



Design Report

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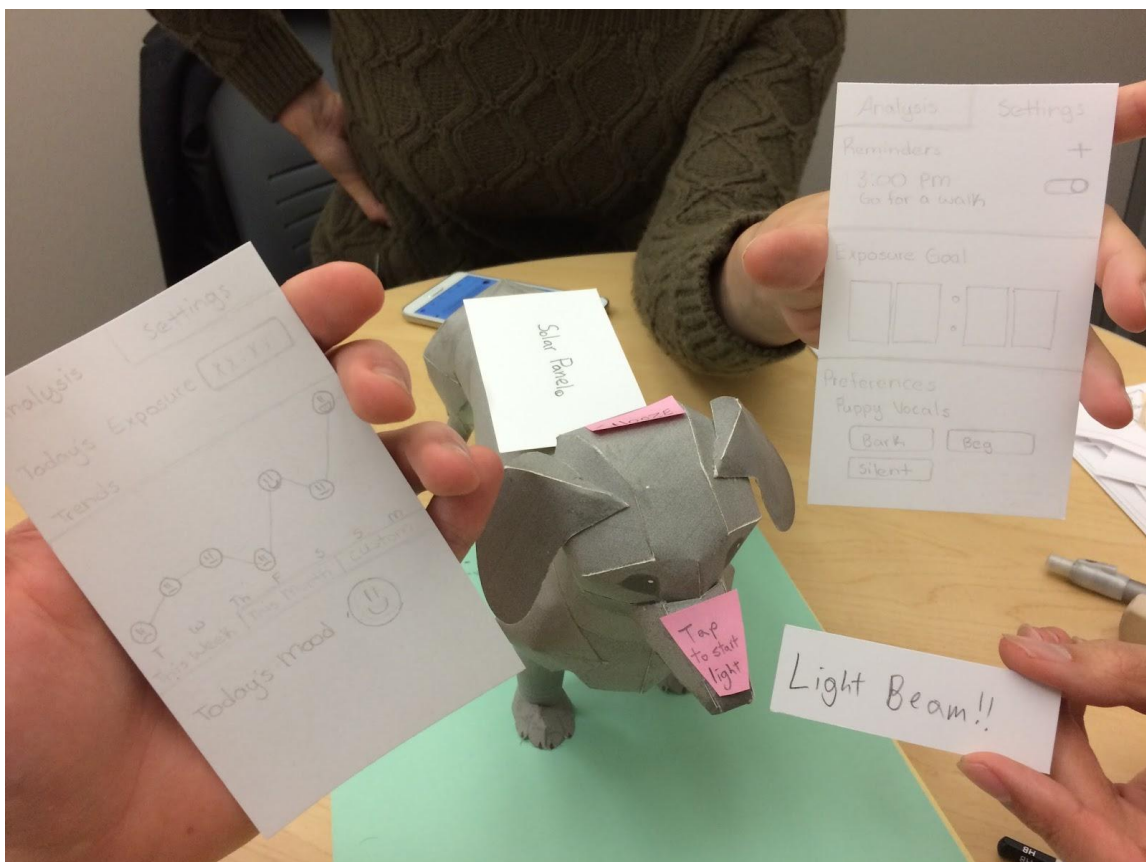
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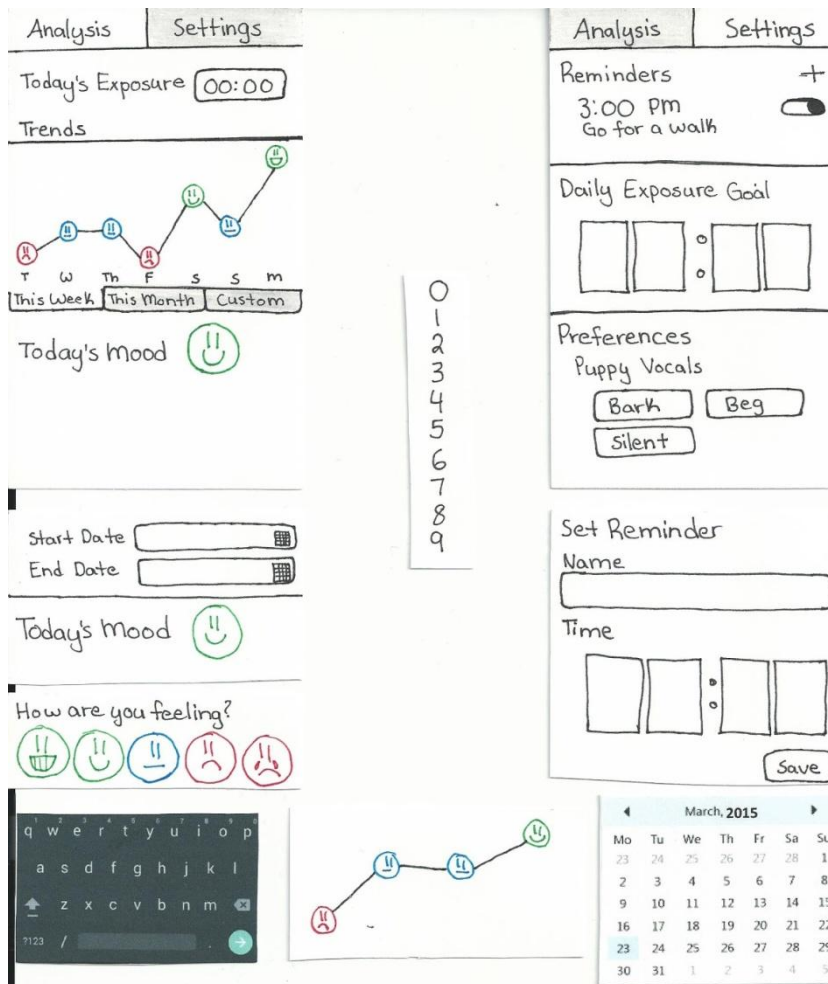
Overview

