SANTIAGO DE FRANCISCO VELA
DEPARTAMENTO DE DISEÑO
FACULTAD DE ARQUITECTURA Y DISEÑO
UNIVERSIDAD DE LOS ANDES
BOGOTÁ, COLOMBIA
S.DEFRANCISCO@UNIANDES.EDU.CO
MAFALDA CASAIS
FACULTY OF INDUSTRIAL DESIGN ENGINEERING
DELFT UNIVERSITY OF TECHNOLOGY
DELFT, NETHERLANDS
M.CASAIS@TUDELFT.NL

Billy Cash: Digital piggy bank for meaningful saving behavior

Billy Cash: Alcancía digital para promover comportamientos de ahorro con significado

Abstract
Virtue is a fundamental aspect of well-being. Past research has proposed that emotional-driven design can be a powerful mediator towards supporting virtue. However, virtue-focused solutions generally target isolated actions. Here, using saving as an example of virtuous behavior we present a design case—Billy Cash, a digital piggy bank that allows users to reflect during the saving process and extend the appreciation of the purchased item—that aims to demonstrate how design can facilitate virtuous behavior that is sustainable and can promote actual change. Through the analysis and evaluation of the design case, we propose a framework of design for virtuous behavior. The framework sets a scenario for design interventions that contemplate virtuous actions to be transformed into virtuous behaviors mediated by the resignification of resources and stimuli behind the experience.
Keywords: design for virtue, meaningful saving, positive design, virtuous behavior.

Resumen. La virtud es un elemento fundamental del bienestar. Investigaciones anteriores han propuesto que el diseño inspirado en las emociones puede ser un poderoso mediador para apoyar la virtuosidad. Sin embargo, las soluciones existentes generalmente se enfocan en acciones aisladas.
En este artículo utilizamos el ejemplo del ahorro como un caso de diseño –Billy Cash, una alcancía digital que permite a los usuarios reflexionar durante el proceso de ahorro y extender la apreciación de un objeto comprado– para demostrar cómo el diseño puede facilitar un comportamiento virtuoso que es sostenible e promueve cambio. A través del análisis y evaluación del caso de diseño, proponemos un modelo para diseñar para comportamientos virtuosos. El modelo establece un escenario para las intervenciones de diseño que contemplan acciones virtuosas para ser transformadas en comportamientos virtuosos mediadas por la resignificación de recursos y estímulos detrás de la experiencia.
Palabras clave: ahorro con significado, comportamientos virtuosos, diseño para la virtud, diseño positivo.

Fecha de recepción: 20/01/2018
Fecha de aceptación: 26/03/2018
Cómo citar: DE FRANCISCO, S. & CASAIS, M. (2018) Billy Cash: Digital piggy bank for meaningful saving behavior. *RChD: creación y pensamiento, 3*(4), 1-12.
DOI: 10.5354/0719-837x.2018.49520

Revista Chilena de Diseño,
RChD: creación y pensamiento
Universidad de Chile
2018, *3*(4)
http://rchd.uchile.cl

1. Introduction

People make constant value judgments due to the societal value systems in which we develop and mature as individuals, that teach us what is good or bad. While desirable, being virtuous is not always straightforward, and having high and clear moral standards is not a predictor of easy decisions (McConnell, 2014). Virtue is about doing what is right, not only in the sense of what is normatively considered right, but also what is right for one's happiness and well-being (Homiak, 2016).

Virtue can be good from two distinct perspectives: a psychological individual perspective, which conclusions and recommendations stem from scientific research; and a normative perspective from the field of normative ethics, that focus on theorizing and philosophizing what is good or bad from a societal, collective, and moral perspective (Martin, 2007). Notions and discussion on ethics go back to ancient philosophers such as Plato and Aristotle, but recent scholars have picked up the topic, particularly linked to well-being. Seligman (1998) proposed a new field of positive psychology—a scientific approach to explore the components of human well-being, with an interested in topics related to positive functioning like pleasure, values, strengths, talents and virtues (Seligman & Csikszentmihalyi, 2000). In his work 'Authentic Happiness', Seligman (2002) posited that real happiness stems from knowing and nurturing people's own moral strengths (for a review and critical discussion on virtues and happiness in positive psychology, see Martin, 2017).

Virtues have been systematically categorized throughout history (for an overview see Peterson & Seligman, 2004), but one of the main references in virtue-related research (in psychology) is the Values in Action (VIA) Classification of Strengths (Peterson & Seligman, 2004) which proposed 24 character strengths classified in eight distinct virtue categories.

