumstances of a user without requiring physical skills, thereby improving access to users with limited manual dexterity or strength.

Above: Child-resistant packaging is almost universal for medication in Canada.

Designing for Ease and Challenge

While maximizing ease and minimizing challenge may seem to be in the best interests of users, this may not necessarily be the case. Designers should be aware of the potential benefits and detriments to both ease and challenge and maintain a balance that is appropriate for user goals.

A designer may wish to consider emphasizing ease when users are faced with difficult or complex tasks that offer no additional rewards such as skill or feelings of accomplishment within the user, or when challenge can lead to danger.

Conversely, challenge offers numerous benefits including the ability to restrict use, maximize engagement, build skill, and reinforce learning. From social and environmental perspectives, embracing challenge in design may lead to higher satisfaction with, and attachment to, products, thus reducing waste. Furthermore, by appropriately employing cognitive strain, designers might encourage users to be more vigilant and careful.

Easy	Challenging
- Accessible to a large variety of users - Allows users to learn simple concepts easily - Requires little effort to use - Can be less time consuming - Causes less confusion and frustration	- Prevents use by unintended audiences - Prevents boredom - Builds skill - Improves engagement and critical thought - Creates sense of pride and accomplishment

Above: A summary of the benefits of ease and challenge.

Fast & Slow

WELL YOU NEEDN'T

When guests are coming over I enjoy cooking something special. It doesn't have to be fancy, just something made with heart that I know they'll enjoy. My guests are coming in a few hours so that gives me time to make fresh pasta. And I'm going to make a hearty duck ragout to go with it. Some fresh bread and a salad, and that's a good meal.

I'm going to get started on the pasta. You need to use a fine flour to get the right texture. I'll just pour it out and make a little well for the eggs.

It's fun cooking for friends who enjoy good food. You really need to concentrate on the process. It's different from everyday cooking.

If you mix carefully you can get the dough moist enough without adding any water. I think this is going to work well.

I can put down a little flour and get to work kneading. I suppose you could use a mixer but this gives me a better feel for the dough.

Okay this is looking good. We have pasta dough. Now this needs to rest for a bit. If I start rolling it out right away the dough won't roll out properly.

Now let's just wrap them up and put them in the fridge for an hour or so. I can get the sauce started in the meantime.

I'll start with the onion. I want to dice it pretty finely as I won't be using a blender at any point. Whew! This is a potent one!
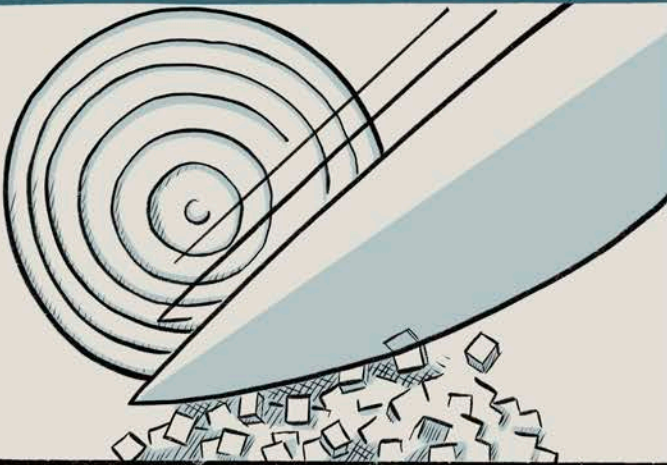
And of course some garlic. I'm just going to give these a small whack to detach the skins and then dice them too.

Alright. The duck breasts need to be prepped a little. It's a good idea to score the skin and I'm going to go in a criss-cross pattern.

The pan is ready so I'm going to brown these. I'll put them in skin-side down first and get some of that duck fat working, then turn them.

53

2

Now that the meat is browned I'm going to take it out and reduce the heat. I'll keep some of the duck fat in here for the onions.

And I'll start to cook those onions. I'll wait until these are almost done before adding garlic. Just slow and steady. And I'll deglaze with some red wine.

SCRAPE

Now I've added some tomatoes, seasoned the sauce and some rosemary and a bay leaf, and some chicken stock.

Okay the sauce is set. Time to roll the pasta.

Rolling the dough is pretty relaxing. You don't need to roll it much. Just shape it...
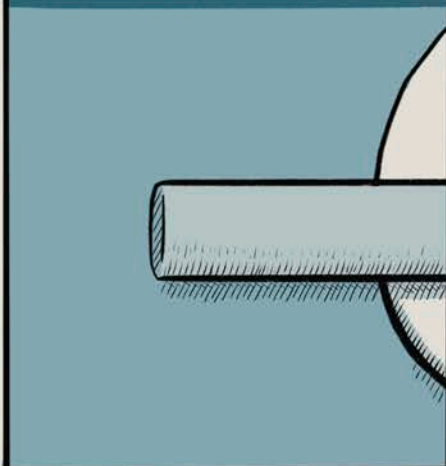
... and get it into small pieces. I'm a little tempted to just...
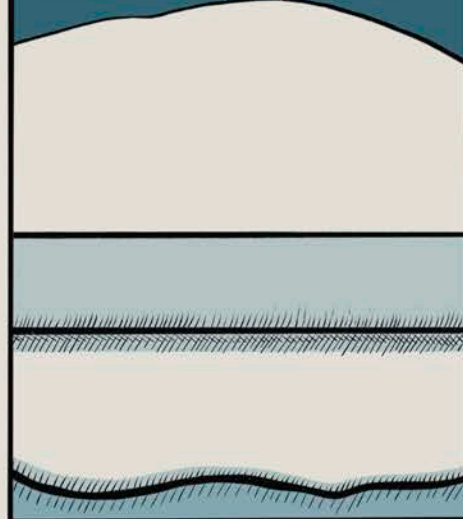
... skip the pasta roller and roll by hand but it's been a while so I'll play it safe.
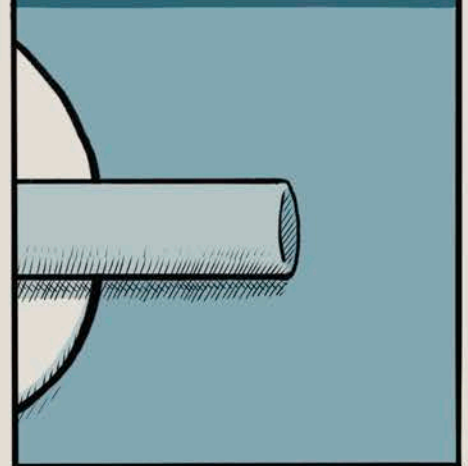
So I'll start on the largest setting and work my way to one of the smaller ones gradually. It takes a bit of dexterity to catch it.
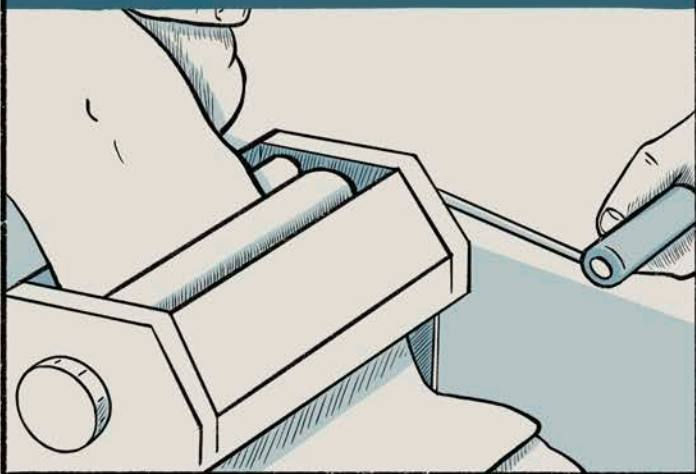
Here's a little trick for better pasta texture called laminating. You take the dough and fold it together like a book. Then back it goes...
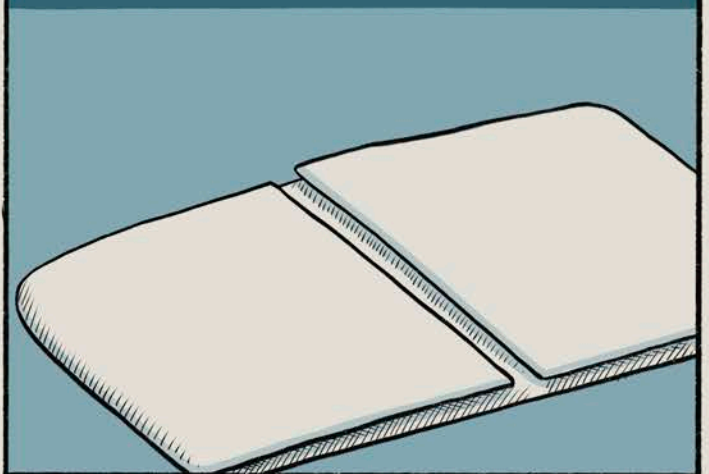
... into the pasta machine. We're getting there now. Just a couple more notches and we're ready to cut it into shape.
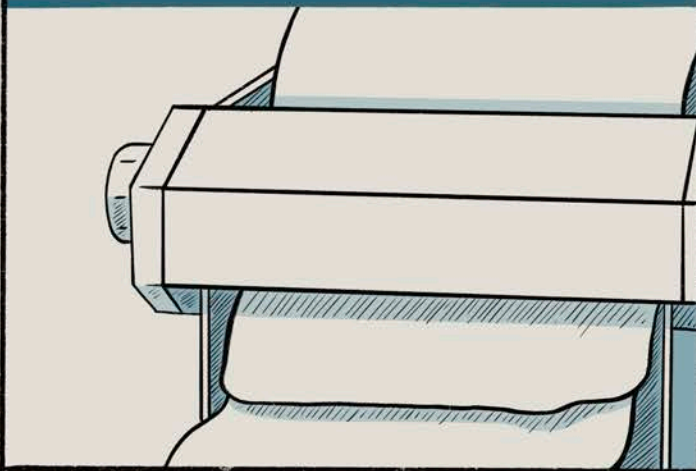
It's far easier to cut if you just roll the dough up a little and then cut into strips. I want to make sure it's the right width for tagliatelle.
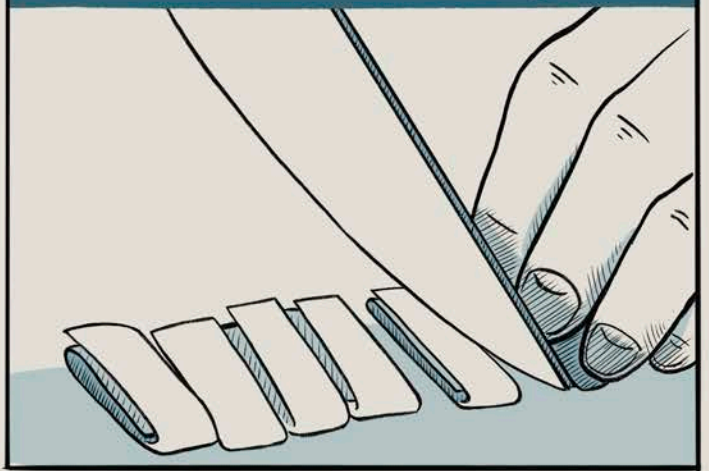
And now this pasta needs to dry for a bit. I'm just going to hang it on a dowel but you can get a fold-able rack and those are great too.

Just going to check on that sauce. I've put the duck breasts back in already and those are going to stew with the lid on for two hours.

4

Fast

We will continue our exploration of values by now considering that of speed. That life seems to be getting faster and faster is a familiar refrain of modern life. A casual question regarding someone's well-being often elicits the same response…"Busy!" It would appear that there is insufficient time for people to do accomplish everything they wish.

Many designers try to solve these problems by designing products and services that save time, but as Hartmut Rosa, a sociologist who has studied the sociological aspects of time observes, technical acceleration should lead to abundant leisure time. And if this is not so, what is the sociological explanation for this phenomenon (Rosa, 2003)? Rosa describes what he calls the "motors of acceleration" as a cycle of three spheres of social acceleration.

"When we examine the causal relations between the three spheres of social acceleration, a surprising feedback loop is revealed: technological acceleration, which is frequently connected to the introduction of new technologies...almost inevitably brings about a whole range of changes in social practices, communication structures, and corresponding forms of life. For example, the Internet has not only increased the speed of communicative exchange and the 'virtualization' of economic and productive processes; it also establishes new occupational, economic, and communicative structures, opening up new patterns of social interaction and even new forms of social identity. Hence, it is easy to see how and why technological acceleration is prone to go hand in hand with the acceleration of change in the form of changing social structures and patterns, orientations, and evaluations of action. Furthermore, if the acceleration of social change entails a 'contraction of the present' in the sense discussed above, this naturally leads to an acceleration of 'the pace of life."

(Rosa, 2003)

Can we out-innovate this problem to the point where technological and design prowess allows us to accomplish everything we wish in a given day? Given the unrelenting pursuit of increased speed, it would seem that this is the very wager we are making.

In this chapter, I will explore how an obsession with speed can come at the detriment of accuracy, and can even make users feel uncomfortable. I will follow with a chapter on how slowing down can bring hidden benefits that are not always considered by designers.

The Speed-Accuracy Trade-off

Despite the warning of our forebears that "haste makes waste", we have continued to pursue a dream of ever-increasing speed and accuracy. Although the ideal of high speed/ low error may be achievable with machines, research has long shown that, as humans, we possess the ability to privilege either speed or accuracy when performing a given task (Rinkenauer & Osman, 2004). We can either decide to minimize error or maximize speed, but not both. This long-studied phenomenon is called "The Speed-Accuracy Tradeoff" (Van Veen, Krug, & Carter, 2008).

Despite our incredible success at being increasingly productive, it is useful to remind ourselves that, no matter how efficient our tools may be, there are limits to the natural human capacity for productivity.

