Mindful Shopping: A Compulsive Buying Disorder Management tool

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Abstract

Mindful Shopping is a web-based tool designed as a mindfulness-based intervention for online shopping behavior, especially for people with Compulsive Buying Disorder (CBD). The tool provides in-the-moment support during online shopping, including: setting a shopping list, budget, and time limit, which then lead to a *mindful-shopping* session. During mindful shopping, questions are asked to improve the user's mindfulness by refreshing their shopping intention and attention. An initial prototype has been developed based on mindfulness-based treatment and iteratively refined through a heuristic evaluation and a small pilot study with five subjects without CBD. The results from the pilot study validated the usability and feasibility of the tool, before evaluating its therapeutic effects. Participants with CBD will be recruited to further investigate its effectiveness with the target users.

Introduction

Compulsive buying disorder (CBD) is characterized as excessive shopping behavior, which leads to harmful consequences such as marked distress, impairment, and significant financial debt [1]. Conservative estimates describe prevalence around 2% in the general population with an extra 6% at risk for CBD [2]. In recent years, treatment studies of CBD have focused on
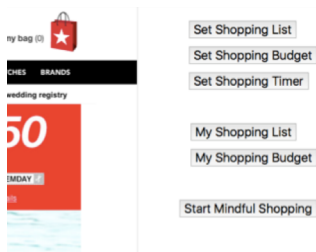
Figure 1. Mindful Shopping Functionality

- *Set shopping list:* prompts the user to add their intended shopping items.
- *Set shopping budget:* prompts the user for their intended budget.
- *Set shopping timer:* prompts the user for their intended shopping duration. From this information, the system would start a timer in the background, and an alert box would be displayed when the intended shopping time is over.
- *My shopping list:* by pressing this button, users can view their shopping list that they entered earlier.
- *My shopping budget*: by pressing this button, users can view the shopping budget entered earlier.

the use of psychotropic medication (mainly antidepressants) and cognitive-behavioral therapy [3].

Consumer online spending has also been increasing. The U.S. Census Bureau estimated U.S. retail e-commerce sales for the 4th quarter of 2016 was $102.8 billion [4]. The characteristics of e-commerce encourage compulsive buying because the Internet gives easy access to isolated shopping environments [5]. At the same time, with the rapid development in mobile technology, a growing number of tools have been designed to provide therapeutic assistance [6]. Recent estimates have suggested that there are now more than 165,000 health-related apps available [7]. However, very few tools exist to support real-time interaction with users to support wise shopping decisions.

This paper presents *Mindful Shopping,* a web-based tool that provides in-the-moment mindfulness-based interventions while users engage in online shopping. Research has shown that CBD is associated with less dispositional mindfulness [1]. This suggests that mindfulness-based interventions may be an effective approach for managing CBD by making users shop with intention and attention.

Background
Mindfulness-based interventions have been applied clinically to other compulsive behaviors such as compulsive eating and gambling [1, 8]. Multiple mechanisms can underlie the effects of mindfulness-based treatment: decreasing stress reactivity, improving awareness of internal experience, interrupting highly conditioned patterns, integrating higher-level processes, and empowering a sense of control and self-acceptance [9]. The essential concept for mindfulness is guiding individuals

to focus their intention and attention on what is happening in the present moment, which, in turn, helps them disengage from habitual, unsatisfying habits and behaviors [10].

Many of the recommendations for preventing shopping binges can be easily integrated into a web-based tool at exactly the point that the adverse behavior occurs during online shopping. Recommendations include making a shopping list and only buying what is on the list; allocating only a certain amount of money to be spent; taking a walk or exercising when the urge to shop comes on; when feeling out of control, seeking counseling or a support group [11]. While few web-based CBD management tools have been developed, there are many tools designed to help people with compulsive eating disorder by adapting mindfulness-based cognitive therapy. For instance, *Mindful Eating*, designed as a daily food experience journal, helps users build mindful-eating habits over time [6].

A web-based therapeutic assistance tool could be effective for delivering or enhancing evidence-based treatments. Web-based tools can improve treatment engagement because they make treatment more interactive with real-time, in-the-moment interventions [12]. In addition, many individuals with disorders will not seek face-to-face professional treatment due to considerations including cost, hassle, shame, and lack of treatment providers [13].

