Project #2 discover

- December 03, 2017

MAKE OBSERVATIONS

1. Opening car door in tight space
    a. What is the challenge: To design something to make car door opening in tight spaces easier?
    b. How did you notice it: personal experience
    c. Significance: Daily influence
    d. Existing solutions: auto parking cars, auto unparking cars, Tesla model x doors
    e. Research: couldn't find
2. Chatbot for lonely people
    a. What is the challenge: TO create a humanlike chatbot that can make lonely people feel better when they talk to it
    b. How did you notice it: Chatbots & lonely people
    c. Significance: Good way to help people who have dangerous thoughts about themselves
    d. Existing solutions: lots, just google search "chatbot for lonely people"
    e. Research: a lot, some even made by hospitals

POSE QUESTIONS

Questions/Topics to Investigate:

1. *Body clock*
2. *Effective ways to wake people up (eg light)*
3. *Sleeping quality of our users*
4. *Motivation*

Interview questions

[Arthur]

- Are you satisfied with your current sleeping habit? Why?
- Tell us a little bit about your sleeping habit (e.g. wake up/sleep time)
- What do you think is the main cause of a bad quality sleep?
- What do you think makes a good quality sleep?
- Do you have an experience of trying to adjust your current sleep pattern? If yes, tell us about the process–how you did it and whether it succeeded or not?
- Do you hear the alarm and cannot get up or you just simply don't hear it?

[Wayne]

- How does the lack of artificial light an hour before sleep affect your energy the next day?
- How does the effect of _____ color of bright light affect your willingness and quickness to wake up?
- Do you find yourself lacking the motivation to wake up or simply can't be waken up from sleep?

[Shaun]

1. How do you wake up?
    a. Do alarm clocks work on you?
    b. Have you ever been unwillingly woken up by someone else waking up?
    c. Have you ever woke someone up unintentionally because you woke up?
2. Are you a heavy sleeper (深度睡眠者)?
3. How would you redesign alarm clocks so that they fit your need?

4. Have you tried any of your own solutions? If so, describe'

Alts

Do you sleep with a vital signs tracking device on?

If yes, please provide us with your sleep data

[Daniel]

- How is your sleeping quality? (answer with rate 1-10)
- Are you okay with technology involved in your daily life?
- Are you interesting on changing your sleeping habits?
- If yes, how much money or effort would you pay on improving it?
- Would you mind trying some unpopular methods?

FIND INFORMATION

KNOWLEDGE OF TOPIC	

What do we currently know about our topic?	*What we know/What we've learned:*
	• Phase delay sleep-pattern
	  • Body not adjusted to waking up at the time
	  • Caused by waking up/sleeping late in the weekends = messes up body clock
	  • Solution: wake up and sleep at the same time as you would do in the weekdays
	• Sensitivity to light
	  • Caused by using electronic devices before sleep
	  • Tricks your brain thinking that it is daytime
	  • Messes up your circadian rhythms and cannot obtain quality sleep
	  • Melatonin: hormones only produced in the dark, which helps you sleep
	  • Solution: don't use electronic devices before sleep, try reading a book
	  • Solution: try to eliminate all the light source in your room at night (e.g. light from sockets), but red light is fine
	  • Solution: get night shift apps (e.g. Flux) on your devices, which will reduce blue light exposure
	• Ambient sounds
	  • Prevent them from fully reaching deep sleep
	  • E.g. air conditioning, music
	  • Solution: Don't turn on AC at night when not necessary, or put it on night mode if there is
	  • Solution: Don't listen to any music at night
	• Consuming caffeine
	  • Stimulant effects is disruptive good sleep
	  • Even drinking 6 hours before sleep affects the quality
	  • Solution: cut off caffeine consumption before 2 p.m.
	  • Solution: start your day with the strongest caffeine beverage
	• Knowing why you should wake up proves you with motivation assuming you're woken up by an alarm or something in the first place. (Michelle Segar, PhD, a healthy living expert and motivation scientist at the University of Michigan in Ann Arbor)

