

CS247B Winter 2026: Design for Behavior Change

# *Final Project Writeup*



*LunaCart*

*Future Me Ordered This*

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# Introduction

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## Project Summary

When you're hungry late at night, what do you reach for first? (It's probably ice cream... is it ice cream? Did I get it right?) Stanford students tend to do the same – not just ice cream though; they go for burgers, tenders, quesadillas, fries, all that good stuff. They do it to reward themselves for a job well done or to keep cranking out their work deep into the early morning hours, staying awake until 2, 3AM because they couldn't find time during the day to take care of all of that side of their academic life. And guess what's available late at night to eat on campus? Not salads, I'll tell you that.

So what happens when students want to eat healthier, but they can't? Their habits start building around what is available to them: grease, salt, and sugar. They're working in survival mode, maintaining education as their first priority and leaving health behind at second or even third. Habits go away, they tell themselves, this is just temporary. Is it, though?

To help those students learn to treat their bodies better without putting additional strain on the process of accessing that healthier food, we created **LunaCart**: a mobile app that addresses this problem through pre-commitment. During the day, students pre-order healthy snacks for evening delivery to their preferred campus location, making an intentional pledge to eat well before cravings and exhaustion set in. The app reinforces this commitment with a morning reflection log where users record whether they followed through and how the experience felt, building self-awareness over repeated use. In return, users get a little bit of surprise enjoyment: a song added to their Growth Playlist as a self-reflection tool to see how well they're doing!

## Project Team

Our team consisted of individuals from a variety of backgrounds (CS, Psychology, Symbolic Systems, Linguistics, and Education). Each member brought their own spark to **LunaCart**. We hope you enjoy reading our report and using our tool – we wish you many nights of healthy and flavorful eating!



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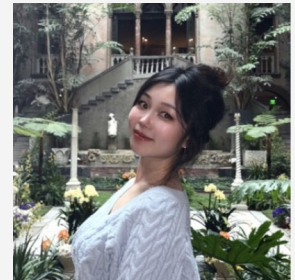
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# Baseline Study

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Read our complete *Baseline Study Synthesis* blog post [here](#).

## Baseline Study Outline

### Study Overview

Our baseline study initially aimed to examine the general attitudes towards late-night eating behaviors of undergraduate students on the Stanford campus. We hoped that our data collection through a diary study would reveal this to be an unwanted but unavoidable habit that developed from being in close proximity to late-night eating locations as well as from having demanding daytime schedules. The key questions we posed included:

- What is the frequency with which students consume food late at night? What foods do they generally consume?
- Why do students eat late at night so frequently? What are the student-reported causes of this behavior?
- Do they enjoy this or dislike this behavior?
- Are there aftereffects that make late-night eating less appealing in hindsight rather than in the moment?
- Have students attempted to curb this behavior, and what methods have they tried?

Upon examining the results of our pre & post-study interviews as well as the self reports from our diary study participants, we realized that the behavior itself is not undesirable to students, but perhaps the food they consume might be the problem. Based on these findings, we shifted our focus and the perspective with which we analyzed our data towards the nutritional value of the food being consumed late at night.

### Study Methodology

Conducted over the span of 5 consecutive days (Wednesday through Sunday), our diary study asked participants to complete a Google form documenting their

late-night eating behavior for the corresponding night. The forms were submitted the following morning (e.g. Wednesday night food consumption → form submitted Thursday morning) to gather a holistic picture of any possible morning aftereffects of eating the night before.

These forms consisted of both objective and subjective questions surrounding the participants' late-night and overall food consumption. Some points addressed included:

- Was food consumed at night past 9 PM; if so, what food was selected?
- When and where was the food consumed?
- How was the food acquired?
- Why was the food consumed?
- What other food was consumed during the daytime prior to the evening? Were any meals skipped?
- What were the participant's emotions before, immediately after, and the morning after consuming the food?

Daily reminders were sent to participants to ensure completion of the forms and encourage the greatest accuracy for time-sensitive responses.

Access our screener [here](#), our study materials [here](#), and our nightly study form [here](#).

### **Target Audience**

The study focused on undergraduate students on campus, who were recruited through connections with members of the team as well as through a public paper flyer with a QR code to a screening form posted in dining halls and other public spaces on campus.



**Fig 1.** Baseline Study recruitment flier and QR code.

Once participants completed the screener, which assessed their eligibility to participate in the study based on the frequency of their late-night food consumption, we organized [pre-study interviews](#) to learn more about their regular eating habits and initial attitudes towards late-night eating.

Following these preliminary interviews, emails containing an instruction guide and link to the diary study form were sent to all approved participants. We had 7 students complete our diary study, with a range of ages, genders and intensities of habit.

After the completion of the study, we [re-interviewed](#) these 7 participants once more to debrief their observations and any impacts the observation period had on their attitudes towards the behavior.

### **Key Research Questions**

Our baseline study attempted to collect data regarding the following key questions:

- How frequent is this behavior of late-night eating observed among undergraduate students?
- Is this a behavior that is seen negatively, neutrally, or positively? Why?

- Have students ever attempted to change this behavior?
- Is this a behavior that occurs due to family/home-based lifestyles that is carried over or something that begins in college?
- Are there Stanford-specific factors that contribute to the continuation of this behavior? If so, what are these factors?

Having retrieved and analyzed our results, we decided to pivot with regard to the angle we view our target behavior. Students didn't express a desire to change the time at which they were consuming food, more so the types and quantities of food they found themselves consuming. Thus, our research questions centered around:

- Why do students choose certain foods over others to consume at night?
- Why do students choose certain late-night locations or methods over others? (e.g. Late Night @ Lakeside vs. DoorDash)
- Are there trends in the types of food that are consumed from each place?
- How often is food a necessity and how often is it a social cue?
- Do the types of food consumed change based on the setting? (e.g. in dorm, dorm on-call, with friends, alone, while working, etc.)
- What do students value more: packaged healthy food or fresh junk food?
- Do students have the ability to proactively determine whether or not they will need food later at night during the day?

Our main question is: If accessibility to healthy late-night food as a barrier is removed, will students truly choose these options over the junk options?

## **Raw Data & Grounded Theory**

After gathering our baseline study data, we synthesized quotes and critical moments into affinity maps on [Miro](#).

In this mapping, there were several areas of focus that occurred across participant feedback:

- Schedules and responsibilities necessitating late-night eating

- Social norms as a driver of behavior
- Late-night eating as sustenance for continued work
- Availability/ convenience as a factor
- Quantity as a factor
- Awareness as a factor
- Attention to nutrition
- Food as a reward

Based on these patterns, we saw three primary encompassing theories emerge:

1. Late-night food consumption is a result of incompatibility between various separate aspects of an individual's day-to-day life.
2. Food consumption is highly influenced by social norms and is in itself a highly social activity.
3. Late night food is intertwined with the continuation or completion of work as various forms of sustenance.

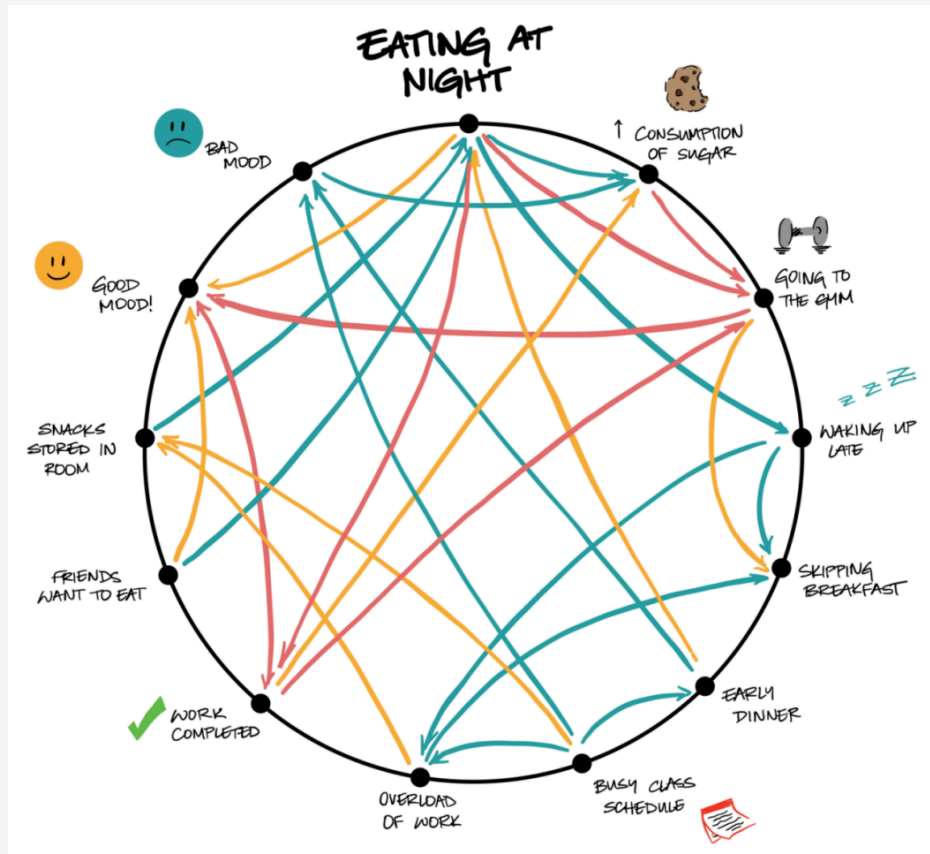
In short, students take different approaches to late-night eating. Some use it as a way to stay in touch with friends and keep up social obligations beyond traditional waking hours. Others use it as motivation to work up until and beyond their deadlines. Both of these reasons share one fundamental core: these activities have no room to be completed during the day – there is just too much to handle without the space to sit down and work or rest. And because of these demanding schedules, there is little brain capacity to attempt any sort of healthy eating, since it is just not convenient. Our task would be to find a way to make healthy eating accessible, with minimal brain power and internal effort required.

*Read our full Grounded Theory Report [here](#).*

## System Models

Two system models formed from the recurring patterns we noted from the study data and our pre- & post-study interviews.

### Model 1: Connection Circle

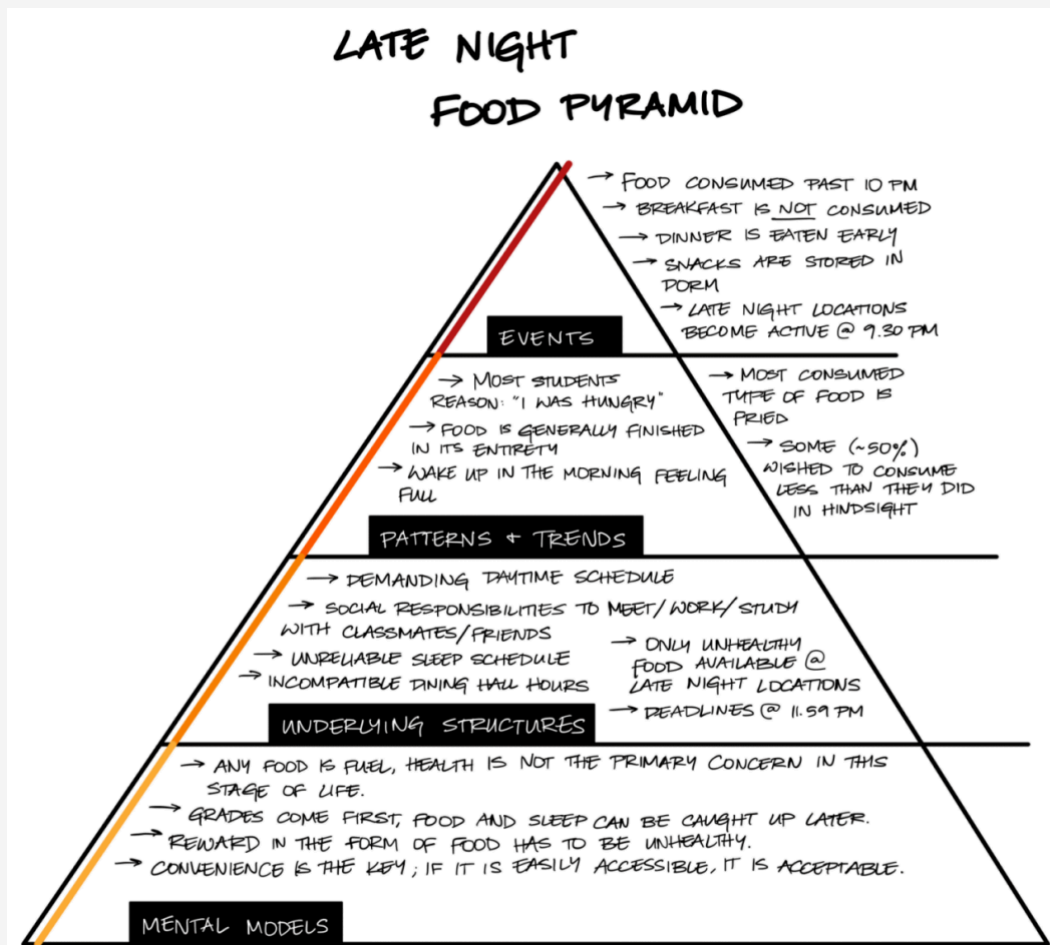


**Fig 2.** Connection circle for late-night eating. Blue arrows represent negative consequences, yellow arrows represent neutral impacts, and pink arrows represent beneficial results.

The connection circle model revealed that late-night eating is less a single bad decision and more a self-reinforcing system formed by time pressure, stress, social life, convenience, and reward. The strongest pattern is that the same conditions that make students vulnerable to late-night eating also make the behavior feel useful or desirable. Academic overload and irregular schedules increase hunger, fatigue, and the need for quick food. Social invitations and the desire for relief make late-night eating feel emotionally rewarding. A key contradiction the model surfaced is that late-night eating often produces short-term benefits, such as comfort, energy, and connection with friends, while also causing longer-term costs, including disrupted sleep, guilt, physical discomfort, and learned dependence on convenience foods. This

helped us see why students do not simply stop the behavior even when they recognize its downsides. The model suggests the behavior persists because it solves immediate problems, even when it creates negative effects later. This means an effective intervention must work with the system's existing rewards rather than depending only on self-control.

### Model 2: Food Pyramid (Iceberg) Model



**Fig 3.** Food pyramid (iceberg) model of late-night eating.

In the pyramid model, the major insight was that visible food choices at night sit atop a deeper structure of habits, constraints, and beliefs. On the surface, students appear to choose snacks based on taste or craving. But the iceberg framing showed that those choices are supported by less visible patterns such as challenging schedules, skipped meals, social norms, limited campus options, and mental models about what college life should look like. One important contradiction this model revealed is that students often describe late-night eating as casual, fun, or normal, even though deeper layers reveal that the behavior is heavily structured by stress, institutional timing, and a lack

of access to healthier alternatives. The model also clarified that unhealthy late-night eating is not entirely about preference. It emerges from an environment where convenience and practicality regularly outweigh nutritional goals. This pushed us to focus less on correcting individual choices and more on addressing the underlying conditions that make those choices feel rational.

