

Beyond Resolving Dilemmas: Three Design Directions for Addressing Intrapersonal Concern Conflicts

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Introduction

Designing products and services that fulfill people's unmet goals, needs, and preferences is a key element of user-centered design. Desmet used the term "concern" to collectively refer to these goals, needs, and preferences and, based on Arnold's appraisal theory of emotions, stated that creating products that touch on people's concerns is a potent way of designing for emotion.¹ People's concerns also play an important role in designing for subjective well-being: Designing to fulfill personal (long- or short-term) goals and aspirations (designing for personal significance) is one of the main constituents of the positive design framework.²

However, people have many, often conflicting concerns related to their everyday activities. For example, a person might want to maintain a slim figure and, at the same time, enjoy the pleasures of eating chocolate, or another might need to spend a Sunday afternoon working to meet an urgent deadline and, at the same time, want to attend a birthday party. In the context of designing, resolving such conflicts (which might arguably lead to less stress and anxiety and therefore to an increase in well-being) might be considered a challenge, given that they imply a choice between what appear to be mutually exclusive alternatives. In this paper, we consider conflicting concerns as an opportunity rather than a threat, and examine how the dynamic created by experiencing these polarities—more than either one of the poles—can inspire fruitful user-centered design activities. In line with this proposition, the goal of this paper is to introduce three different opportunities to design for conflicting concerns, with implications particularly for the fields of design for emotion and design for subjective well-being.

1 Pieter M. A. Desmet, "Designing Emotions" (PhD diss., Delft University of Technology, 2002). See also Magda B. Arnold, *Emotion and Personality* (Vol. 1): Psychological Aspects (New York: Columbia University Press, 1960).

2 Pieter M. A. Desmet and Anna Pohlmeier, "Positive Design: An Introduction to Design for Subjective Well-being," *International Journal of Design* 7, no. 3 (2013): 5–19.

Figure 1

Tanya Heath Shoes, Paris (THP Shoes). A multi-height high-heeled shoe that turns into its low-heeled version with a simple click that allows you to remove and change the design of the heel. Photo: Courtesy of THP Shoes.



People's conflicting concerns often manifest themselves as dilemmas. One product that addresses an everyday dilemma for women is the Tanya Heath Paris (THP) shoe (see Figure 1)—a high-heeled shoe that turns into a low-heeled version by switching to a different type of heel. The shoe was designed with the intention of resolving the dilemma between elegance and comfort. Here, a design solution focusing only on the concern for elegance would violate the concern for comfort. Similarly, designing only to address the concern for comfort would ostensibly violate the concern for elegance. As a result, neither of the resulting designs would be emotionally satisfying because they would evoke both pleasant and unpleasant user experiences. To resolve this emotional duality, the designer of Tanya Heath shoes seems to have focused on simultaneously fulfilling the conflicting concerns, instead of focusing on either concern in isolation.

The THP shoes in Figure 1 are an example of how conflicting concerns are often addressed with design—that is, by redesigning a product in a way that *resolves* the concern conflict. However, the landscape of designing with dilemmas extends beyond resolving dilemmas. Consider the notorious dilemma between health and indulgence. Although food products, such as low-fat ice cream, aim for resolution, the products in Figure 2 illustrate that this dilemma can be addressed in at least two additional ways: by *moderating* (e.g., "KitchenSafe") and by *triggering* (e.g., "Dilemma") the dilemma. KitchenSafe (see Figure 2a) has a time-controlled lock mechanism that helps people to stay away from tempting snacks (e.g., candy) for a desired amount of time, and Dilemma (see Figure 2b) is a table piece that can be used as either a fruit bowl or a cake plate, acknowledging the health vs. enjoyment dilemma.



Figure 2a (left)
KitchenSafe by David Krippendorff. A kitchen appliance with a time-controlled lock mechanism, which, for a desired amount of time, prevents access to tempting food (e.g., candy). Photo: Courtesy of KitchenSafe.

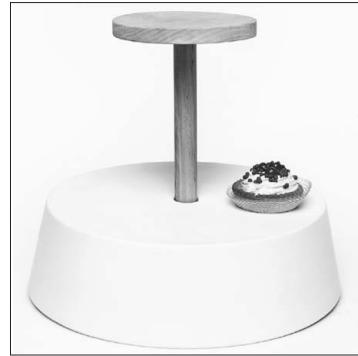


Figure 2b (two images at right)
Dilemma by Dean Brown designed for Fabrica. An uncertain table piece that can be used as fruit bowl or a cake plate. It acknowledges a personal dilemma: to eat healthily or to indulge. Without being judgmental, it presents two alternative ways to enjoy food. Photo: Shek Po Kwan, 2014. Courtesy of the designer.