- Different stages of sleep and what it takes to wake up from each stage
    - Disregarding the first two of stages which shouldn't be difficult to wake up from unless you're doing it on purpose
    - REM and 3 and 4 stage of sleep is the one we're tackling
    - As for deep sleep which accounts for REM and possibly 3 and 4, the quickest way to wake someone up is by calling their name according to robot jones
    - However, a normal alarm clock should suffice just that it might take seconds longer

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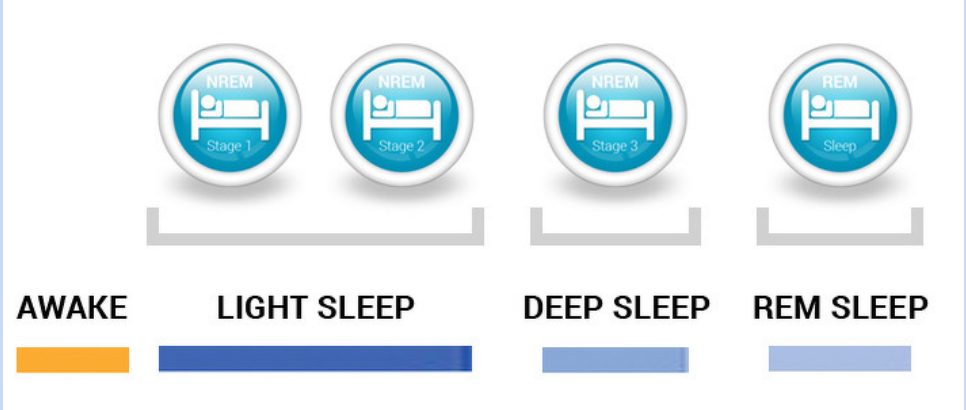
- Circadian rhythms
    - Biological timekeeping system on:
        - Body temperature (will rise before waking up to create alertness)
        - Various hormonal changes
        - Brain cycle between sleepiness and alertness at regular intervals
    - Factors that will impact the clock:
        - Light (plays the largest part)
        - Exercise
        - Horomones
        - Medications
    - Causes of disorder:
        - Work (e.g. stress)
        - School (e.g. procrastination)
        - Social commitments (e.g. gaming, watching videos)
    - Different types:
        - Jet lag
        - Shift work
        - Delayed/advanced sleep phase disorder
        - Irregular sleep-wake rhythm
    - Treatments (identify which type then take the appropriate methods):
        - Bright light therapy - properly timed exposure to light to fight the urge to sleep
        - Regular sleep habits
        - Taking melatonin supplements
    - Changes as you grow older

- Sleep hygiene
    - Different practices and habits that are necessary to have good nighttime sleep quality and full daytime alertness
    - Physical and mental health → improve productivity and overall quality of life
    - How to improve?
        - Appropriate amount of sleep (not too much or less)
        - Limiting daytime naps
        - Avoiding stimulants (e.g. caffeine)
        - Exercising
        - Don't eat before sleeping, indigestion disrupts sleep
        - Expose to light accordingly to the time of the day
        - Pleasant sleeping environment
    - Identifying poor sleep hygiene
        - Sleep disturbance
        - Daytime sleepiness
        - Take long time to fall asleep

- Stages of sleep and what it takes to wake up in each stage (REM)



- NREM Stage 1
  - Decided to sleep and closed your eyes
  - Lasts 1 to 10 mins
  - Can be quickly back awake again
  - Sometimes experience hypnic jerk (sensation of falling down)
- NREM Stage 2
  - Lasts about 20 mins
  - Activity within your body decreases overall
  - Harder to wake up
- NREM Stage 3
  - 35 to 45 mins after sleeping
  - Brain waves slow down and become larger = less processing
  - Sleep through most potential sleep disturbances
  - Will feel disoriented for the first few mins
- REM Stage 4 (rapid eye movement)
  - Lasts around 10 to 60 mins
  - When dreams, bedwetting, and sleepwalking occur
  - Increase of the heart and respiration rates