## **Secondary Research**

*Read our complete literature review [here](#) and comparative analysis [here](#).*

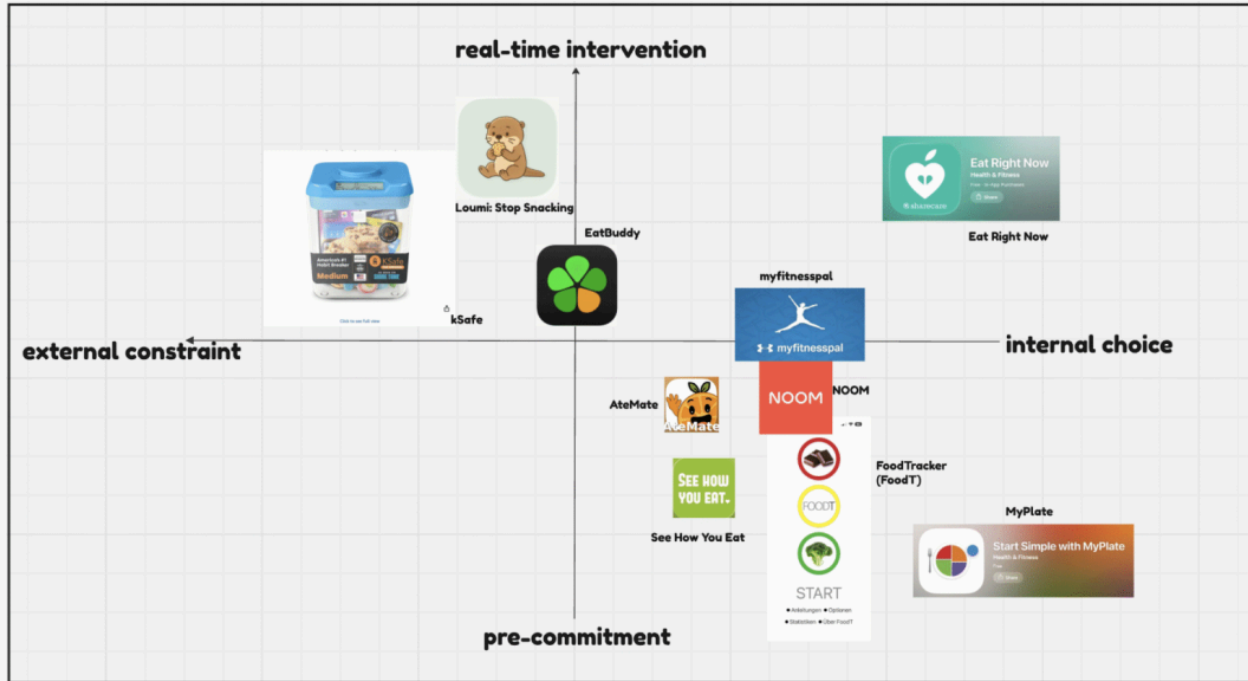
## **Literature Review**

The literature on late-night eating characterizes the habit as a convergence of factors instead of a mere willpower failure. Principle among said factors are circadian and scheduling misalignments, emotional regulation and regulatory needs, and environments that promote convenience and cravings. Qualitative studies of Night Eating Syndrome (NES) describe a reinforcing cycle in which “emotional hunger” prompts eating for short-term relief, nighttime is a particularly vulnerable period, and subsequent guilt/shame exacerbates distress and future urges. Additional research on eating timing links the roles of social jetlag, overscheduled routines, emotional eating, and environmental availability to the habit, indicating that late-night eating is often a socially conditioned rational response, even when conflicting with health goals.

Multiple studies suggest that informational interventions are insufficient to match the complexities of late-night eating. In these contexts, behavioral nudges, such as repositioning healthier options, limit effectiveness and are often overpowered by immediate cravings and convenience; the additional dimension of high-temptation situations and social environments further raises the ineffectiveness of informational interventions. Evidence from related behavior-change fields indicates that interventions targeting deeper psychological mechanisms can be more effective than standard educational approaches. For example, values-alignment interventions that frame unhealthy choices as inconsistent with autonomy and social justice have led to lasting changes in attitudes and purchasing behaviors. Research also shows that making decisions as a group and publicly committing can be more effective than simply listening to expert lectures. This is because social norms, a sense of ownership, and public commitment play a powerful role in changing behavior. Another important finding is that when people limit their eating to daytime during periods of circadian disruption, they are less likely to experience increases in depression-like and

anxiety-like moods. This suggests that what we eat is as important as when we eat, as timing can directly affect mental health.

## Comparative Analysis



**Fig 4.** Our 2x2 comparative analysis map. Up-Down Axis: a continuum with solutions offering real-time intervention (top) and pre-commitment solutions (bottom). Left-Right Axis: solutions dealing with an external constraint (L) or relying on internal choice (R).

The competitive landscape consists of three main approaches: quantification and tracking, mindset and awareness with coaching, and hard constraints or targeted restraint. Most tools excel in one area but often overlook the others. Most were digital which bucketed them into a clear category of internal constraint, where the users would have to choose to access an app if they wanted something to remind them of their desired behavior. As a result, one of our axes became external constraint vs. internal choice. The tools also focused on a division of intervention time, split between proactive intervention, where users imposed restraint on themselves in advance, and real-time intervention, where users were stopped in the behavior during the time they wanted to engage in it. This produced our second axis: pre-commitment vs. real-time intervention.

Tracking and optimization tools like MyFitnessPal support behavior monitoring through quick logging and feedback on calories, macronutrient ratios, and progress. These features improve convenience and integration with broader health systems.

However, a focus on numerical tracking can be counterproductive for those with sensitive relationships to food. As a result, some design teams avoid hard limits, deficit framing, and streak-based pressure, favoring approaches that encourage gentler self-regulation.

Coaching and mindset tools like Noom take a “psychology-first” approach, using CBT-inspired framing, daily micro-lessons, and support from coaches or group accountability. However, they often focus on weight loss as the main outcome, which may not meet the needs of users seeking to change late-night eating specifically. Photo-based and reflective journaling tools, such as visual diary products that emphasize rhythm, reminders, and non-judgmental awareness, make it easier to identify patterns but are more effective for documentation than prevention.

Constraint and retraining tools act at the moment of temptation. For example, kSafe uses pre-commitment by securing food, offering immediate results with minimal effort and a short learning curve. However, it mainly restricts access and does not address underlying causes such as stress, boredom, or circadian disruption; it can also be bypassed by obtaining new food. FoodTrainer uses go/no-go inhibition training to reduce automatic reaching for trigger foods through brief, scalable daily sessions, though its effectiveness in real-world late-night situations remains uncertain. Lighter tools like Loumi intervene at the point of temptation by offering a brief, manageable commitment and redirecting attention, making the intervention feel more tolerable and self-compassionate.

# Proto-Personas

## Rationale for Persona Selections

We selected these three personas because they represent distinct but overlapping late night eating patterns that are common across post secondary student life, shaped by time pressure, social environments, and academic demands.

### Persona 1: The Midnight Oil Fueler

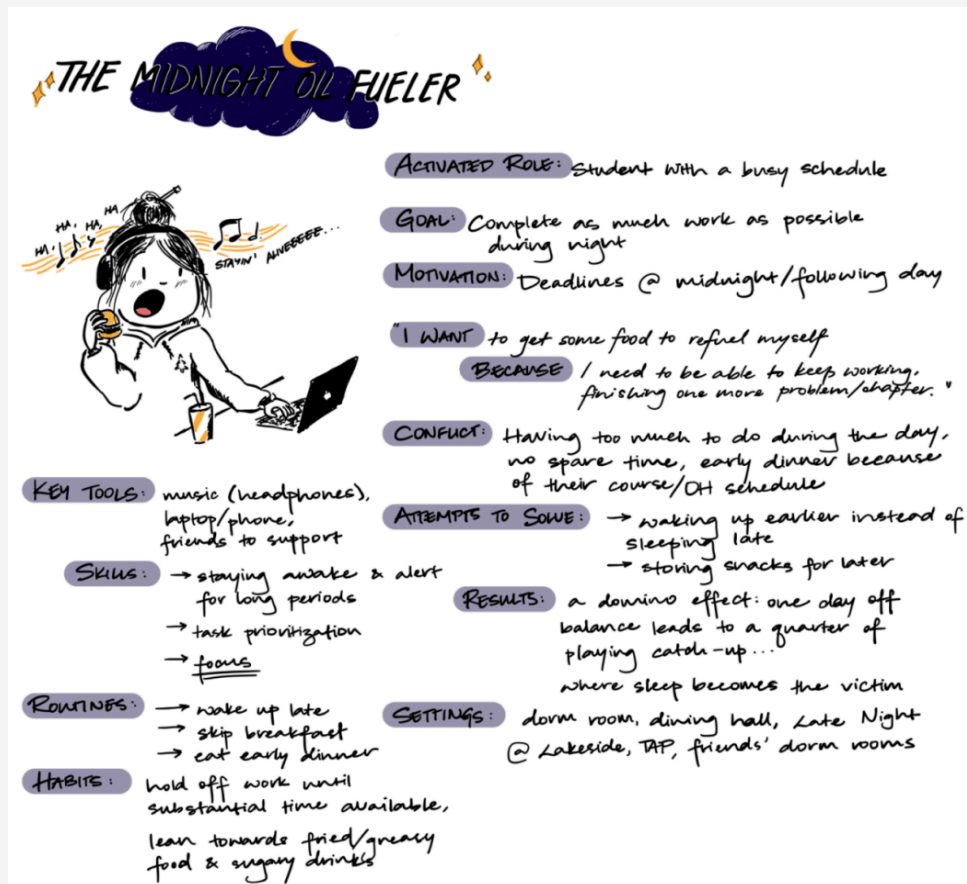


Fig 5. "The Midnight Oil Fueler" persona.

### Persona Description:

"The Midnight Oil Fueler" represents a busy post secondary student whose most productive hours begin late at night, after a tightly packed day finally winds down. Characterized by her laptop open, snack or drink in hand, and half jokingly singing "Staying Alive" to keep herself awake as shown in the persona illustration, she embodies the reality of working through exhaustion.

## Why This Persona Matters:

This persona matters because it encapsulates many students in post secondary schools whose academic lives are defined by dense schedules and limited flexibility. Across the timeline, moments of stress, relief, hunger, and short lived energy gains repeat in a cycle that feels familiar to a broad student population. "The Midnight Oil Fueler" makes visible how structural demands normalize late night work, rushed eating, and sleep sacrifice as survival strategies rather than exceptions. Understanding this persona helps surface shared struggles and highlights opportunities to design support systems that align with how students actually experience their days.

## Key Insight:

The Midnight Oil Fueler is driven by the pressure of dense daytime commitments and imminent deadlines, which push her to rely on late night productivity and food as functional fuel to keep going.

## **Persona 2: The Nocturnal Undergraduate**

DRAWING	NAME	THE NOCTURNAL UNDERGRADUATE
	ROLE	STUDENT
	GOAL + MOTIVATION	I WANT TO DO WELL IN SCHOOL SO I CAN HAVE A GOOD LIFE. I ALSO DON'T CARE ABOUT COMPROMISING MY EATING SCHEDULE FOR MY GOAL.
	CONFLICT	I LOVE EATING BUT MY CLASSES MEAN I SKIP MEALTIMES. ALSO, I MISS BREAKFAST BC I SLEEP LATE + STAY UP LATE. I EAT LATE @ NIGHT AND WAKE UP HUNGRY + FEELING LIKE I DIDN'T SLEEP WELL.
	ATTEMPTS TO SOLVE	GET LESS SLEEP + WAKE UP FOR "BPAST"; SKIP CLASS TO EAT LUNCH/DINNER; GET SLEEPY WHILE WORKING, BC I DON'T WANT TO EAT.
	SETTING	ON CAMP, LATE NITE, TAP, STUDY SPACES w/ FOOD
	TOOLS	DINING \$, DOOR DASH, PRE-BUGHT FOOD
	SKILLS	LATE-NIGHT STUDYING, CRAMMING PSET WORK, EATING w/ FRIENDS, FINDING DOORDASH DRIVERS.

**Fig 6.** "The Nocturnal Undergraduate" persona.

## Persona Description:

"The Nocturnal Undergraduate" is a student whose academic life is centered around late night studying and delayed routines. As shown in the persona, they regularly

sleep and eat off cycle, skipping traditional meal times and relying on late night food runs or delivery to sustain long study sessions. Their days are structured around classes and work, while meaningful academic progress happens after dinner and often stretches past midnight.


#### Why This Persona Matters:

This persona matters because it reflects a large portion of students in post secondary schools who operate on non-traditional schedules shaped by academic pressure and limited daytime flexibility. "The Nocturnal Undergraduate" makes visible how late night productivity, irregular eating, and compromised sleep are normalized behaviors rather than exceptions. Understanding this persona helps reveal systemic gaps in campus services, food access, and study support for students whose peak working hours fall outside standard schedules.

#### Key Insight:

"The Nocturnal Undergraduate" is driven by the need to prioritize academic success within rigid daytime constraints, leading them to depend on late night work and irregular meals to keep up.

### Persona 3: The Snack Spiral

Drawing	Name	S.W. (The Snack Spiral)
	<b>Activated Role</b>	A senior in college with a heavy courseload + social life. S occasionally goes out on late nights with friends and/or roommates.
	<b>Goal</b>	<i>I want to have a <b>balanced</b> relationship with late-night eating</i>
	<b>Motivation</b>	<i>...I don't want food choices to feel like "good vs. bad". I just want to feel <b>healthier</b> and <b>less self-conscious</b>.</i>
	<b>Conflict</b>	S. swings between restriction ("no late night EVER") and permission ("I NEED late night food now"), plus LNE is often <b>social + environment-driven</b> (i.e. shared snacks in suite, post-outing hunger)
	<b>Attempts to Solve</b>	<ul style="list-style-type: none"> <li>● Cutting it out "cold turkey"               <ul style="list-style-type: none"> <li>○ Result: Feels <b>too extreme, unrealistic</b></li> </ul> </li> <li>● Being more conscious + allowing smaller snacks               <ul style="list-style-type: none"> <li>○ Result: Works better along the quarter; feels <b>sustainable</b></li> </ul> </li> <li>● Daily logs of night eating               <ul style="list-style-type: none"> <li>○ Result: <b>Increased awareness</b> + more structure to eating, slight decline in late-night eating</li> </ul> </li> </ul>
	<b>Setting/ Environment</b>	<ul style="list-style-type: none"> <li>● <b>Dorm/common space</b>: friends, snacks, TV/work present in one space</li> <li>● <b>Campus late-night areas</b>: post-going out, "let's grab food" moments w/ friends</li> <li>● <b>Work/social events</b>: student org/work rooms with snack bags</li> <li>● <b>Home/school contract</b>: Likelihood of snacking away from home increases</li> </ul>
	<b>Tools</b>	<ul style="list-style-type: none"> <li>● Self-logging</li> <li>● Social accountability</li> <li>● Food availability control (snack ours <i>only</i> at certain times)</li> <li>● Routine meals at normal hours</li> </ul>
	<b>Skills</b>	<ul style="list-style-type: none"> <li>● Reflection ("Did I <b>need</b> the food that I ate?")</li> <li>● Moderation framing</li> <li>● Noticing triggers (boredom, early dinner/skipping dinner, social outings)</li> </ul>
<b>More</b>	<ul style="list-style-type: none"> <li>● Habits:               <ul style="list-style-type: none"> <li>○ Snacking when others are snacking -&gt; <b>common trigger</b></li> <li>○ <b>Post-alcohol eating</b></li> <li>○ <b>Boredom snacking</b> (when there's "nothing to do" in proximity to food)</li> <li>○ Lack of <b>food availability</b> -&gt; <b>lowering habit</b></li> </ul> </li> </ul>	

**Fig 7.** "The Snack Spiral" persona.

#### Persona Description:

"The Snack Spiral" is a senior in college whose late nights blur the line between socializing, studying, and eating. As shown in the persona, they often begin the evening feeling finished with food, only to get pulled back in by shared spaces, friends, and convenience. What starts as light snacking becomes a series of "just one more" decisions that gradually escalate into late night overeating.