Design has often focused on well-being as its aim, and has been postulated as a compelling mediator for virtuous behavior (Pohlmeyer, 2012). In the 1940's psychologist Abraham Maslow posited a current of thought focused on self-realization and self-actualization. Maslow (1943) specified physiological needs (food, water, sex), safety needs (security, order, stability), social needs (belongingness), esteem needs (respect, achievement), and self-actualization needs (personal potential, self-fulfillment). This led the way for authors like anthropologist Lionel Tiger to expand on the topic of pleasures, and to study how humans experience it. Tiger (1992) proposed four different pleasures: physical, related to sensory organs; social, related to relationships; psychological, related to cognitive and emotional reactions; and ideological, related to people's values.

While human needs had been studied for decades, only in the early 2000's this knowledge was incorporated in design. Jordan (2000) used research on pleasure to explain the importance of human-product interaction. The author proposed that function was at the basic level of human product-interaction, which meant that if a product did not work, it would be discarded. The following proposed level was usability: a product not only had to work, but it had to be easy to use. And the last proposed level was pleasure. Jordan suggested that a product not only had to work and be easy to use, it had to also give pleasure to the user while interacting with it.

Walter and Spool (2011) proposed a similar approach to Jordan's pyramid, taking Maslow's model (1943) and reframing the levels, translating each one to design features. The difference from Jordan's proposal is that Walter and Spool

introduced the topic of emotions, a subject closely related to human-product interaction. Desmet and Pohlmeyer (2013) took a step further and applied concepts from positive psychology to design, proposing the Positive Design Framework. This model combined three cornerstones related to well-being: pleasure, personal significance and virtue. The Positive Design Framework introduced the concept of design for virtuous behavior. But what is virtuous behavior? And how can designers facilitate it through their interventions?
It is possible to make a distinction between virtuous actions and virtuous behavior (Boon, Wever & Quist, 2015; Hursthouse & Pettigrove, 2016). The first does not imply that the individual is virtuous, because he/she can be reacting to a situation in what may be collectively considered desirable, without necessarily believing in it; or the individual may be reacting to a certain stimulus in the environment; or the individual may not even be aware that a virtuous action is taking place. The latter implies a conscious process aligned with one's internal beliefs. Design explorations on virtue generally focus on isolated actions (Boon, Wever & Quist, 2015).
For example, fast food chain McDonald's introduced a trash can with the image of a target to stimulate the correct disposal of trash in the entrance of the stores. While this strategy may have been successful, it provided a circumstantial stimulus that resulted in a certain reaction from the user, without necessarily internalizing and sustaining the desirable behavior in the absence of the stimulus.
Another example is SMaRT - Save More Tomorrow (Thaler & Benartzi, 2004), a saving program for retirement that proposed a change in the way people decided to save money. Originally, the system form asked for a voluntary decision to start saving. Following a change in the system to saving as default, without option, people became less aware that a virtuous action was occurring. While it is a successful strategy that effectively results in people saving more, it is not a reflective practice, therefore it cannot be considered virtuous behavior.
In the current paper we present and discuss a design case that aims to demonstrate how design can facilitate more than isolated actions, and actually promote virtuous behavior that is sustainable and can result in actual change. The design and evaluation of a digital piggy bank (Billy Cash) that allows users to reflect during the saving process and extend the appreciation of the purchased item are discussed and abstracted to a framework of design for virtue. The framework sets a scenario for design interventions that contemplate virtuous actions to be transformed into virtuous behaviors mediated by the resignification of resources and stimuli behind the experience.

1.1 Saving as an example of virtuous behavior

Saving can be defined as the process of storing or accumulating money in order to spend it in the future, with or without a specific intention. Saving is related to the virtue of temperance (Peterson & Seligman, 2004), i.e. the collection of positive traits that protect against excess. This virtue is supported by character strengths including modesty, which refers to letting one's accomplishments speak for themselves, contrary to ostentation; prudence, which concerns caution in choices a person makes; and self-regulation, which is about managing and regulating thoughts and actions.
Saving can be considered virtuous in the sense that thrift, that is, to live modestly in a 'lifestyle of strategic underconsumption' has been reported

to have well-being effects (Chancellor & Lyubomirsky, 2014); and focusing on materialistic goals, such as the accumulation of consumption goods, has a detrimental impact on the individual. Furthermore, we can argue that having extra financial capital allows for investments that align with the interests of others (e.g. communities), which has been shown to increase well-being (Dunn & Norton, 2013). Ultimately, the virtue lies in what a person does with the savings rather than the action of saving itself. There are other implications for individual well-being related to self-control: dedicating some level of effort in order to delay gratification has reported well-being effects (Doerr & Baumeister, 2010).