The problem: Sunlight exposure levels among the 20-30% of people that live in altitudes similar to Seattle and experience Seasonal Affective Disorder (SAD) are variable. People try to find ways to deal with their mood, but have trouble tracking and remembering to receive treatments. The solution: SAD symptoms have been shown to be correlated to vitamin D deficiency and directly influenced by the amount of serotonin produced by the brain. Serotonin production from the brain has been shown to be directly correlated to the amount of sunlight that is received that day. While vitamin D deficiencies come with more physical health concerns, we've determined that users are more concerned about their mental health (i.e. SAD). So our intended solution focuses on helping the users deal with their SAD symptoms through a series of monitoring tasks, reporting tasks, and reminder tasks that revolve around a particular sunlight exposure goal. This solution would also leverage local weather information to help user more easily and regularly reach that goal and, hopefully, also assist in mitigating potential vitamin D deficiency.

Initial Paper Prototype



Our initial design had two tabs called Analysis and Settings. The Analysis tab contained graph data, viewing current exposure, and setting today's mood. The Setting tab contained setting reminders, setting exposure goals, and preferences. The most critical pieces of this design were: the ability to set a sunlight exposure goal for the day, the ability to record mood, and the ability to set a reminder. These were the



three things absolutely necessary for a user to be able to complete our two primary tasks which were: 1) to see the correlation between sunlight exposure and mood or general happiness, and 2) to remember to get the sunlight exposure levels needed or to maintain a treatment regimen. As shown in the images above, the application portion of the solution which is where the user is able to accomplish setting goals and reminders and recording mood; and the hardware portion of the solution is where the user receives feedback from the solution. The robot puppy acts as the reminder mechanism for both reminders set by the user and the exposure goal. The puppy is also a crucial portion of this design because he is equipped with an extremely bright light to help users get to their exposure goals when the sun just isn't an option. Ultimately, that piece of functionality could be the difference in fighting SAD symptoms.

Testing Process

During our contextual inquiries and general pre-design research we discovered that a solution like ours could appeal to not just users who suffer from SAD, but also users who don't suffer from SAD directly (i.e. they have a loved one with SAD) and users who are looking for preventative solutions or a healthy exposure tool. Because of those findings, we set out to do our user testing with one person from each of the previously described groups. We found a male student Information Technology student who suffers from SAD, a female accounting student who has a sibling that suffers from SAD, and a male who neither suffers from SAD nor is directly aware of any loved ones suffering from SAD. Our testing process varied from the first participant to the third as we discovered some holes in our test protocol during the first test and attempted to fill them for the subsequent tests, but in general all of the participants were taken through something similar to our final protocol, which can be found in the Appendix.

Each of the participants mentioned above sat down with at least three members of the group where one group member was purely an observer and took notes, one group member was the application/computer who responded to the users actions, and one group member was the facilitator who walked the

participant through the testing scenarios. The scenarios that each participant was taken through started with putting them in a situation where they would have acquired a Lux Puppy, and then asking them to complete our primary tasks. These tasks were broken into smaller tasks that mapped to the application layout and between certain tasks; additional information was given to the participant to make sure that they always felt like what they were doing was meaningful and logical.