#### Why This Persona Matters:

This persona matters because it reflects many students in post secondary schools who navigate food choices in highly social, environment driven settings. "The Snack Spiral" highlights how late night eating is rarely a single choice and more often a chain of small, context based decisions shaped by peers, availability, and fatigue. Understanding this persona helps shift focus away from individual willpower and toward the environments and social dynamics influencing student behavior.

Key Insight:

"The Snack Spiral" is driven by social proximity and late night settings that steadily erode boundaries and turn "just one more" into a self-reinforcing cycle.

# Journey Maps

## Journey Map 1: The Midnight Oil Fueler

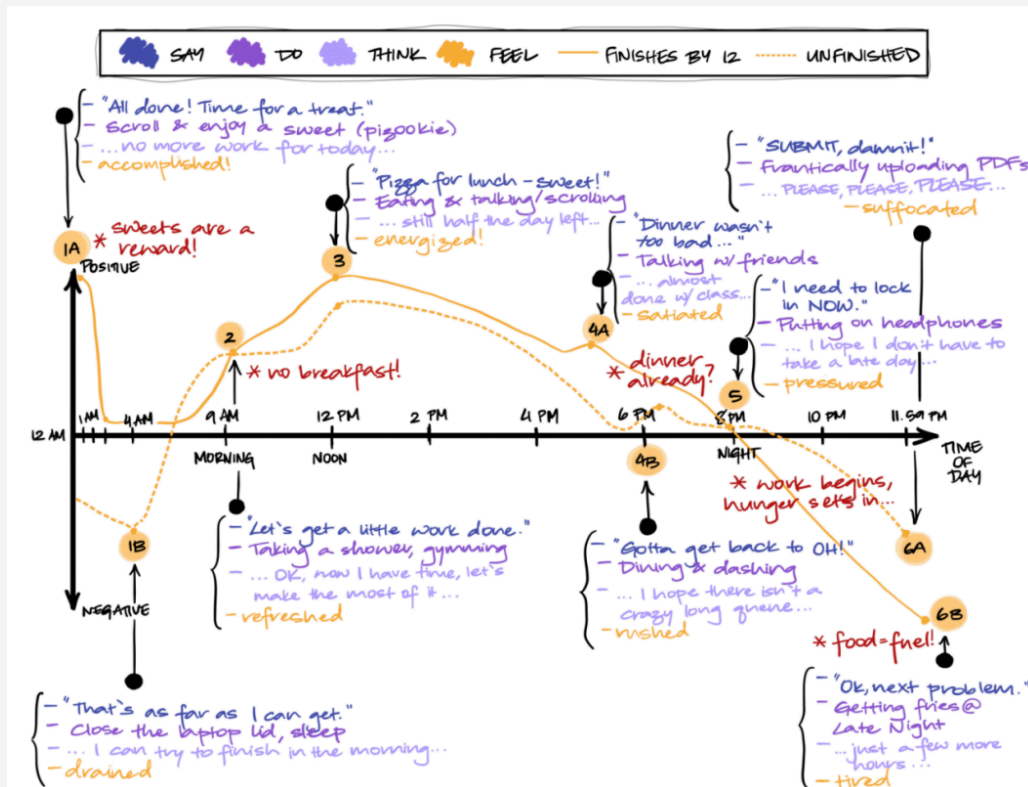


Fig 8. "The Midnight Oil Fueler" journey map.

The Midnight Oil Fueler is a curious creature with strange cycles of reward and fatigue. This isn't necessarily their fault, however. They begin their days at midnight (12AM), usually staying up to finish work they couldn't do the previous day or wrapping up something that was due at 11:59PM (cutting it kind of close, don't you think?). Whether they determine food as sustenance or a celebration depends on this: the Fuelers that chug along into the wee hours of the morn' use food as motivation and energy to keep going (#staystressed) while the Fuelers that live life on the edge and count the seconds down to the deadline feel a sense of relief and congratulate themselves with a Pizookie (A pizza cookie! I recommend trying it with mint ice cream to cut the sweetness). Both tend to find rest and recuperation in their sleep, but they already know the same routine awaits them the next day.

This cycle isn't all their doing - it is a vicious cycle of classes that clash with lunches, labs and office hours that demand 5-minute dinners on the go, and an endless list of social obligations that don't end until the sun goes down (maybe not even then).

These Fuelers peak whenever they eat, because they are living in survival mode most of the time. And this is exactly where we can insert ourselves with our healthy food: if we make the sustenance and the rewards healthy but still comforting, we create better habits than thriving on sugar and grease.

### Journey Map 2: The Nocturnal Undergraduate

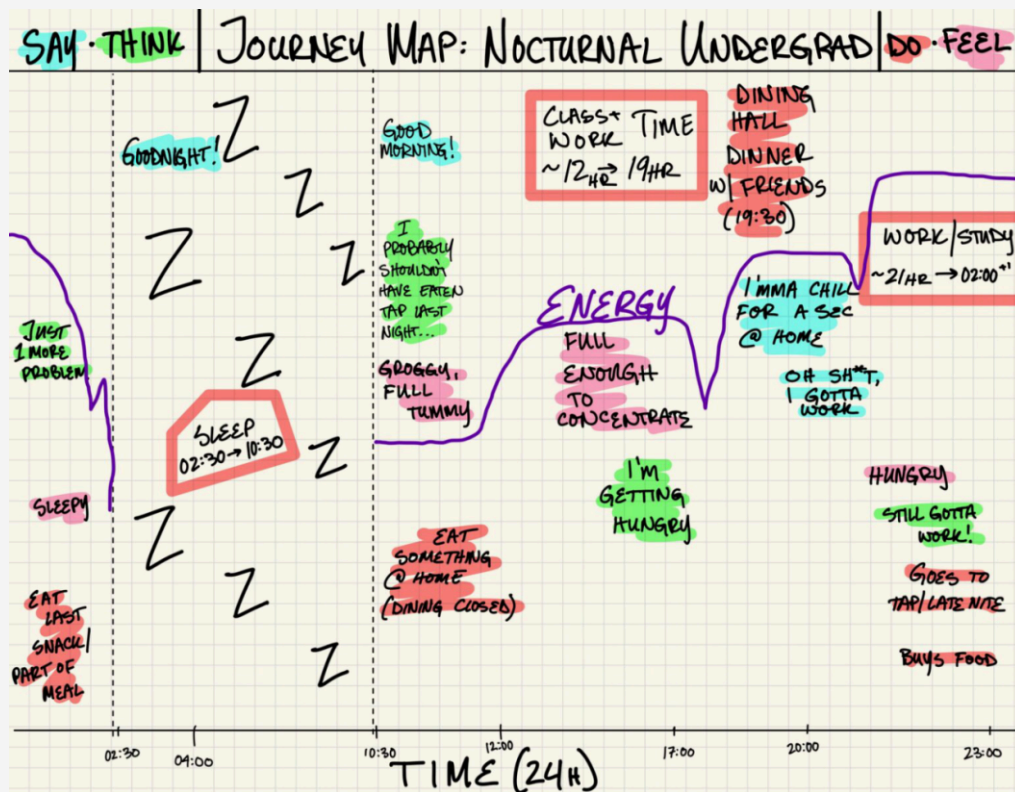


Fig 9. "The Nocturnal Undergraduate" journey map.

Central to the Nocturnal Undergrad's journey map are the packed days full of classes and the fact that these classes (and the time the persona uses to complete work for those classes) overlap with regular meal times. A big pain point is that this persona's late-night schedule requires them to seek out food that is quickly available; on-campus, that means either going to Late Nite or On Call, where options are limited and usually ultra-processed foods that can disrupt sleep and affect interpersonal behavior and physical health. We saw the late-night window as the primary opportunity for intervention: this is where the persona falls to the traps of unhealthy late-night eating, and we wanted to provide a solution that could offer them better options while not totally disrupting their already-busy schedule.

### Journey Map 3: The Snack Spiral



**Fig 10.** "The Snack Spiral" journey map.

At the core of "The Snack Spiral" journey is a late-night environment where socializing, convenience, and fatigue interact to gradually pull the persona back into eating after they have already decided to stop. The evening begins with a clear boundary and a neutral emotional state, but exposure to friends and shared spaces introduces subtle pressure to re-engage, leading to small, justified choices like light snacking. A central pain point is that these decisions accumulate almost unnoticed—each "just one more" feels insignificant on its own, yet collectively leads to a loss of control, especially as tiredness weakens the ability to self-regulate. Because the experience remains relatively positive or neutral until the very end, when it shifts to discomfort and regret, the persona lacks a natural moment to stop. This makes the early-to-mid stages, when social cues first prompt reconsideration and when snacking is still framed as minimal, the most promising points for intervention, where small changes to the environment or social norms could help preserve the initial intention to stop eating.

# Intervention Design

## Assumption Map + Assumption Testing

Read the full Assumptions blog post [here](#) and the full Assumptions Test Report [here](#).



**Fig 11.** Assumption Map.

Our assumption map organized the project's assumptions along two axes: importance to the intervention's success (vertical) and the current certainty about each assumption (horizontal). Assumptions were further color-coded by category: orange for desirability (do students want this?), blue for feasibility (can we build this?), and green for viability (should we do this?).

The upper-right quadrant contained the assumptions that were simultaneously high-stakes and uncertain, making them the top priorities for testing. Three assumptions stood out as the most critical to validate before moving forward with “Future Me Ordered This.”

First, we needed to test whether students would actually follow through on morning pre-orders later at night. This was the single most important desirability assumption underlying the entire intervention: if the temporal separation between planning and eating caused commitments to dissolve by evening, the core mechanism would fail. Second, we needed to determine whether students would find a healthy menu appealing enough to order from it in the first place. Even if the pre-commitment structure worked perfectly, a menu that failed to match real cravings and taste preferences would become a bottleneck for adoption. Third, we needed to evaluate whether social features and peer accountability could drive sustained habit adoption, since the intervention's longer-term engagement model depended on leaderboard dynamics and group commitments translating into genuine behavioral reinforcement rather than superficial interaction.

Several other assumptions in the Evaluate quadrant warranted attention as well, including whether gamification elements like a virtual pet or plant would sustain engagement, whether pre-paid orders would reduce late-night impulse eating, and whether a morning prompt was the right trigger for planning. However, the three assumptions we selected for formal testing represented the highest-risk unknowns: they spanned the full user journey from initial engagement (menu appeal) through the core behavioral mechanism (morning-to-night follow-through) to long-term retention (social accountability), and a failure at any one of these points would have required a fundamental redesign of the intervention.

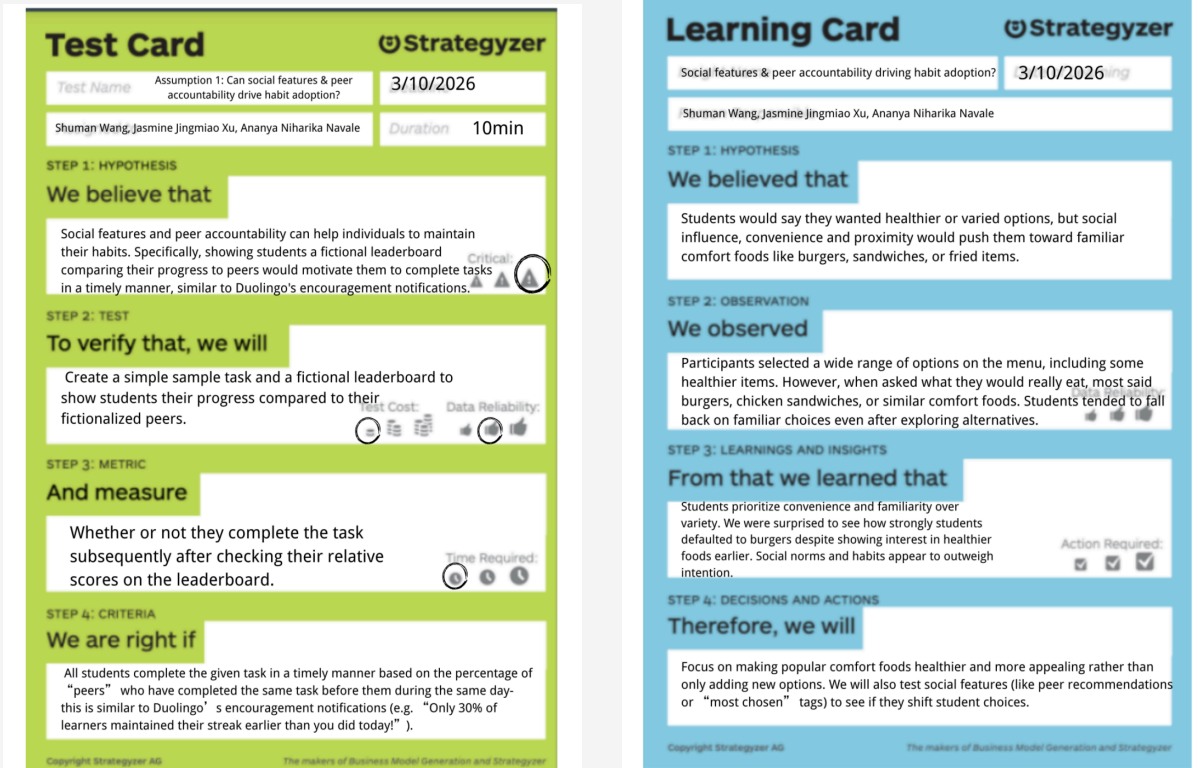
### **Assumption Test 1: Can social features & peer accountability drive habit adoption?**

*We believe that:* Social features and peer accountability can help individuals to maintain their habits.

*To verify that, we will:* Create a simple sample task and a fictional leaderboard to show students their progress compared to their fictionalized peers.

*And measure:* Whether or not they complete the task subsequently after checking their relative scores on the leaderboard.

*We are right if:* All students complete the given task in a timely manner based on the percentage of "peers" who have completed the same task before them during the same day. This is similar to Duolingo's encouragement notifications (e.g. "Only 30% of learners maintained their streak earlier than you did today!").