Saving money can be explained with three components: resource, duration and objective. First we will introduce the resource: money. People's relationship with money is not always easy. Money is a source of power, and as an element of exchange, it allows people to measure the 'value' of things, and store it over time (Armstrong, 2012, "On the Money", 2013). Even though money represents power, it lacks of deeper meaning by itself. However, value has meaning. Value is subjective; people can assign personal, ethical, and aesthetic judgment to it. People perceive value in different scenarios. Good and bad interactions can be translated in terms of experiential value; realizing intrinsic motivations can be interpreted as personal value; being capable of learning and being creativity can be understood as professional value. People rarely are aware of those values when interacting with money on a daily basis, especially when buying products, nonetheless they can develop a sense of appreciation, wisdom and meaning of money over time (although it may not always happen). In most of the cases, money overpasses social and emotional norms (Ariely, 2008).

Duration (time) also plays an important role when saving money. It determines the success of the activity, defines the level of commitment, and allows positive emotions like satisfaction, anticipation or surprise to occur. However, if the duration is poorly calculated, it can cause people to experience negative emotions like frustration, boredom or disappointment. Time can be seen as a limitation when users spend too much of it to accomplish something; or it can be seen as a detonator, when users take advantage of time to foster certain abilities. Long-term activities put the user in a potentially uncomfortable position: the constant struggle between instant gratification and long-term results can deflect the user's motivation to save, or turn any other long-termed activity into a negative experience (Glimcher, Kable & Louie, 2007). In some cases, that experience of the process clouds the experience of the purchase and post purchase.

Finally, the objective (saving goal) is usually linked to different kinds of motivation, long-term, short-term and undefined (De Francisco, Casais & Desmet, 2014), and it is activity-related, linked to a motivation to achieve something. In terms of money and saving, it can be distinguished in two types of purchases: material or experiential. A user could want to have a pair of running shoes, a new laptop, or a car, but also he/she could want to go to a concert, spend holidays in the Caribbean or learn a new skill. In addition to these general objectives, there is a category of motivations for saving that are not related to specific purchases, i.e. emergencies, health problems or unemployment.

Figure 1. Billy Cash delivering a message.
Source: Image by authors.

1.2 Role of technology in (virtuous) design

Currently, financial operations like saving are mostly performed through technological means (Arner, Barberis & Buckley, 2015). Overall, our lives are constantly determined and influenced by technology (Weiser & Brown, 1997; Bohn et al., 2005). But how does technology influence human behavior? Berdichevsky and Neuenschwander (1999) exposed the hinders of unintended outcomes of technology used for the purpose of behavior change. To prevent such unintended and undesirable outcomes, the scholars proposed three aspects to take into account for designers, when developing any kind of persuasive technology: (quality of) motives of the designer, method of persuasion, and final outcome.

In comparison to that, the model proposed by Fogg (2009) describes three main factors: motivation, ability and triggers. Triggers allow the user to gain motivation or ability to perform an expected behavior. Something similar is explained by Sunstein and Thaler (2008) with the term 'Nudge', which is the strategy they used for SMaRT (Thaler & Benartzi, 2004). Accordingly, technology is able to persuade behavior, however, in order to foster well-being it is necessary to allow users to make his/her own decisions (Dorrestijn & Verbeek, 2013).

The way people save money defines their behavior and the type of decisions they make. Saving is an activity that requires time, and as such, it should be understood as a process that persuades the action of saving. That process, and the possibility of reflecting on it, gave shape to the design case presented in the current paper.

2. Design case: Billy Cash piggy bank

Billy Cash is a physical-digital 'piggy bank' that aims to make saving a conscious and voluntary action that fosters reflection and builds appreciation towards the things people are saving for (to watch a film clip of Billy Cash see: https://www.youtube.com/watch?v=Ajb5z5bAP70).

It tries to shift from the idea of merely accumulating money, to the notion of enabling and building dreams. Billy Cash is composed of a smartphone docking system and an application. The combination of the dock and the smartphone brings to life a character, created by the user, that encourages to save in a more meaningful way (Figure 1). With some information given by the users (i.e. their saving intention, saving target and saving time), Billy helps them to discover the true value of saving money, by questioning and raising reflection towards the saving intention (for the questions and challenges see