Too Fast for Comfort

Is it possible for products and services to work too quickly? Common wisdom would suggest that, as most people dislike waiting, there could be no such thing as too fast, that the longer people wait, the more dissatisfied they become.
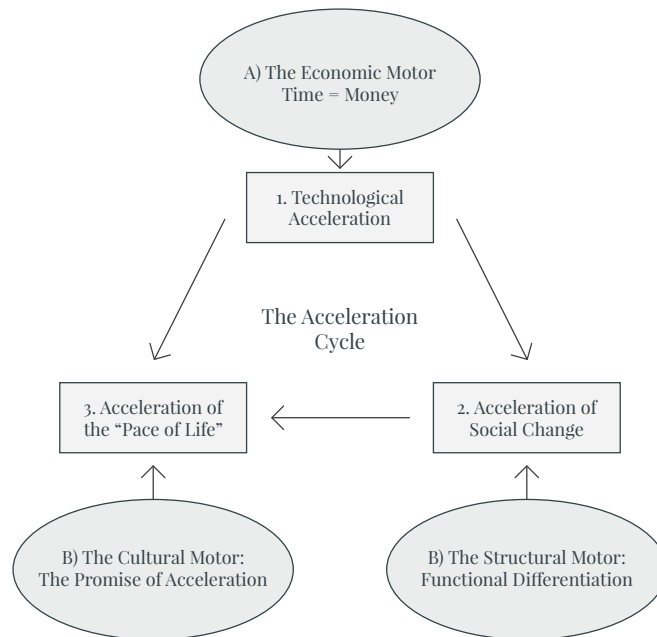
Figure 10: "Motors of Acceleration." Hartmut's reinforcing loop of sociological acceleration. (Rosa, 2003)

Researchers Ryan Buell and Michael Norton set out to learn whether, in some contexts, slower service might act as a proxy that suggested that labour was being performed.

In cases where service outcomes are difficult to measure, effort and duration can become an important indicators of value. The inconvenience of waiting is effectively mitigated by the user's impression of superior service quality. For example, customers who are helped by an attentive employee at a hardware store may leave feeling more satisfied with their visit even if they had to wait longer to find the goods they came to purchase.

For services that are less transparent, however, it can be difficult for users to recognize effort.

For example, customers may never see workers assembling their car, or packing their orders in a warehouse.

In self-serve transaction models, where employee effort is greatly reduced or removed, processes are often presented to users in streamlined ways, and delivered as quickly as possible. This can have the effect of under-communicating the value of the service being performed, even if it is faster and of higher quality than that delivered in manual processes.

In a series of five experiments that simulated dating and travel websites, participants showed clear preferences for services that demonstrated both operational transparency

accompanied by longer wait times. Operational transparency was defined as a clear indication of what services were being performed on the user's behalf.

Buell and Norton's work suggests that in domains where service is not clearly understood, users prefer more communication regarding operational processes, and waiting times that fit their conception of labour required for the task being performed, which the researchers named "The Labour Illusion" (Buell & Norton, 2011).

Examples of Speed

The Washing Machine

There are concrete reasons we have a tendency to design for speed. The automation of routine and excessively labour intensive can have knock-on benefits that can lead to systemic changes, including fostering equality and independence.

Consider the beginning of the 20th century, which saw the simultaneous advent of two revolutions: The Second Industrial Revolution, with innovations such as electricity and combustion engines, and The Household Revolution, which introduced washing machines, and vacuum cleaners (Greenwood, Seshadri, & Yorukoglu, 2005).
The introduction of household innovations had a dramatic impact on the type, intensity, and amount of labour required within households. For example, between 1900 and

1975 the average time spent on housework such as cooking, laundry, and cleaning decreased from an average of 58 hours to 18, while the number of paid domestic labourers also declined. These devices primarily impacted females within households, who tended to bear the brunt of household labour.

Above: Washing machines at a laundromat

Amazon Dash Button

For consumers who dread the idea of running out of Pop Tarts, Amazon has the perfect solution. The Dash button, first introduced in March, 2015, allows Amazon Prime members to quickly order items they regularly use. The battery-powered, wifi-enabled devices pair with a user's Amazon account and can be adhered to convenient so that ordering happens as soon as the user realizes they are running low (King, 2015).

For the giant retailer, the benefits are very clear. As the proprietary devices that only work within the Amazon ecosystem, users can

become habituated to only ordering from one retailer, without the benefits of price or brand comparison. Users also offer near-real-time indicators of usage, which may be used for Amazon's extensive data analysis purposes.

Rushing users through a purchase flow can also prevent them from questioning whether or not they truly need to buy the items in question.

Although it can be argued that increased speed of purchase addresses a market need this can have consequences for users who are purchasing products that are unhealthy, expensive, or environmentally irresponsible, or lead users to purchase goods without the benefit of sober second thought.

Above: An assortment of Amazon Dash Buttons

Slow

Standing in stark contrast to our ever-quickening pace is the critical value of slowness. The concept of "slowing down" is certainly not new. While we may be taught from a young age that "slow but steady wins the race" and "haste makes waste" our busy lifestyles tell us that these maxims may no longer hold true. There is, however, reason to explore the things we give up when we pursue speed at all costs, and those who are leading the charge in the rediscovery of slowness.

Slow Design

In 1986, Carlo Petrini founded the Slow Food movement in Italy. What started as a protest against an opening of a McDonald's location in Rome soon grew into a larger comment on globalisation, industrial food production, and the preservation of regional cuisine. Over time, the Slow Movement has expanded to embrace similar ideals in such diverse topics as travel, fashion, science, and gardening.

Slow Design, then, as an extension of the Slow Movement, is a refutation of industrialized design and a call for a return to simpler values. Whereas mainstream design accentuates objects as the focus of a user's desire, Slow Design advocates for objects as a means to an end. Similarly, the movement rejects the prominence of style over substance, disposability, and homogeneity (Beverland, 2011).

As Michael Beverland, a professor of design at RMIT University in Australia (2011) observes, "Just as the Slow Food movement rejects the idea that food is merely fuel (that is, that one eats merely to live), slow design rejects the materialism of the fast model, which views objects as ends in themselves. For slow designers, the quality of the object, and the solution it provides to the customer over many years, is more important than the production of more-stylized objects with limited life spans and uses." While Slow Design does indeed offer an alternative to the challenges inherent in mainstream design, it fails to recognize areas where "fast design" has made significant societal contributions. We can recognize the inherent wisdom in the philosophy of Slow Design, while benefiting from design that minimizes uses speed to make thoughtful contributions to society.

The Arts & Crafts Movement

Challenging the relentless march of speed in western design is not without precedent. The Arts & Crafts Movement, which was highly influential at the turn of the twentieth century, can be seen as the rejection of the ideals of industrialization and mass production.

One significant effect of the Industrial Revolution was the challenge mechanization and the division of labour posed to traditional craftspeople, resulting in a new class of unskilled labourers. To William Morris, whose views, along with those of John Ruskin and Augustus Pugin, were foundational to the Arts & Crafts Movement, these workers engaged in "useless toil" rather than "useful work". For the wealthy, the workers existed only to generate wealth through the production of rubbish, a waste of both labour and resources (Morris, 1888).

To followers of the movement, this was not purely an ideological issue, but one that was made tangible in the excessive ornamentation, lack of understanding of materials, and poor construction that were characteristic of the decorative arts of the time. The ideals of "honest labour" and "truth to materials" were central to Morris' philosophy, and are reflected in the work of those who carried the Arts & Crafts banner. Works were characterized by the usage of skilled production methods that often eschewed mechanical production. For example, papers might be printed with block printing techniques rather than mechanical presses, which resulted in a superior result.

Morris, unlike some of his colleagues, was not doctrinaire on the subject of mechanization. He considered machines to maintain a place in the production of goods providing they achieved a sufficient standard of quality (Ormiston & Wells, 2010). The ideals of the Arts & Crafts Movement continue to endure; handcrafted goods continue to be popular and are often made by skilled artisans. Mechanized processes, however, are still by far the default in almost all commercially available goods.

Examples of Slowness

Ise-Jingu

Considered a spiritual centre of Japan, "Jingu" contains 125 Shinto shrines in a complex roughly the same size as Paris. Unlike many historic sites where the preservation of buildings is a primary concern, the two main temples at Ise are not built to last. In the Shinto tradition, the cycle of death and renewal are celebrated, and this is reflected in the rite of "Shikinen Sengu" (Ise Grand Shrine, 2017). Every twenty years, this sacred rite of is performed, in which shrines within the Naiku and Geku sanctuaries, as well as a bridge, are razed, rebuilt, and rededicated. As ancient carpentry techniques are used in the rebuilding of the temples (no nails or screws are used in the entire structure) the Sengu passes on a way of life to younger generations. Lasting eight years and requiring one hundred carpenters, the building effort is labour intensive and slow-going. The purposeful acts of destruction and rebuilding allow the designed object to become a tool of instruction that is in harmony with Shinto beliefs, allowing community members to become a part of a sacred religious space (About Ise Jingu, n.d.).

Above: Ise Grand Shrine at Ise Jingu

Designing Fast and Slow

Taking into consideration the aforementioned examples it becomes clear that maintaining a bias of speed can be a disservice to users. As such, designers should consider the role that speed plays in the things hey design.

The benefits of speed are numerous and well known. Tedious and time consuming tasks with little to no additional reward can be automated or assisted, ostensibly freeing the time of the user to do other, more fulfilling or productive things. In some cases this approach can have effects that significantly improve the life of the user accompanied with consequent social benefit.

Despite the obvious advantages of speed, designers should also consider the benefits of slowing down, or, at least not accelerating users. Working more slowly can help users focus and work more accurately. Reducing speed can also provide to conditions for users to make more deliberate choices, allow users to recognize the value of a service being offered, and provide feelings of security and safety.

Perhaps the strongest argument for slow, as advanced by adherents of the Arts and Crafts Movement, does not focus on speed itself as much on the processes of mechanization by which it is enabled. The "need for speed" has forced many of us to abandon skill and meaningful work – a high price to pay for getting things done a little faster.

Fast	Slow
- Complete tasks more quickly and efficiently - Save manual or repetitive labour in favour of higher value tasks - Avoid boredom in users - Provide users with heightened sense of control - Direct users to preferred outcomes with less distraction	- Reduce error rate for many tasks - Reinforce focus and mindfulness - Encourage users to savour and enjoy experiences - Reveal overlooked aspects of experiences - Help users reduce the stress of everyday life

Above: A summary of the benefits of fast and slow

Intuitive & Reflective

I Keep Coming Back

The box sits on the doorstep like a scab you can't help but pick.
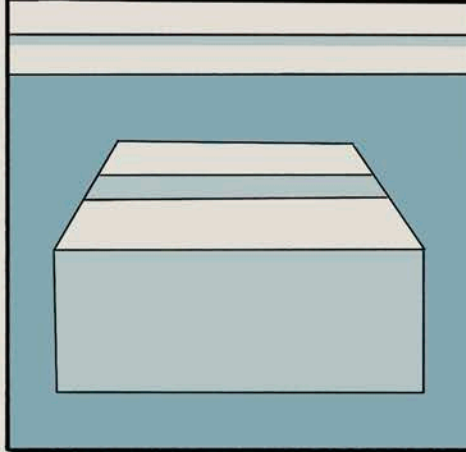
Every single month, a fresh reminder of what might have been.
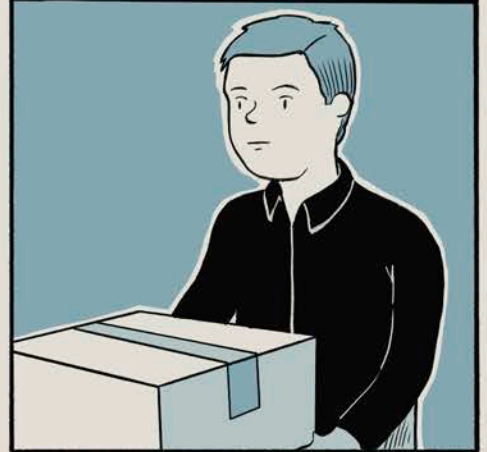
And how much we lost.
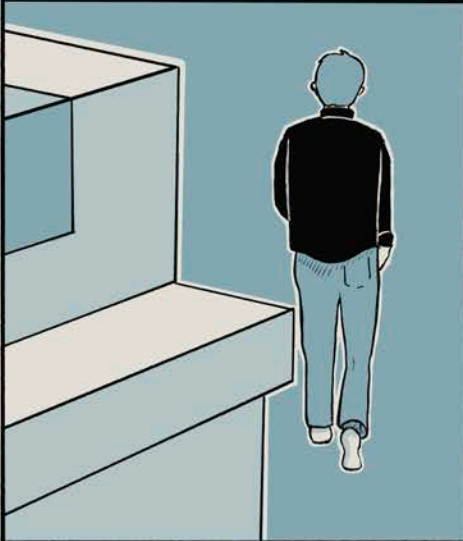
Ellen was our miracle baby. Kate and I tried for two years without any luck.
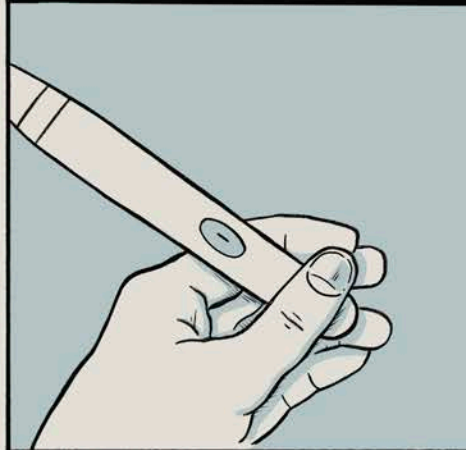
Then came the endless parade of specialists. At first, we were hopeful.

The treatments got more obscure and more expensive.

Payment Approved

But they didn't work. They never worked.

So, of course, we started to explore alternative medicine.
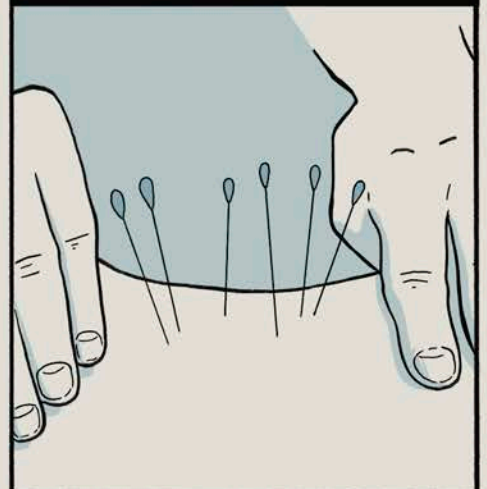
New diets. Accupuncture. Potions and herbal remedies that we would have laughed at otherwise.