People's dilemmas are extremely varied, ranging from very practical ones that subtly influence subjective well-being (e.g., elegance vs. comfort) to essential ones that fundamentally affect subjective well-being (e.g., career vs. family). The wide variety of dilemmas people experience offers an interesting space to explore dilemma-focused design opportunities that go beyond resolving the dilemmas. To explore the three distinct design directions that specifically address dilemmas, we first introduce a definition of dilemmas. Next, we present an analysis of 109 existing products through which we identify the three directions these products seem to use to address users' dilemmas. Finally, we discuss the similarities and differences between these directions and their potential contribution to design fields, such as designing for emotions and designing for subjective well-being.

Defining Dilemmas

Intrapersonal conflict, or contradicting tendencies within an individual, is a well-studied psychological phenomenon that represents an important aspect of the variety and complexity of human experience. To illustrate, the concept appeared in the writings of Freud to emphasize the hidden conflicts between the conscious and the unconscious mind.³ In addition, it was used by Lewin to describe basic motivational poles, or motivational conflicts (i.e., approach–approach, approach–withdraw, withdraw–withdraw) and by Erikson to illustrate the tensions within the stages of psychosocial development (e.g., initiative vs. guilt, at play-age).⁴ The Cognitive Dissonance Theory developed by Festinger focuses on how people achieve psychological balance despite inconsistent (or conflicting) thoughts or attitudes.⁵ Meanwhile, Piaget's Dynamic Disequilibrium Theory proposes that discrepancy (or conflict) between what children already know and what they discover in their environment is a prerequisite for cognitive development.⁶ These theories span a wide range of areas, from personality psychology to developmental psychology, which indicates that intrapersonal conflict is a multi-faceted experience that can engage multiple psychological constructs.

3 Sigmund Freud, *Civilization and Its Discontents* (London: Penguin Books, 1929), 76–90.

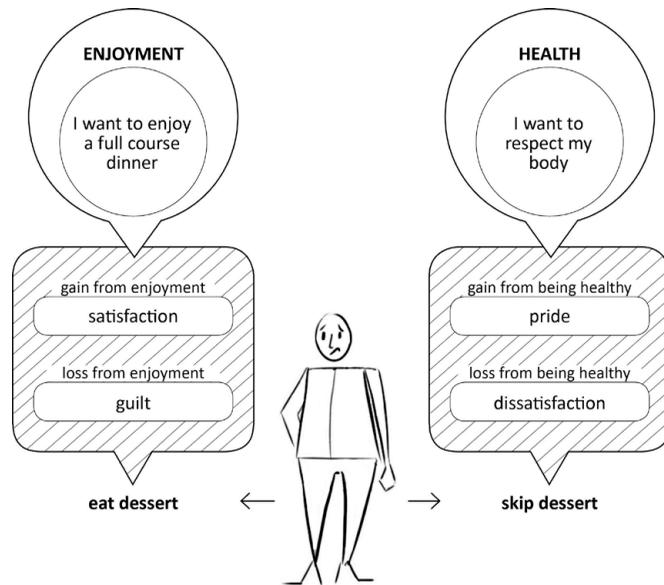
4 See Kurt Lewin, *A Dynamic Theory of Personality* (New York: McGraw-Hill, 1935), 88–113; and Erik H. Erikson, *Identity and the Life Cycle* (New York: WW Norton & Company, 1980), 51–57.

5 Leon Festinger, *A Theory of Cognitive Dissonance* (Stanford, CA: Stanford University Press, 1957), 32–47.

6 Jean Piaget, *The Origins of Intelligence in Children* (New York: International Universities Press, 1952), 3–20.

Figure 3

Model of dilemmas for designers illustrating the three main ingredients of dilemmas (mutually exclusive choices, conflicting concerns and mixed emotions).