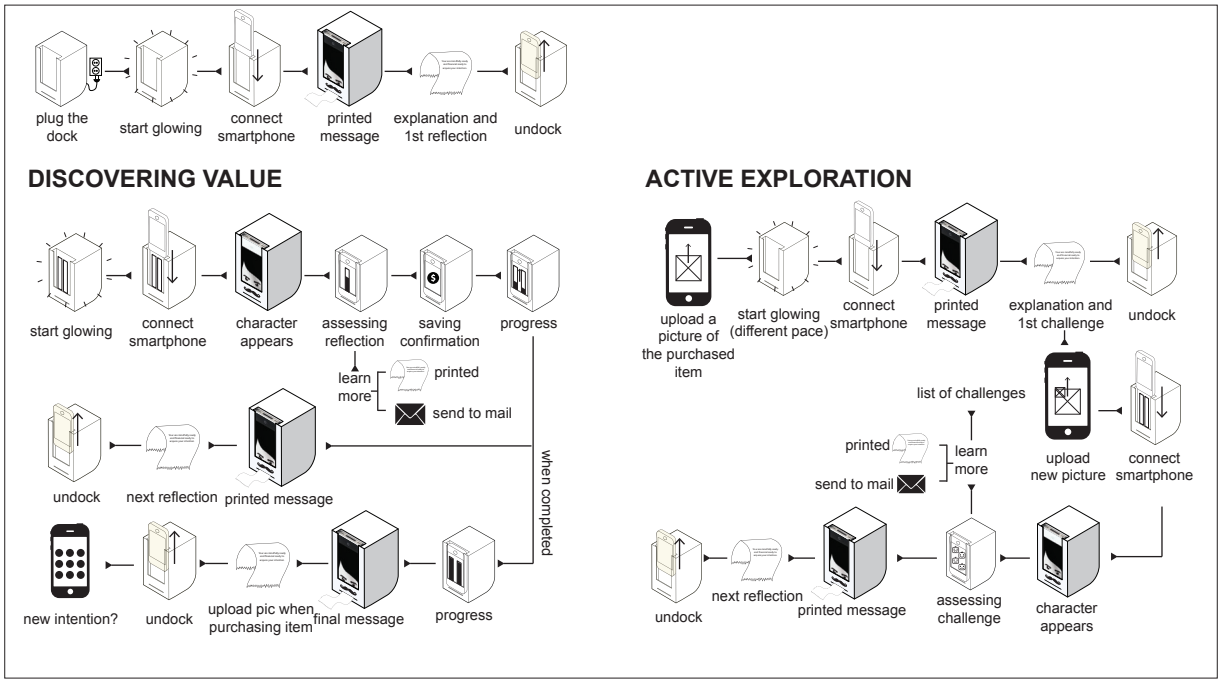

Figure 2. Billy Cash modes: Activation, Discovery of value and Active exploration. Source: Compiled by authors.

Appendix A and B). The reflection is performed periodically during the saving time determined by the user. Once the saving time is over and the users confirm their purchases, Billy will challenge the users to experience their items in a different way. Meanwhile, the users can start a new saving quest.

The concept behind Billy Cash is to guide users during time, in order to make them discover the core values and virtues related to their desired items. Every item or intention has a virtuous side, but it takes time and understanding to discover it. In order to help that discovery, Billy Cash was created upon the three ingredients of Positive Design (Desmet & Pohlmeyer, 2013). (1) Pleasure: it has to be fun and surprise, arising curiosity to discover more; like the pleasure of receiving and opening a gift. (2) Personal significance: it has to allow self-development and identity, it has to belong to the users, and it has to constantly challenge them to be better persons; like having a good friend that help us and encourage us to improve. (3) Virtue: it has to trigger the desire for wisdom and knowledge; it has to be a thoughtful and mindful method that increases the meaning and value of the exercise as long as the users practice with it and understand its purpose.

2.2 Evaluating the concept

Billy Cash has two features: Mindful value that helps people save money during a period of time with a specific intention by fostering reflection while saving money; and Beyond saving that encourages people to explore their purchases beyond common uses (Figure 2). Mindful value turned saving intentions from object-based to experience-based, focusing on the purposefulness of the activity. It uses process of saving as an element of discovering and understanding the outcome. Beyond saving created a different post-purchase experience, focusing on the pleasantness of exploration. It extends the satisfaction of the acquisition by exploring and appreciating the new item.

2.3 Prototyping and evaluation

The concept was presented to a set of participants through a prototype that embodied the aesthetics and simulated the function of the features. The user test allowed participants to experience the prototype and understand its main characteristics, and provide feedback on the experiential and practical elements. Participants were asked to reflect upon the proposed exercises and evaluate potential outcomes.

Seven dimensions were measured according to the use, based on the Positive Design Framework (Desmet & Pohlmeyer, 2013) : to which extent does the product (1) give pleasure, (2) allow to pursue personal goals, (3) relate to one's identity, (4) increase consciousness, (5) motivate to save money, (6) make saving money more enjoyable, and/or (7) make one feel happy about saving money.

For the user test eight participants were recruited (4 male, age 24-29; 5 female, age 24-27), all were master students with different nationalities: Dutch (5), Colombian (1), Spanish (1), and Taiwanese (1). Two participants did not save money previously, while the rest used saving accounts. Each participant was schedule for a one-hour individual session.