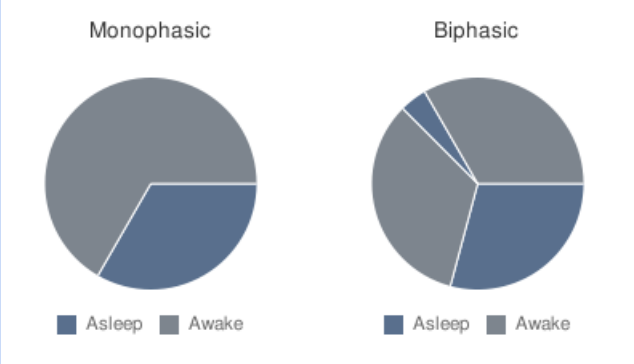
- Melatonin
  - Hypothalamus (a portion of the brain, more specifically the suprachiasmatic nuclei [SCN]) controls circadian rhythm
  - Factors (e.g. light) signals the brain → sends signal the body to release melatonin → makes body feel tired and want to sleep
  - Occurs around 9 pm
  - Can be obtained by taking sleeping pills
    - Beware of overdosing
    - Study shows melatonin can reset the body clock better, but not clear whether exposure to light will be more effective

- Serotonin
  - Neurotransmitters; REM inhibitor
  - Obtained through diets high in amino acid tryptophan (e.g. red meat, tofu, nuts) and exercising
  - High levels of serotonin keeps you awake and lower desire to sleep
  - Keeps you awake in the day, but maybe in the night as well (insomnia)

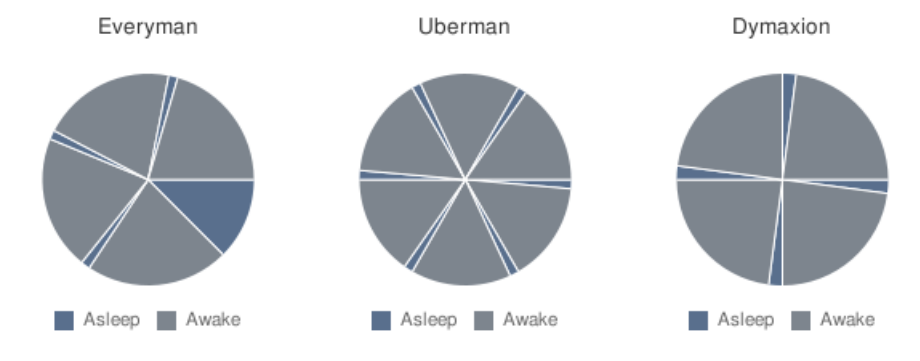
- How to reduce ambient sounds and lights while sleeping
  - Reduce noises:
    - Cover floors with rug
    - Cover windows with thick curtains
    - Soundproof installments
    - Move sound-making devices away from the room
  - Dim light by:
    - Tapes
    - Semi-transparent materials (most preferably a tint red colour)
    - Learn how to disable them

- Different sleeping habits
  - How it works?
    - How long you have been awake
    - The regular timing of your sleep

- Types of sleep patterns:



- Monophasic
    - One sleep per day
    - Around 8 hrs per night
- Biphasic
    - Two sleeps per day
    - Nap and long sleep
        - Siesta (sleeping habit in Spain and Latin America) - less than 30 mins
        - 90 mins to reach REM and get a full rest



- Polyphasic (maximize deep sleep and reduce time of light sleep)
    - Everyman
        - 3 x 20 mins naps (9 am, 2 pm, 9 pm) + 3 hrs core sleep (1 to 4 am)
        - Requires strong dedication and willpower to go through the adjustment period
    - Uberman
        - 6 x 20 to 30 mins naps (2 am, 6 am, 10 am, 2 pm, 6 pm, 10 pm)
        - Hardest to implement
        - Not flexible; miss one nap and feel really sleepy on the next
    - Dymaxion
        - 30 mins nap every 6 hrs
        - Really hard to achieve so
    - Keeps you energized throughout the day, but requires strict discipline and might be messed up by irregular melatonin production
    - Society are driven by monophasic sleeping pattern = hard to accommodate with others
- Most importantly is to maintain a regular/predictable sleep pattern and stick to it