Iterative Design Process
Mindful Shopping (Figure 1) is being developed through an iterative design process. Below, we describe considerations made thus far, as well as the proposed next steps. The targeted users of this system are people

Figure 2. Workflow of Mindful Shopping

with CBD who want to change their buying behaviors. In addition, this tool may have broader appeal for individuals without CBD, but who still seek to be more mindful during shopping.

Starting with a high-level conceptual model of the proposed system, we completed a design specification that addressed the semantic, syntactic and lexical level design of *Mindful Shopping.* This informed the development of a low-fidelity prototype illustrating the critical functions of the system. Five evaluators participated in a heuristic evaluation of the prototype interface, using Nielsen's heuristics [14], which include flexibility and efficiency of use, visibility of system status, aesthetic and minimalist design, among others. According to their feedback, we adjusted the layout of the online shopping window, making it larger. Also, we refined the questions in the *Mindful-Shopping* session to be more user-friendly. The refined prototype was tested in a small pilot study, which resulted in additional refinement.

Mindful Shopping

We designed *Mindful Shopping* as a web-based tool that includes an online shopping window as well as additional functions providing real-time help to users. The additional functions are shown beside the shopping window, within the browser and any interventions also appear within the browser window. The online shopping window is an external shopping website (e.g. http://www1.macys.com). Since people with CBD often purchase items that are not needed and unaffordable or they spend longer periods of time than needed on shopping [15], we designed the basic functions accordingly to help users shopping with intention and attention. Figure 1 outlines functions available to support mindful shopping.

The user's goal is to make appropriate online shopping decisions, which they initiate through the *Start Mindful-Shopping* button. This was inspired by the concept of "Mindful Eating"[6]. The approach to mindful eating is learning to pay attention to your thoughts and feelings instead of eating mindlessly or unconsciously, so we designed Mindful Shopping to help users pay attention to their thoughts, feelings and needs by asking questions, at the appropriate time, following a workflow shown in Figure 2. These may include: How are you feeling right now? What are you buying? Is it in your shopping list or under your shopping budget? Do you really need it? Depending on the user's answer to these questions, the system would provide different types of interventions to help user change their behavior and seek out a different experience. These interventions are designed based on the common recommendations to prevent shopping binges and are described below.

- *Making a wise buying decision:* the mindful-shopping process will end and take users go back to the shopping page. There are two possible paths that could lead to this result: the item is in the shopping list and under the shopping budget; or the user realizes that the item is not useful and decides not to buy it. By giving users positive feedback, the system will help users feel more confident and in control.

- *One minute relax:* the system will close the whole shopping page for one minute. During that one minute, users can only see a dialog with a message encouraging them to relax before making a wise decision. Then the website will return after one minute. The mechanism behind this function is that it forces
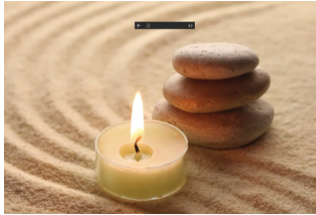
Figure 3. Window displayed for "Meditation"

the user to take a break from online shopping, and thereby it helps refresh their intention and attention.

- *Stop:* the system will close the whole shopping page and a dialog with messages will be displayed. From the control flow, the system recognizes that the user needs help to stop their online shopping behavior. Therefore, the system automaticaly closes the shopping website and gives them advice, such as to take a break or call a friend.
- *Encouragement:* the system would close the whole shopping page and a dialog with messages would be displayed. Similar to the *Stop* function, the *Encouragement* page appears when the user needs encouragement from the system to help them stop online shopping, but instead helps users make peace with themselves and accept who they are. In addition to giving the users encouragement, the system also suggests closing their eyes and breathing naturally.
- *Meditation:* the system would close the whole shopping page and open a new window (Figure 3). The audio would play meditation music after users click on the play button. Meditation is common recommended treatment for compulsive behaviors; it can help users to be less stressed and anxious. In this system, we only implemented a simple mediation session. Future work should be done to implement systematic meditation training sessions.

Pilot Study

We conducted a small pilot study of the refined system with participants recruited from the general population to address usability issues before bringing this to the patient population, and at the same time to assess the feasibility of these functions in helping non-target users make wise buying decisions. While this tool is designed primarily for people with CBD, it may also have a broader use, as people acknowledge the need for more mindful shopping.