For the purpose of user-centered design, we define the key feature of dilemmas as the realization that two options exist that cannot be exercised simultaneously. We approach dilemmas from a phenomenological perspective, considering them to be experiences with three main constituents: (1) mutually exclusive choices at the behavioral level, (2) conflicting concerns at the cognitive level, and (3) mixed emotions at the affective level.⁷ The articulation of these three ingredients enables us to provide a more elaborate definition of dilemmas: People experience a dilemma when they are faced with two mutually exclusive choices, both of which touch upon their personal concerns, and the simultaneous fulfillment of both choices is challenging, if not impossible, to obtain or achieve. Because of this challenge, people experience both positive and negative emotions toward each alternative. This definition is in line with the literature on goal-directed behavior, which suggests that goals can only be properly understood when they are studied in relation to other goals, and also by taking into account the cognitive, behavioral, and affective responses organized in goal pursuit.⁸

These three constituent parts serve to illustrate the depth of experience inherent in dilemmas and can thus help designers to unravel them. Consider the following scenario, which is also illustrated in Figure 3: You are at a restaurant with friends; you have just finished your dinner, and the waiter asks if you would like to have some dessert. You are very full after your meal; however, the idea of having something sweet and indulgent sounds very tempting. Dilemmas always involve choices between appealing alternatives: Each choice leads to potential “gain” and “loss”—for example, will you indulge in the dessert (gain) at the cost of feeling gluttonous (loss)? Or will you control your urges (gain) at the cost of prolonging an enjoyable dinner experience (loss)?

7 Deger Ozkaramanli, Elif Özcan, and Pieter Desmet, “Long-Term Goals or Immediate Desires? How to Use Self-Control Dilemmas to Design for Distant Gains,” (working paper).

8 James T. Austin and Jeffrey B. Vancouver, “Goal Constructs in Psychology: Structure, Process, and Content,” *Psychological Bulletin* 120, no. 3 (1996): 338–75, doi: 10.1037/0033-2909.120.3.338.

These prospective gains and losses are associated with the potential harm or fulfillment of personal concerns. In this case, the concern of fully enjoying a dinner out conflicts with the concern of controlling what may be an overly indulgent appetite. As personal concerns are weighed against one another, this moment of hesitation results in mixed emotions. If you choose to have dessert, you might feel satisfaction and joy. Yet, you might also feel guilty because this choice violates your concern for being mindful about the needs of your body. If you choose to skip the dessert, you might feel proud for controlling your urges; yet, you might also feel dissatisfied or even annoyed because of an unfulfilled desire.

What Design Can Do with Dilemmas

Designing with dilemmas can be beneficial both for the designer and the user. According to Glover, Ronning, and Reynolds, contradiction is a rich source of creativity because it stimulates the elimination of conflicts to restore balance.⁹ For instance, the Theory of Inventive Problem Solving (TRIZ) encourages design engineers to actively seek and eliminate conflicts among functional properties in a given design brief.¹⁰ De Bono's theory of lateral thinking maintains that serious creativity is enabled when designers build on contradictory opinions in an ideation session to improve emerging ideas.¹¹ Designing with dilemmas is also a user-relevant activity. Given that they are related to decision making, dilemmas are a pervasive phenomenon in everyday life, and products play an important role in helping people manage these dilemmas. Many products that people use might not strike them as dilemma-inspired products at first; however, every product addresses one or more user concerns and, as illustrated in the examples in Figure 2, they often implicitly address conflicting user concerns.

By examining a set of existing products that appear to address dilemmas, three distinct design directions underlying these designs emerged. We first selected 109 existing products from design blogs, design shops, and graduation projects completed by masters-level students, based on whether the product could address conflicting user concerns. Because we did not have the opportunity to talk to the designers of each product, we selected ones that included detailed descriptions, clearly indicating which user concerns the design team wanted to address. For each of the 109 products, we formulated conflicting concern statements based on the product descriptions. In addition, we questioned how the selected products address dilemmas and categorized our conclusions based on the way they handle the conflicting concerns specifically involved in the dilemma. Our analysis revealed three primary directions that designers use to deal with dilemmas:

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- 9 John A. Glover, Royce R. Ronning, and Cecil R. Reynolds (eds.), *Handbook of Creativity* (New York: Springer-Verlag, 1989), 199–208. For an implication of their work in the design discipline, see Deger Ozkaramanli and Pieter M. A. Desmet, "I Knew I Shouldn't, Yet I Did It Again! Emotion-Driven Design as a Means to Motivate Subjective Well-Being," *International Journal of Design* 6, no. 1 (2012): 27–39.
- 10 Darrell Mann, "An Introduction to TRIZ: The Theory of Inventive Problem Solving," *Creativity and Innovation Management* 10, no. 2 (2001): 123–25.
- 11 Edward de Bono, "Serious Creativity," *Journal of Quality and Participation* 18, no. 5 (1995): 12–18.