**Fig 12.** Test and Learning Card for Assumption 1.

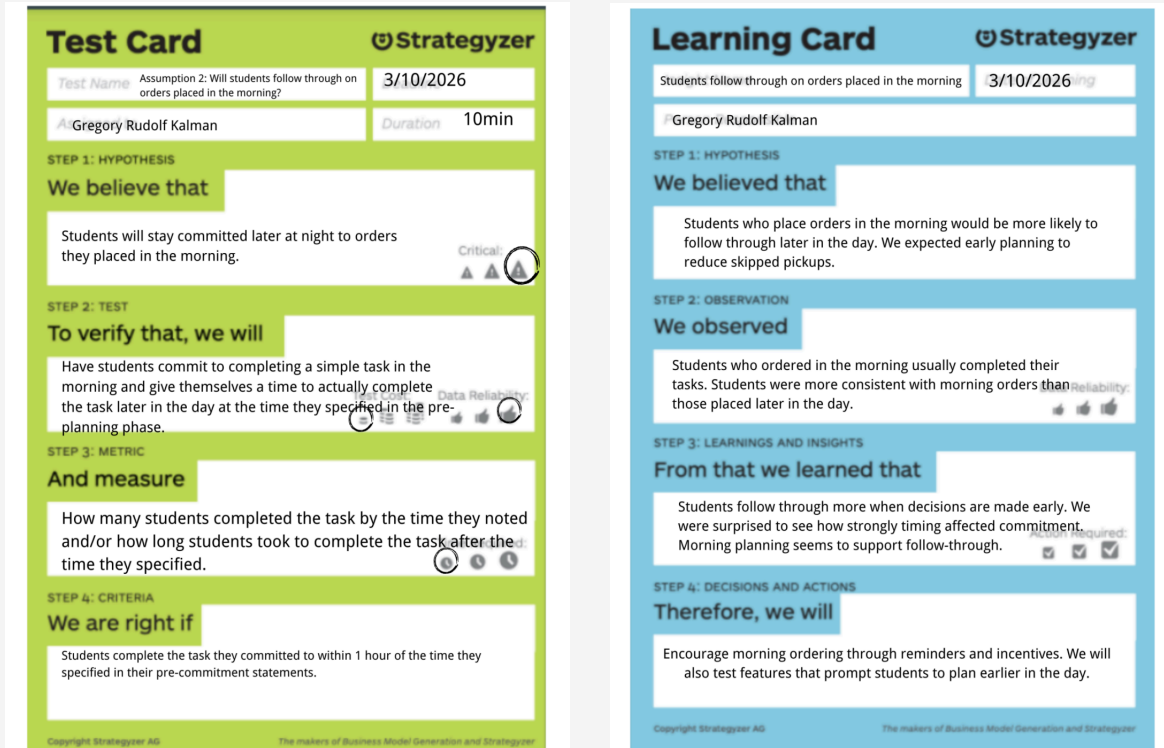
**Assumption Test 2: Will students follow through on orders placed in the morning?**

*We believe that:* Students will stay committed later at night to orders they placed in the morning.

*To verify that, we will:* Have students commit to completing a simple task in the morning and give themselves a time to actually complete the task later in the day at the time they specified in the pre-planning phase.

*And measure:* How many students completed the task by the time they noted and/or how long students took to complete the task after the time they specified.

*We are right if:* Students complete the task they committed to within 1 hour of the time they specified in their pre-commitment statements.



**Fig 13.** Test and Learning Cards for Assumption 2.

### **Assumption Test 3: Could students find a healthy menu appealing enough?**

*We believe that:* Although our menu during the intervention study may not have offered the ideal food choices that a student would gravitate towards naturally, students could potentially take interest in other healthier menu options that are equally as enticing as the current offerings.

*To verify that, we will:* Create a fake menu that combines current menu items and fictional healthier options to share with participants to complete when they are hungry at night, and have them submit their "orders" to us.

*And measure:* How many times the fake healthier foods are selected over the foods that are known to be already available.

*We are right if:* The students still find themselves craving the newer fake options we place on the menu, despite their knowing that these foods don't exist. We hope that their hunger and intuitive desire are strong enough to point them towards the healthier options regardless of the facts.

## Test Card

Strategyzer

<b>Test Name</b> Assumption 3: Could students find a healthy menu appealing enough?	<b>3/10/2026</b>
<b>Austin König</b>	<b>Duration</b> 10min

**STEP 1: HYPOTHESIS**

**We believe that** [redacted]

Although our menu during the intervention study may not have offered the ideal food choices that a student would gravitate towards naturally, students could potentially take interest in other healthier menu options that are equally as enticing as the current offerings. Critical:

**STEP 2: TEST**

**To verify that, we will** [redacted]

Create a fake menu that combines current menu items and fictional healthier options to share with participants to complete when they are hungry at night, and have them submit their "orders" to us. Data Reliability:

**STEP 3: METRIC**

**And measure** [redacted]

How many times the fake healthier foods are selected over the foods that are known to be already available. Time Required:

**STEP 4: CRITERIA**

**We are right if** [redacted]

The students still find themselves craving the newer fake options we place on the menu, despite their knowing that these foods don't exist. We hope that their hunger and intuitive desire are strong enough to point them towards the healthier options regardless of the facts.

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## Learning Card

Strategyzer

<b>Insight Name</b> Student appeal toward healthier menu options vs. actual eating behavior	<b>3/10/2026</b>
<b>Austin König</b>	<b>onsible</b>

**STEP 1: HYPOTHESIS**

**We believed that** [redacted]

Students could potentially take interest in healthier menu options that are equally as enticing as current offerings. If presented with an appealing menu that combines existing items and fictional healthier alternatives, students would gravitate toward the healthier options even when hungry at night.

**STEP 2: OBSERVATION**

**We observed** [redacted]

We created a fake menu combining current items and fictional healthier options and had 4 students submit "orders" when hungry. All 4 students selected healthier items (Avocado Toast, Tofu Bowl, Gyro with Hummus, Greek Yogurt Parfait, Fresh Fruit, Burrito Bowl). However, when asked what they were really planning to eat, all 4 defaulted to comfort food: burgers (2), a chicken sandwich (1), and chicken tenders (1). Data Reliability:

None chose a healthy option as their real meal.

**STEP 3: LEARNINGS AND INSIGHTS**

**From that we learned that** [redacted]

There is a clear intention-action gap in students' food choices. While students express interest in and willingness to select healthier options on a menu, their actual eating behavior defaults to familiar comfort foods (burgers, chicken sandwiches). Aspirational preferences do not translate into real decisions when convenience and habit take over. Aspirational Required:

Simply offering healthy options is not enough to change behavior.

**STEP 4: DECISIONS AND ACTIONS**

**Therefore, we will** [redacted]

Move beyond simply offering healthier options and instead focus on behavioral nudges that bridge the intention-action gap. We will test strategies such as making healthy options the default choice, using pre-commitment combined with social accountability, and framing healthier items as indulgent (e.g., "loaded avocado toast" instead of "avocado toast"). We will also investigate whether reducing the visibility or friction of unhealthy options shifts actual ordering behavior.

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**Fig 14.** Test and Learning Cards for Assumption 3.

## Interventions & Storyboards

### Idea/Storyboard 1: “What’s on the Menu?”

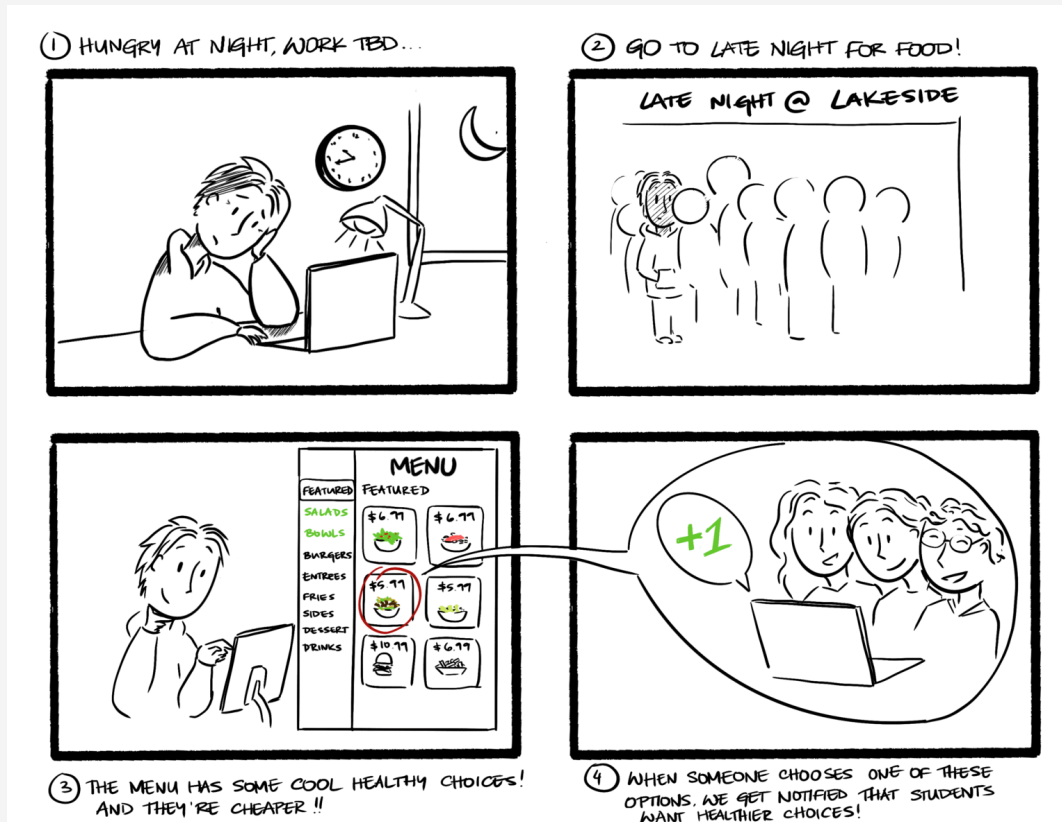


Fig 15. “What’s on the Menu?” storyboard.

#### Description:

This intervention involves partnering with existing on-campus late-night food providers (e.g., Lakeside Late Night, TAP) to present a modified menu that includes both healthier and less healthy options. Currently, many late-night offerings skew heavily toward highly processed foods, with very limited nutritious choices (for example, TAP currently offers only a Caesar salad as a healthier option, buried among thickshakes and burgers and fries). Expanding the availability of appealing, nutritious late-night foods addresses a key structural barrier to healthier eating.

Beyond simply introducing healthier options conceptually, the menu would be designed using behavioral nudges to increase their salience and appeal. Healthier items would feature appealing images, descriptive labeling, and prominent placement near the top of menus or under “featured” sections to increase visibility and perceived desirability.

However, due to logistical constraints and the short study timeline, it is not currently feasible for campus providers to actually introduce new healthy food items. As such, the healthier options would be simulated: if selected, they would appear as “out of stock.” This design allows us to examine how perceived scarcity or disappointment influences subsequent food decisions, for example whether encountering unavailable healthier options increases awareness of limited nutritious late-night availability, shapes later choices, or shifts attitudes toward campus food environments.

Because this intervention does not directly increase access to healthier foods, its primary goal is exploratory: to better understand how choice architecture, perceived availability, and emotional responses to scarcity shape late-night eating behavior. Insights from this study could inform future interventions where healthier options are genuinely introduced and supported through improved menu design.

#### Pros/Cons:

##### *Pros:*

1. By embedding the modified menu directly into existing campus late-night dining venues, the study captures how students actually respond to nudges under natural conditions — rather than in a hypothetical or lab-based scenario. This design can strengthen the ecological validity of the findings.
2. The intervention does not require sourcing, preparing, or storing new food products, which keeps costs low. This makes it a practical and budget-friendly first step that can generate actionable insights for the future.

##### *Cons:*

1. Repeatedly showing appealing healthy options only to reveal them as unavailable could leave participants feeling misled or annoyed. That frustration itself may become a confounding variable. Students might shift their choices out of irritation rather than because of the intended scarcity or awareness effect.
2. Since participants never actually consume any healthier food, the intervention cannot produce direct improvements in diet quality or well-being within the study timeframe. Its value is purely exploratory, which may be a limitation if stakeholders expect immediate positive outcomes.

- Deliberately presenting food items that do not exist raises mild concerns about deception. Although the risk is low, this design demands careful handling during informed consent and debriefing to ensure participants do not feel manipulated, which could otherwise undermine trust and continued engagement.

### Idea/Storyboard 2: “Future Me Ordered This”

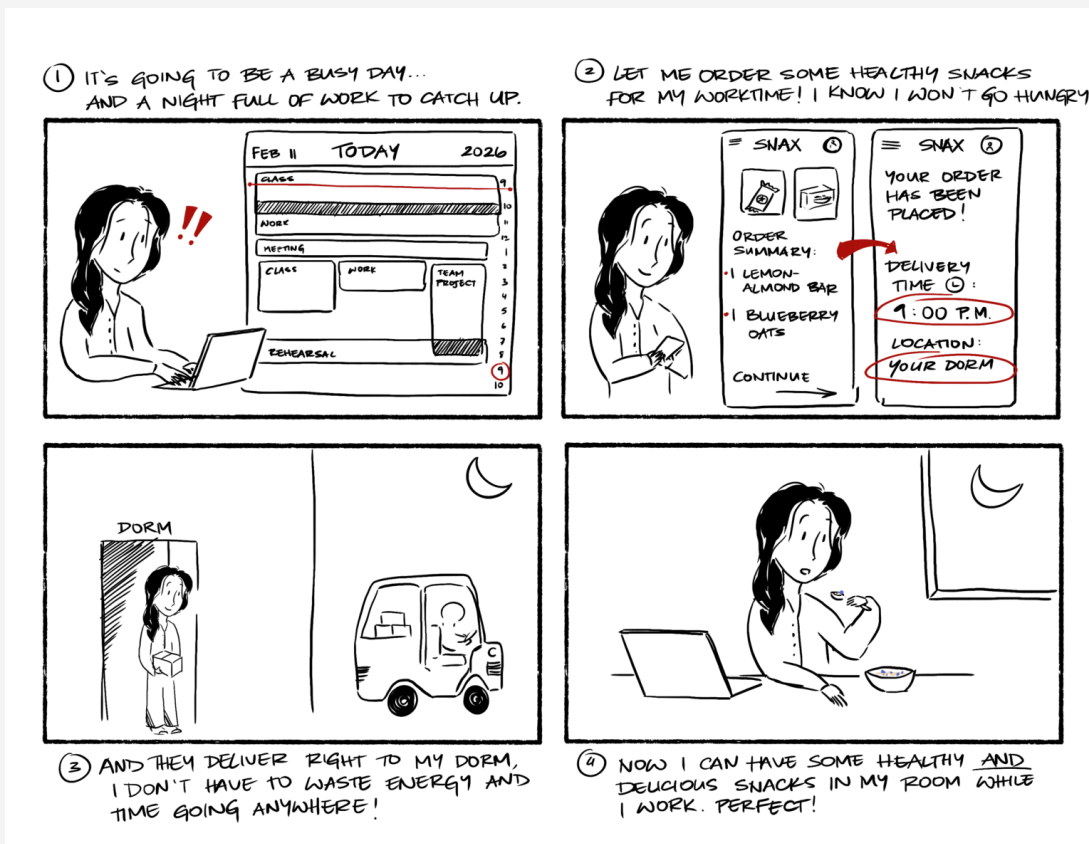


Fig 16. “Future Me Ordered This” storyboard.

#### Description:

This intervention leverages pre-commitment and advance planning to help students make healthier late-night food choices before fatigue, stress, or convenience pressures influence decisions. Each morning, participants would receive a notification from an app prompting them to consider whether they anticipate staying up late that night. If so, they would be guided through pre-ordering a late-night snack or meal.

The app would walk participants through several steps: selecting a healthier food option, scheduling a delivery or pickup time, pre-paying to reduce last-minute friction, and confirming their intention through a simple commitment prompt (e.g., “I

*plan to follow through with this plan tonight*”). Food options would consist primarily of nutritious late-night choices — such as nut bars, oatmeal, or other balanced snacks — provided through a partnership with Step One Foods, a healthy food company sponsoring the study.

To strengthen engagement and adherence, the intervention would include additional behavioral support. First, light gamification and reflection features would reinforce consistency: the app would check in later that night or the following day to see whether participants followed through, prompting brief reflection on how their food choice affected energy, mood, or productivity. Consistency could be rewarded through small incentives (e.g., keeping a plant, pet, or village alive), rewarding commitment follow-through and supporting habit formation over time. Second, because social norms often influence late-night eating — students frequently eat simply because peers around them are eating — the app could incorporate optional social features. Participants could invite friends to join, make commitments together, and view shared progress or leaderboards, leveraging accountability and positive peer influence to support healthier choices.