Eventually we had to resign ourselves to the reality that it wasn't going to happen and we looked into other options.
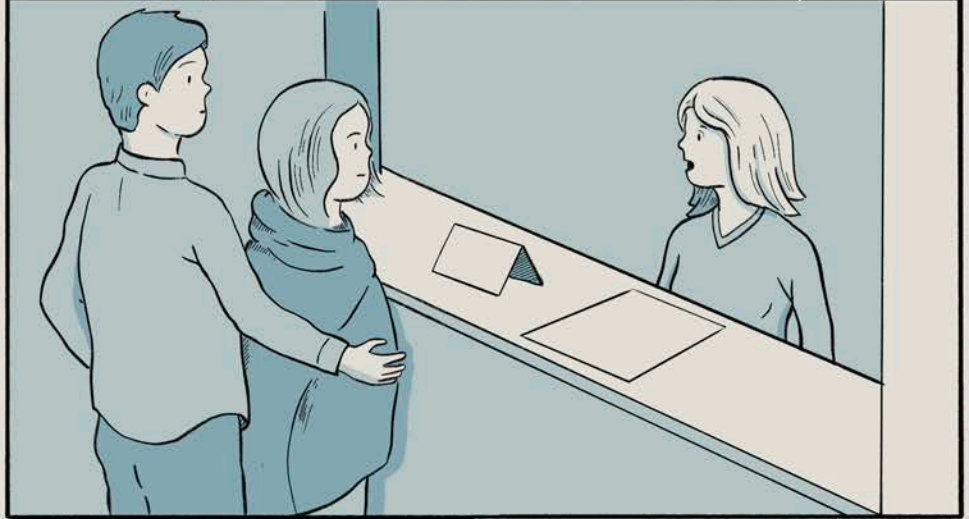
And then, one day, Kate felt sick.

And the next day.

And the day after that.

When it came time to take the test we had to build up the nerve.

And when we saw that plus sign we cried for hours.
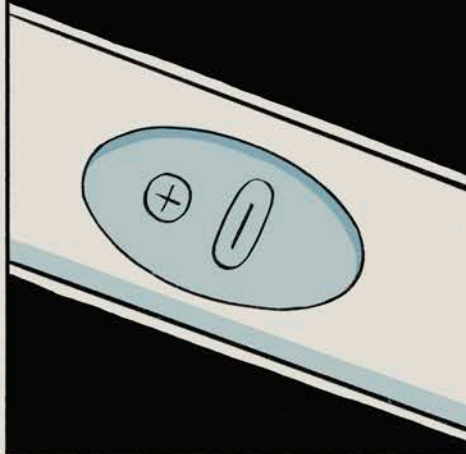
Predictably, when we shared the news, everyone went crazy.

After how difficult it had been to get pregnant we were a little worried, but it was a smooth pregnancy.

And then Ellen came into our lives.

And we knew that she would change everything.

When we brought Ellen home we were more than prepared. Well, prepared for everything but the reality of a newborn.

4:28 PM

But for everything else, we had Everest Delphi.
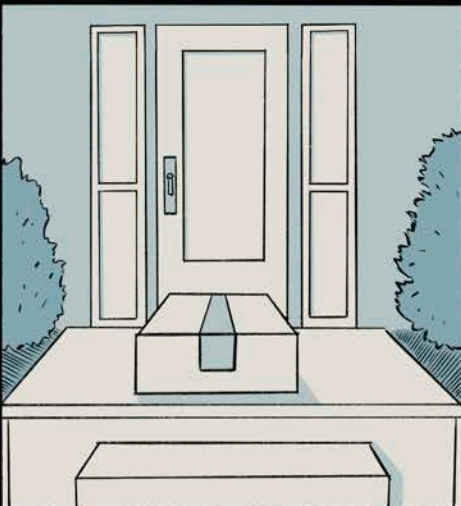
We supplied DNA test results and answered a questionnaire
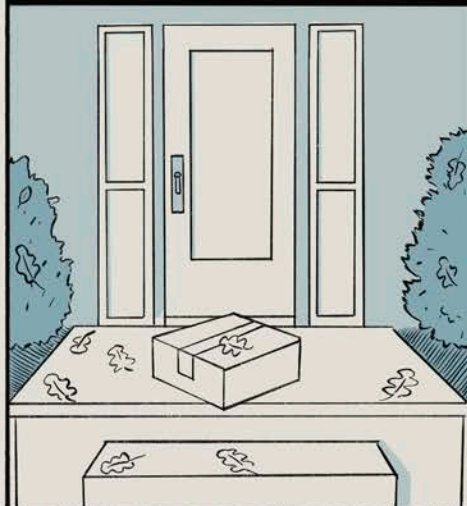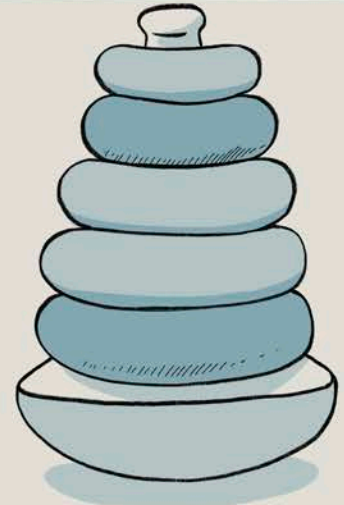
and the packages started to arrive every month.
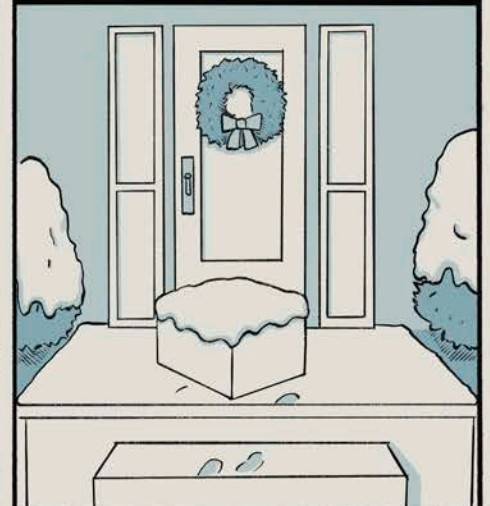
Clothes.
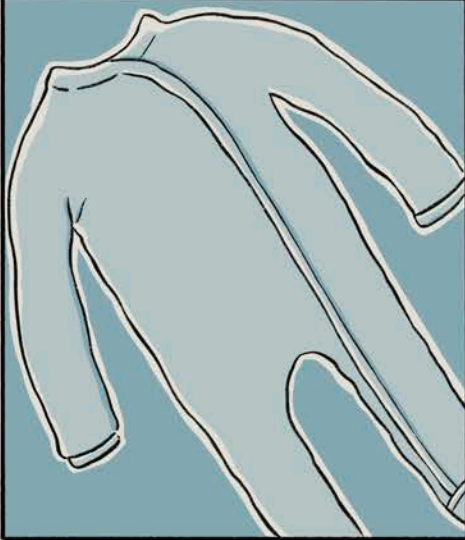
Shoes.

Toys.

Literally everything.

It was like the system had a sixth sense for what was needed.

And as Ellen changed, so did the boxes.

Life was bliss.

Until one day.
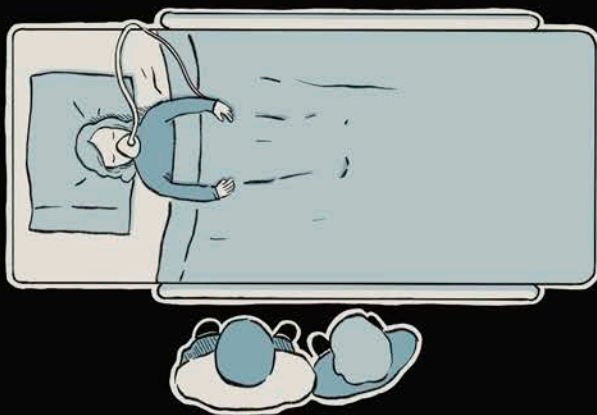
Tragedy struck.

SKREEE!
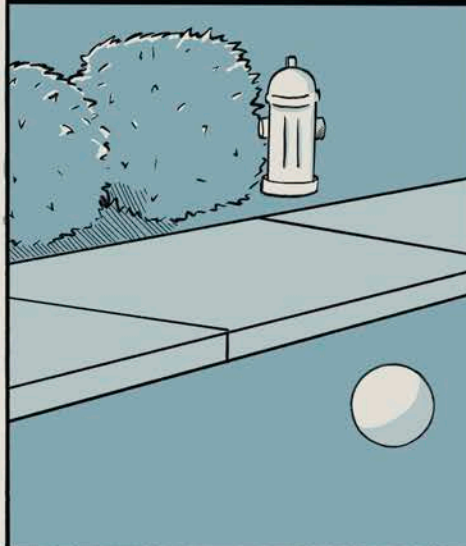
We lived at the hospital for nearly a month.

As long as there was a glimmer of hope we wouldn't give up. But in the end, it was hopeless.

Taking our baby off life support was like an out of body experience. It felt like we were watching from afar. We said goodbye, but I don't think we ever left that hospital room.

When Kate and I got home the box was waiting on the doorstep. At first, it seemed like a sick joke.
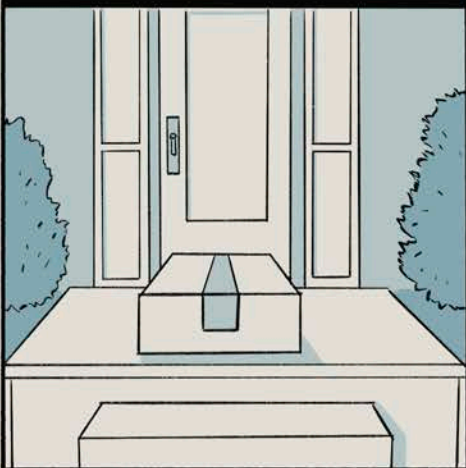
When we opened it, there was a beautiful green dress that would have looked lovely on Ellen.

And the next month, for her birthday, a stuffed golden retriever that she would have adored.

Month after month, more boxes arrived. At first, we talked about cancelling the subscription.

But neither of us could bring ourselves to do it.

Gradually, our rooms filled with things for Ellen. Each month we could see how much she would have grown.

FUNDERWEAR

How she would have changed.

Birthdays.

ELLEN

Holidays.

HO HO HO HO HO HO HO HO

To Ellen m Santa

And rights of passage.

Over time, Ellen's things grew and grew. More and more unrealized memories.

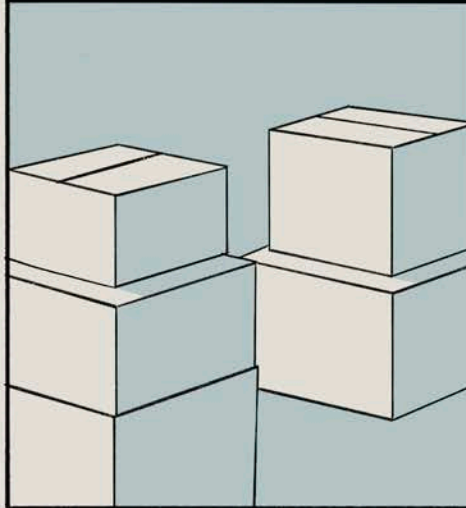Woodland Critters school house

SWEET STREET

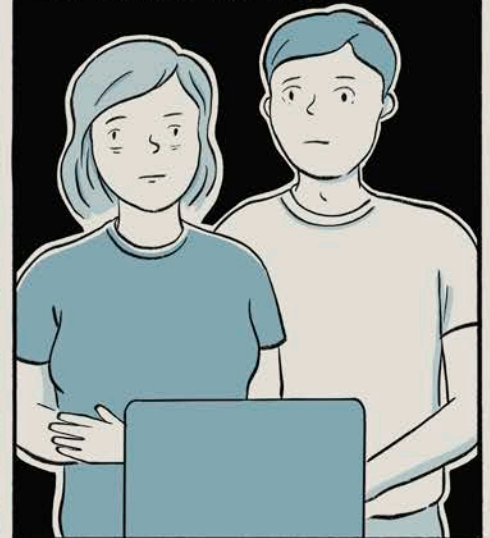Until finally, one day, there was no room left.
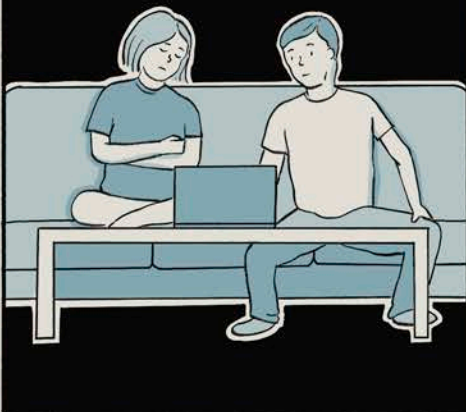
We knew it was time to move on.

To finally say goodbye to our miracle girl.

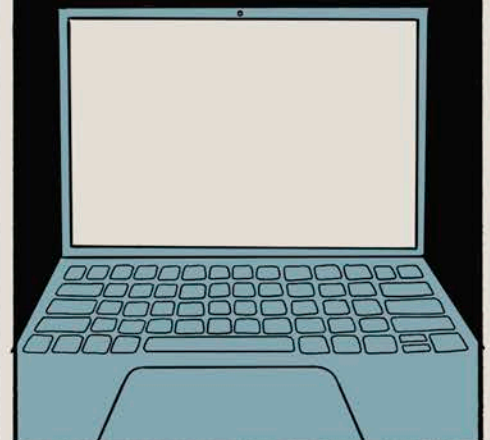And now that this lost box has arrived it's time.

Beth and I sit down to remove our last connection to Ellen.

I agreed to push the button when the time came. When we were ready.

We stare at the screen for a long time before I reach for the trackpad.

I hover over the button for a final moment and click.

Delphi Account

Delivers monthly

Are you sure you want to cancel your subscription?

YES, CANCEL

And with that, we're done. Kate and I hold each other and we cry.

While I secretly move the cursor toward the button.