Our testing process was refined mostly after the first test where we discovered some large holes in the protocol. The first participant was not given much 'filler' scenario between tasks and it was obvious that his understanding of why he was doing the things he was doing was unclear and it affected his choices during the test. The second test went much smoother in terms of the scenario and the actions of the user, though we did struggle slightly getting the user to interact with the paper prototype as she would her cell phone screen.

Testing Results

The tables in the appendix represent an itemized list of the things we learned about our paper prototype from the class heuristic evaluation all the way through the three usability tests. From our class evaluation and our first usability test, which was done with our original paper prototype, we learned several things. First, not all touchable areas were obvious to the users; in particular the Today's Mood section didn't afford touch-ability and so users thought that the app was telling them their mood instead of the users reporting their own mood. Second, in the 'reminders' tab the on/off toggle for each reminder wasn't clear in conveying whether it was on or off. Thus, we made it more explicit that it's an on/off button by adding color to the toggles-- green indicating on, red indicating off.

Lastly, the content organization was strange for our users. They didn't find it intuitive that recording today's mood was on the same page as their mood/exposure analysis chart and they found it equally confusing that they were able to set reminders from the settings tab. Needless to say these were the first things we addressed in our second iteration paper prototype by creating a third tab and dividing content more logically across those tabs and by placing a casing around the mood indicator in order to signify touch-ability and edit-ability. Another area that had an issue was the snooze button on the puppy. During the evaluation, it was suggested we add a way to change the snooze time and during our first test the user did not want to snooze and just wanted to turn off the alarm. From all this confusion, we decided that the snooze button was an unnecessary feature and that we should focus on other aspects of the design.

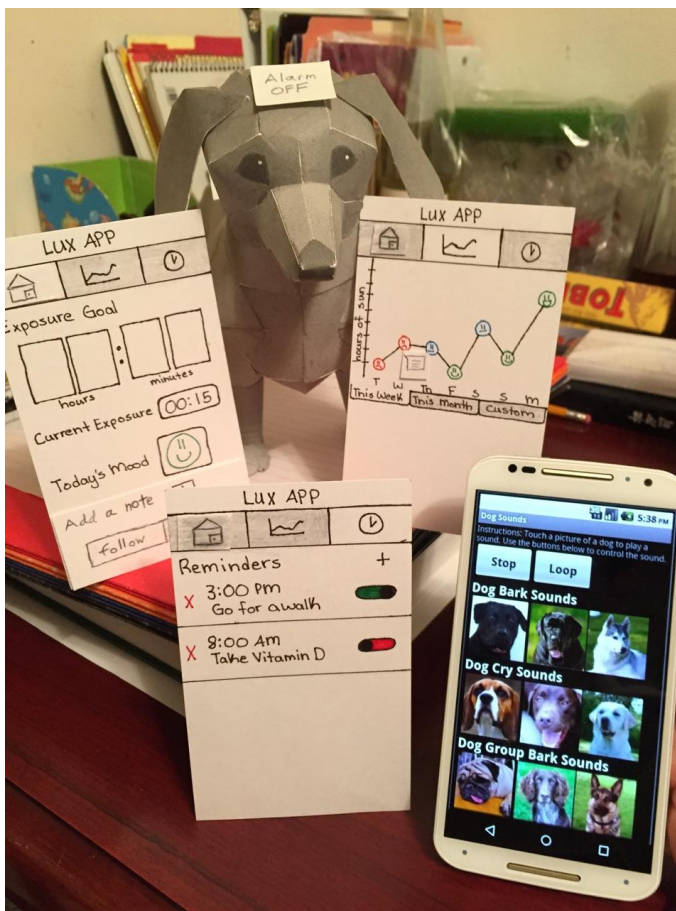
From our second and third usability tests, which were both done with our second version paper prototype we learned more about the information that was being communicated from the app as well as minor usability issues. We identified some readability issues with our graph data as the user wasn't exactly sure of what data the graph was plotting. Adding a label to the y axis indicating it was hours of sunlight cleared the confusion. We also identified some usability issues with our iconography because not all of them were communicating the things we wanted. We refined the icons to more clearly convey the content in each of the tabs.