Overall, this intervention targets multiple behavioral drivers. Pre-ordering healthy options increases ability by improving access and convenience, as the pre-order menu consists exclusively of healthy food choice, while pre-commitment reduces decision fatigue at night. Gamification, reflection, and social accountability enhance motivation, and the morning prompt functions as a trigger that encourages proactive planning before high-risk late-night moments arise. Together, these elements aim to reduce friction, support follow-through, and promote more consistent healthier late-night eating behaviors without restricting choice.

## Pros/Cons:

### *Pros:*

1. Late-night food choices are often made when students are tired, stressed, and running low on self-control. By shifting the decision point to the morning, when cognitive resources are more plentiful, the pre-commitment mechanism locks in a healthier intention before high-risk moments even arise.
2. This design has the potential to help students build lasting habits. The combination of gamification elements (e.g., keeping a virtual plant or pet alive), nightly reflection prompts, and consistency rewards goes beyond nudging a single choice. These features reinforce repeated engagement over time, increasing the likelihood that healthier late-night eating becomes a sustained habit rather than a short-lived experiment.
3. Since late-night eating is often a social activity among college students, the optional social features (e.g., shared commitments, friend invitations, leaderboards) tap into peer accountability and positive social norms. This turns a common trigger for unhealthy eating into a support mechanism for healthier choices.

### *Cons:*

1. Building a polished app with pre-ordering, payment processing, push notifications, gamification, and social features requires significant development time and resources.
2. Depends on consistent daily engagement. The intervention only works if participants remember to open the app each morning and plan ahead. Students with hectic or unpredictable schedules may skip the morning prompt frequently.
3. Morning plans may not survive the reality of the night. Late-night schedules are inherently spontaneous: social plans change, appetite fluctuates, and on some nights students simply do not stay up late. A pre-ordered meal that no longer fits the evening's reality may go to waste or be ignored.

### Idea/Storyboard 3: “Pause Before the Pizza”

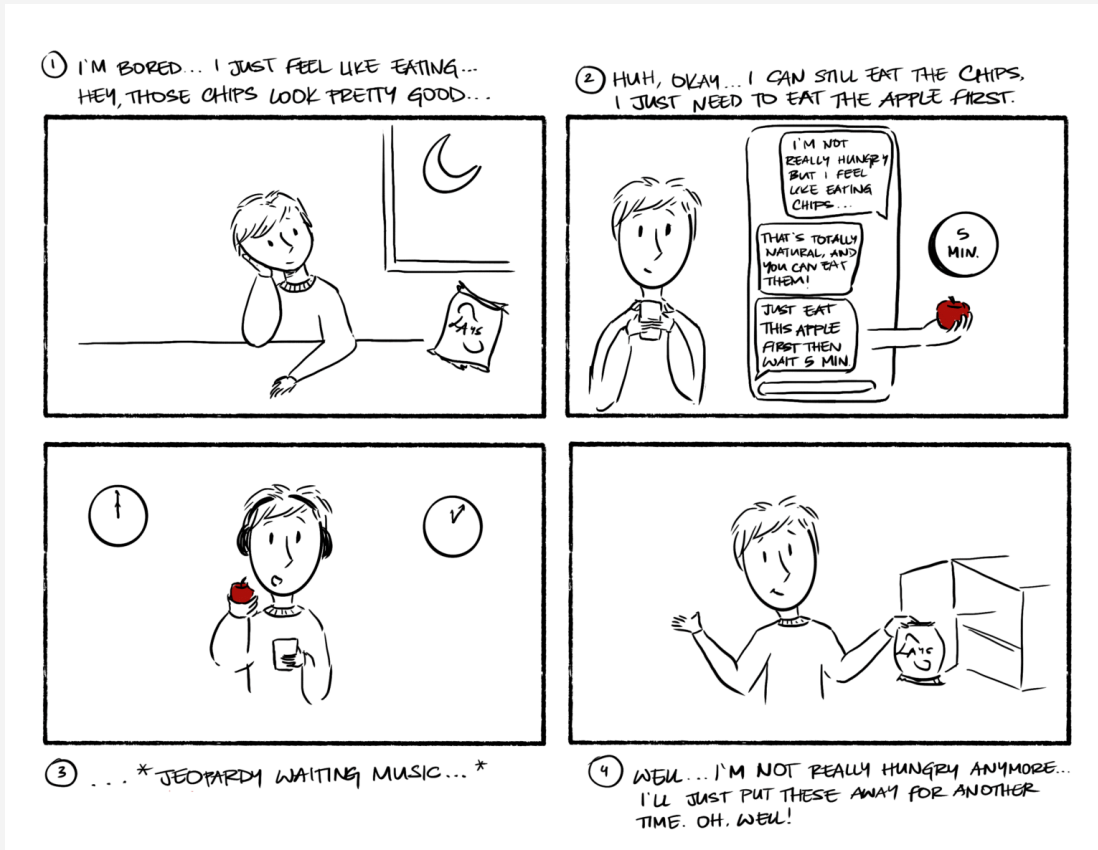


Fig 17. “Pause Before the Pizza” storyboard.

#### Description:

This intervention focuses on shaping participants’ immediate responses to late-night hunger by introducing a simple “healthy first” default. Participants would be provided with a selection of convenient healthy snack options to keep in their dorms (e.g., fresh fruit alongside nutritious packaged items from Step One Foods). They would be encouraged to consume one of these options whenever late-night hunger arises before deciding whether to eat anything else.

Importantly, the intervention does not restrict participants from eating other foods afterward. Instead, participants are asked to eat one pre-listed healthy option first and wait approximately 15 minutes before deciding whether they still want additional food. The goal is to reduce impulsive late-night eating while preserving autonomy and flexibility.

To support adherence, an accompanying app would provide moment-of-decision prompts. When participants feel hungry, they would tap an “I’m hungry” button in the

app, which would prompt them to choose a healthy snack and initiate a 15-minute reflection timer before accessing food delivery apps such as DoorDash or Uber Eats. This creates a brief pause that encourages mindful decision-making.

This intervention leverages several behavioral mechanisms to encourage healthier late-night eating without restricting choice. Providing participants with convenient healthy snack options to keep in their dorms increases ability by reducing practical barriers to healthier eating. Making a nutritious snack the default first step when hunger arises introduces a timely trigger and draws on default effects, reducing the effort required to choose a healthier option. Importantly, participants retain full autonomy to eat other foods afterward, which helps sustain motivation and minimize resistance while gently nudging behavior toward more intentional and balanced late-night eating.

#### Pros/Cons:

##### *Pros:*

1. The core mechanism (i.e., eat a healthy snack first, then wait 15 minutes) is intuitive and requires no complex technology or extensive vendor coordination. This simplicity keeps implementation costs low and makes the intervention easy to replicate across different campus settings.
2. This intervention respects participant autonomy. Rather than restricting what students can eat, the intervention simply introduces a “healthy first” default while leaving all other options on the table. This non-restrictive framing minimizes psychological reactance and increases participants’ likelihood of accepting and adhering to the approach over time.
3. Uses natural satiety signals to curb impulsive eating. Consuming a nutritious snack before deciding on additional food gives the body time to register fullness cues during the 15-minute pause. This physiological buffer can organically reduce cravings for high-calorie options and lower overall late-night calorie intake.

##### *Cons:*

1. May lead to “double eating” rather than substitution. For students with strong late-night cravings or large appetites, the healthy snack might simply be consumed on top of the usual unhealthy food. In that scenario, the intervention

could inadvertently increase total caloric intake instead of improving diet quality.

2. Does not address broader environmental triggers. The intervention focuses on the individual moment of hunger but leaves untouched the larger contextual factors (e.g., peer pressure, stress eating, the pervasive marketing of fast food delivery apps) that drive late-night eating in the first place.

## **Final Selection Rationale**

Ultimately, we selected option 2 ("Future Me Ordered This") because it addresses the widest range of behavioral drivers surfaced in our research while remaining realistic for our target users. Our baseline study revealed that students do not want to stop eating late at night; they want to eat better when they do. The pre-commitment mechanism directly targets the temporal mismatch between intention and action that our participants described: during the day, they value health, but at night, exhaustion and convenience take over. By anchoring the food decision in the morning, the intervention leverages a window when cognitive capacities are fuller, and cravings have not yet materialized.

Compared to "What's on the Menu?", which relies on choice architecture within existing campus venues, "Future Me Ordered This" goes further by actually delivering healthier food to students rather than simply making it more visible on a menu they may or may not visit. Our assumption testing confirmed that students express interest in healthy options on paper but default to typical comfort foods when it comes time to order, which means visibility alone is insufficient. Compared to "Pause Before the Pizza," which intervenes only at the moment of temptation and depends on students having healthy snacks already stocked and the self-discipline to use a timer, the pre-commitment model builds the infrastructure around the user: the food is chosen, paid for, and delivered before the high-risk moment arrives. "Pause Before the Pizza" also does nothing to confront the environmental scarcity of healthy late-night food on campus, which our study identified as a structural barrier.

Additionally, "Future Me Ordered This" easily accommodates the social dimension of nighttime eating, which emerged as a strong theme across our grounded theories. The app's platform enables group ordering and joint commitments, turning peer influence from a trigger for unhealthy eating into a reinforcement mechanism for healthier choices. It also concurs with our finding that the intervention study's pre-commitment forms worked chiefly through salience rather than control: students appreciated being reminded to think about their evening food, and the optional

commitment checkbox came across as empowering rather than restrictive. The app preserves that autonomy-respecting design while providing the functional backbone of actual food delivery, addressing the intention-action gap left open by the other two ideas.

## **Intervention Study Outline**

*Read the full Intervention Study Outline blog post [here](#) and Intervention Study Synthesis blog post [here](#).*

### **Study Goal**

Our intervention aimed to help participants make healthier late-night eating decisions using pre-commitment and pre-planning. The core hypothesis was that decisions made in the morning, before fatigue, stress, or convenience pressures accumulate, would be more intentional and health-aligned. The key question that we aimed to answer was: "Can pre-commitment earlier in the day meaningfully shift late-night food choices?"

### **Participants**

A total of 7 participants took part in the study, including 2 who completed the original baseline study and 5 who were newly recruited. All were noted to be friends or acquaintances who notably consumed food at "night" (between 9PM and 5AM) on a regular basis, and were screened using the same questions from the baseline study screener.

### **Procedure**

Each morning for five consecutive days, participants received a [Google Form](#) guiding them through a brief pre-commitment exercise. The Google Form was divided into two parts:

#### Part 1: Pre-commitment for the night

The first section of the form focused on pre-commitment for that evening. Participants were asked whether they anticipated staying up late and, if so, were guided through selecting a late-night snack or meal in advance. They chose from a curated healthy menu, featuring options such as nut bars, oatmeal, and other balanced snacks, provided through our partnership with [Step One Foods](#) for the study. Participants were then prompted to indicate when and where they planned to

eat the snack and optionally confirm their intention with a simple commitment statement (e.g., "I plan to follow through with this plan tonight").

## Part 2: Accountability

Participants reflected on whether they followed through with their previous night's commitment. The full process took ~1 to 2 minutes per day.

### **Key Research Questions**

Our intervention study attempted to collect data regarding the following key questions:

- Will students be able to pre-plan their evening based on a schedule established in the morning?
- Will they be willing to order food that will supposedly be delivered to them (in good faith)?
- What are the tradeoffs between packaged, healthy food and "fresh", unhealthy food? Which will students prefer?
- How long can students commit to eating healthy food at night over the course of a 5-day week?
- Is this a sustainable practice long term (ordering and delivery)?

### **Insights & Implications for Design**

Insight 1: The core mechanism of pre-commitment worked, but through salience, not control.

Participants consistently reported that the biggest impact of the intervention was that the form made healthy late-night eating top-of-mind. Moreover, the optional commitment checkbox was particularly well received. Participants indicated that because it was optional, it felt like an active, autonomous choice rather than a coercive element. Overall, it seemed that the intervention's power came less from restriction and more from increased salience and intentionality.

Design Implications: The core structure of the intervention should be preserved in the final app, particularly its emphasis on autonomy and light-touch commitment. Because the impact came from increased salience rather than restriction, the solution

should continue to frame pre-commitment as a supportive planning tool rather than a rule to follow. Retaining the optional "I plan to follow through" prompt is important, as it reinforces intentional choice without feeling coercive.

### Insight 2: Pre-Commitment Requires External Cues

Participants shared that although they were motivated to complete the form, they would likely forget without the team's daily reminders. This suggests that pre-commitment is not yet an automatic habit and depends on external cues to prompt action. One participant noted that on particularly overwhelming days, when her workload was heavy, she might not have the mental bandwidth to complete it or might simply forget. However, participants also noted that the brevity of the form, taking only one to two minutes, significantly increased compliance, as its low time cost made it feel manageable even on busy days. Therefore, this signifies that pre-commitment is not self-sustaining. At least in the earlier stages before it becomes a habit, it requires environmental scaffolding.

Design implications: This suggests that the final app must integrate built-in notification and reminder features, while keeping the pre-commitment process as quick and frictionless as possible. Reminders can explicitly emphasize the low time investment, such as "Take 1 to 2 minutes to plan your snack", to reduce perceived effort and increase follow-through.

### Insight 3: Cravings Are Unpredictable

Several participants noted that their nighttime cravings were hard to predict in the morning. They might plan one thing but want something completely different later. This can become a barrier for using the pre-commitment mechanism.

Design implications: The final solution should build flexibility directly into the pre-commitment process. Because cravings and internal states are dynamic and often unpredictable, the app should allow users to edit or adjust their planned choice without framing changes as failure. Morning selections can be positioned as a "best guess" rather than a binding decision, reinforcing that plans can evolve.

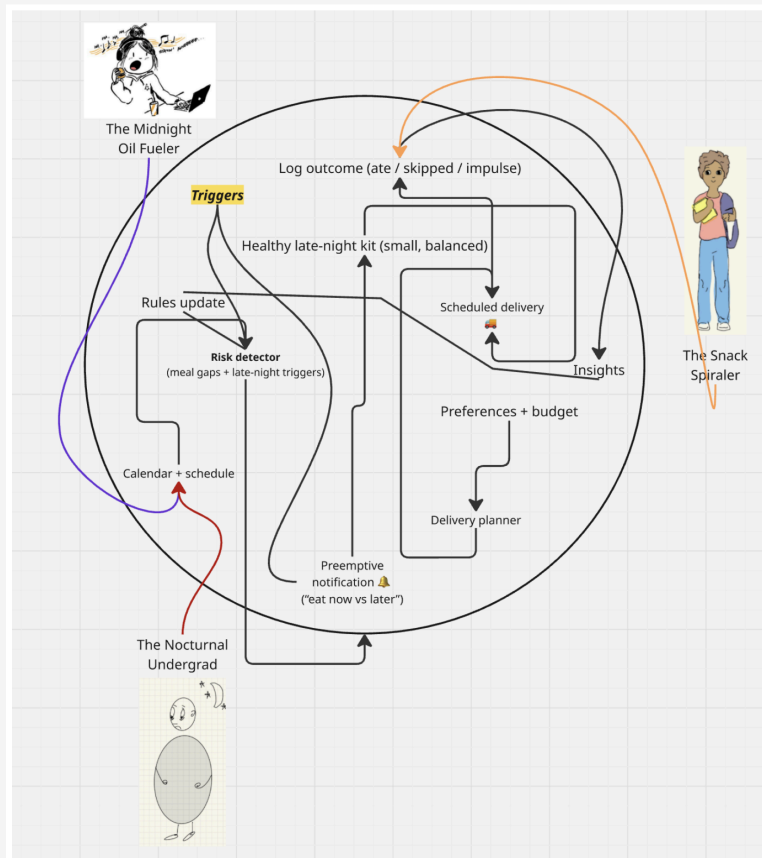
### Insight 4: The Menu can be a Bottleneck

Many participants did not choose from the provided delivery menu because the options did not align with their cravings. Several expressed interest in fresh fruit, which was unavailable. Furthermore, one participant shared that she would prefer to

pay out-of-pocket for something that truly matched her preferences rather than receive a free option that didn't fully align with what she was craving. This indicated that cost was not the primary constraint, but food appeal and fit were. We initially assumed free food would increase adherence. Instead, food desirability was the limiting factor. It is therefore crucial to design a menu that actually caters to people's tastes.