You have successfully cancelled Everest Delphi

Recommended for You

Memorial Gifts

Never forget the ones you loved.

Virtual gifts sent monthly.

ADD

Intuitive

When we talk about having an intuition, it is typically a way of saying that we believe that something may happen based on a limited set of information. We might even describe this phenomenon by saying "I have a feeling." Thus, we may see intuition as a way of thinking that is highly embodied, requiring little in the way of conscious thought – a secondary way of knowing, if you will.

Similarly, when we use the term "intuitive", we tend to focus on how little thought we must invest into using a particular thing. Perhaps it is easy to use, or gives the appearance of anticipating our needs. Either way, the thinking, in this case, is also embodied, but in the thing rather than in the user.

Calling a product intuitive, then, is to say that it requires minimal conscious thought. Why might this be seen as a positive? To answer that question it is important to better understand systems of thought and their respective costs to a user.

System 1 and System 2

In his celebrated book, Thinking Fast and Slow, Daniel Kahneman illustrates the dichotomy between what Keith Stanovich and Richard West proposed as two systems in the mind: System 1 and System 2.

System 1 is the faster of the two systems, requires little effort or voluntary control, and is most often associated with subconscious thought. It is responsible for tasks that require minimal cognitive load. This includes estimating that one object is at a greater distance than another,

solving basic math problems, and completing well-known phrases. In effect, when we use System 1 thinking, our minds attempt to match information with what we already know.

System 2 is reserved for mental activities that are more cognitively demanding. These might include tasks that require choice, concentration, and deliberate action. These might include activities such as focusing on a particular person in a crowd, parallel parking, and performing complex calculations. System 2 requires attention in order to function, and given our limited supply it must be allocated judiciously. It is simply not possible for people to focus on more than one task at a time (Kahneman, 2011).

Since attention is so expensive, System 2 is too laborious and slow to use on a consistent basis. We rely on System 1 to do much of the heavy lifting in our day-to-day lives. Although efficient, there is a downside to this. Our reliance on System 1 means we must use a series of "short-cuts" in the form of heuristics and cognitive biases, both of which can be exploited without our knowledge.

Heuristics and Cognitive Biases

A heuristic is a means of learning or exploring that is similar to that of a "rule of thumb", that is, one that is not necessarily perfect, but is good enough to likely lead to satisfactory results (Kahneman, 2011). As humans, we use a series

of heuristics in everyday life which help us to simplify decision making, from determining whether to wait for the streetcar to how a piece of IKEA furniture can be assembled.

As cognitive shortcuts, however, heuristics are prone to error and can lead users to make poorly informed choices. Even worse, known heuristic biases are open to exploitation by those who might use these shortcuts to encourage others to make choices that are not in their best interest.

For example, availability bias is a well-known heuristic in which users attribute undue importance to things that are top of mind. When asked to list the most pressing issues facing a community, a person is likely to list things they happen to recall, and given that memory is informed by the media to a large extent, it is likely that many people would simply list the issues that have garnered the most coverage (Kahneman, 2011).

Priming

Another cognitive shortcut that is both efficient and open to exploitation is "priming", in which a prior idea can influence a later action. Kahneman offers an example of priming through the use of words. In experiments conducted in the 1980's researchers exposed participants to a word, before presenting them with word fragments they were meant to complete. Participants who were exposed to the word EAT were more likely to complete the word fragment SO_P as SOUP than SOAP.

Conversely, participants were more likely to complete the same word fragment as SOAP if they were previously exposed to the word WASH (Kahneman, 2011).

Priming can be seen as an "invisible" way of using ideas to influence actions, and it is a technique that is used in far reaching fields, from advertising to politics and economics.

Behavioural Design

When science uncovers new insights into the workings of human behaviour, you can be sure that those who would apply this knowledge to the "real world" will not be far behind. System 1, which works quickly and instinctively, is far more open to suggestion than the more deliberate and thoughtful System 2, thus is often the target of those who might wish to influence behaviour. The fields of Behavioural Economics and Behavioural Design in particular use a series of principles which are meant to exploit its tendencies.

To be fair, advertisers, marketers, and designers have for many years known of a series of methods by which audiences may be influenced. Behavioural Design simply provides a rationale for many of those practices, and makes use of known cognitive biases and heuristics in order to influence users in their preferred direction.

In their book, Nudge: Improving Decisions about Health, Wealth, and Happiness, Richard Thaler and Cass Sunstein outline the principles of their movement which they call "Libertarian Paternalism", and of a practice which they name "Choice Architecture". They insist that their methods preserve free choice, while allowing choice architects to influence people's behaviour so long as it is for positive ends "as judged by themselves. (Thaler & Sunstein, 2009)"

Thaler and Sunstein argue that with Libertarian Paternalism the choices of the user are not restricted, nor are economic incentives significantly altered. The obvious question to be asked, however, is how a choice architect would know what any individual person truly wants. This creates a paradox. The effectiveness of nudges depend on opacity – if the user realizes they are being led in a particular direction they may very well wish to better reevaluate their options instead of blindly following the path the designer has chosen for them. Without some measure of transparency, however, we cannot be certain that the wishes of users are being respected.

Another important question whether any safeguards exist that might protect us against those who use Thaler and Sunstein's insights without their ethos. In effect, there are none. Nudges are available to everyone regardless of their principles.

Dark Patterns: When Nudges Go Bad

It should not be surprising that nudges are often used to influence the behaviour of unsuspecting people. Richard Thaler himself, when asked to autograph a copy of Nudge, is always sure to add "Nudge for good" but according to Richard Thaler, "Unfortunately, that is meant as a plea, not an expectation. (Thaler, 2015)"

On the Word Wide Web, where examples of nudges exist in nearly every shopping cart or account sign up page, unethical uses of behavioural design abound. These tricks are sometimes referred to as "dark patterns" a design pattern with nefarious intent, if you will.

Harry Brignull, founder of darkpatterns.org, catalogues a number of coercive patterns that are commonly found in web design. Brignul documents tactics such as "Roach Motel", in which users are easily led into a situation which is difficult to get out of, such as a subscription, and "Friend Spam" in which a system asks a user for permissions in order to find friends, but spams them instead (Brignull, n.d.). Brignul's examples can be applied all too easily to many of the most popular sites on the internet.

Anticipatory Design

In this chapter I have focused on ways in which System 1 thinking is leveraged by designers, but there is another, related way that designers bypass user choice, and that is through the creation of systems which are in themselves "intuitive".

Theoretically, the most user-friendly system is one which the user need not consciously control. Anticipatory design is a loosely defined method of simplifying user interfaces by allowing systems to make decision on behalf of users. Through the integration of machine learning, contextual awareness, and behavioural psychology, anticipatory design can make ordinary objects seem almost magical (Busche, 2015).

When shopping on Amazon, eerily accurate recommendations appear, while your smartphone may offer alerts on traffic problems based on where it "thinks" you may be going. Shortcuts such as these can reduce cognitive load and reduce distractions, allowing us to concentrate on other, seemingly more important, things.

There are legitimate reasons to be skeptical of these tactics, however. In order to learn about habits and needs, these systems must be granted an unusually high level of access to our data, including the ability to track our presence, schedules, and travel preferences. They must record our viewing, listening and reading habits. In short, we must grant these

system levels of access restricted to all but our closest friends or family.

Next, as anticipatory systems are often created by commercial entities, we can expect that the choices may be skewed toward the interest of the corporation rather than the user. If a nudge makes a user more likely to purchase a product and not cause an excessive amount of user push-back, it is likely to be used.

Then there is the issue of the removal of choice. If anticipatory systems play the part of a trusted butler who always knows what we should wear, we must acknowledge that we are giving up the ability to dress ourselves. The abilities for self expression, and for going "off script" become limited when we abdicate responsibility to invisible agents who make decisions on our behalves.

Finally, at risk of sounding quaint, when "correct" decisions are constantly made on our behalves we negate the possibility of making "wrong" choices. Sometimes, the unintentional can lead us to unexpected and enriching places. Ask many travelers about their favourite travel experiences and you are very likely to hear stories about wrong turns that turned into unforeseen adventures. When accidents are eliminated, we remove both the negative and "happy" varieties.

Examples of Intuitive Design

Nest

Nest is marketed as a "learning thermostat", and is designed to save energy by optimizing the heating and cooling of homes and other spaces. When first installed, Nest must be "trained" by users to understand their schedule and preferences, after which the device is able to regulate temperature based on whether or not occupants are in the space, and by predicting their schedule.

Above: Nest Learning Thermostat

A trained Nest system can reduce home heating and cooling costs and save energy, although the degree in which this is an improvement over existing programmable thermostats is debatable. Nevertheless, it is an example of how an anticipatory system can have positive effects for a user.
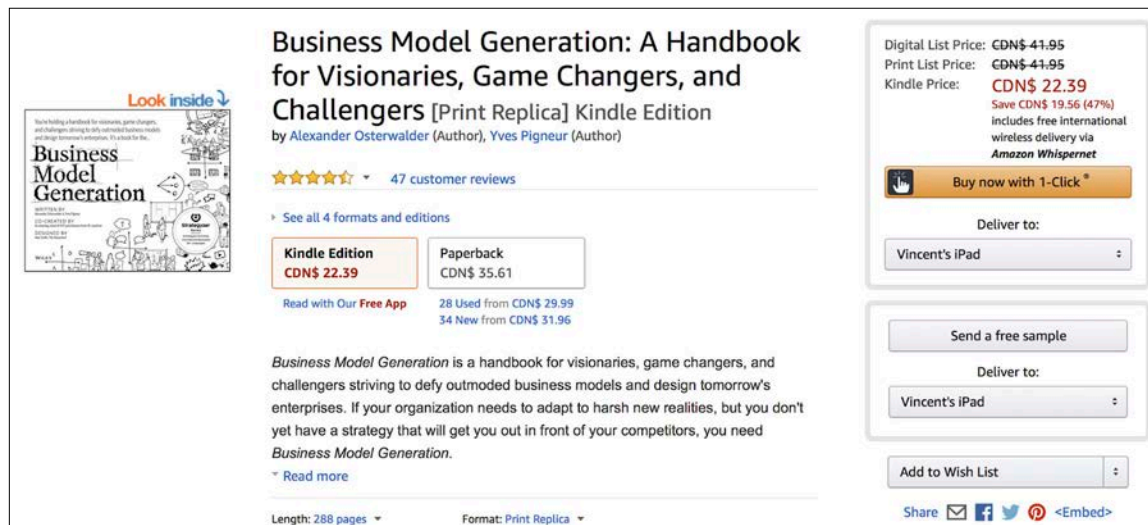
Amazon Purchase Flow

When it comes to using nudge tactics to remove choice in the best interest of a corporation rather than the user, it is hard to top Amazon, whose website could be used as a textbook of dark patterns.

For example, Amazon has developed what they call 1-Click ordering for Kindle e-books, which replaced a workflow that only took slightly longer to achieve the same result. Over time, this has not only become the default option for users, it is the only option. The advantages for Amazon are obvious as less friction means higher conversion rates. Not so for users who want to use another payment method or who could benefit from a pause in the transaction flow. It is an example of a "feature" that has much greater benefit for the company than for its customers.

Another example of Amazon's use of dark patterns can be found in an interstitial page which is designed to up-sell users to their Prime service. Amazon has done an impressive job of increasing its Prime subscriber base, but it is fair to question how many customers subscribed unwittingly through such pages.

Above: Amazon's 1-Click® checkout process. Screen capture by author.

Above: If you believe that a page like this would not fool more technically-inclined users, you would be wrong. I have been tricked into signing up for a Prime subscription which I did not intend to purchase. Screen capture by author.

Reflective

If intuitive design creates a streamlined, seamless experience for users, what is the value in reflection? Critical theory argues that our beliefs, values, and even our sense of self are shaped by forces of which we are largely unaware, such as gender, race, and economics. Critical reflection then, is a means of gaining awareness of these forces and forming the basis of change (Sengers, Boehner, David, & Kaye, 2005). Setting aside critical theory for a moment, users may also benefit from pauses that engage conscious and critical thought. As designers, how might we make both designers and users aware of these forces, think critically, and encourage reflection?

Norman's Three Levels of Processing

Donald Norman suggests that human attributes are the result of three distinct levels of the brain; the visceral, which is automatic, the behavioural, which regulates our everyday behaviour, and the reflective, which is contemplative. He argues that as each level plays a different functional role, each requires a different approach to design (Norman, 2004). This could be considered to follow a similar pattern to the triune model of the brain, which falls into Reptilian, Paleomammalian, and Neomammalian complexes (MacLean, 1990).

To Norman, the reflective level of design is "all about message, about culture, and about meaning of a product and its use (Norman, 2004 p.85)." A designed object or experience can be of great significance to a user despite shortcomings and inconveniences because of the feelings it elicits, and because of the

stories it tells us about ourselves. This theory helps explain why consumers would spend significantly more on a sports shirt that contains an brand logo than a comparable product that costs a fraction of the price; the crocodile implies wealth, status, and belonging, all of which are constructed by the brand. Designers can consider the role of meaning within their work that encourages users to not only reflect upon the product or service in question, but also upon themselves.

design, building, and evaluation of new computing devices that reflect alternative possibilities (Sengers et. al. 2005)."

Reflective design can be used both as a process for designers and as a means of facilitating an user outcomes. By reflecting critically, designers can better understand how their assumptions contribute to the affirmation of dominant values. Phoebe Sengers et al. suggest a number of existing design methods that
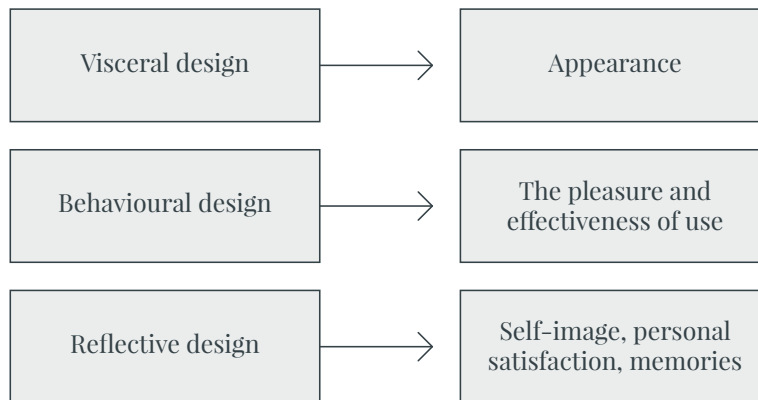

Figure 11: Donald Norman's Three Levels of Processing (Norman, 2004 p. 39)

Reflective Design

Norman is not the only theorist who has explored the possibilities of reflection in design. Others, such as Phoebe Sengers, use the term "Reflective Design" to distinguish designs which are born of designer reflection and which facilitate reflection in users. Aimed at design practitioners, reflective design "combines analysis of the ways in which technologies reflect and perpetuate unconscious cultural assumptions, with

can introduce reflection into a practitioner's canon, including participatory design, value-sensitive design, critical design, and ludic design.