Figure 4

Collage of existing products that can address dilemmas through acting on conflicting concerns:

1. Breast Pump Bag by Medela. Photo by the first author.
2. Macbook Air by Apple, Inc. Photo by the first author.
3. Floating Mug by Tigere Chiriga. Photo by the first author.
4. Bossy by Lucas Neumann. Photo: Courtesy of the designer.
5. Scribble Alarm Clock by Mayhem. Photo by the first author.
6. Muffintop by Fred and Friends. Photo by the first author.
7. Conflict Kitchen by Brett Yasko. Photo: Courtesy of Conflict Kitchen.
8. DURR by Theo Tveteras and Lars Vedeler. Photo: Skrekkøgle. Courtesy of the designers.
9. 50-50 Cake by Matthias Laschke and Marc Hassenzahl (in) Hassenzahl, M., & Laschke, M. (2015). Pleasurable Troublemakers, in S. Walz and S. Deterding (Eds.), *The Gameful World* (Cambridge, MA: MIT Press), 167–95. Photo: Matthias Laschke. Courtesy of the designer.



1. *Resolving dilemmas.* These interventions aim to redesign existing products, services, or environments in such a way that conflicting concerns can be simultaneously fulfilled.
2. *Moderating dilemmas.* These interventions aim to help users manage their dilemmas by explicitly prioritizing one concern over the other.
3. *Triggering dilemmas.* These interventions aim to draw attention to the concerns aroused by the dilemma and thus create awareness about the dilemma itself, without necessarily fulfilling any one of these concerns.

Figure 4 provides a collage of nine existing products that can address conflicting concerns using one of these three directions. We refer to these examples in the rest of this paper to elaborate on the proposed design directions.

Resolving Dilemmas

Analysis of the selected products shows that many products and services aim to redesign an existing design concept in such a way that it resolves the dilemma, by simultaneously addressing conflicting concerns (see the example in Figure 1). For example, if you, as a user, are in a media store to buy a personal computer, you might ask yourself the following question: “Do I want a portable laptop, or do I want a powerful laptop?” On the one hand, you might be mesmerized by the size and lightness of one option, and on the other hand, you fear that it might not deliver the functionality you expect from one of its more powerful, yet heavier, competitors. In this situation, we can argue that the MacBook Air (see Figure 4) resolves this dilemma by fulfilling both the concern for portability and the concern for performance. By focusing on the conflict between these two concerns, instead of either concern in isolation, the MacBook Air creates a win-win situation and thus an emotionally satisfying product experience.

People’s concerns do not necessarily focus only on product qualities, such as wanting a *portable* computer or enjoying a *light* breakfast. Desmet proposed that concerns can also be formulated with a focus on the qualities of the *activity* that the product enables (e.g., “I want to *travel light* when carrying a computer,” or “I want to *feel energized* after breakfast”). They might also focus on qualities of the self that the product expresses (e.g., “I want to have a *hassle-free life*,” or “I want to be an *energetic person*”).¹² In light of this framework, conflicting concern statements can be formulated and resolved using any of these three qualitative levels (i.e., product, activity, or self). For example, we can argue that Apple’s MacBook Air resolves the conflict between two concerns that focus on the qualities of the product (i.e., “I want to have a *portable* computer” vs. “I want to have a *powerful* computer”), while Medela’s portable breast-pump resolves the conflict between two concerns that focus on the qualities of the self (“I want to be a *nursing mother*” vs. “I want to be a *working mother*”). Products can also resolve a conflict across different qualitative foci. For example, the Floating Mug (Figure 4) resolves the conflict between a concern focused on product qualities (“I want to keep my desk clean”) and a concern focused on the qualities of the activity the product enables (“I want to enjoy a cup of coffee while working”).

Moderating Dilemmas

Our analysis indicates that products can also support dilemma resolution by suggesting which concerns to prioritize. When conflicting concerns are associated with behavioral choices that cannot be made simultaneously, one choice has to be prioritized over the other, at least for the time being.¹³ For example, an

12 Pieter M. A. Desmet, “Product Emotion,” in *Product Experience*, ed. Hendrik N. J. Schifferstein and Paul Hekkert (Amsterdam: Elsevier, 2008), 379–97. For an extended version of this framework, see Pieter M. A. Desmet, “Faces of Product Pleasure: 25 Positive Emotions in Human–Product Interactions,” *International Journal of Design* 6, no. 2 (2012): 1–29.