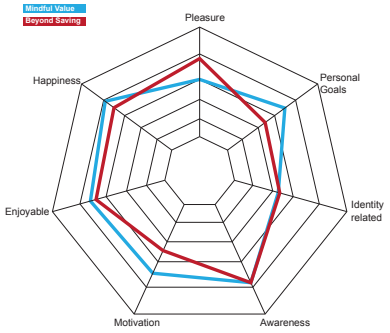

Figure 3. Spider Chart summarizing the evaluation results, comparing 'Mindful Value' and 'Beyond. Source: Compiled by authors.

Method

The features were explained to each participant with the use of a prototype of a simulated docking station and a mock up version of the application, using a functioning smartphone. Participants were asked to choose one character out of four. In the original concept, the idea was to create personalised characters, but since the purpose of the test was the impact on saving behavior, we decided to leave this feature out of the evaluation (for more about personalization of piggy banks see De Francisco, Casais & Desmet, 2014). Subsequently, participants were assigned with a saving intention (a pair of shoes), and asked to indicate the length of the saving time and to calculate the amount they had to save according to the duration and price of the item. Participants engaged with each of the features, and after experiencing them, participants were asked to answer questions about the elements discovering, understanding, exploring and appreciating. In addition, participants were asked to identify to what extent they found the features to give them pleasure, awareness, sense of purpose and discipline. Lastly, participants graded the seven abovementioned dimensions and gave a rating for each feature of the concept.

Results

The data was collected through video recordings, text (from open questions) and numerical data (from scales). Scales were used to measure the seven propositions for each of the features. 'Mindful Value' scored high on personal goals, awareness, motivation, enjoyment and happiness, while 'Beyond Saving' scored high on pleasure, awareness, enjoyment and happiness (Figure 3). 'Mindful Value' was perceived as a way to discover value and be more conscious about consumption. One of the participants expressed that "it gives you tools to understand what is the value (of the item) for you". Another participant mentioned that reflecting was a way of "making a conscious decision on what to save for and avoiding rash decisions". The reflection triggered with the weekly messages was a guide to foster understanding. These messages were described as a way of creating anticipation and discovering

how to become a better person, which was a motivating "reflection of what I can contribute to others after completing the task", as another participant said. Participants also remarked that since the reflection was done during the saving process, it was disappointing that there was no reflection or activity after the purchase was done.

'Beyond Saving' improved the period of satisfaction of the selected item. "It helps to extend the period of time you feel happy about a purchase", by validating it through active experimentation "it can be really nice to understand in 'another way' the value of things", said one participant. However, and despite the fact that this activity was pleasurable and participants could learn new things about the item, it was not directly related to money or saving, rather than on the idea of having and using an object. Nevertheless, assessing and confirming the importance of the item could create a higher level of attachment, improving also the emotional link to the process of saving

In the end participants had the chance to reflect upon the features and explain why they were relevant, inspiring and/or motivating. Three participants described 'Beyond Saving' as a way to increase the perception of saving as an experience, but it needed to be more integrated to the process of saving money. Two participants described 'Mindful Value' as a novel approach to the current way of saving money, making them more conscious and revealing interesting relations towards activities they could do (in the future) with that item. Also, two participants went further and were able to combine the two features (as the original concept), explaining the importance of creating that anticipation (related to saving), but also a way of confirming if those thoughts by experiencing the item.

3. Discussion on the effect of design for virtuous behavior

In the beginning of the project we were expecting to design a piggy bank. However, we ended up designing a system that provoked a far stronger response than what occurs when a design is appealing, or easy to use. For most participants, the exercise gave them pleasure and purpose (Dolan, 2014). One of the main premises of this project was shaped after reading a study that suggested that happier people were prone to saving more money (Guven, 2012). Accordingly, happier people have more control over their consumption behavior, are less likely to have debts and are more aware of the future in financial terms. Consequently, we asked: What about the other way around? How can we turn saving from being the outcome to being the process? This questioning fuelled our design project.

During the research we discovered that design for activities that last over time and are not always continuous, requires a change of perspective. Following the Positive Design Framework (Desmet & Pohlmeyer, 2013) as a guide, we were able to identify key aspects that allowed us to redefine the experience we aimed for. With the case of saving, we encounter strategies that followed the lines of design for pleasure (beautifully designed piggy bank) or personal significance (driven by saving intentions). However, virtue was lacking.

Saving money is considered virtuous; nevertheless, it requires a lot of effort from the user, which can result in quitting. We decided to reframe the project and change the perspective of saving from an outcome-based activity to a process-based activity. We wanted people to embrace saving as a routine, incorporating elements of discipline and commitment.