Finally, we learned that the mood information we were tracking was not thorough enough. A simple 1-5 scale was too simple for this of system because more than the amount of sunlight received in a day could affect the mood of the user. We assessed a series of iconography after this in order to finalize icons that better represented a pages' content and we added some context to our graphing data in order to make it more legible. In our third test, we talked to the user and found that one issue in our design was the lack of detail in our mood selection. This caused us to include a notes feature in the mood tracking section in order to compensate for the complexity of what affects emotions.

One last small change from the user testing that we made was the addition of a quick toggle on the home page to indicate whether the robot puppy should follow the user around or not. This was a surprising thing that we ended up overlooking because it seemed so obvious.

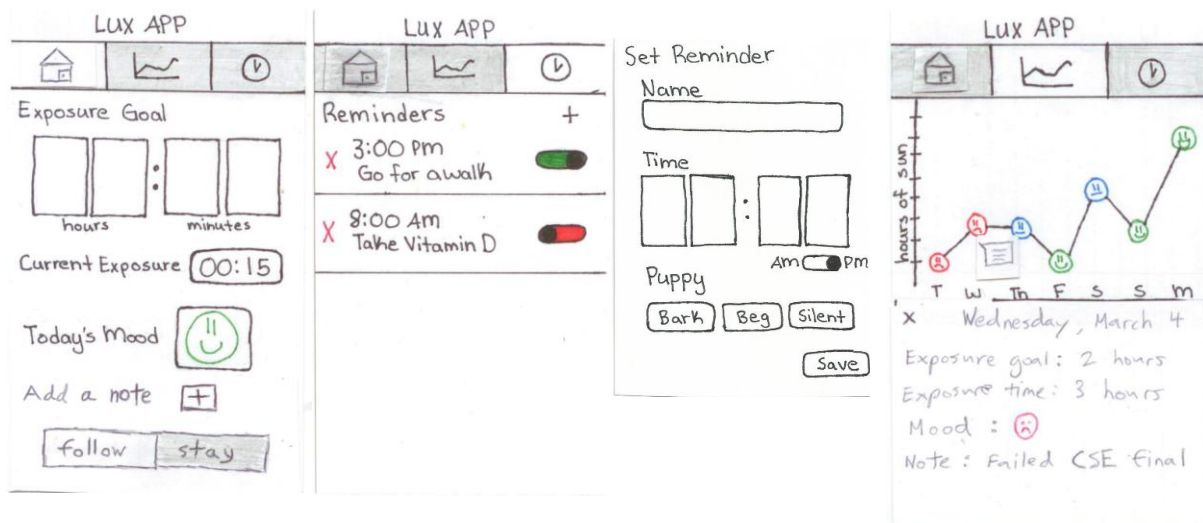
In the class critiques it was discussed that we should try to find a way of having actual sounds and light instead of just note cards. For the second and third test, we included real dog sound effects from an app instead of just note cards with comic book style sound effects written on them and that seemed to increase the user's interest in our solution. As for the light, we could not come up with a solution in time to produce a light similar to the effect of a light therapy box, so we continued using the note cards.

Final Paper Prototype

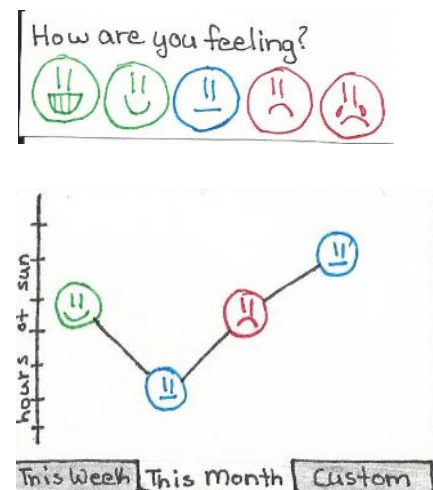
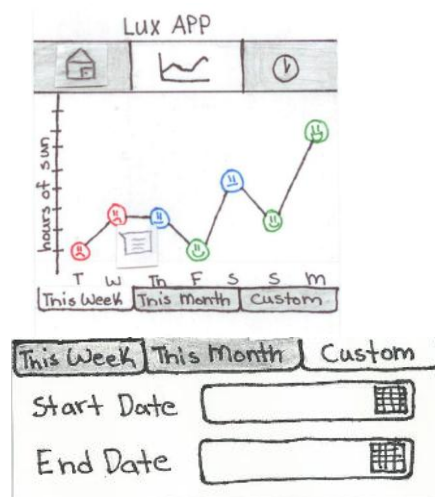


Our final paper prototype design ended up a good deal different than the original because of the things we discovered during testing. The design has three tabs that were labeled with iconography instead of text which represent, Home, Analysis, and Reminders. We felt that this makes our design appear more sleek as well as more intuitive (people understand a home symbol and a clock to represent reminders). The Home page contains the exposure goal setting, recording today's mood, adding notes to that mood, and changing the puppy's ability to follow the user around. The Analysis tab still contains a graph, though a bit more detailed and legible, that can be viewed for the current week, month, or some custom setting. When viewing the week graph a list of moods and notes is shown beneath the graph. The Reminders tab expanded on the original idea and contains a list of already set reminders and the ability to add and delete reminders. We also decided to individualize each reminder with the choice of barking, begging, etc.