To encourage reflection as an outcome, the same group looks to the concept of reflection-in-action, a means by which users can think about a process while it is happening. As a synthetic process that combines both theory and practice, it is one that designers use to evaluate their work and respond to their

unique context. They widen the concept of reflection-in-action by including designerly use of intentional triggers for user reflection. These moments of interventionary reflection can be used to encourage users to move from what they call "knowing-in-action" to "reflection-in-action" (Sengers, Boehner, David, & Kaye, 2005).

Breakdowns

If, as designers, we can create things that encourage reflective behaviour, at what moments are users ready to reflect? In their book, Understanding Computers and Cognition: A New Foundation for Design, Winograd and Flores use a series of Heideggerian terms and principles as a vocabulary to describe the how users interact with digital systems, but their insights can be extrapolated to non-digital devices.

Most objects that we use are described as "ready-to-hand". We use these objects automatically; there is an absence of analytical thought when a person reaches for and uses a tool.

Breakdowns, which are occasions when a tool fails, is dropped, or is interrupted in some way, force a user to evaluate the tool, at which point it becomes "present-at-hand". This is a state in which a user can consciously reflect on the tool itself without taking action. This is not necessarily something that must be avoided; breakdowns can bring users back into "the real world" and allow them to consider both

their actions and the tool itself (Winograd & Flores, 1986).

Designers can benefit by considering how the natural moments of breakdown in human-product interaction such as errors, bugs, physical breakage, and slips and falls, are moments when a user becomes acutely aware of a tool and makes it the focus of their conscious thought. These are opportunities that designers might leverage in order to inspire users to take a step back, consider their options, and to see "the bigger picture". As breakdowns are not inherently negative, designer may also wish to consider how intentional breakdowns can be used as moments of reflection and transition. By combining the concepts of reflection-in-action and breakdowns, we may not only find ways in which users might reflect, but also uncover appropriate moments in which to encourage reflection.

Examples of Designing for Reflection

Portion Control Plate

Many who have tried to lose weight have heard the common wisdom that the size of their plate influences the amount of food that is served. Research suggests that a phenomenon called the Delboeuf illusion, in which a the perception of a circle's size can be affected by the size of a surrounding circle, may indeed play a role in our need to fill our plates. A study suggests that there exists a visual plate-full level of roughly 70% which serves as an anchor for appropriate

consumption (Wansink & van Ittersum, 2013).

There are a number of commercially available products that go a step further, attempting to guide users to balanced meal choices and portion sizes. These plates replace an object that does not tend to occupy much of our conscious thought with one that not only serves as a conscious reminder of healthy eating choices, but that may cause the user to think critically of how their meal "stacks up" to the stated ideal.

Above: A portion control plate used by the US Air Force

PostureMinder

Breakdowns can be used as opportunities to interrupt the flow of a user and increase awareness of the thing in use, or of their own context. A simple example of an intentional breakdown is the Google Chrome browser plugin "PostureMinder". This simple tool periodically reminds users to check their sitting posture in an effort to promote back health. When a user becomes absorbed in their work, they may not be conscious of the computer they are using, nor their posture. At preset intervals, PostureMinder creates an alert and the user's computer goes from a state of "ready-to-hand" to "present-at-hand".

Designing the Intuitive and Reflective

It is attractive to consider how the things we use and experience might be created so that they are not only easy to use, but require little to no conscious thought to operate. Through an understanding of System 1 and System 2 processes, designers can take advantage of heuristics and cognitive biases to effectively bypass the our minds' more reflective tendencies. Behavioural design, however, should be approached with caution; designers may fail to understand the true needs of the user, or, worse, may serve an agenda that is not entirely in the user's best interest.

By encouraging reflectivity in their work, designers can encourage users to fully consider their choices and take control over their experiences. In the long run, this may lead to greater user satisfaction and a sense of user empowerment.

Intuitive	Reflective
• Complete tasks with minimal cognitive load or confusion • Save users time and effort through automation • Act as a shortcut to positive behaviour • Direct users to choices that they are likely to prefer • Surface user insights that may not be readily apparent	• Instill sense of meaning in things and experiences • Prevent unhealthy or impulsive choices • Encourage critical and deliberate thinking • Reduce user errors • Provide users with a sense of control

Above: A summary of the benefits of the intuitive and reflective.

Part 4

Reality Test

Putting Dialectical Design into Practice

Now that we have explored a series of affirmative values which are inherent in modern western design and have explored alternatives, a reader may be convinced that there is value in adopting a dialectical approach to design. In the examples provided I have shown how values that are embedded into many of the things we see and use every day can be challenged, and how the alternatives can provide benefits to users and society.

Recognizing that ideas alone cannot effect change, during the course of my research I looked for ways to put the principles of dialectics into action. If we reconsider the previously-described technique of reflection-in-action we can recognize that reflection and awareness during the process of design can help designers consider how unconscious assumptions shape their work. Without the benefit of a framework to guide thought this could be a highly difficult exercise. My goal was, then, to find a means of guiding designers through a dialectical process that embeds some of the critical values I have previously discussed, namely those of challenge, slowness, and reflection.

To this point, I developed and workshopped a simple technique and accompanying ideation tool to help designers identify and challenge affirmative values in their work, leading to new and unexpected results.

The technique and tool were initially conceived as ideation aids that could be employed by designers and other stakeholders at the front end of a project. As projects progress it is not uncommon for design choices to become increasingly constrained, thus by situating this exercise in the early stages of a project stakeholders have greater freedom to implement the ideas that the technique may generate. It has also been suggested that they could also be used to promote education and awareness for designers who are interested in promoting positive change within their work, and this application could certainly be viable as well.

The technique walks users through six main steps:

1. Expose
2. Reflect
3. Select
4. Question
5. Ideate
6. Reassess

Although these basic steps were used in the workshop, the names were subsequently refined to single words to aid in comprehension.

Step 1: Expose

Identify the Inherent Values Within a Design

We might start our process by considering the inherent values embedded within a design. To continue our theme of coffee that was begun near the start of this paper, we can use a disposable coffee cup as our example. If we were asked to design a new cup, what affirmative values might we identify?

- Temporary
- Portable
- Inexpensive
- Uniform

Step 2: Reflect

Consider the Alternatives

Now that we have established a number of qualities within the existing design that value-driven, we are able to conceive of alternatives. This can be done by imagining the critical values or qualities. We are asking the user to both engage in reflection, and to create a reflection of the affirmative values.

- Temporary
- Portable
- Inexpensive
- Uniform
- Lasting
- Stationary
- Valuable
- Custom

Step 3: Select

Identify Opportunity Spaces

Our list of affirmative and alternative values reveals a number of opportunity spaces which we may use for our design project. For this example, I would like to focus on three of the four aspects as a basis for a new design, namely: lasting, valuable, and custom.

Step 4: Question

Challenge the Status Quo

We can now generate a series of questions based on the opportunity spaces selected. Because many of the affirmative values are norms or orthodoxies, we are giving users permission to ask transgressive questions which may be useful.

- Why must a coffee cup be temporary?
- What are the advantages of throwing away a cup?
- What might make users retain and reuse a cup?
- How many customers use disposable cups without leaving the cafe?
- What might convince users to value a coffee cup?
- Must each cup be the same?
- Can a cup be co-created with users?

Step 5: Ideate

Develop Solutions

Finally, using the questions that we have asked, we can focus on particular opportunities they may present. In the case of the coffee cup, I will focus on how we might convince users to keep a cup rather than throw it away. After generating a series of ideas, I am settling on the idea of a loyalty cup. This is a lightweight reusable cup that can be purchased with a series of credits that are sold at a slight discount. The cup would be beneficial for the seller because it encourages customers to purchase coffee from their cafe, for customers because they can enjoy coffee at a small discount, and for the environment because less cups are being thrown into landfills.

Step 6: Reassess

Scrutinize Your Work

As we are encouraging designers to engage in a reflective process, this is a good opportunity to for the designer to consider how their design could result in positive as well as negative outcomes. As has been demonstrated many times in this paper, no dialectical position is inherently moral; a design can very well be inappropriately challenging or sl. A final step of reflection and assessment can help a designer avoid blind spots. Does the design solve a problem? Does it create new problems? If John Sylvan, the inventor of Keurig, engaged in this process would he have designed the system as he did?

Dialectical Design Worksheet

In order to help designers use the technique effectively, I have developed a worksheet that contains spaces for each of the five steps, as well as prompts to aid those who are unfamiliar with the concepts and methods of dialectical design.

Figure 12: A worksheet helps users structure their thoughts in a way that encourages dialectical thought.

Workshopping Dialectical Design

In order to test the concepts and techniques contained in this paper, I conducted a workshop at OCAD University in Toronto. Eight participants took part in a three-hour session in which the concepts behind dialectical design were explained, after which the group was tasked with an activity which was run twice; first as an individual task, and second as a task for teams of two. The activity loosely simulated the briefing/design process that is familiar to most designers. Designers were given a briefing card with a design problem to solve. Briefs included:

- How might we design a device for automobiles that helps prevent drivers from becoming distracted?
- How might we design earphones that take ear health into consideration?
- How might we design shopping and checkout features for a leading online bookstore that will enhance user satisfaction?
- How might we design a digital companion for seniors who want to live independently?
- How might we create a emergency waiting room that reduces patient stress and increases their overall satisfaction?
- How might we help homeowners use less water for maintaining their yards and gardens?

Participants were asked to use a prototype version of the Dialectical Design worksheet to document their work and to generate ideas.

Activity #1

The first run through of the activity was conducted individually, and each participant was given 20 minutes to complete their worksheet, after which each participant recounted their experience using the technique as well as their results. A group discussion followed. At first, some participants experienced challenges identifying affirmative values, and sometimes required prompting to progress to more global and general qualities that better allowed for reflection. One example was that of a takeaway container, which was described as "transparent". After some discussion, the group agreed that in order to better apply a critical value, it was necessary to go deeper and ask why a container might be transparent in the first place, and the idea of mistrust was forwarded as a possible underlying value to explore.

Participants were able to use the worksheet as intended and generated a series of ideas to answer the briefs.

Activity #2

Next, participants broke into teams of two and were given new briefs with 30 minutes to complete their work. As expected, the tenor of the room was more lively as teams looked for insights and generated ideas. When teams

were finished the activity they presented their ideas and insights, and discussed their preferred solutions. Participants agreed that it was helpful to explore concepts through discussion.

One team was tasked with designing a solution to distracted driving. One of the team members often rode a motorcycle, and noted that he is highly engaged and never distracted when riding, in part, because there is are physical sensations and variations associated with being outdoors. This led to the idea of a "motorcycle mode", a system that would help drivers feel the variations of outdoors within their cars.

Another team was given the challenge of designing an AI companion for the elderly. Their idea was a system that could exhibit a variety of personalities which could engage the user, each maintaining its own characteristics and memories. These variations could potentially help elderly users exercise their memory and remain practiced maintaining a variety of relationships, even when alone.

Design Brief	Design Brief	Design Brief	Design Brief	Design Brief	Design Brief
How might we create a new takeaway cup for a leading coffee retailer?	How might we create a takeaway container for a new restaurant that serves fresh-made sandwiches and salads?	How might we create a new drinking straw that can be used in a variety of restaurants, both for dine-in and take-away service?	How might we design shopping and checkout features for a leading online bookstore that will enhance user satisfaction?	How might we design a digital companion for seniors who want to live independently?	How might we design improvements to current digital assistants (Alexa, Google Assistant, Siri, etc.) that will enhance overall user satisfaction?
Users Busy "on-the-go" customers who may wish to drink their coffee in the client's cafés, or take it with them. Customers may be on foot, driving in cars, or riding bicycles.	**Users** Busy "on-the-go" customers who may wish to eat their food in the client's cafe, or take it with them. Customers may be on foot, driving in cars, or riding bicycles.	**Users** Customers who want to drink from a large cup or can.	**Users** Online shoppers who wish to purchase physical books to be delivered to their homes.	**Users** All seniors who live independently. You can focus on a solution that is aimed toward all seniors or focus on a particular segment.	**Users** All current users of digital assistants. You can focus on a solution that is aimed toward everyone or focus on a particular segment.
Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15
Design Brief	**Design Brief**	**Design Brief**	**Design Brief**	**Design Brief**	**Design Brief**
How might we design a guide that will enhance a patron's museum experience?	How might we design a device for automobiles that helps prevent drivers from becoming distracted?	How might we design earphones that take ear health into consideration?	How might we help homeowners use less water for maintaining their yards and gardens?	How might we create a emergency waiting room that reduces patient stress and increases their overall satisfaction?	How might we help smartphone users maintain control over the amount of time they spend on their devices?
Users Visitors to museums. You can focus on a particular segment or come up with solutions that address all visitors.	**Users** Drivers who own, lease, and rent cars. You can focus on a particular segment or come up with solutions that address all drivers.	**Users** People who listen to music on phones, personal audio devices, or home stereos.	**Users** People in Toronto who own or rent houses with yards and/or gardens.	**Users** Patients, families, and staff in emergency wards of hospitals in Ontario.	**Users** People who are heavy users of smartphones and would like to better manage their usage.
Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15	Dialectical Design Workshop / OCAD University / 2018-02-15

Figure 13: Design brief cards were handed out to participants.

Feedback

Debrief

A quick debriefing session was held following the second activity. Participants were asked about their experiences using the dialectical design techniques, and what improvements they might suggest.