13 Michaela Riediger and Alexandra M. Freund, “Interference and Facilitation Among Personal Goals: Differential Associations with Subjective Well-Being and Persistent Goal Pursuit,” *Personality and Social Psychology Bulletin* 30, no. 12 (2004): 1511–23. doi: 10.1177/0146167204271184.

employee might want to wake up early to prepare for an important meeting at the office and, at the same time, want to relax in bed a little longer. However, both relaxing in bed and preparing for the meeting at the same time is impossible, and thus a choice must be made. The Scribble alarm clock in Figure 4 might motivate the person to wake up at a planned time by enabling the person to recall the most important task of the day (e.g., a work meeting).

Dilemmas in forced-choice situations often involve a distinction between a psychologically distant concern (e.g., “I want to lose weight”) and an immediate concern (“I want to eat whatever pleases me”).¹⁴ Distant concerns are governed by the reflective system and guard long-term interests (i.e., long-term goals, aspirations, and personal values), while immediate concerns are governed by the impulsive system and guard short-term interests (i.e., desires and obligations).¹⁵ Designing for the fulfillment of both distant and immediate concerns is important for subjective well-being.¹⁶ However, everyday conflicts between these concerns challenge people to forego pleasures (e.g., spending money, sleeping late, or drinking alcohol), or to exercise virtues such as kindness and honesty at a time when ignorance and lying would be more comfortable.¹⁷ In fact, many individual and societal issues—ranging from healthy eating, to safe sex, to work productivity and environmentally friendly behavior—involve intrapersonal dilemmas of this kind. Therefore, designing products that can aid in the prioritization of distant concerns over immediate ones not only might help users to manage their dilemmas, but also might contribute to their subjective well-being.

In addition, explicitly addressing the distinction between distant concerns and immediate concerns doubles the design space by offering designers the opportunity either to stimulate behaviors that align with distant concerns (e.g., eating healthy snacks) or to discourage behaviors that align with immediate concerns and interfere with the achievement of distant concerns (e.g., indulging in sweets). For example, the KitchenSafe (see Figure 2a) addresses the dilemma between health and indulgence by creating a *barrier* to satisfying an immediate concern, such as finishing a bag of candy before dinnertime. Similarly, the Scribble alarm clock addresses the dilemma between competence and relaxation by creating an *enabler* that helps the user to fulfill a distant concern, such as waking up early to prepare for a work meeting. Moreover, Bossy (see Figure 4) acts both as an enabler and a barrier by suggesting activities that increase work time productivity (e.g., stretching) and hindering activities that decrease productivity (e.g., browsing the web aimlessly). In addition to acting as enablers and barriers, products can be designed to address the dichotomy between distant

14 Wilhelm Hofman, Roy F. Baumeister, Georg Forster, and Kathleen D. Vohs, “Everyday Temptations: An Experience Sampling Study of Desire, Conflict, and Self-Control,” *Journal of Personality and Social Psychology* 102, no. 6 (2011): 12–13.

15 Janet Metcalfe and Walter Mischel, “A Hot/Cool-System Analysis of Delay of Gratification: Dynamics of Willpower,” *Psychological Review* 106, no. 1 (1999): 3–19, doi: 10.1037/0033-295X.106.1.3.

16 Desmet and Pohlmeier, “Positive Design,” 11–12.

17 Joseph M. Strayhorn, “Self-control Theory and Research,” *Journal of the American Academy of Child and Adolescent Psychiatry* 41, no.1 (2002): 7–16, doi: 10.1097/00004583-200201000-00006.

concerns and immediate concerns by making consequences of behavioral choices tangible and by adding new sources of displeasure/pleasure to immediate desires/distant concerns.¹⁸

Triggering Dilemmas

A distinct group of products stood out from the rest because they seemed to *embody* dilemmas instead of resolving them for or with the user. These products aim to engage people in a moment of personal reflection or discussion by triggering dilemma awareness. Experiencing a dilemma foregrounds the gains and losses involved in each choice and thus can create room for reflection between imperfect alternatives. On this experience, cognitive neuroscientist Steve Fleming writes “the agonizing feeling of conflict between two options is not necessarily a bad thing: It is the brain’s way of slowing things down.”¹⁹ For example, the Durr watch (see Figure 4) is a conceptually rich product that can address many dilemmas, one of which we can formulate as the conflict between “experiencing the passage of time” and “following a daily routine.” With these concerns in mind, the Durr might trigger a dilemma each time the watch vibrates: Should I pay attention to it, or simply move on with my day? By raising awareness about the concerns involved in the dilemma without interfering with the choice, such products might engage people in a moment of “stop and think” behavior, where concern priorities are analyzed and possibly adjusted.