The most integral part of this design is the clear division of content. Because the content on each tab feels like it belongs on that tab and nothing feels out of place the users are more confident in their ability to accomplish our two primary tasks which are 1) to remember to get the sunlight exposure levels needed or to maintain a treatment regimen and 2) to see the correlation between sunlight exposure and mood or general happiness. For our first task, the user starts at the home page and sets a light exposure goal for the day. After this that are able to go to the reminders tab to set up additional reminders that help them reach their goals.

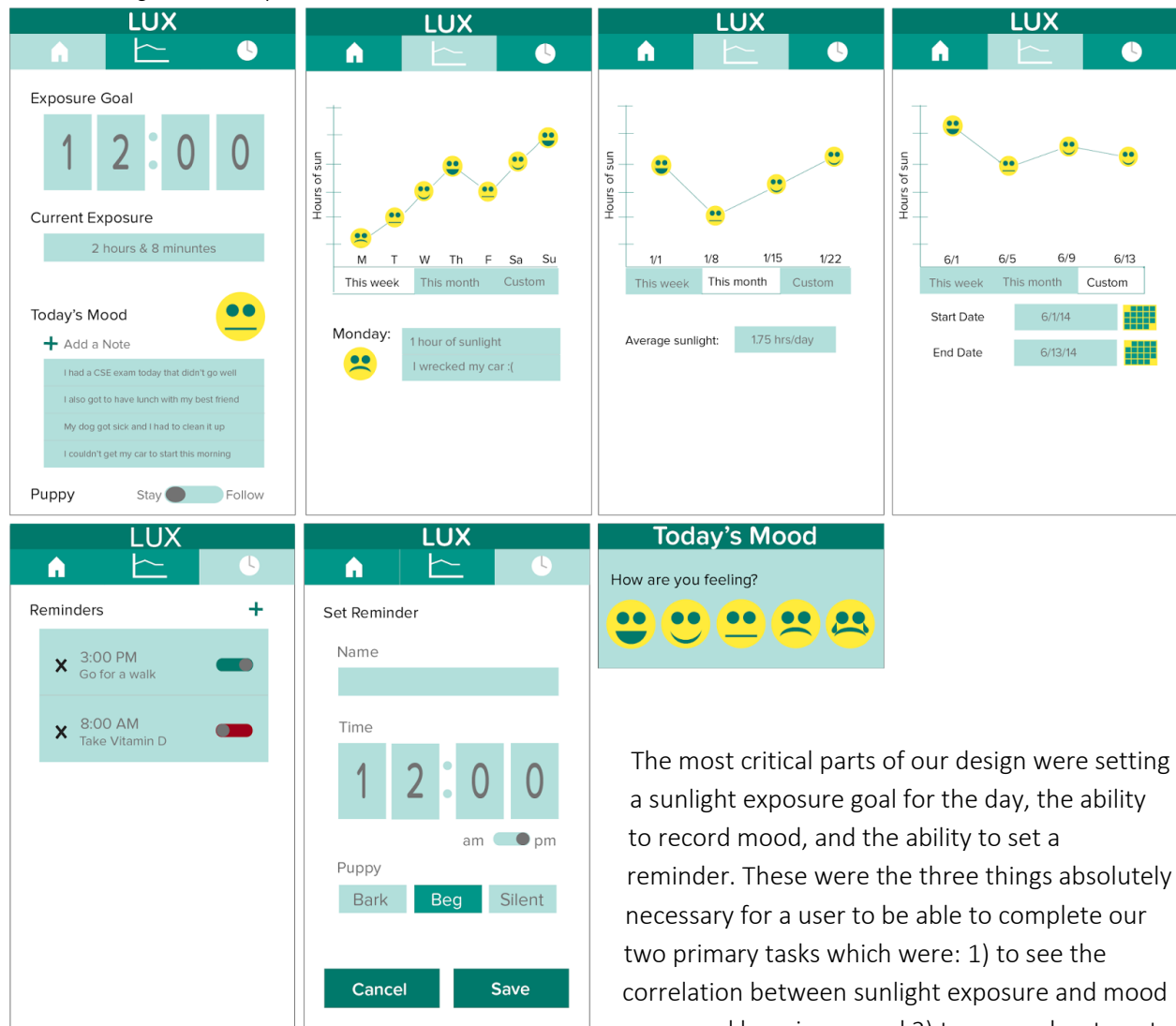


The puppy will use this goal and the reminders set by the user to notify the user of either their specific reminder or just that time is running out to reach a particular exposure goal. The user can quiet the puppy by tapping it on the head. For the second task, users need to have been tracking their sunlight exposure (which happens through the puppy) and recording their mood daily. If sufficient data exists, the user will go to the analysis page and look at a graph of their sunlight exposure and mood correlations. The user can