- How people hear noises when asleep
    - How noise affects your sleep?
        - Brain continues to register and process sounds on a basic level in sleep
        - Causes wakes, moves, shifts, and experiences in change in heart rate and blood pressure
        - “Sound sleepers” - brain activity makes them more impervious to noise
    - White Noise
        - Reduces background sounds and replaces it with itself
        - E.g. air conditioning
        - Helps you sleep through the night undisrupted
        - Need to find the white noise that works the best for you
    - Noise pollutions from the outside
        - Use white noise
        - Use earplugs
    - Exploding head syndrome (type of parasomnia)

- Caused by lack of sleep
- Hear imaginary noises before falling asleep
- Alleviate by getting more sleep

[Shaun]
People go through multiple stages of sleep stages during a sleep.
These stages can be detected using commonly found sensor combinations that can be found in certain smart watches

It is easier to wake up during light sleep as opposed to trying to wake up during deep sleep.
A viable solution to wake someone up faster is to wake them up during light sleep. Since each complete sleep cycle lasts approximately 20 to 100 mins, it is feasible to wake the user up slightly earlier than their set alarm time if they are in a more ideal wake-up condition. This will allow the user to wake up faster and the side effects of the alarm or whatever will be lessened.

[Daniel]
Directly:

- **Alarms:**
  - Alarms that provide different sounds or even different kind of signals
  - Alarms that are made to be user-interactive (https://www.popsci.com/alarm-apps-wake-up)
- Possible Issues:
  - Getting used to alarms' sounds (https://www.soneticscorp.com/safety-signals-become-background-noise/)

    Brief Intro: Researches had proved that if listening to a sound or noise for a long period of time, they tend to start to ignore the sound, thus, not reacting to the alarms.
    Possible impacts:
    - Alarm fatigue
    - Listener fatigue
    - Apathy
    - Ignorance

    Therefore, customizing the alarm for each of the users can be a possible solution.

Indirectly:

- **Sleeping Habit:**
  - Analysing users' sleeping habits is solving the problem indirectly, which by improving users' sleeping quality, we hope the users can "sleep efficiently."
  - Making the users more relax before they go to bed can pull them into deep sleep more easily comparing to those who are not. (http://www.sleephealthfoundation.org.au/fact-sheets-a-z/187-good-sleep-habits.html)

    Brief Intro: Having a good sleeping habit can really help our users to improve their sleeping quality. In order to achieve that there are a list of changes they can make:
  - Stop using phones and computers 1-2 hrs before going to bed
  - Do not put 3C technology products in the bedroom
  - Take a warm bath
  - Read something quietly
  - Drink a warm milk drink.
  - Definitely no alcohol or caffeine before you sleep

[Wayne]
1. There're sex difference in the response to light during sleep, which was identified as one of our potential solution.

" In contrast to women, men had higher brightness perception and faster reaction times in a sustained attention task during blue-enriched light than non-blue-enriched. After blue-enriched light exposure, men had significantly higher all-night frontal NREM sleep slow-wave activity (SWA: 2–4 Hz), than women, particularly during the beginning of the sleep episode. Furthermore, brightness perception during blue-enriched light significantly predicted men's improved sustained attention performance and increased frontal NREM SWA. Our data indicate that, in contrast to women, men show a stronger response to blue-enriched light in the late evening even at very low light levels (40lux), as indexed by increased vigilant attention and sleep EEG hallmarks. Collectively, the data indicate that sex differences in light sensitivity might play a key role for ensuring the success of