Design Implications: Rather than offering a fixed, prescriptive menu, the final solution should prioritize personalization and flexibility, allowing users to select foods that genuinely appeal to them while subtly guiding choices toward healthier variations. Alternatively, we can also conduct deeper research into what people actually gravitate toward at night and design a menu that meaningfully reflects their real cravings and taste preferences, rather than relying on assumptions about what they might want.

## System Paths



**Fig 18.** Persona system paths.

For the Midnight Oil Fueler and the Nocturnal Undergrad, they begin with a manual calendar/schedule scan – what does the rest of the day look like? This brings up potential weakness points: lunch might need to be skipped, dinner could only be squeezed in for about 5 minutes at 8:30pm, etc... From there, the two user types enter the app, place their orders with their schedules in mind, and go about their day, until their deliveries arrive. The Snack Spiral persona, on the other hand, begins with their log: the reflection is the most important part for them rather than the ordering. They aren't necessarily desperate for something to be checked off their list, but it is imperative that they see their progress and receive a reward for perhaps \*not\* spiraling the previous night. Once that is taken care of, and the reward is retrieved, they return to the same path as the other two personas.

Our audience includes students who visit late night dining spots like TAP occasionally as well as those who rely on it during intense academic periods. For heavy courseload students, scheduled pre-orders aligned with long study blocks provide structured,

balanced fuel instead of last minute impulse decisions. For students who tend to spiral, reminders and pattern insights make the link between deadlines, social nights, and eating more visible. The system supports planning ahead when fuel is necessary and introduces friction when ordering is driven by habit rather than need, creating a balance between autonomy and guidance.

## Story Map



Fig 19. "Future Me Ordered This" story map.

We created the story map by organizing the experience around two primary activities: ordering food and tracking late night eating habits. We then broke each into clear steps and granular actions, mapping every interaction from login to checkout and from opening the tracker to submitting progress.

Revisiting our raw intervention data showed that reducing friction would be vital to break the cycle for the most extreme users, particularly those with heavy late night eating habits who only partially completed surveys. This led directly to our MVP features, which focus on the most valuable and non-negotiable components:

streamlined ordering, pre scheduled delivery aligned with workload, simple habit tracking, and timely notifications. Prioritizing these elements ensures the system supports behavior change without adding complexity that could discourage consistent use.

## **MVP Features**

Given the system paths and story map, we crystalized the core functionality, as well as ALPHA and BETA functions for our MVP, as outlined below.

### **Core Functionality (ALPHA)**

1. Menu browser with curated healthy late-night snack options sourced from partner restaurants and cloud kitchens; this is at the core of our product, and without it, we have no backbone.
2. Cart and checkout system with individual payment processing; also core to operations.
3. Real-time delivery tracking with ETA and order status updates to let users know exactly when their orders are coming.
4. User profile with authentication, dietary preferences, and order history; basis for a personalized experience such as tailored menus to dietary preferences and the ability to reorder something they loved.

### **UI/UX Specifications**

5. Home feed serves as a centralized hub for navigation and quick reordering (ALPHA); this could also be grouped under Core Functionality, but we conceptualized it more as a UI feature. This feed is the user's home base and instruction guide, showing them what progress they've made and how to use the app.
6. Push notifications for delivery updates and essential alerts (ALPHA); vital for communicating information to the user.
7. Eat-rate confirmation prompt post-delivery to track consumption percentage (BETA), on a prototype level, this is not top priority.
8. Streak tracking system visible on user profile (BETA); similar to point (7), not a top priority, as it doesn't immediately address pain points.

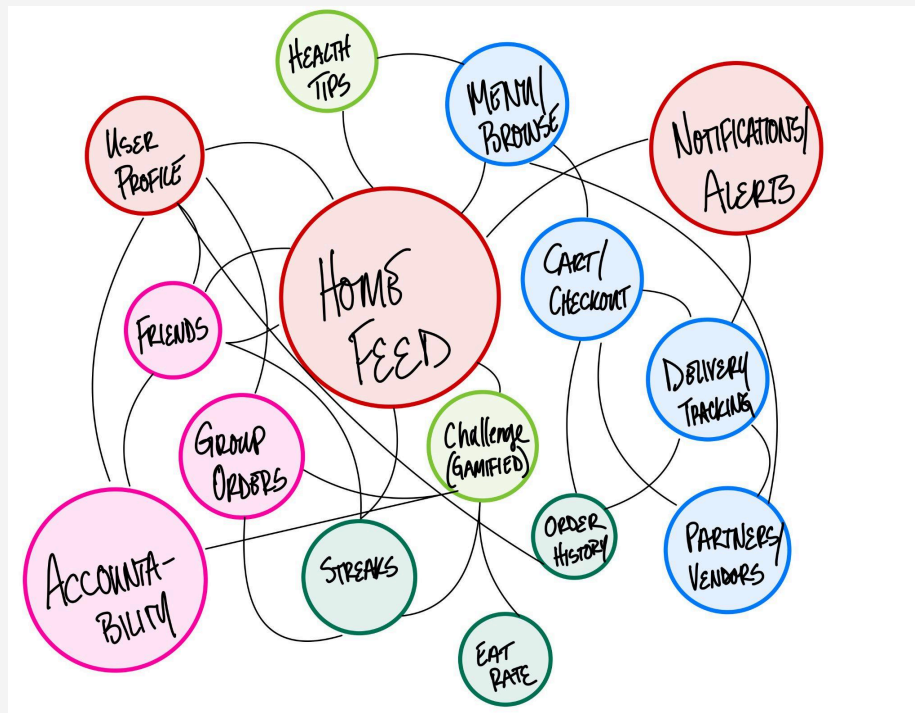
9. Notification for group invites, streak-at-risk warnings, and peer activity (ALPHA); vital information for the user: these notifications help to boost accountability and help break those nasty habits!

### **Accountability and Social Aspect Specifications (BETA)**

For each of these points (10-14), these are largely out of scope for our prototype. At a prototype scale, statistics such as streaks and eat-rate statistics wouldn't be visible, so we group them as "nice to have."

10. Friends system with the ability to view peer streaks and eat-rate statistics
11. Group ordering with shared cart and split payment functionality
12. Accountability nudges triggered by streak breaks or declining eat-rate
13. Structured challenges tied to streak and eat-rate goals
14. Health tips and contextual nutritional guidance surfaced on the home feed

## Bubble Map



*Fig 20. Bubble Map.*

At its core, the product is built around a curated menu browsing experience for healthy late-night snacks, sourced from a network of partner restaurants and cloud kitchens. This feeds into a cart and checkout flow with individual payment processing, followed by real-time delivery tracking with ETA and status updates so users always know when their food is arriving. User profiles with authentication, dietary preferences, and order history round out the foundation, enabling personalized menus and easy reordering.

The home feed serves as the user's central hub, not just for navigation and quick reorders, but as a progress dashboard and guide to the app's features. Push notifications handle essential communication: delivery updates, group invites, streak-at-risk warnings, and peer activity alerts that reinforce accountability and help users break unhealthy habits.

At the beta level, the product introduces a post-delivery eat-rate confirmation prompting users to log whether they consumed their order, along with a streak tracking system visible on their profile. These aren't immediate priorities for the prototype since they don't address core pain points, but they lay the groundwork for the accountability layer.

The social and accountability features are largely out of scope for the prototype, since metrics like streaks and eat-rate percentages won't be surfaced at that stage. These include a friends system for viewing peer statistics, group ordering with shared carts and split payments, accountability nudges triggered by streak breaks or declining eat-rates, structured challenges tied to health goals, and contextual nutritional guidance on the home feed. All are treated as "nice to have" for now but are central to the product's longer-term engagement model.

# Interaction Design

Read our complete Wireflows and Sketchy Screens blog post [here](#).

## Wireflows

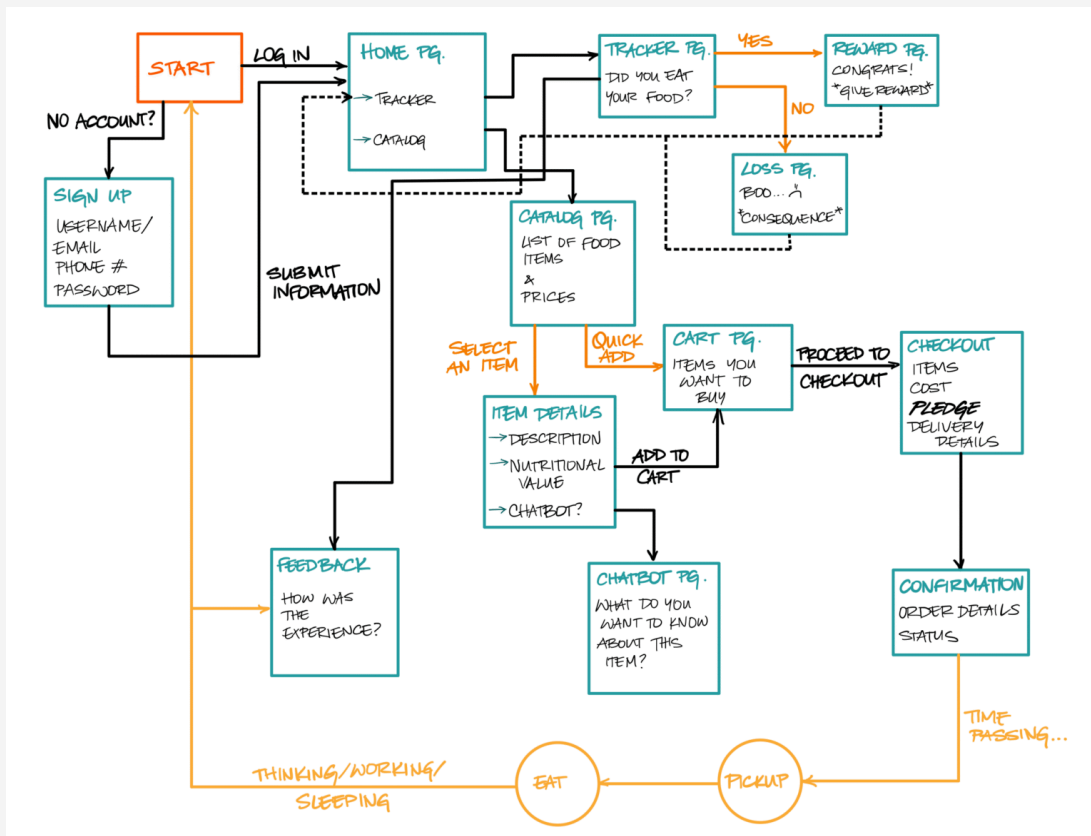


Fig 21. LunaCart wireflow.

Our final wireflow captures the full **LunaCart** experience from account creation to post-meal feedback. Users either log-in or sign-up, landing on a home page that branches to a tracker and catalog. The catalog is a central hub, letting users browse items, view nutritional details, ask a chatbot questions, and add to cart. From the cart, users proceed to checkout, where they confirm items, cost, delivery details, and a pledge before receiving an order confirmation.

The design prioritizes the tracker and catalog as the most revisited screens, since users return to them every ordering cycle. ‘Quick Add’ on the catalog page reduces friction for repeat orders, and the tracker's yes/no check-in directly routes users to either a gentle reward or a loss page, reinforcing the habit loop. The feedback page

closes the loop post-meal, feeding back into the home screen so the cycle restarts naturally.

## Sketchy Screens

### Task 1: Pre-ordering for one person

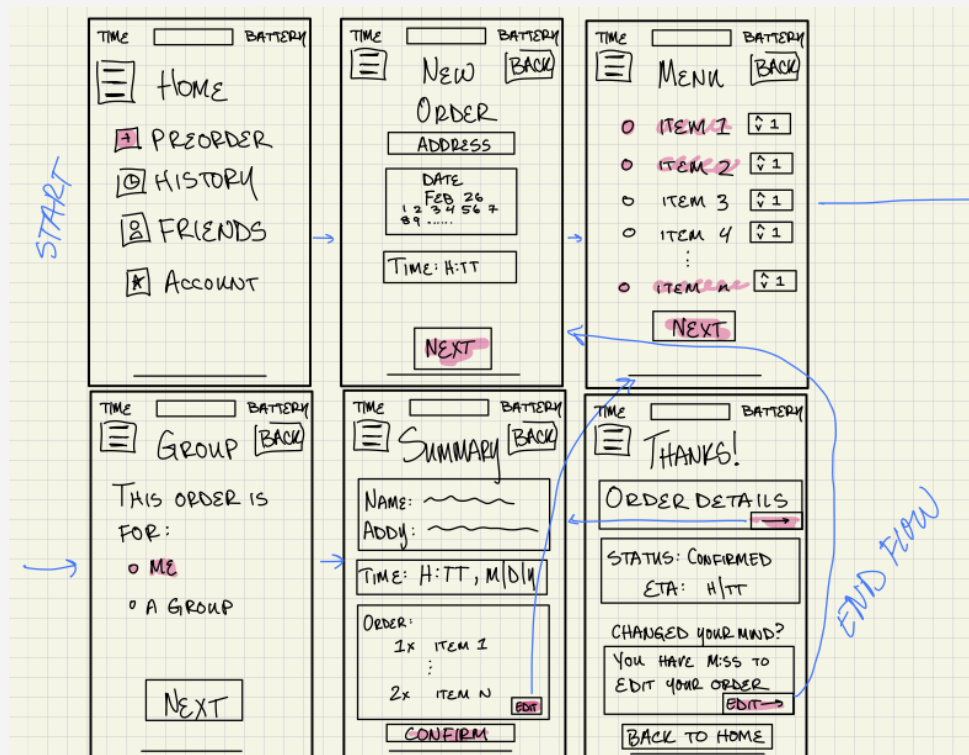


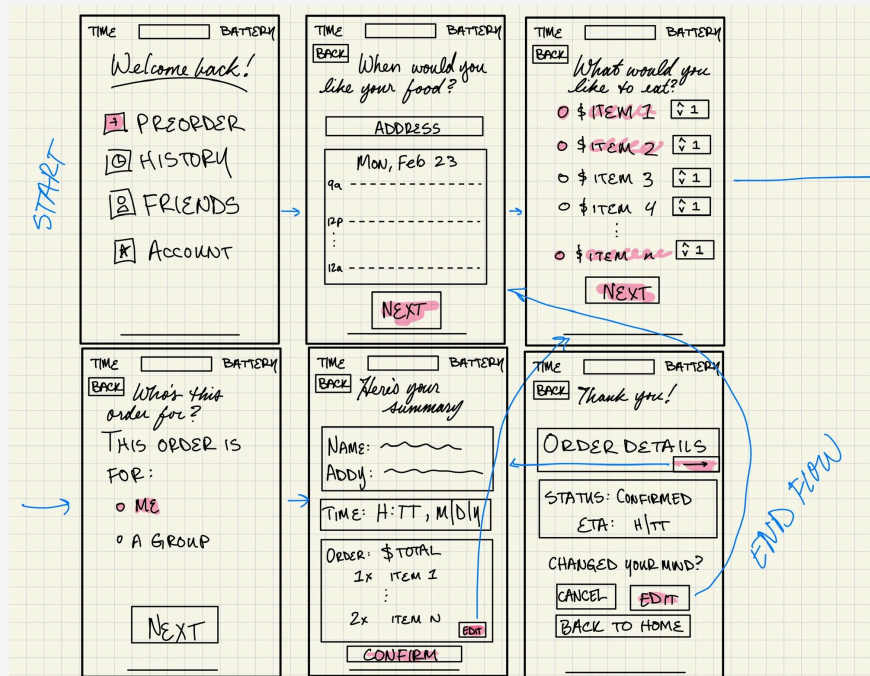
Fig 22. Original sketchy screens for Task 1.