view the detailed mood information for each day of the current week below the graph. And the user can view a month summary of the same data or set a custom time frame to view the analysis.



Digital Mockups

Version 1 Digital Mockup



the sunlight exposure levels needed. As shown in our digital mockup, the UI portion of our project is where the user is able to accomplish setting goals and reminders and also recording mood. After a user navigates to the reminders tab and simply adds a new reminder, the robot puppy acts as that reminder mechanism to go outside and catch some rays, or alternatively use the built in bright light therapy.

Changes made from paper to digital

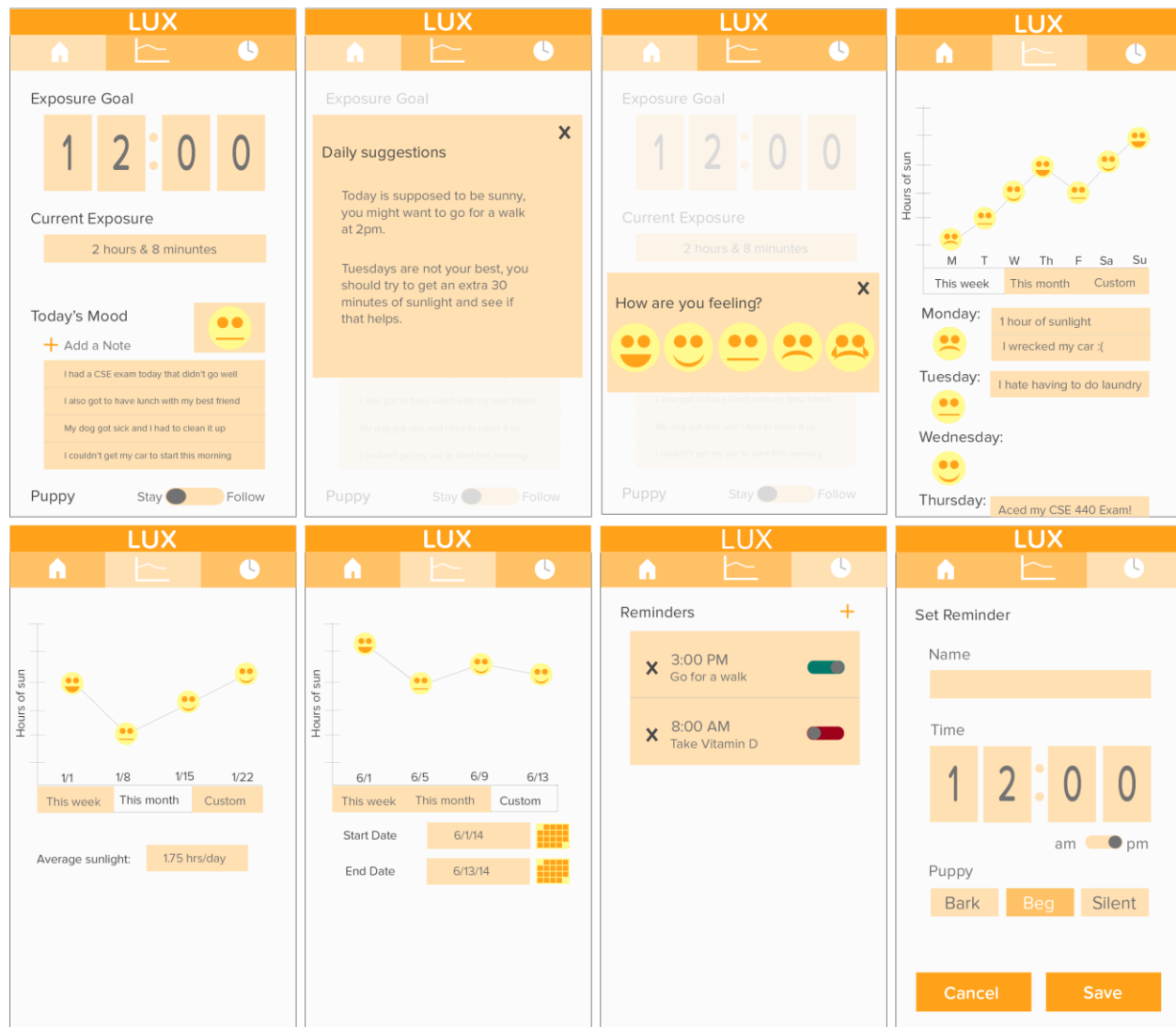
One change we made from our paper prototype to our digital prototype was the way we displayed notes for a given day under the correlation tab. In our paper prototype we basically just outputted the plain text with no format. In our digital mockup we added some style and formatting to the text so it fit better in context of the rest of the app by making the layout have the same layout as the notes section in the home tab. Also, a minute detail we changed was the formatting of the date picker when choosing a