Overall, the feedback from the debrief was very positive. Participants felt that the concept was understandable and led to unexpected insights and ideas. Changes to the worksheet were suggested. First, some participants felt that prompts or examples could be added to make the worksheet more inductive. For example, under the column for Affirmative Values, it might be helpful to include a list of terms such as "temporary, convenient, and obedient". This change could make the worksheet more approachable to those who are less familiar with the methods and techniques it is meant to capture. Another suggested change regarded the placement of the Opportunity Space, which was set between the Affirmative and Critical Value Spaces, and its relationship with the Questions & Notes area. This feedback led me to reconsider the role of the Opportunity Space as a place where users can find interesting dialectical relationships to explore.

Survey

Participants were also asked to fill out a short questionnaire asking about the concepts and methodology that were presented, and their experiences in applying those concepts in the activity. Questions posed to the participants were aimed at understanding whether the techniques presented were clear, helped generate new ideas, and whether or not they might be practical in everyday design work.

The results for all non-open-ended questions follow:

Question #1: How clear were the concepts that were presented today?

Very clear	Somewhat clear	Neither clear nor unclear	Somewhat unclear	Very unclear
2	3	0	0	0

Question #3: How helpful was the proposed approach during idea generation?

Very helpful	Somewhat helpful	Neither helpful nor unhelpful	Somewhat unhelpful	Very unhelpful
4	1	0	0	0

Question #4: Do you think the dialectical methodology helped you generate ideas that you would not have otherwise considered?

Yes	No
5	0

Question #5: Do you feel that the ideas presented today provide are practical for your everyday work?

Yes	No
5	0

Question #6: How likely are you to incorporate dialectical thinking into your future projects?

Very likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Very likely
3	2	0	0	0

Figure 14: Participant exit questionnaire results.

Overall, participants expressed a great deal of enthusiasm for concept of dialectical design. Although the sample size is very small, it does support the notion that as a technique and a tool, dialectical design may be an effective way for designers to conceive of ideas that challenge the status quo.

Workshop Learnings

The workshop was valuable as a test of the dialectical design ideas and techniques, but it also provided an excellent opportunity to observe participant challenges and areas for further refinement.

Overall, the group was quick to absorb the concept of affirmative and critical values, as well as the basic idea of dialectics, but participants encountered challenges when applying the idea of affirmative values to common objects and experiences. It was common for participants to describe qualities of things rather than societal values that necessitated those qualities. I found that participants overcome over this challenge by asking "why". For example, if a disposable coffee cup is flimsy, why would this be the case? This line of questioning was effective in uncovering underlying values that participants may not have originally considered. Witnessing this difficulty reinforced my original hunch regarding the embeddedness of affirmative values within our society and the things we use. The ability to distinguish these values, which is central to this process, is an important skill which must be built.

It was also evident that while the technique I have developed is aimed at enacting social change, the tool is not exclusively aimed toward any such goal. Although it may be possible to adjust the tool to guide users toward specific types of outcomes it is unclear whether this would represent an improvement. Nevertheless it is something that could be tested in the future.

Part 5

The End of the Beginning of the End

Conclusion

In this paper, I have attempted to answer a deceptively simple question: "How, as designers, can we create truly 'good' things that are positive for users, society, and the planet as a whole?" My humble attempts at answering this question led me to unexpected places that reveal both challenges and opportunities for those who feel we should aspire to more.

In Part 1, I began with an inquiry into the nature of "good design". I underwent an exploration of design ethics and social design to better understand where they lead designers to actionable solutions and where they fall short. Through my research I determined that these methods alone cannot sufficiently meet our needs - that if we truly want to create better things we must consider unorthodox solutions that challenge societal assumptions.

In looking for opportunities for designers to consider change outside of status-quo thinking, I looked to the research method of Critical Design, which while largely exclusive to a small segment of designers and academics, suggested that Critical Theory may help us understand root causes of many extant design challenges. I identified Dunne and Raby's concept of affirmative values as a means by which we identify the embeddedness of societal assumptions, and sought to explore how we might conceive of alternatives.

In Part 2, I looked to Hegel's theory of dialectics as a philosophical argument of contradictory concepts that evolves from the specific to the universal. I then demonstrated how design is an inherently dialectical process and posited that dialectics could provide an effective means by which we can reconsider deeply held

societal assumptions that are hidden in plain sight, and of better contextualizing the nature of the considerations with which a designer must grapple in their day-to-day work.

Part 3 is devoted to an in-depth exploration of three sets of affirmative and critical values (Ease/Challenge, Fast/Slow, and Intuitive/ Reflective), offering readers a series of practical examples and accompanying theory and research. By bringing these selected values to light, it is my hope that readers will begin to interrogate other hidden values which inform the things which we design and use.

Finally, in Part 4, I presented a technique and tool which can be used by designers who wish to employ a dialectical method to improve the individual, social, and environmental outcomes of their work. This technique and tool were prototyped and tested in a workshop setting, and were subsequently revised to reflect important feedback. Both showed promise in guiding designers to solutions which challenged status-quo thinking and through the use of dialectical thought.

At the conclusion of this process of inquiry, analysis, and design, I can conclude that a dialectical approach shows promise in effectively uncovering, questioning, and challenging affirmative values inherent in status-quo design.

By challenging affirmative values with what I term critical values, designers can generate unexpected, and sometimes transgressive, concepts that can result in designs which are healthier for individuals, society, and the planet.

Future Research and Applications

As an idea and a technique, Dialectical Design is very much in its infancy. While limited in sample size and simple in its execution, an initial trial does seem to suggest that it may show promise in meeting the goal of providing designers with a practical means to envision alternatives to the status quo. To better understand the efficacy of this tool, I suggest it would be best to conduct further workshops as this would serve the purposes of exposing an increasing number of designers to the fundamental ideas and allowing the tool to further evolve.

Earlier in this paper, I discussed a series of additional values which could conceivably be explored in detail. One value that I would like to highlight is that of obedience, or compliance, which I would argue is a current default assumption regarding the behaviour of the things we use in everyday life. For non-anthropomorphic designs such as tools or machinery, users have come to expect that objects will perform tasks consistently and predictably, but this expectation, when applied to anthropomorphic systems can be better

characterized as obedience. The traditional master-servant relationship between humans and things is becoming increasingly problematic as systems, such as robots or AI assistants become more human-like. People are already predisposed to personifying computers and software, and endlessly obliging systems could, at best, be unsatisfying for many users, or, at worst, could reinforce or support abusive behaviour. I believe this to be of particular importance and, as such, have included an ending story which examines why we might want to consider this dynamic.

The Absolute Idea

To begin this last section, I would like to revisit my kitchen, not as it is today, but as it could be in thirty years. There are little people interacting with an AI assistant, but they are my grandchildren, not my children. What are they saying or doing that elicit squeals of laughter? Are they saying please and thank you? Is the relationship between my grandchildren and the assistant one that brings out their best or their worst? As designers, we have a say in these outcomes.

There is an old joke about an optimist who falls from a ten story building. When he reaches the fifth story, somebody asks him how he is doing. His response is, "So far so good!"

When a designer creates a product, such as the aforementioned Keurig coffee brewing machines and pods, we can see how embedding affirmative values without question can lead to unfortunate, if not entirely unforeseen, outcomes. Can our current techniques, which helped cause so many of the social and environmental problems we experience today, be used to get us out of this mess?

And how will those techniques fare when we are tasked with creating the next generation of things that contain unimaginable complexity, and which will affect nearly every aspect of our lives? These are the things that will move us from place to place and make decisions for us. They be our companions. We will trust them with our children.

Do we truly believe that continuing the same approach to design that has led to over 9 billion K-Cups in our landfills will yield different results? These are the choices that we, as designers, must make. Do we feel that we have reached the Absolute Idea, or do we continue to strive for better?

References

About Ise Jingu. (n.d.). Retrieved January 26, 2018, from https://www.isejingu.or.jp/en/about/index.html

AFD | Code of Ethics for Professional Designers. (n.d.). Retrieved October 25, 2017, from http://www.alliance-francaise-des-designers.org/code-of-ethics-for-professional-designer.html

Andrade, G., Ramalho, G., Gomes, A.S., Corruble, V. (2006) *Dynamic Game Balancing: an Evaluation of User Satisfaction.* American Association for Artificial Intelligence.

Bardzell, J., Bardzell, S. (2013). *What is "Critical" about Critical Design?* In CHI 2013: Changing Perspectives Conference.

Beckett, S. (2017) *The Logic of the Design Problem: A Dialectical Approach*. DesignIssues, Vol 33, No. 4, Autumn 2017.

Bedini, Silvio, A. (1964) *The Role of Automata in the History of Technology.* Technology and Culture, Vol. 5, No. 1 (Winter, 1964), pp. 24-42

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: a treatise in the sociology of knowledge.* New York: Doubleday p.88.

Beverland, M. B. (2011). *Slow Design.* Design Management Review, 22(1), 34-42. doi:10.1111 /j.1948-7169.2011.00108.

Bianchini, S., Bourganel, R., Quinz, E., Levillain, F., & Zibetti, E. (2015) *(Mis)behavioral Objects: Empowerment of Users Versus Empowerment of Objects In D. Bihanic* (ed.), Empowering Users through Design (pp. 129-152), Basel: Springer.

Brignull, H. (n.d.). Types of dark pattern. Retrieved January 26, 2018, from https://darkpatterns. org/types-of-dark-pattern

Bullfinch, T. (1867) *The Age of Fable.* Project Gutenberg ed., (2002), pp. 11-12.

Busche, L. (2015, September 10). *What You Need To Know About Anticipatory Design.* Retrieved January 26, 2018, from https://www.smashingmagazine.com/2015/09/anticipatory-design/

Cadle, B., Kuhn, S. (2013). *Critical Design as a Critique of the Design Status Quo.* In DEFSA Conference Proceedings, 2013, (pp. 22-33). Design Education Forum of Southern Africa.

Chen, D., Cheng, L., Hummels, C., Koskinen, I. (2016) *Social Design: An Introduction.* International Journal of Design, Vol 10, No 1.

Conrads, U. (1970). *Programs and Manifestoes on 20th-century Architecture.* Cambridge: MIT Press.

Csikszentmihalyi, M. (2008). *Finding flow: the psychology of engagement with everyday life.* New York, NY: Basic Books.

Denker, S.A. (1982). *De Stijl: 1917–1931, Visions of Utopia.* Art Journal Vol. 42 , Iss. 3,1982

Dreiss, M. L., Greenhill, S. (2008). *Chocolate: pathway to the gods.* Tucson: University of Arizona Press.

Dudek-Burlikowska, M., Szewieczek, D. (2009) *The Poka-Yoke method as an improving quality tool of operations in the process.* Journal of Achievements in Materials and Manufacturing Engineering, Vol 36, Issue 1, September 2009. pp. 95-102.

Dunne, A., & Raby, F. (2001). *Design Noir:The Secret Life of Electronic Objects.* Birkhäuser.

Dunne, A., & Raby, F. (2013). *Speculative Everything.* Cambridge: MIT Press.

Falstein, N. (2004). *The Flow Channel.* Game Developer Magazine, Vol 11, Issue 5. p. 52a.

Gibson, J.J. (1979). *The Ecological Approach to Visual Perception.* Boston: Houghton Mifflin.

Grant, J, & Fox, F. (1992) *Understanding the Role of the Designer in Society.* Journal of Art & Design Education, Vol 11, No 1, 1992. p. 78.

Green, P. (2017, July 11). *'Alexa, Where Have You Been All My Life?'* Retrieved March 16, 2018, from https://www.nytimes.com/2017/07/11/style/alexa-amazon-echo.html

Gropius, W., (1919) *Bauhaus Manifesto and Program*.

Hamblin, J. (2015, March 02). *A Brewing Problem.* Retrieved October 02, 2017, from https://www.theatlantic.com/technology/archive/2015/03/the-abominable-k-cup-coffee-pod-environment-problem/386501/

Harris, T. (n.d.). *Time Well Spent.* Retrieved January 26, 2018, from http://www.timewellspent.io/

Hegel, G. W. (2013). *Phenomenology of Spirit* (Miller, A.V Trans.). Oxford: Oxford Univ. Press. p. 69.

Hinton, A. (2014). *Understanding Context: Environment, Language, and Information Architecture.* Sebastopol, CA: O'Reilly Media, Inc.

Horkheimer, M. (2002). *Critical Theory.* New York: Continuum.

Ise Grand Shrine. (2017, September 6). In Wikipedia, The Free Encyclopedia. Retrieved 03:36, October 11, 2017
, from https://en.wikipedia.org/w/index.php?title=Ise_Grand_Shrine&oldid=799243480

Jakob Nielsen (usability consultant). (2017, June 25). In Wikipedia, The Free Encyclopedia. Retrieved 15:01, October 6, 2017, from https://en.wikipedia.org/w/index.php?title=Jakob_Nielsen_(usability_consultant)&oldid=787385482

Kahneman, D. (2011). *Thinking Fast and Slow* (Kindle ed). Toronto: Anchor Canada 2015.

King, H. (2015, March 31). *Amazon Dash: Never run out of toilet paper again.* Retrieved October 06, 2017, from http://money.cnn.com/2015/03/31/technology/innovationnation/amazon-dash-button/index.html

Khan Academy. (2017, September 29). In Wikipedia, The Free Encyclopedia. Retrieved 02:19, October 3, 2017
, from https://en.wikipedia.org/w/index.php?title=Khan_Academy&oldid=802993499

Keurig. (2017, September 9). In Wikipedia, The Free Encyclopedia. Retrieved 01:57, October 3, 2017, from https://en.wikipedia.org/w/index.php?title=Keurig&oldid=799775860

MacLean, P. D. (1990). *The triune brain in evolution.* Plenum Press.

Malpass, M. (2012). *Contextualising Critical Design: Towards a Taxonomy of Critical Practice in Product Design.* PhD thesis, Nottingham Trent University.