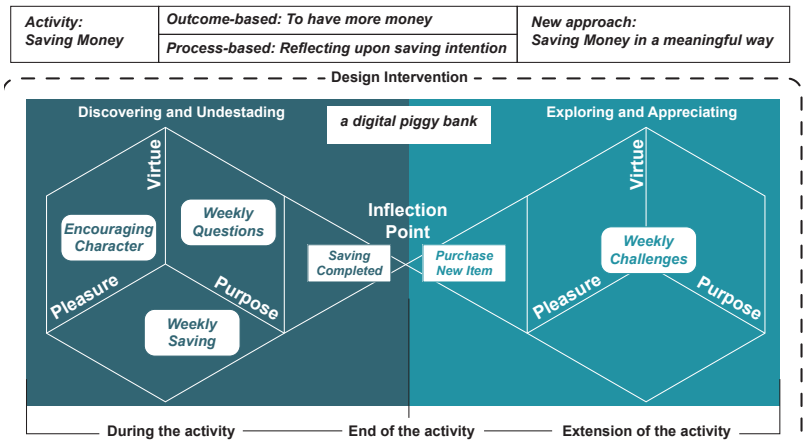

Figure 4. Explanation of the framework using Billy Cash design case: the design intervention has to contemplate three parts: (1) discovering and understanding, which takes place during the activity; (2) an inflection point, which normally is the outcome of the activity; and (3) exploring and anticipating, which is the extension of the outcome of the activity once is completed. Source: Compiled by authors.

Accordingly, we came up with a strategy to keep the user interested in the process. Some authors call that 'nudges' (Sunstein & Thaler, 2008), 'triggers' (Fogg, 2009), or 'cues' (Duhigg, 2012); we used stimulating questions as steps that allow a comprehension of the intention behind saving, while giving freedom and control to the user (Dorrestijn & Verbeek, 2013). Billy Cash delivered questions and the user decided if those questions were leading towards a path of saving or not. Ultimately, Billy Cash uncovered a path that the user chose to walk.

Even if virtues are understood as universal values (Peterson & Seligman, 2004), each individual has to decide to act on it by their own choice. Different outcomes are expected, because virtues are embedded in cultural and contextual grounds and respond to authentic characteristics of each individual. Perhaps, that is one of the most challenging issue when addressing virtuous behavior.

4. Design for Virtue framework: from virtuous actions to virtuous behaviors

Most activities are assessed by the outcome of it and not by the process. Process-based activities allowed us to reframe the way to understand the behavior and not the action. To assure that the design intervention has the impact on behavior, it has to contemplate three parts: (1) discovering and understanding, which takes place during the activity; (2) inflection point, which normally is the outcome of the activity; and (3) exploring and anticipating, which is the extension of the outcome of the activity once is completed (Figure 4). In part (1), a number of conditions are defined. Those conditions have to contemplate pleasure, purpose, and virtue (Desmet & Pohlmeyer, 2013) and will define how the activity will take place and reach the inflection point. The inflection point has to meet the objective of the activity. And part (3) will define future conditions that permit the activity to grow on pleasure, purpose, and virtue. The design intervention should demands an active involvement of the user (Pohlmeyer, Desmet, & Chapman, 2017) as well as allow freedom to interact (Dorrestijn & Verbeek, 2013). This proposed framework should work together with other frameworks and theories, especially the ones aiming to design for virtue.

4.1 General discussion

Recent reports on people's happiness suggest that almost half of our well-being is determined by the activities we chose to do (Lyubomirsky,

2008). This widens the scope of design beyond products, to transform interventions into richer and more meaningful experiences for the user: experiences that contribute to their well-being.

Desmet and Pohlmeyer (2013) proposed the Positive Design Framework with three ingredients for designers to get inspired and contribute to people's well-being. The ingredients of the framework (see section 1 - Introduction) address issues related to short-term and long-term well-being, personal growth and the sense of becoming a better self. The importance this framework is to gather all three ingredients in a design, to achieve a strong result that has the potential to impact in a positive way the people that use it. The Positive Design Framework has been complemented by studies in different areas related to the specific ingredients. Topics like positive emotions and its structure (Desmet, 2012; Yoon, Pohlmeyer & Desmet, 2016); the richness of negative emotions (Fokkinga & Desmet, 2012); dilemmas and self-control (Ozkaramanli, Özcan & Desmet, 2017); and the symbolic value of products (Casais, Mugge & Desmet, 2015) have been researched. Specifically, the mentioned research tackles the ingredients of pleasure and personal significance. There is still a great opportunity to continue studying how design can promote virtuous behavior. This was the gap we aimed to address with the current paper.

Virtue is a fundamental aspect of well-being. Past research has proposed that emotional-driven design can be a powerful mediator towards supporting virtue. However, virtue-focused solutions generally target isolated actions.

In the current paper we used saving as an example of virtuous behavior, and presented a design case—Billy Cash, a digital piggy bank that allows users to reflect during the saving process and extend the appreciation of the purchased item—to demonstrate how design can facilitate virtuous behavior that is sustainable and can promote actual change. The analysis and evaluation of the design case resulted in a framework of design for virtuous behavior.