custom date. The calendar icon simply looked better beside the date box instead of inside of it like we have it in our paper prototype. In our paper prototype we didn't have default times for the 'exposure goal' or the 'reminders' clock. We made sure to include this in our digital mockup.

Changes made from responses to critique

The first change we made in response to critique was displaying the notes as a list in the correlation tab. If you see our first digital mockup (green theme) in the correlation tab it only shows the notes for 1 day of the week (in this case, it is showing Monday). However, we got a suggestion to display the whole week as a list so the user is able to just swipe vertically to scroll through the notes for the whole week. This is shown in our revision mockup (orange theme). The second change was the color scheme. At first we had the green which was fairly neutral, but in critique it was mentioned that a brighter color scheme would work better for our design so we decided on an orange color scheme. Another change that was made was clarifying that the mood selector was a popup window on the homepage and not a separate screen.

Version 2 Digital Mockup



In our final mockups, users will accomplish tasks by taking the following steps:

Task 1 (Seeing Analysis)

The user sets their mood daily on the homepage and is able to add notes about what affected their mood that day. When the user receives light therapy from the puppy or goes for a walk, the current exposure on the homepage will increment. Both the mood and light exposure is carried over to the analysis page where the user can view their weekly, monthly or custom analysis. Any notes that the user inputs will be displayed here as well.

Task 2 (Getting reminders)

In our final mockup, the user starts at the home page and the first time they open the application in the morning, they are welcomed by a suggestion window. This provides the user information based off of analysis like what exposure goal to set and through weather reports when to go for a walk. The user sets an exposure goal and then goes to the reminders tab to set a time to be notified by the puppy.

Discussion

What did you learn from the process of iterative design?

Iteratively designing our project was really helpful in getting a really solid and usable design figured out.

After initially deciding on the basic form of our project, we thought of most of the components that would be present in our system. However, the original form of the Lux application proved to contain too many options in a small space. It was only during the usability testing that we realized that Lux would function much more easily with a third section on the app dedicated to reminders. The design process definitively gave us ample feedback and methods for discovering and correcting this major usability error.

In general, the process allowed our design to end up very aesthetically appealing. If we did not have as many chances to revise our system as we did it seems unlikely that we would have ended up with such a straightforward user-interface.

How did the process shape your final design?

During the initial brainstorming portion of our process we really hammered down the tasks that we thought were important. In addition, the large amount of time that we spent working on perfecting these task-concepts allowed us time to effectively think of a lot of solutions to achieve them. It also helped us to better judge what tasks seemed more critical to accomplish (extensive user feedback played a big role). Not only did this process help us determine what to focus on, it also revealed areas that we took for granted like having the puppy stay.

How have your tasks changed as a result of your usability tests?

Our usability tests didn't force us to change much functionality of our tasks. What it did do, however, was allow us to refine the processes the user takes to accomplish the tasks. We isolated the task of setting up

a reminder to make it more intuitive and flow as one distinct task. We also made clarifications of adding labels and refining the graph to make the task of seeing correlation between sunlight and mood more clear. The small change of functionality we did make was removing the ability to hit snooze on the puppy. This was introducing complexity while not offering much value in return.

Do you think you could have used more, or fewer, iterations upon your design?