Triggering dilemmas might be particularly useful when people do not realize the consequences their choices have on their subjective well-being. For instance, many people have a concern for maintaining good health; however, specific moments of decision-making might not reflect this awareness. A person may think about ordering pizza after a hard day of work (concern for comfort), or might avoid talking about using a condom as a way to show trust in his or her partner (concern for intimacy). More importantly, people can easily justify their choices to maintain their cognitive consistency.²⁰ For instance, one might think “the pizza is only bread and cheese” or “if she had a sexually transmitted infection, she would have told me in advance.” One way of intervening in these situations is by deliberately evoking cognitive dissonance in an attempt to challenge attitudes. For example, the Fifty-Fifty Cake (shown in Figure 4) aims to create “friction” (i.e., trigger a dilemma) by offering the user two options from which to choose: eating the healthy side or the unhealthy side of the cake first. By offering both options, the cake triggers a dilemma between the concern for health and the concern for enjoyment.

Our analysis suggests that to trigger dilemmas, designers have to (1) define the specificity of the dilemma to trigger, and (2) define the source of the ambiguity that triggers this dilemma. For

18 Deger Ozkaramanli, Elif Özcan, and Pieter M. A. Desmet, “Long-Term Goals or Immediate Desires?” (working paper).

19 Steve Fleming, “Hesitate!” *Aeon Magazine* (January 8, 2014), <http://aeon.co/magazine/psychology/indecision-is-sometimes-the-best-way-to-decide/> (accessed May 31, 2015).

20 Festinger, *A Theory of Cognitive Dissonance*, 32.

example, the Fifty-Fifty Cake can trigger a specific pair of conflicting concerns (i.e., health vs. indulgence) and thus a specific dilemma, in the context of having tea. In contrast, the Durr watch (Figure 4) can trigger a range of dilemmas, depending on the user's physical and mental context during product use. In addition, triggering dilemmas often involves invoking the source of an ambiguity, which engages user reflection using the ambiguity as a cue.²¹ All three examples shown in the bottom row of Figure 4 involve unconventional product experiences that distinctly differ from experiences with prototypical examples in the corresponding product categories (i.e., a typical snack-bar, a typical watch, or a typical cake mold). Conflict Kitchen, by communicating different cultural and political views through its brand identity, aims to help its customers engage with global issues; Durr uses novel interaction qualities to redefine the perception of time; and Fifty-Fifty Cake has different aesthetics than a regular cake mold.

Reflection on the Intentions and Effect

Note that the proposed categories are based on an analysis of existing products. The relative depth of this analysis, and the nuances among the categories can be challenged by using them as input to create new products and services (i.e., as design directions). Our goal with these categories is to show how design has multiple ways to address user dilemmas than merely trying to resolve them.

Although a product might be intended in a certain way, users might not infer the designer's intentions. One reason is that users and designers construct meaning in separate contexts that are influenced by different factors.²² An important factor, for instance, is the design literacy of users (i.e., users' ability to interpret design intentions). For example, Tanya Heath shoes (Figure 1) is intended to resolve the dilemma between choosing a high-heeled shoe (concern for elegance) and a flat shoe (concern for comfort). However, Tanya Heath shoes can also spark discussions concerning how society expects elegant women to dress (e.g., women should look sexy, elegant, feminine, tall, slim, and so on); thus, it can also trigger dilemmas unintentionally.

In addition, products can serve multiple intentions at the same time. Some of the products in Figure 4, such as Floating Mug and MuffinTop, are non-typical design examples compared to their prototypical examples, such as a typical mug or a cupcake mold. The attributes that make these products non-typical, or novel, help to emphasize the dilemma they address. For example, the conflict between cleanliness ("I want to keep my desk clean") and enjoyment ("I want to enjoy a cup of coffee while working") could also be resolved by incorporating a subtle coaster at the bottom of the cup. By explicitly integrating a coaster into the form of the cup,

21 Anthony Dunne and Fiona Raby, *Speculative Everything: Design, Fiction, and Social Dreaming* (Cambridge, MA: MIT Press, 2013), 117–23.

22 Nathan Crilly, David Good, Derek Matravers, and P. John Clarkson, "Design as Communication: Exploring the Validity and Utility of Relating Intention to Interpretation," *Design Studies* 29, no. 5 (2008): 425–57, doi: 10.1016/j.destud.2008.05.002.