### Critiques:

- The home screen feels like a hybrid between a side menu and a full dashboard, should commit to one or the other, and it's unclear whether it's meant to be a home view or a hamburger drawer
- Add a larger calendar and a delivery time window selector (e.g. block a range like 3:30 to 5:00pm)
- Delivery details need more precision, consider a pin-drop map or a dedicated instructions field
- "Back" button should move to the top-left corner to match standard navigation expectations

- The "change your mind" screen is confusing, simplify to two clear actions (Edit, Cancel)
- A wizard-style funnel separating time, location, and order details across individual screens could reduce cognitive load while making the flow feel more engaging

Revised Version:



**Fig 23.** Revised sketchy screens for Task 1.

Justification:

After incorporating peer feedback, the redesign focused on clarity and usability. The hamburger menu was removed from the first screen to simplify navigation, and the back button was moved to the top left for convention consistency. Headers were rewritten to feel warmer and more conversational.

The second screen's scheduling input was upgraded to a Google Calendar-style day view for easier time range selection. Smaller polish touches included adding a price indicator in the menu directory and decluttering the "changed your mind" screen for cleaner visual hierarchy.

## Task 2: Pre-ordering for group

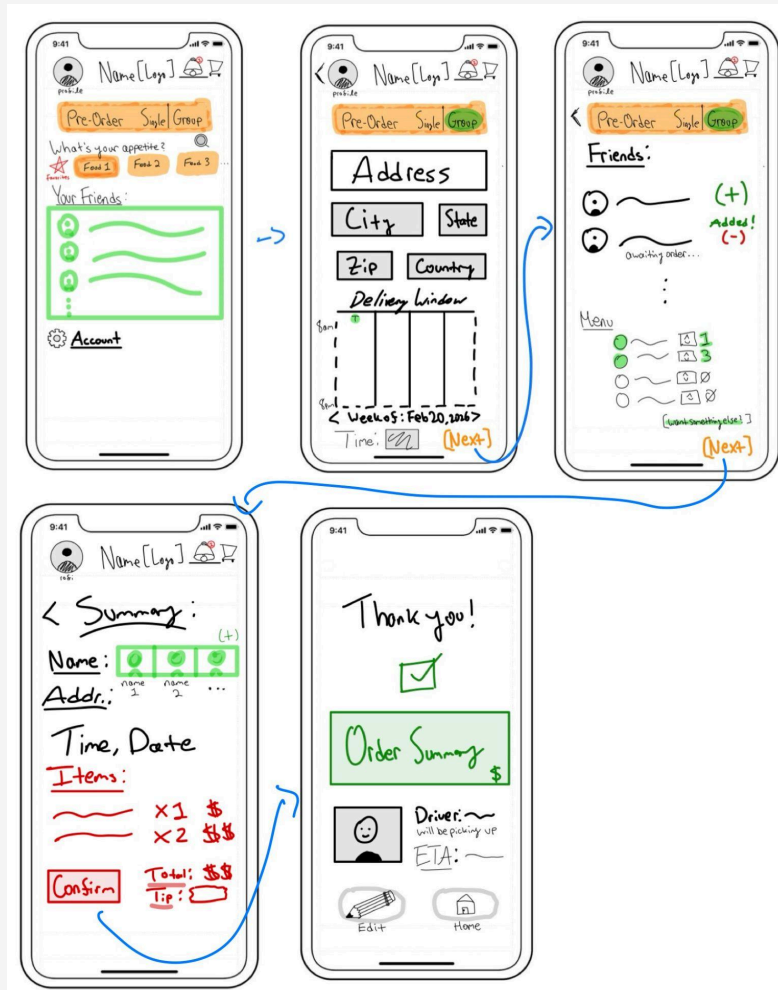


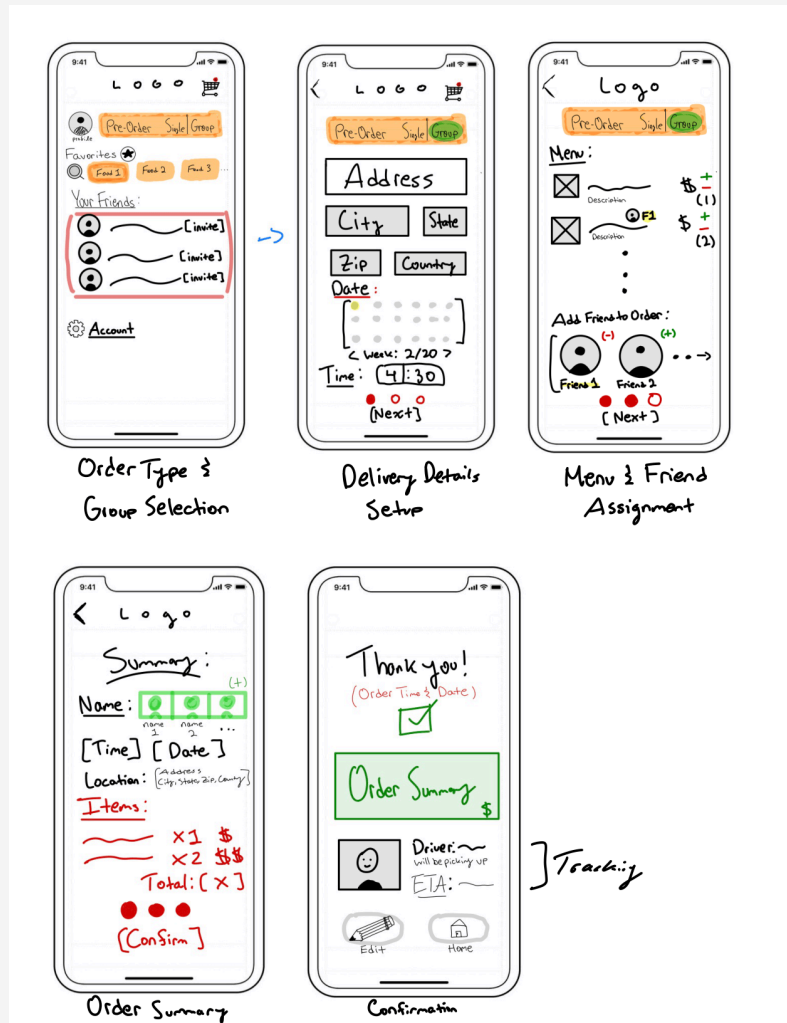
Fig 24. Original sketchy screens for Task 2.

### Critiques:

- Clarify what "What's your appetite" means on the first screen and what options are available
- Revisit top bar icon placement; profile, cart, and notifications are competing for the same corner and worth comparing against other food apps for reference
- Standardize the placement of the "Back" button across screens for consistency
- Add editing flows for cases where a user needs to modify an order mid-process
- Offer a quick "Dorm / Default address" option on the address screen

- Some screens feel crowded; reduce density and use whitespace more intentionally
- Consider a wizard-style flow with a clear "Next" button to guide users progressively

Revised Version:



**Fig 25.** Revised sketchy screens for Task 2.

Justification:

Based on the feedback, the revised flow includes a clear order-editing flow, standardized top bar navigation and Back button placement, a structured step-by-step progression, and quick-select address options. The "What's your appetite?" prompt was replaced with a favorites/search section.

Screen density was reduced while maintaining the visual hierarchy, color-coding, delivery window, and friend order status features. Overall, the flow provides only essential details at each stage of an order, including the group feature, menu, and order tracking.

### Task 3: Making a Reflection Log Entry

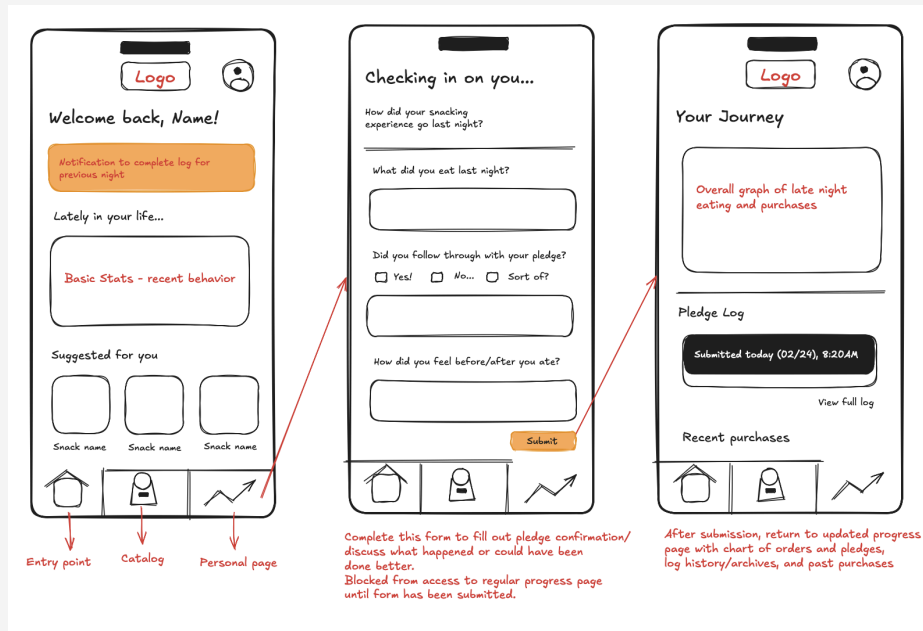


Fig 26. Original sketchy screens for Task 3.

#### Critiques:

- The middle check-in screen's paragraph entry format may hurt retention due to logging time; a dropdown with preset options could be faster
- Slide 1 lacks a quick re-order or search function, adding friction to accessing past meals
- The check-in rating could be more specific with a scale or references to particular meals
- The journey/stats screen shows too many metrics at once and could be broken into progressive reveals (last week first, then full history)
- The "blocked until you submit" mechanic may feel punishing; a skip or save draft option would keep the tone supportive

- The pledge log on the final screen is unclear and would benefit from a tooltip, label, or onboarding cue

Revised Version:



**Fig 27.** Revised sketchy screens for Task 3.

Justification:

The revised workflow includes a save draft option on the check-in form so users are not blocked from viewing their own progress, as a forced completion gate risks feeling punishing. The form still surfaces first in the progress tab as a compromise, keeping the habit loop intact without requiring completion. Varied question formats replace long-form responses to reduce friction while still capturing enough detail for meaningful backend synthesis.

'Log entry' results feed into an AI layer that generates a playlist or 'Song of the Day' based on the emotions, foods, and thoughts captured, shifting the output from a raw data dump to something personal and rewarding. The progress view also incorporates a social component where users can send and receive 'pat-on-the-back' posts, broadening recognition beyond task completion to any incremental progress. 'Pledge History' moves to its own dedicated screen functioning as an archive of past entries, which makes its purpose clearer and removes the confusion of presenting it alongside active metrics.

## Moodboard



**Fig 28.** LunaCart moodboard created on Canva.

For our final group moodboard, we decided to create something that conveys a warm nighttime atmosphere, where energies may be low but activity and vibes are up. This is a palette of deep blues and warm oranges, paired with rounded shapes and cozy imagery to make the experience feel calming rather than overwhelming. This direction supports users who want gentle structure and comfort late at night, while still keeping the interface playful and inviting enough to encourage action.

Food should be something that makes people take time for themselves, allows them to stop and savor, to enjoy energizing themselves. It's not something that should make a person feel guilty later on, it is a safe space. For this reason, we used words such as "nurturing", "warm", and "chill" to make our app feel like a judgement-free zone that is only working in the best interest of the user. The goal is to make the user feel relaxed and supported, to make them feel like they can focus on their priorities while our app will take care of all the hard work for them.

# Style Tile

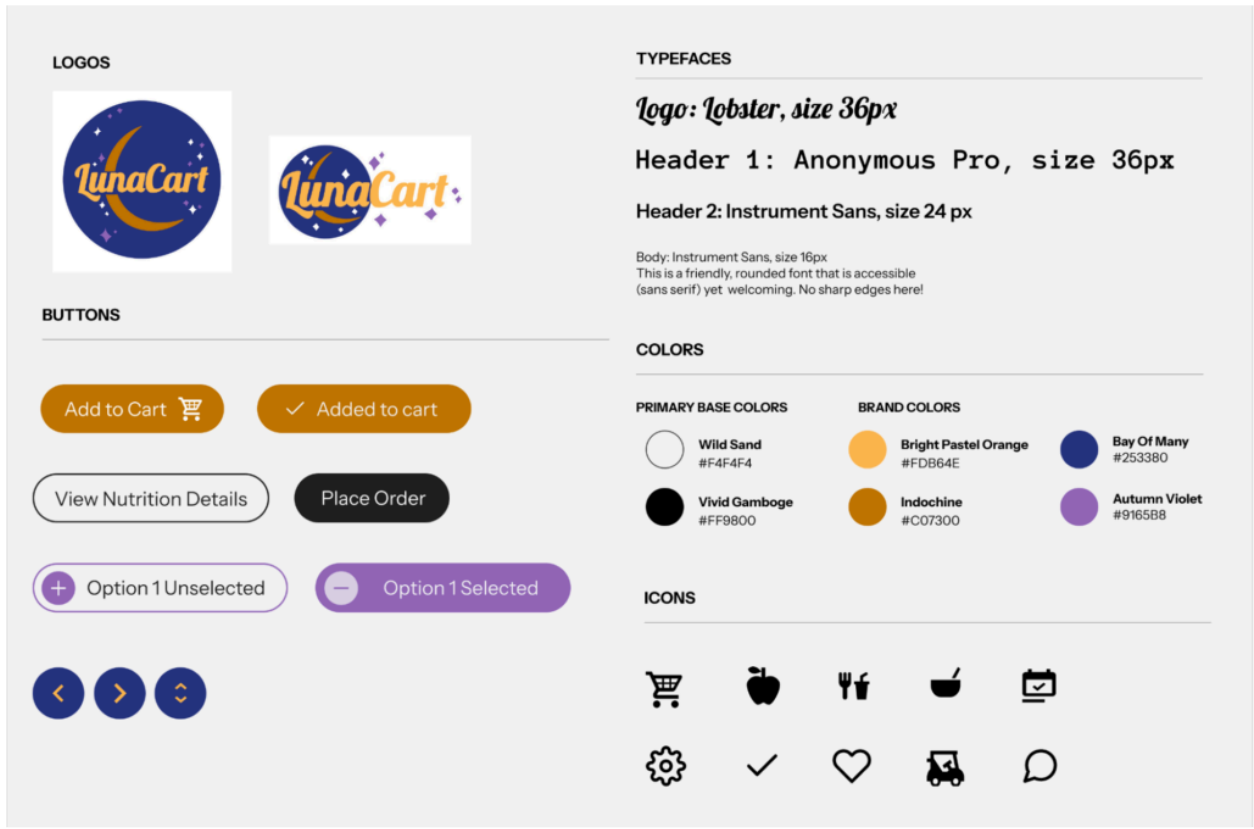


Fig 29. LunaCart style tile created on Figma.