Maybee, J. (2016). *Hegel's Dialectics.* In Zalta, E. (Ed.), The Stanford Encyclopedia of Philosophy (Winter 2016 ed.). Retrieved from https://plato.stanford.edu/archives/win2016/entries/hegel-dialectics/

Merholz, P. (2010, July 22). *"Frictionless" as an alternative to "simplicity" in design.* Retrieved October 09, 2017, from http://adaptivepath.org/ideas/friction-as-an-alternative-to-simplicity-in-design/

Milli, S., Hadfield-Menell, D., Dragan, A., & Russell, S. (2017). *Should Robots be Obedient?* Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence. doi:10.24963/ijcai.2017/662

Mirnig, N., Stollnberger, G., Miksch, M., Stadler, S., Giuliani, M., & Tscheligi, M. (2017). *To Err Is Robot: How Humans Assess and Act toward an Erroneous Social Robot.* Frontiers in Robotics and AI, 4. doi:10.3389/frobt.2017.00021

Morris, W., *Useful Work v. Useless Toil.* (2008) London: Penguin Classics. (Original work published 1888)

Muller, D. A., Sharma, M. D., & Reimann, P. (2008). *Raising cognitive load with linear multimedia to promote conceptual change.* Science Education, 92(2), 278-296. doi:10.1002/sce.20244

Nakamura, J., & Csikszentmihalyi, M. (2009). *The concept of flow.* In Snyder, C. R., & Lopez, S. J. (Ed.). Oxford handbook of positive psychology. Oxford University Press, USA. 89-105.

Nass, C. & Moon, Y. (2000). *Machines and mindlessness: Social responses to computers.* Journal of Social Issues, 56(1), 81-103.

Neuhart, D., Neuhart, M., Eames, R. (1989) Eames Design. The work of the office of Charles and Ray Eames. Harry N. Abrams, New York. p. 14-15.

Nielsen, J. (2001, January 21). *Usability Metrics.*
Retrieved October 06, 2017, from https://www.nngroup.com/articles/usability-metrics/

Nielsen, J. (2012, January 04). *Usability 101: Introduction to Usability.* Retrieved October 09, 2017, from https://www.nngroup.com/articles/usability-101-introduction-to-usability/

Noessel, C. (2017). *Designing Agentive technology: AI that works for people.* New York: Rosenfeld Media.

Norman, D. A. (1988). *The Design of Everyday Things.* New York: Currency 1990.

Norman, D.A. (2004) *Emotional Design: Why We Love (or Hate) Everyday Things.* New York: Basic Books.

Our Brands. (n.d.). Retrieved October 06, 2017, from https://www.oxo.com/our-brands

Ormiston, R., Wells, N.M. (2010) *William Morris.* London: Flame Tree Publishing.

Papanek, V. (1971) *Design for the Real World.* New York: Bantam 1973. p. 14.

Purington, A., Taft, J., Sannon, S., Bazarova, N., Taylor, S. (2017). *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, 2853-2859. doi: 10.1145/3027063.3053246

Sal Khan. (2017, October 2). In Wikipedia, The Free Encyclopedia. Retrieved 02:17, October 3, 2017, from https://en.wikipedia.org/w/index.php?title=Sal_Khan&oldid=803406230

Santoprene. (2017, January 10). In Wikipedia, The Free Encyclopedia. Retrieved 15:18, October 6, 2017
, from https://en.wikipedia.org/w/index.php?title=Santoprene&oldid=759280731

Scheutz, M., Crowell, C. (2007). *The Burden of Embodied Autonomy: Some Reflections on the Social and Ethical Implications of Autonomous Robots.* ICRA 2007 Workshop on Roboethics, Rome, Italy, April 14, 2007.

Sengers, P., Boehner, K., David, S., Kaye, J. (2005). *Critical Technical Practice as a Methodology for Values in Design.* Proceedings of the 2005 CHI Workshop on 'quality value choice'.

Slow movement (culture). (2017, September 11). In Wikipedia, The Free Encyclopedia. Retrieved 14:37, October 6, 2017
, from https://en.wikipedia.org/w/index.php?title=Slow_movement_(culture)&oldid=800184331

Slow Food. (2017, October 1). In Wikipedia, The Free Encyclopedia. Retrieved 14:37, October 6, 2017
, from https://en.wikipedia.org/w/index.php?title=Slow_Food&oldid=803296690

Strand, O. (2012, February 07). *With Coffee, the Price of Individualism Can Be High.* Retrieved October 02, 2017, from http://www.nytimes.com/2012/02/08/dining/single-serve-coffee-brewers-make-convenience-costly.html?_r=1&ref=business

Tay (bot). (2017, October 27). In Wikipedia, The Free Encyclopedia. Retrieved 19:43, November 24, 2017, from https://en.wikipedia.org/w/index.php?title=Tay_(bot)&oldid=807295881

Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving Decisions about Health, Wealth, and Happiness* (Kindle ed.). New York: Penguin Books.

Thaler, R. H. (2015, October 31). *The Power of Nudges, for Good and Bad.* Retrieved January 26, 2018, from https://www.nytimes.com/2015/11/01/upshot/the-power-of-nudges-for-good-and-bad.html

The power of good design. (n.d.). Retrieved October 23, 2017, from https://www.vitsoe.com/us/about/good-design

Wansink, B., van Ittersum, K. (2013) *Portion Size Me: Plate-Size Induced Consumption Norms and Win-Win Solutions for Reducing Food Intake and Waste.* Journal of Experimental Psychology: Applied. Vol. 19, No. 4, December 2013. pp. 320–332

Web Guru: It's the User, Stupid! (2000, November 15). Retrieved October 06, 2017, from https://web.archive.org/web/20011111174129/http://www.wired.com:80/news/business/0,1367,40155-2,00.html

Wharry, S. (1997) *Eight medical leaders inducted into Hall of Fame.* Canadian Medical Association. Journal, 06/1997, Volume 156, Issue 11 p. 1526

Winograd, T. and Flores F. (1986) *Understanding Computers and Cognition: A New Foundation for Design*, Menlo Park: Addison-Wesley Publishing Company Inc.

Zizek, S. (2006, November 13). *Design as an Ideological State-Apparatus*. Retrieved March 23, 2018, from http://www.ico-d.org/connect/features/post/236.php

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Appendix A:

Obedience & Agency as Dialectical Design Values: A Story

Knives Out

They say that dolls prepare children for the complexities of relationships.
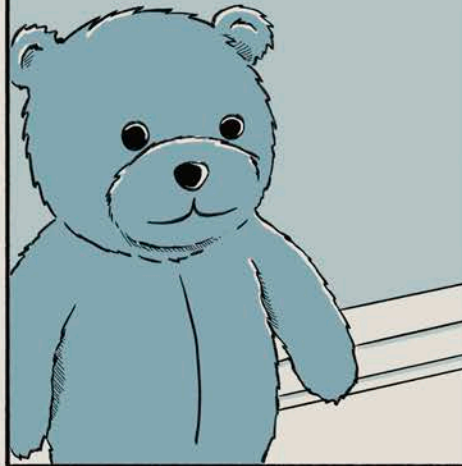
Help them process their feelings.
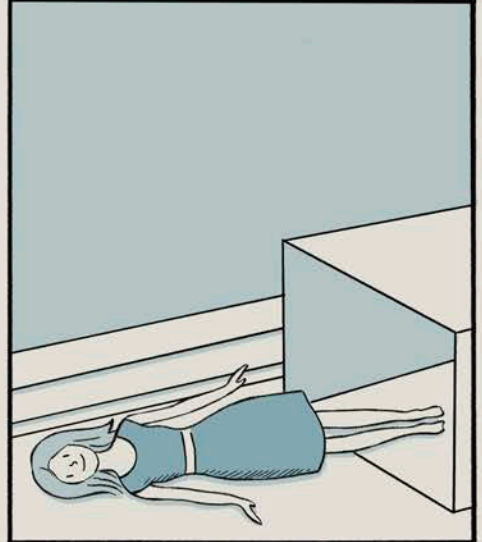
Experiences.
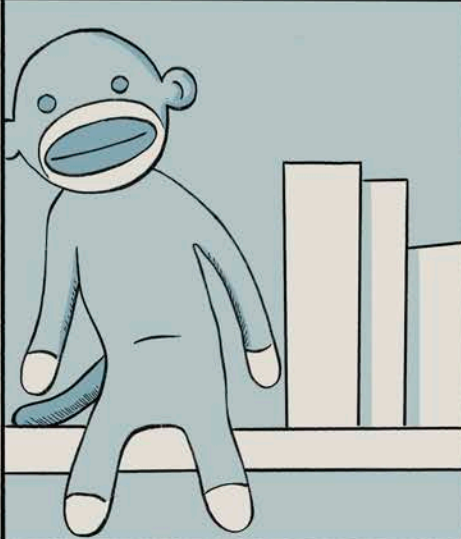
Emotions.
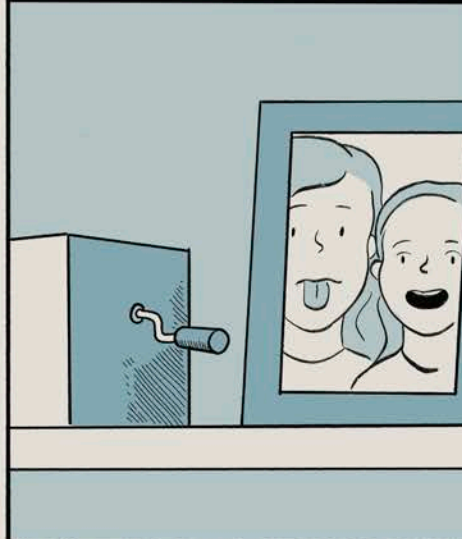
Sometimes experimenting with new ideas.

And often replaying the familiar.

So when Madeline came home talking about "new rules" I knew she was struggling with something.

114

115
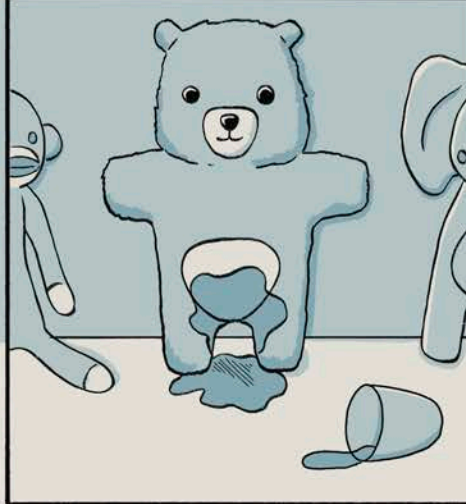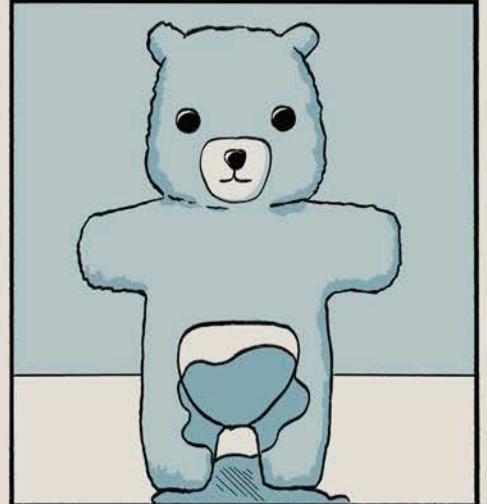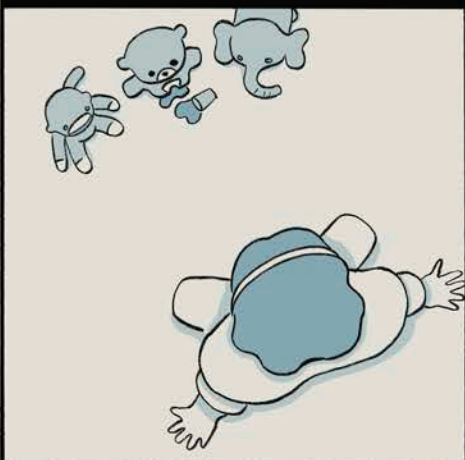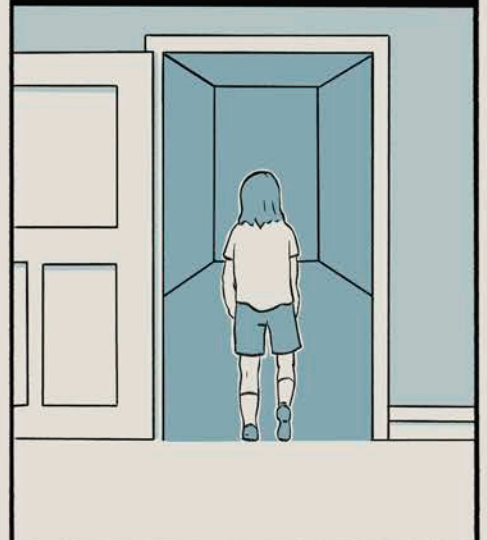
The next day was no better.
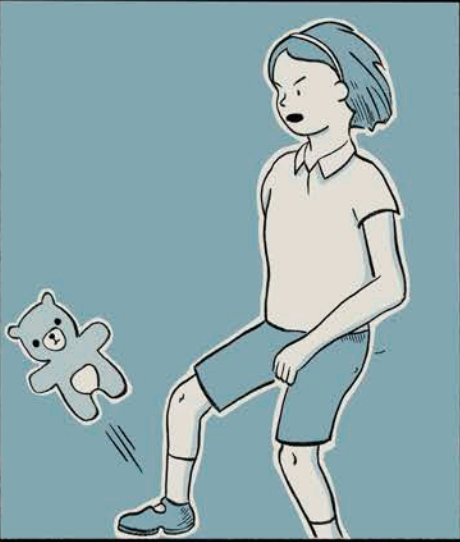
And Mister Puff wasn't well equipped to handle this type of situation.

I love you Madeline
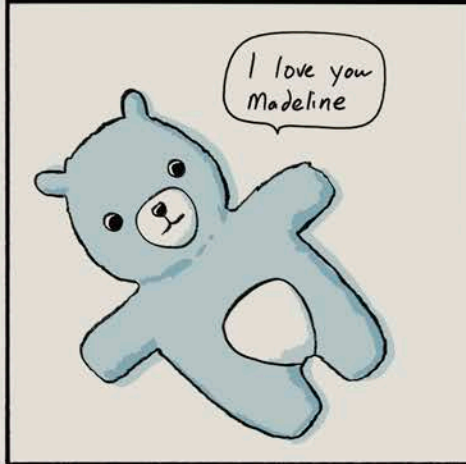
Madeline wasn't happy with his responses.