Floating Mug resolves and emphasizes this dilemma at the same time. Another example that might serve multiple intentions is MuffinTop molds; by using humor, they intend to raise awareness about the consequences of indulging in muffins. Here, the main intention might be to support the prioritization of health over indulgence; however, the product might also be experienced as a visual embodiment of this dilemma. As a result, for some people it might be an amusing product that influences eating behavior, but for others, it might trigger a dilemma by reinforcing the stereotypical expectations of a female figure.

Discussion

In this paper, we explored three design directions that highlight the possible contribution of using dilemmas as a starting point for user-centered design activities. These directions are: (1) resolving dilemmas, (2) moderating dilemmas, and (3) triggering dilemmas. Our analysis indicates that products designed with these intentions deal with conflicting concerns in distinct ways: simultaneously fulfilling conflicting concerns can resolve a dilemma; prioritizing one concern over the other can moderate a dilemma; and emphasizing the conflict among concerns can trigger a dilemma. By making these design directions explicit, we hope to create room for contemplating the differences among them and to stimulate creation of new design ideas. For example, it is interesting to think about how the Floating Mug (see Figure 4) can be redesigned to prioritize concern for cleanliness over concern for enjoyment. Or how can the same product be redesigned to trigger this dilemma? These mental exercises can open up space for new design ideas that might not otherwise be considered.

The conflicting concern statements can be formulated at varying levels of abstraction that are appropriate for the design direction to be used. For instance, to represent choices, concern statements are often formulated at a concrete level that includes information about the design context (e.g., “I want to eat dessert after dinner” vs. “I want to have a healthy diet”). Such concrete formulations might work well for addressing dilemmas that are embedded in specific design contexts (e.g., snacking after dinner). Alternatively, concern statements can be formulated at an abstract level (e.g., “I want to be a nursing mother” vs. “I want to be a working mother”). Although these statements do not include contextual information, their open-ended nature creates space for a wider range of design solutions.²³ This space might play an important role in conceptual design activities—for instance, when triggering dilemmas. The model of dilemmas shown in Figure 3 facilitates designers’ navigation of various abstraction levels until they find the most inspiring level for a given design direction.

23 Nigel Cross, “Expertise in Design: An Overview,” *Design Studies* 25, no. 5 (2004): 427–41, doi: 10.1016/j.destud.2004.06.002.

The three design directions proposed here share both similarities and differences. While products in the first category have a direct influence on the relationship between people and their environment (i.e., the product is the solution to the dilemma), products in the second and third categories mediate this relationship (i.e., the product is the means used to address the dilemma). Thus, the products have an indirect influence on the quality of this relationship. Although products in the second and third categories both mediate the relationship between people and their environment, they do so using different means. Products in the second category (i.e., moderating dilemmas) focus on managing the behavioral choices involved in a dilemma, while products in the third category (i.e., triggering dilemmas) focus on managing attitudes that might precede certain behaviors. Although behaviors and attitudes influence each other (i.e., changing one can lead to a change in the other),²⁴ these two design intentions rely on different sources of information and inspiration for their actualization.

The design directions we propose have implications for different fields of design. For example, the idea of resolving dilemmas by reconciling conflicting user requirements is common to manufacturing practices. For example, diet foods promise to deliver low-fat and tasty foods, which resolve the dilemma between health and indulgence. Smartphones serve as phones, cameras, agendas, computers, and music players, and these “all-in-one” features both introduce and eliminate many dilemmas, which makes the phones very popular. These examples indicate that identifying and resolving dilemmas might be a means to develop innovative products and services that use conflicting concerns as a driver for innovation.²⁵

In addition, moderating dilemmas can support dilemma management by prioritizing one or more concerns involved. This prioritization is particularly important when the satisfaction of remote concerns directly conflicts with concerns for instant gratification (e.g., being responsible vs. “one more drink for the road”). Dilemmas of this nature underlie many individual and social challenges, ranging from maintaining healthy eating habits and practicing safe sex to engaging in environmentally friendly behavior. More importantly, deliberations over such dilemmas negatively influence subjective well-being, while addressing distant concerns leads to enhanced subjective well-being.²⁶ Consciously buying and using “delayed gratification” products, such as KitchenSafe, Bossy, the Scribble alarm clock, or MuffinTop, indicates a person’s commitment to protecting distant concerns from the interference of immediate ones. Therefore, studying the principles for designing these products might be a fruitful means to motivating behaviors that enhance subjective well-being.