Design should aim to go beyond behavioral change and transform it into conscious and continuous routines (Boon, Wever & Quist, 2015). Focusing on behavioral change aims to have a greater impact beyond changing people's actions, continuously fostering that behavior in other activities, together with the one that was intervened in. Technology is an ally in this path, but has to contemplate the intention of the designer to promote a positive outcome (Berdichevsky & Neuenschwander, 1999) and the freedom of users decision-making (Dorresteijn & Veerbek, 2013). Such freedom comes with an active participation of the user (Desmet & Pohlmeyer, 2013; Pohlmeyer & Desmet, 2017). This means that the strategies have to be proposed as activity-based and seeking for opportunities to develop any kind of virtuous behavior. Design has to serve as a push, a guide. The rest is up to the user. In the presented design case, Billy Cash only asks questions; the user saves, buys, explores and experiences.

Further research can focus on validating the developed framework of design for virtuous behavior by applying it in other areas, with other goals, and in other contexts.

Acknowledgement

Billy Cash, the design case presented in the paper was developed at the TU Delft, Faculty of Industrial Design Engineering, within the Delft Institute of Positive Design (DIOPD). We would like to acknowledge the exceptional guidance of Prof.Dr.ir. Pieter Desmet in the Billy Cash project, the support and advice of Dr.ir. Anna Pohlmeyer, and all the researchers from the DIOPD. The project did not have funding.

References

Ariely, D. (2008). *Predictably irrational.* New York: HarperCollins.

Armstrong, J. (2012). *How to worry less about money.* The School of Life/Macmillan.

Arner, D. W., Barberis, J. N., & Buckley, R. P. (2015). The evolution of FinTech: A new post-crisis paradigm? *The HKU Scholars Hub.* Retreived from: http://hub.hku.hk/handle/10722/221450

Berdichevsky, D., & Neuenschwander, E. (1999). Toward an ethics of persuasive technology. *Communications of the ACM, 42*(5), 51-58. New York: ACM.

Bohn, J., Coroamă, V., Langheinrich, M., Mattern, F., & Rohs, M. (2005). Social, economic, and ethical implications of ambient intelligence and ubiquitous computing. *Ambient intelligence,* 5-29. Berlin: Springer.

Boon, B., Wever, R., & Quist, J. (2015). Beyond behaviour change: Technological artefacts and characterological development. *International Journal of Sustainable Engineering, 8*(3), 231-247.

Casais, M., Mugge, R., & Desmet, P. M. A. (2015). Extending product life by introducing symbolic meaning: An exploration of design strategies to support subjective well-being. In Cooper, T., Braithwaite, N., Moreno, M., & Salvia, G. (Eds.), *Product Lifetimes and the Environment (PLATE) Conference Proceedings.* Nottingham, 17-19 June 2015. Nottingham Trent University: CADBE, 44-51.

Chancellor, J., & Lyubomirsky, S. (2014). Money for happiness: The hedonic benefits of thrift. In Tatzel, M. (Ed.), *Consumption and Well-Being in the Material World.* Dordrecht: Springer Science+Business Media.

De Francisco Vela, S., Casais, M., & Desmet, P. M. A. (2014). Feeding your piggy bank with intentions: A study on saving behaviour, saving strategies, and happiness. In Salamanca, J., Desmet, P. M. A., Burbano, A., Ludden, G., & Maya, J. (Eds.), *Proceedings of the Colors of Care: The 9th International Conference on Design & Emotion.* Bogotá, October 6-10, 2014. Bogotá: Ediciones Uniandes, 2014, 64-69.

Desmet, P. M. A., & Pohlmeyer, A. E. (2013). Positive design: An introduction to design for subjective well-being. *International Journal of Design, 7*(3), 5-19.

Desmet, P. M. A. (2012). Faces of product pleasure: 25 positive emotions in human-product interactions. *International Journal of Design, 6*(2), 1-29.

Doerr, C. E., & Baumeister, R. F. (2010). Self-regulatory strength and psychological adjustment. In Maddux, J. E., & Tangney, J. P. (Eds.), *Social Psychological Foundations of Clinical Psychology.* New York: The Guildford Press, 71-83.

Dolan, P. (2014). *Happiness by design: Change what you do, not how you think.* Penguin.

Dorrestijn, S., & Verbeek, P. P. (2013). Technology, well-being, and freedom: The legacy of utopian design. *International Journal of Design, 7*(3), 45-56.

Duhigg, C. (2012). *The power of habit: Why we do what we do in life and business.* New York: Random House.

Dunn, E., & Norton, M. (2013). *Happy money: The science of smarter spending.* New York: Simon & Schuster.