We are confident the number of iterations falls within the goldilocks zone of just right. If we had fewer iterations I think a few minute details would've slipped through the cracks, but aren't sure we would've gained any extra useful feedback with more iterations. One aspect that we did not focus as much on was the puppy; we tried to make it as simple as possible because it is such a strange experience. The less the user has to worry about the dog, the more useful it will be at reminding them. With more time, we would have probably looked at different iterations of the puppy, especially the aesthetics.

Appendix

Final Testing Protocol

Give Project Overview: We are working on a solution that will help people who live in cloudy raining generally dark areas like Seattle self mediate their seasonal depression symptoms.

Scenario1: It is time for midterms. You have three classes that you have to prepare for and you are working part time. You are stressed, maybe you aren't sleeping enough, and you just feel tired and reclusive. Out of concern for your mental health, your mother sends you this package that to your surprise contains a Lux Puppy. You do your due diligence and don't read a single part of the instructions, but you have been using the puppy for about a week at this point.

Scenario 1.1: It is Friday morning

Task 1: Set a daily exposure goal

Task 2: View your sunlight exposure to mood trends

Scenario 1.2: There are about _____ (fill with hours from Task 1) hours of sunlight left before the sun goes down today. The Puppy has begun barking.

Task 3: Stop the Puppy's barking: What are you going to do about your sun exposure?

- this can be done by stopping the alarm or turning on the light

Task 4: If the user ignores the puppy and does not "go for a walk" or use the light therapy bulb - once the sun goes down the puppy barks again because you still have an option to reach your exposure goal: the Light therapy bulb

- the user should activate the light therapy bulb

Scenario 1.3: After viewing your exposure and mood chart you decide to start taking regular walks in order to increase your mood levels.

Task 5: Set a reminder to go for a walk at 3 pm.

Scenario 1.4: The time of your walk is approaching; the Puppy starts barking.

Repeat Task 3 and Task 4

Task 6: record daily mood

Post Testing Questions

1. Did you like the interaction between the application and puppy?
2. Were you confused at any point during the testing? Anything in particular that was unclear?
3. Does looking at the analysis help motivate you to get more sunlight exposure?
4. Would you buy/use this?

Class Heuristic Evaluation Results		
Issue	Severity	Revision Image (and explanation)
Confusion on what graph is presenting- No explicit y-axis label. (visibility of system status/ consistency and standards)	1	We added axis descriptions
The student suggested allowing a user to alter snooze time (user control and freedom)	2	We thought of adding a snooze time to setting reminders but after our first usability test we decided to remove the snoozing function because it was causing too much confusion.
User was not sure if the smiley face was actually a button (consistency and standards)	2	To indicate that the mood was a button we decided to put a box around the face
No functionality for deleting reminders (User control and freedom)	2	We added an "X" next to each reminder to allow the user to delete
On/off switch for the reminders area is missing an	1	Added color component to prototype

“on” component (beliavability issue)		
User could have confusion on how to set time and does not indicate am/pm. (beliavability issue)	1	Added option for am/pm. Only allow certain numbers to be chosen.

User Testing Summary		
Incident	Negative Severity	Revision Image
The participant was confused about the graphing area. He wasn't aware that the graph was trying to show both mood and sun exposure, he thought that it was just charting mood.	3	We added axis descriptions
The participant could not figure out how to turn the alarm on the puppy off. We had included a snooze like button for the case where a user could not do the task the puppy wanted right at that moment, but we did not include any kind of button for just turning the alarm off when the user agrees to do the task the puppy wanted.	3	We decided to take out a snooze function to reduce confusion; instead petting on the head will just stop the alarm.
Confusion about setting mood when changing graph. Did not know if changing the daily mood on the screen would affect the data on the graph	2 - it was making it hard to understand the content structure of our app	Added a third tab and reorganized.
“today” tab iconography was confusing to the user	2 - impeded user’s ability to understand how to navigate our application	We changed the icon to a more recognizable symbol
The user pointed out that there was no way to stop the puppy from following the user	3 - Not being able to essentially turn off the system is definitely a major usability problem.	Added a radio button to set the dog’s following actions in the home section

The user indicated a lack of information from the daily mood selector.	3 - Just collecting a single mood value is pretty lousy, and is limiting to what the user can do with the app.	We put an option to allow the user to add a note to describe their mood. This can then be viewed along with other information in the analysis tab
User felt that the mood tracking lines were meaningful because of the smile faces	0 - was a positive incident	
User understood how the dog's actions followed from the app interaction	0 - was a positive incident	