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- 24 James M. Olson and Mark P. Zanna, “Attitudes and Attitude Change,” *Annual Review Psychology* 44 (1993): 117–54, doi: 10.1146/annurev.ps.44.020193.001001.
- 25 Deger Ozkaramanli, Steven F. Fokkinga, Pieter M. A. Desmet, Erkan Balkan, and Eapen George, “Recreating AlaTurca: Consumer Goal Conflicts as a Creative Driver for Innovation,” paper presented at ESOMAR Brilliant Transformations Qualitative Research Conference, Valencia (November 17–19, 2013).
- 26 Robert A. Emmons and Laura A. King, “Conflicts Among Personal Strivings: Immediate and Long-Term Implications for Psychological and Physical Well-Being,” *Journal of Personality and Social Psychology* 54, no. 6 (1988): 1040–48, doi: 10.1037/0022-3514.54.6.1040. For a positive psychology perspective on the relationship between goals and well-being, see Peter Schmuck and Kennon M. Sheldon, *Life Goals and Well-Being: Towards a Positive Psychology of Human Striving* (Seattle, WA: Hogrefe and Huber, 2001).

By creating mental space for personal reflection or discussion, designing to trigger dilemmas is an intention in line with the goals of critical design. Critical design offers a fruitful design space for addressing complex societal issues, where asking questions are as important as finding solutions. Dunne and Raby refer to critical design as a way of highlighting dilemmas that can challenge existing belief systems and offer alternative ones.²⁷ This definition suggests an alignment between the goals of critical design and of designing to trigger dilemmas: to challenge the way people perceive and reflect upon their world. However, not all products that are intended to trigger dilemmas can be classified as critical design proposals. For example, Fifty-Fifty Cake and the Durr watch are not intended as critical designs, yet they still trigger dilemmas by raising awareness about conflicting concerns that people might otherwise not notice.

Designing to moderate or trigger dilemmas can be compared to design approaches that intend to influence user behavior, such as persuasive technologies, pleasurable troublemakers, social design, and nudging.²⁸ Persuasive technologies and pleasurable troublemakers influence behavior in a desirable direction, with users' conscious consent. In contrast, social design and nudging interventions implicitly steer behavior in a desirable direction (e.g., placing healthy food items at eye-level in school cafeterias to promote healthy eating), while still allowing users the freedom to make a different choice (e.g., choosing unhealthy food instead of healthy food). Designing with dilemmas balances the transparency of persuasive technologies with the intention to support the formation of a "self-nudging system" when dealing with these dilemmas. This balance is in line with the approach of Dorrestijn and Verbeek, who stated, "Design for well-being... should attempt not only to influence human actions and decisions in desirable directions, but also to make it possible for users to develop an active and critical relationship with these influences."²⁹

Note that the proposed design directions for addressing dilemmas are based on an analysis of existing products and are representative of the current authors' interpretations of these products. Therefore, further evaluating the completeness of and the nuances among these directions is necessary—for example, by implementing them as a generative tool in new design assignments. In addition, our current experience indicates that the choice among these directions depends on the intentions of the designer *and* on the nature of the dilemma he or she wants to address. For instance, an effective way of dealing with moral dilemmas might be to trigger them to raise awareness about their complexity, while the best way to address environment-driven dilemmas often might

27 Dunne and Raby, *Speculative Everything*, 189.

28 For more on each of these approaches, see B. J. Fogg, *Persuasive Technology: Using Computers to Change What We Think and Do* (Boston: Morgan Kaufmann, 2003), 15; Marc Hassenzahl and Matthias Laschke, "Pleasurable Troublemakers," in *The Gameful World*, eds. Steffen Walz and Sebastian Deterding (Cambridge, MA: MIT Press, 2015), 167–95; Nynke Tromp, "Social Design: How Products and Services Can Help Us Act in Ways that Benefit Society" (PhD diss., Delft University of Technology, 2013), 61–82; and Richard H. Thaler and Cass R. Sunstein, *Nudge* (New York: Penguin Books, 2008), 184–92, respectively.

29 Steven Dorrestijn and Peter-Paul Verbeek, "Technology, Wellbeing, and Freedom: The Legacy of Utopian Design," *International Journal of Design* 7, no. 3 (2013): 54.

be to resolve them. Therefore, evaluating the relationship between the nature of the dilemma and the designer's intentions is an opportunity for future research.

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