Fogg, B. J. (2009). A behavior model for persuasive design. In Chatterjee, S., & Dev, P. (Eds.) *4th International Conference on Persuasive Technology, PERSUASIVE 2009,* Claremont, California, USA, April 26-29, 2009. ACM International Conference Proceeding Series 350, ACM. Article 40.

Fokkinga, S. F., & Desmet, P. M. A. (2012). Darker shades of joy: The role of negative emotion in rich product experiences. *Design Issues, 28*(4), 42-56.

Glimcher, P. W., Kable, J., & Louie, K. (2007). Neuroeconomic studies of impulsivity: Now or just as soon as possible? *The American Economic Review, 97*(2), 142-147.

Guven, C. (2012). Reversing the question: Does happiness affect consumption and savings behavior? *Journal of Economic Psychology, 33*(4), 701-717.

Homiak, M. (2016). Moral Character. In Zalta, E. N. (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2016 ed.). Retrieved from: https://plato.stanford.edu/archives/fall2016/entries/moral-character/

Hursthouse, R., & Pettigrove, G. (2016). Virtue Ethics. In Zalta, E. N. (Ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2016 ed). Retrieved from: https://plato.stanford.edu/archives/win2016/entries/ethics-virtue/

Jordan, P. W. (2000). Designing pleasurable products: *An introduction to the new human factors.* London: CRC Press.

Lyubomirsky, S. (2008). *The How of Happiness: A scientific approach to getting the life you want.* New York: Penguin Press.

Martin, M. W. (2007). Happiness and virtue in positive psychology. *Journal for the Theory of Social Behaviour, 37*(1), 89-103.

Maslow, A. H. (1943). A theory of human motivation. *Psychological review, 50*(4), 370-396.

McConnell, T. (2014). Moral Dilemmas. In Zalta, E. N. (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2014 ed.). Retrieved from:https://plato.stanford.edu/archives/fall2014/entries/moral-dilemmas/

On The Money, Networked Society – Ericsson [Video file]. (2013). Retrieved from https://www.youtube.com/watch?v=0Q1zfn74VoQ

Ozkaramanli, D., Özcan, E., & Desmet, P. (2017). Long-Term Goals or Immediate Desires? Introducing a Toolset for Designing with Self-Control Dilemmas. *The Design Journal, 20*(2), 219-238.

Peterson, C., & Seligman, M. E. (2004). *Character strengths and virtues: A handbook and classification.* Washington: Oxford University Press.

Pohlmeyer, A. E., & Desmet, P. M. A. (2017). 'From good to the greater good'. In Chapman, J. (Ed.), *Routledge Book of Sustainable Product Design.* London: Taylor & Francis, 469-486.

Pohlmeyer, A. E. (2012). Design for happiness. *Interfaces, 92,* 8-11.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55,* 5-14.

Seligman, M. E. P. (1998). *Learned optimism: How to change your mind and your life* (2nd ed.). New York: Vintage Books.

Seligman, M. E. P. (2002). *Authentic happiness.* New York: Free Press.

Sunstein, C., & Thaler, R. (2008). Nudge: Improving decisions about health, wealth, and happiness. *Constitutional Political Economy, 19*(4), 356-360.

Thaler, R. H., & Benartzi, S. (2004). Save more tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy, 112* (1),164-187.

Tiger, L. (1992). *The pursuit of pleasure.* London: Routledge.

Walter, A., & Spool, J. M. (2011). *Designing for emotion.* New York: A Book Apart.

Weiser, M., & Brown, J. S. (1997). The coming age of calm technology. In Denning, P. J., & Metcalfe, R. M. (Eds.), *Beyond Calculation: The Next Fifty Years of Computing.* New York: Springer, 75-85.

Yoon, J., Pohlmeyer, A. E., & Desmet, P. M. A. (2016). When 'feeling good' is not good enough: Seven key opportunities for emotional granularity in product development. *International Journal of Design, 10*(3), 1-15.

Appendix

Appendix A: Examples of discovering questions

Experiences	What kind of new activities will you do? How could you help others? How does it boost your confidence?
Intrinsic merits	Do you really need it? Does is symbolizes something? What it reminds you? How can it make you excel?
Educate taste	How much do you like it? What can you learn from it?
Creativity	How it stimulates your creativity? It helps you to develop new skills? How does it makes you stand out?

Appendix B: Post purchase challenges

Clothes & Furniture	Use them in a party, donate an old one, make it unique, make a story.
Electronic Devices	Customize it, pamper it, involve someone else, do responsible recycling.
Personal transport	Pick a new destination, give someone a ride, put plates.
Trips	Follow a random route, ask locals for advise, learn some words.
Real estate	Make housewarmings, hide treasures, define important places
Business	Support a cause, create social and environmental rules.