	individually-targeted light interventions." (Nature; Sex differences in light sensitivity impact on brightness perception, vigilant attention and sleep in humans; Sarah L. Chellappa, Roland Steiner, Peter Oelhafen & Christian Cajochen) This is especially helpful when we're designing a board design and also mean that our participant will have to include both genders 2. I found a journal that uses mathematical models to predict the modern body clock since people no longer follow the light dark cycle. "The model shows that without artificial light humans wakeup at dawn. Artificial light delays circadian rhythmicity and preferred sleep timing and compromises synchronisation to the solar day when wake-times are not enforced. When wake-times are enforced by social constraints, such as work or school, artificial light induces a mismatch between sleep timing and circadian rhythmicity ('social jet-lag'). The model implies that developmental changes in sleep homeostasis and circadian amplitude make adolescents particularly sensitive to effects of light consumption. The model predicts that ameliorating social jet-lag is more effectively achieved by reducing evening light consumption than by delaying social constraints, particularly in individuals with slow circadian clocks or when imposed wake-times occur after sunrise. These theory-informed predictions may aid design of interventions to prevent and treat circadian rhythm-sleep disorders and social jet-lag." (Nature; The effects of self-selected light-dark cy cles and social constraints on human sleep and circadian timing: a modeling approach;Anne C. Skeldon, Andrew J. K. Phillips and Derk-Jan Dijk) This shows that teenagers are especially affected by artificial light in terms of their body clock, which means we need to focus on the consumption of artificial life before bedtime.
What do we NEED to know about our topic or what would we like to know more of?	*Questions/Topics to Investigate:* • What and Why sleep (Arthur) • How sleep works and how to manipulate it (Wayne) • What we are trying to solve and constraints + Users and Interview (Daniel) • Possible solutions (Shaun)
Are there any conflicting sources of information? Areas of disagreement in our group or within the field?	*Areas of uncertainty or disagreement:* • Some of the apps asked their users to solve math puzzles or questions before they close the alarm; however, it might not work for people who are bad at math initially or too easy for them • A lot of solutions is about waking up by an alarm clock, but the problem is that the users tend to not hear the noise of the clock • Cold shower is better than warm showers before sleep, unless enough time is given to cool down after a warm shower (saus)
What background knowledge do we think our audience will need to know in order to understand our project?	*Novice understandings:* • Our objective: to wake up by yourself without disturbing others • Benefits of waking up on time • How to achieve better sleep cycle and quality • What are some proven ways to do so

References

Breus, Michael J., PhD. Dec. 16, 2013. "New Details on Caffeine's Sleep-Disrupting Effects". Psychology Today. Sussex Publishers, LLC. Web. Nov. 19, 2017. https://www.psychologytoday.com/blog/sleep-newzzz/201312/new-details-caffeine-s-sleep-disrupting-effects.

Cheng, Jessica. Jul. 24, 2008. "Why is it So Hard to Wake Up in the Morning?" Popular Science. Bonnier Corporation. Web. Nov. 19, 2017. https://www.popsci.com/scitech/article/2008-07/why-it-so-hard-wake-morning.

This reflection follows the Ranning model of reflection.

What Happened?

Using the design thinking process, we came up with possible design thinking ideas and then we trimmed them down to two that we liked to do as a group. We then took in Mr.Manning's suggestion and decided to do the topic that had to do with waking people up without disturbing those around them. After that, we did research about our topic and collaborated what we found so that every member knows the research info.

Think and feel - What were you thinking and feeling?
I was thinking that our topic selection was kinda tricky because the two results we wanted to do were very similar. Yet combining them would be too difficult and too broad. I was thinking that some of our research material were pretty irrelevant from what our topic is: which is to wake people up without disturbing others.

Evaluate - what was good and bad about the experience?
What was good about the experience was that we got our first run at trying to do deep background research for our project ideas and then put our ideas together and maybe eliminate some and fuse some ideas to achieve a focus we all want to work on.

Envision - what else could you have done?
We could have compiled our topics and gone through the list together in a more efficient manner if each member discussed their research and ideas briefly before copy pasting blocks of text onto the group document.

Plan - What would you do differently next time?
Next time, I would try to get the team to discuss ideas and findings before throwing the text onto the document.

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- *September 17, 2017*

This reflection follows the Ranning model of reflection.

What Happened? We came up with interview questions and reached out to members of the schoo ...

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This reflection will follow the Gibbs reflective cycle. Future reflections will follow the Ranning model of reflection.

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What Happened? We partnered up in groups of twos and interviewed each other (using the same ...