Participants: Five participants were recruited (mean age = 26 years, SD= 10.4, 60% female). Participants did not receive any benefits. Average completion time was 10 minutes. From a post-study interview, the average frequency of participants doing online shopping was once a week, and they spend 1.3 hours on it each time on average.

Procedure: The participants performed an online shopping task, although the actual purchase was not completed; participants instead told the researcher whether they *would* buy the particular item or not. The online-shopping task ended after the participant made a buying decision (buy a particular item or not). A Likert-scale questionnaire was utilized to get participants' feedback on the usefulness of functions.

A brief explanation of the system was given at the beginning. Participants were then instructed to use the system to complete an online-shopping task, and were encouraged to use the think-aloud method during the task. After finishing the online-shopping task, participants were asked to fill out the questionnaire. A short interview was given in the end (See sidebar).

Online-Shopping task. To perform the online shopping task in the system, the recommended steps are: set shopping list, set shopping budget, set shopping timer, shopping online, start mindful-shopping before making a buying decision. The mindful-shopping session could take different paths, depending on the users' actions.

Function	Average Score (1-7)
Set shopping list	5.8
Set budget	5.6
Set shopping timer	6.2
One minute relax	6.6
Stop	4.4
Encouragement	4.8
Meditation	4.2

Table 2: Average score participants gave for the usefulness of each function on a scale of 1-7

Results. All participants easily learned how to use the system. They all followed the five steps to complete the online-shopping session. Table 1 shows how many participants ended the task with each intervention and their final buying decision, correspondingly.

Intervention name	Number of participants	Final buying decision
Making a wise buying decision	1	Yes
One minute relax	2	No
Encouragement	1	No
Meditation	1	No

Table 1: Participants' final results and buying decision

One participant made a wise buying decision and the final buying decision is yes, which means that item was in her/his shopping list and shopping budget. All other participants changed their final buying decision to not buy the item.

All participants filled out the questionnaire. Table 2 shows participants' feedback on the usefulness of each function. Since participants may have not used all the functions (depending on their answers to questions in the mindful shopping session), a brief explanation was given to those functions they did not encounter. The average score for all functions was 4.2 or above (with a range of 1-7), which indicates that all functions were useful in helping them making a wise buying decision. All participants thought the system could help them make wise buying decisions, and would want these functions on other online-shopping websites or apps.

Discussion. Since the target users for this system are people with compulsive buying disorder, and all these participants are not (according to the interview), this evaluation cannot represent the intended use case of a CBD subject using this system. For example, no participant ended with the "stop" function because they don't have the uncontrollable urge for shopping. Therefore, more work is needed to determine whether the system would help CBD patients. However, the results from the pilot study validated the usability and feasibility of the tool, before evaluating its therapeutic effects. It can remind people about their shopping intention, help them save time spending on online-shopping by setting the timer, make them think more thoroughly before making a buying decision by the mindful-shopping process. A limitation for the system is that it depends on the user's self-awareness and voluntary use of the functions it provides. Since CBD is mainly explained by chronic and repetitive failures in self-regulation, users may ignore the functions that this website provided, and go back to previous behavior.

Conclusion

This paper presented a novel approach of implementing mindfulness-based intervention in online shopping systems, aiming at helping CBD subjects make wise buying decisions. The pilot study showed the built-in functions are effective in changing users' potentially unwise buying decision through the mindfulness activities. The limitation of this paper is that there were no CBD patients participating in the evaluation. Therefore, in the future, participants with CBD will be recruited to further investigate its effectiveness with the target users.

Although bearing similarities with mindful-eating, this work incorporated the mindful-cycle with the unique characteristics of CBD patients. While these early results are encouraging, future work should be dedicated to more advanced formalization of high-level mindful-shopping cycle, better related to the clinical treatment of CBD patients. In addition, this type of intervention during online shopping informs the potential of an intelligent online-shopping system. For example, instead of relying on the users to manually start the mindful shopping session, an intelligent system could detect the "place order" behavior and then start the mindful-shopping process automatically. Further, the system could recognize items and their prices in the shopping cart, and then compare them with the contents of a specified shopping list and shopping budget, which will initiate the mindful-shopping process accordingly.

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