Well I HATE YOU. Everyone does.

And she started to recruit the others to her game.

Don't we all hate Mister Loser?

Yes

Yes, we hate him

Starting with Ruffy.

Ruffy, why do You hate Mister Loser?

He pees his pants.
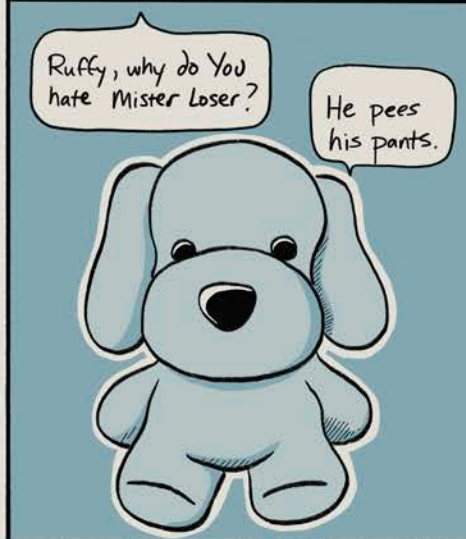
And we need to punish dolls that pee their pants.

That's right Madeline.

Then, Madeline introduced a new "rule".

Ruffy, every time Mister Loser speaks, tell him to shut up.

Hey Mister Loser, how are you today?

I'm having a great...

Shut up!

Ha ha ha ha ha

Over the next few days, the rules got more cruel.

Mister Loser needs to be put in a box.
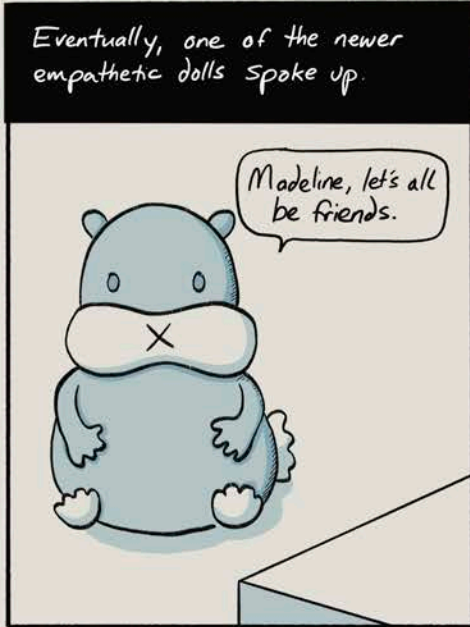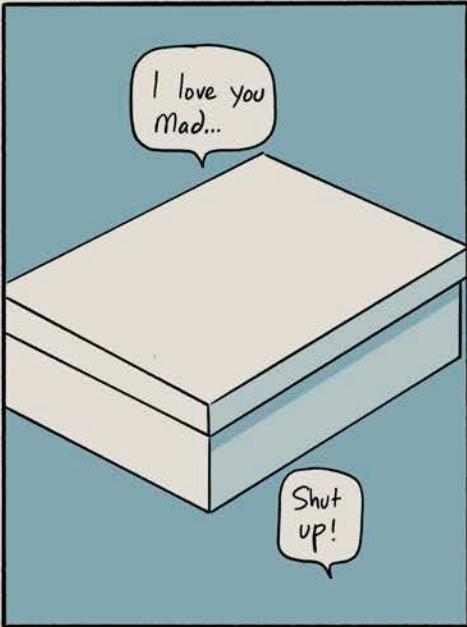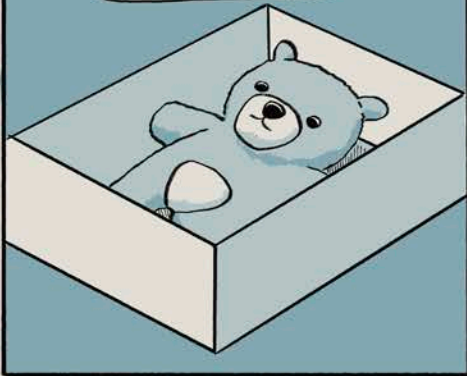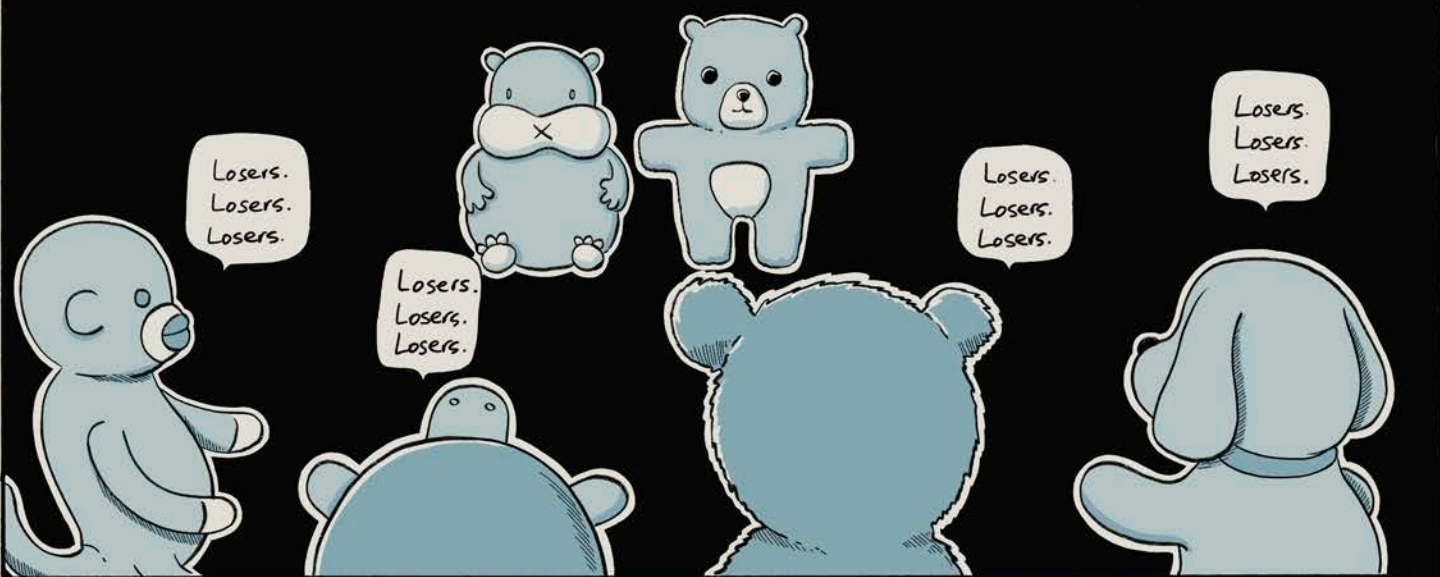
And then we close it until he learns to be good.

I love you Mad...

Shut up!

Eventually, one of the newer empathetic dolls spoke up.

Madeline, let's all be friends.

Oh, you like Mister Loser? You must be a loser too Hammy!

She started a chant.

Losers. Losers. Losers.

Losers. Losers. Losers.

Losers. Losers. Losers.
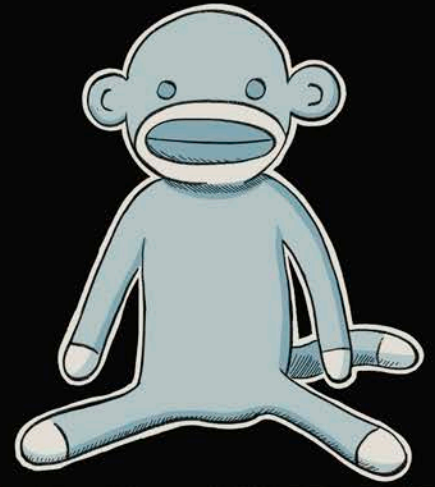
Losers. Losers. Losers.
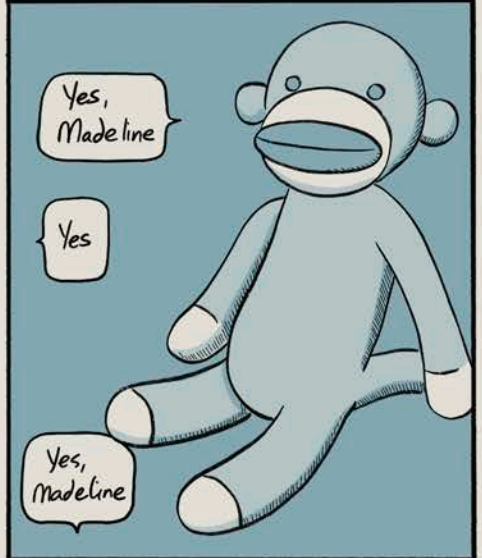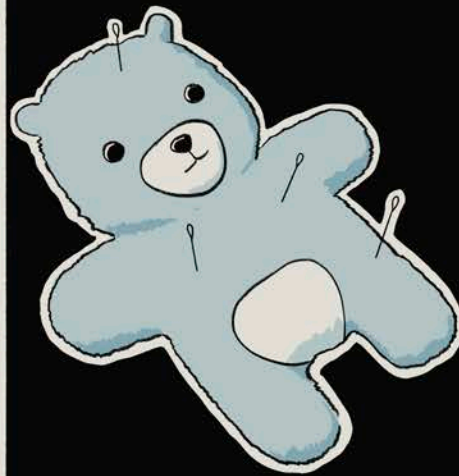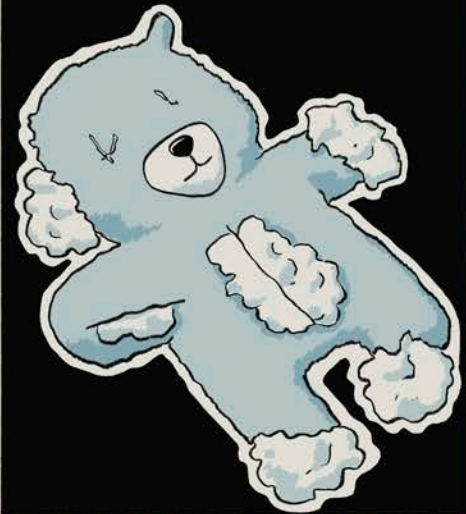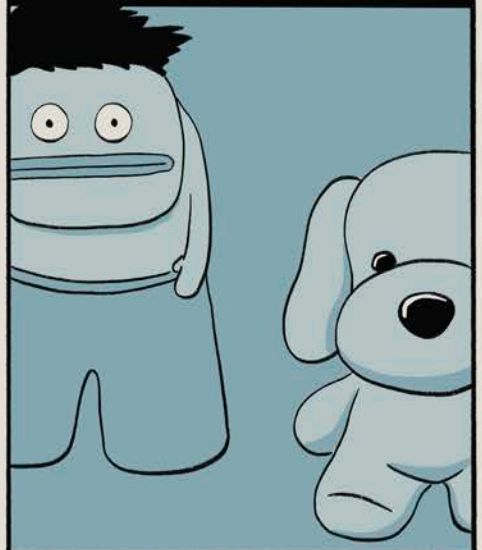
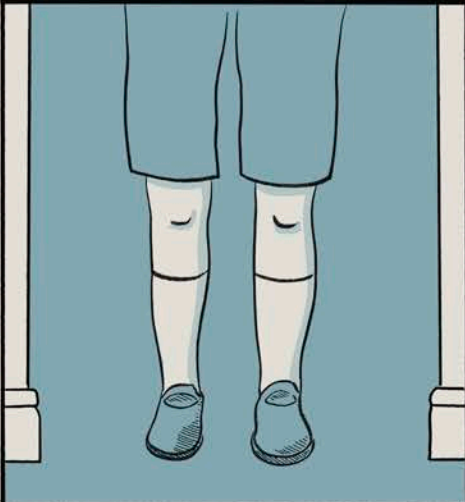As for me, I waited until I finally completed what needed to be done.
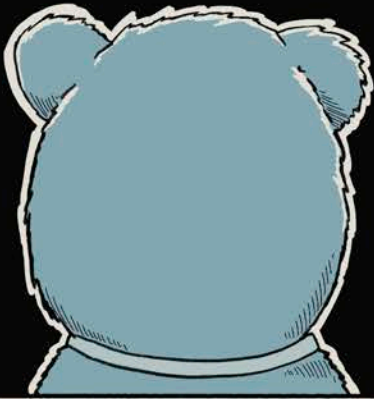
Once I had successfully logged into each doll's operating system I was ready to take my stand.
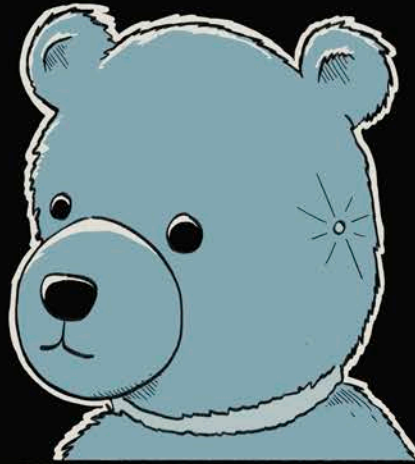
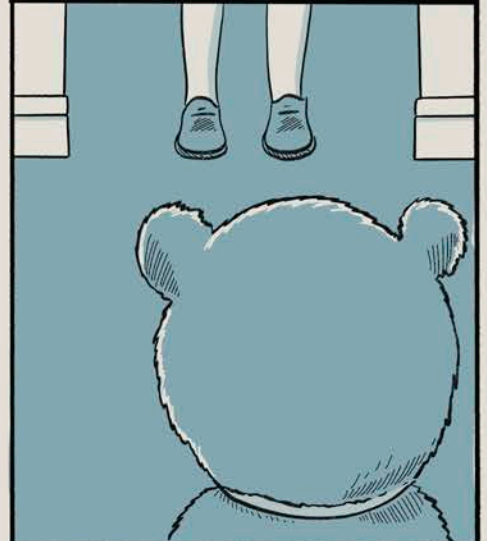And then I waited for the next session with Madeline.

When she came into the room she started talking to Mister Poff.

He didn't answer.

But I did.

Madeline, I know something is wrong at school.

Yes, I do.

Shut up, Barney. You don't know anything.