Our style tile reflects **LunaCart**'s core mission: making healthy choices feel intentional, approachable, and rewarding, especially during moments of fatigue and stress.

## Color Palette

We use a warm, inviting palette anchored by soft neutrals and balanced with vibrant accents. The base colors (Wild Sand and Vivid Gamboge) provide a clean, calm foundation that reduces visual overwhelm, while the brand colors (Bright Pastel Orange, Bay of Many, and Autumn Violet) introduce energy and emotional warmth. Orange is used to signal action and motivation (e.g., "Add to Cart"), while blue and violet add a sense of trust, calm, and reflection, especially important for the morning log experience. This balance mirrors the app's dual purpose: proactive planning and reflective awareness.

## **Typography**

Our typography choices emphasize clarity and friendliness. The logo uses *Lobster* to create a playful, memorable brand identity that feels approachable rather than clinical. Headers use *Anonymous Pro*, giving structure and readability while subtly evoking a “task-oriented” or checklist feel. Body text in *Instrument Sans* ensures accessibility and ease of reading, reinforcing the app’s goal of reducing cognitive load during busy or late-night moments.

## **UI Component Styles**

Buttons and UI elements are designed to feel soft, rounded, and satisfying to interact with, so that it mirrors the psychological reward of checking off a task. Primary actions use bold, filled buttons with warm colors to encourage engagement, while secondary actions are more muted to avoid decision fatigue. The use of rounded pills and toggles (e.g., “Option Selected”) reinforces a sense of completion and progress. Icons are simple and minimal, supporting intuitive navigation without clutter.

## **Accessibility Considerations**

We prioritize high contrast between text and background for readability, particularly for late-night use when users may experience visual fatigue. Sans-serif body text improves legibility across devices, and button sizes are designed for easy interaction.

*Read our full Moodboard and Style Tile blog post [here](#).*

## **(Final) Prototype**

*We welcome you to try our prototype available [here](#). We would also recommend opening the prototype on a phone for more accurate simulation of usage.*

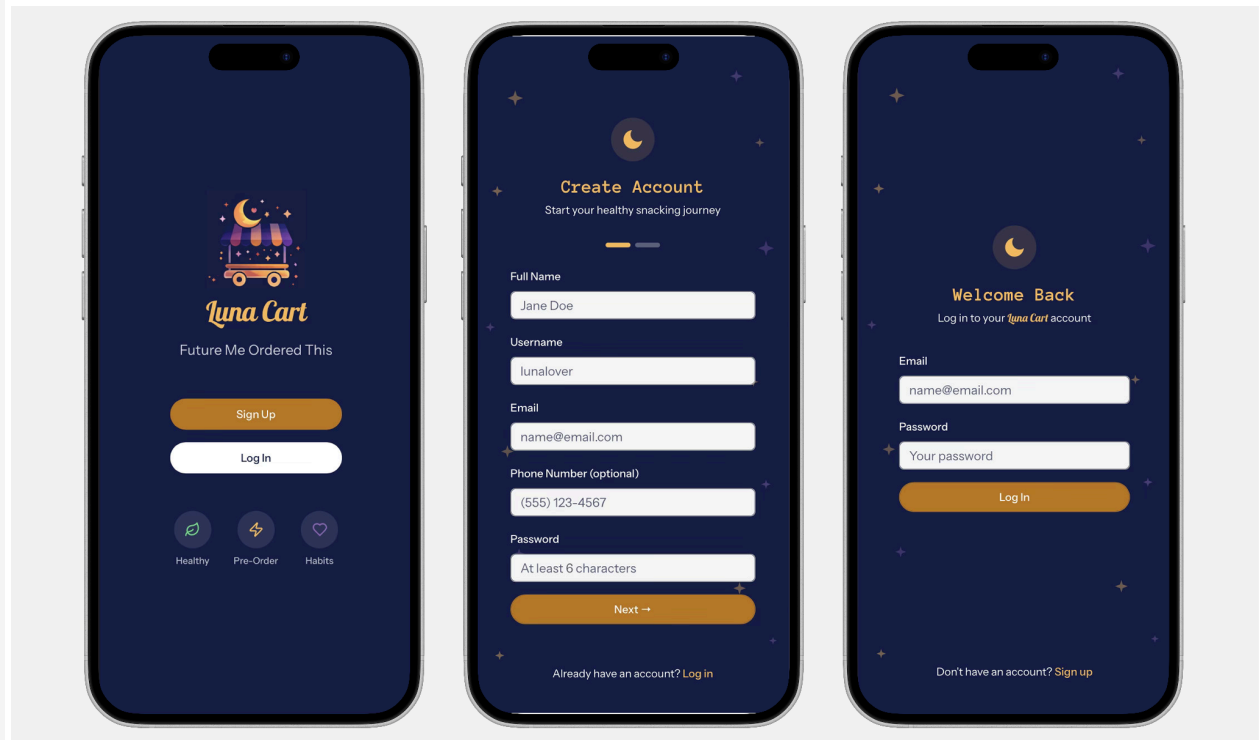


Fig 30. Entry signup/login flow.

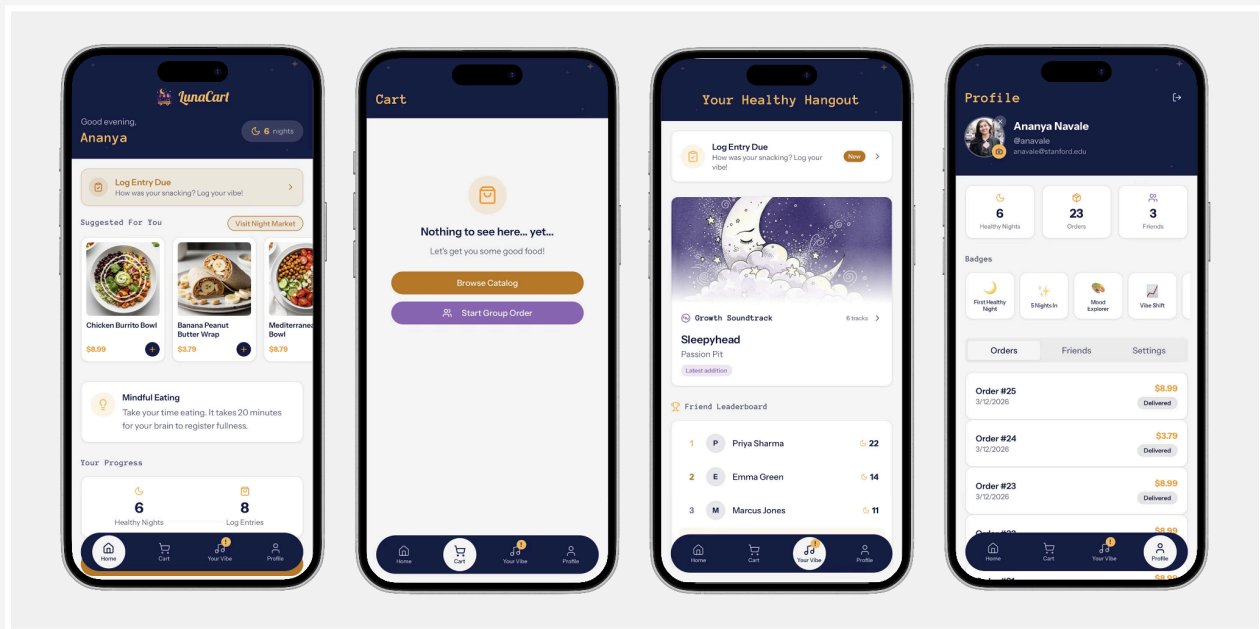


Fig 31. Primary tabs in tab navigator.

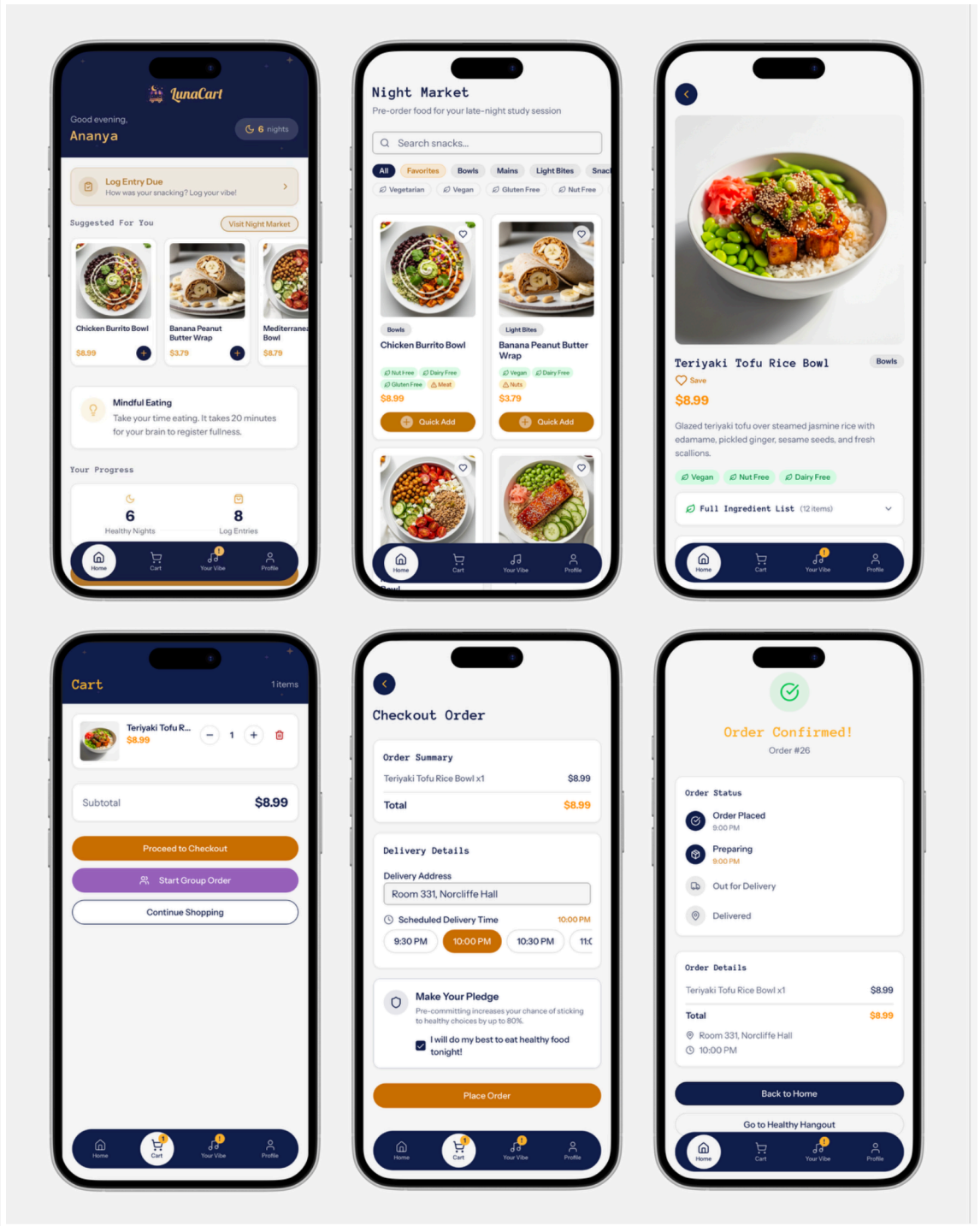


Fig 32. Task flow 1: Pre-ordering for a single person.

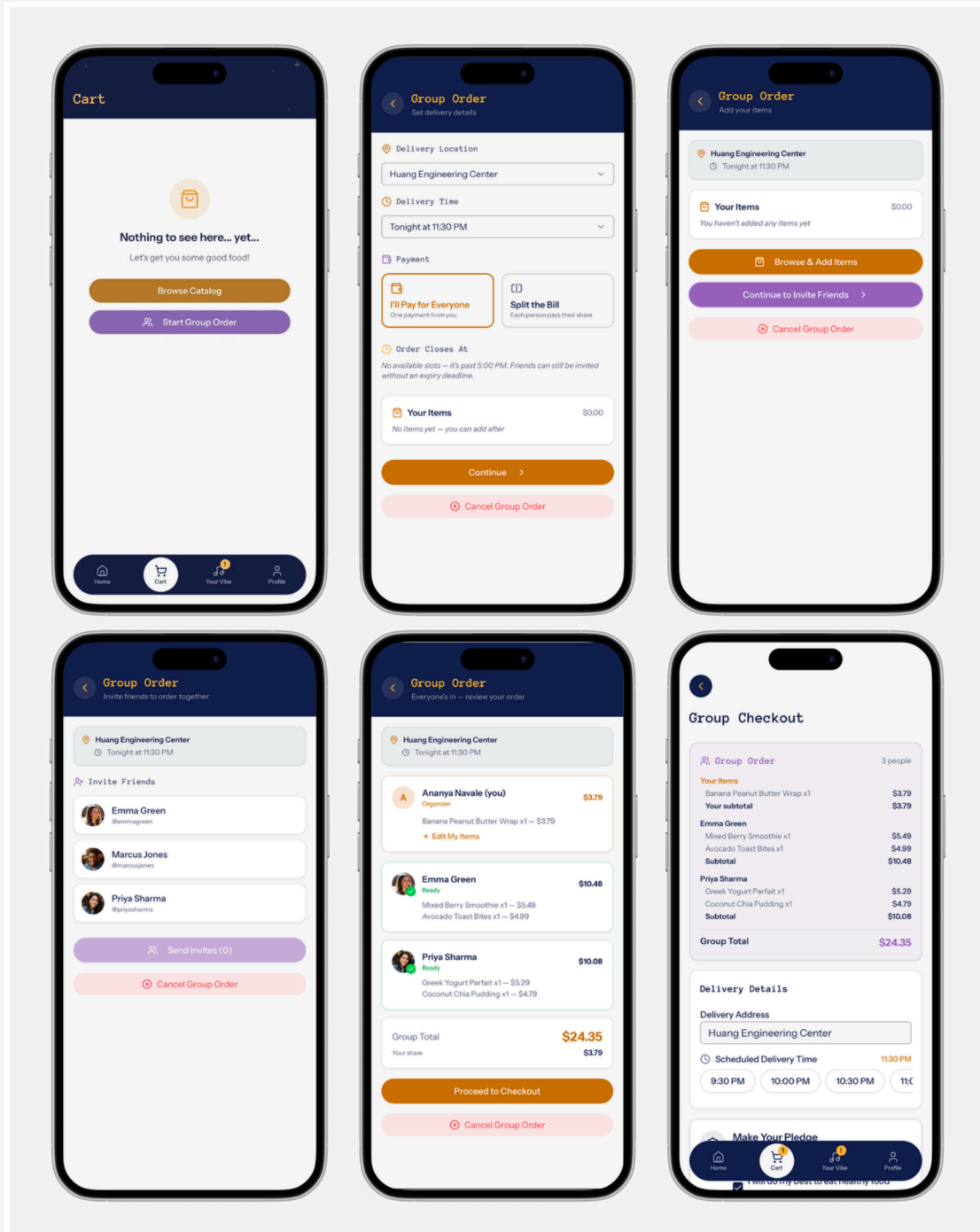
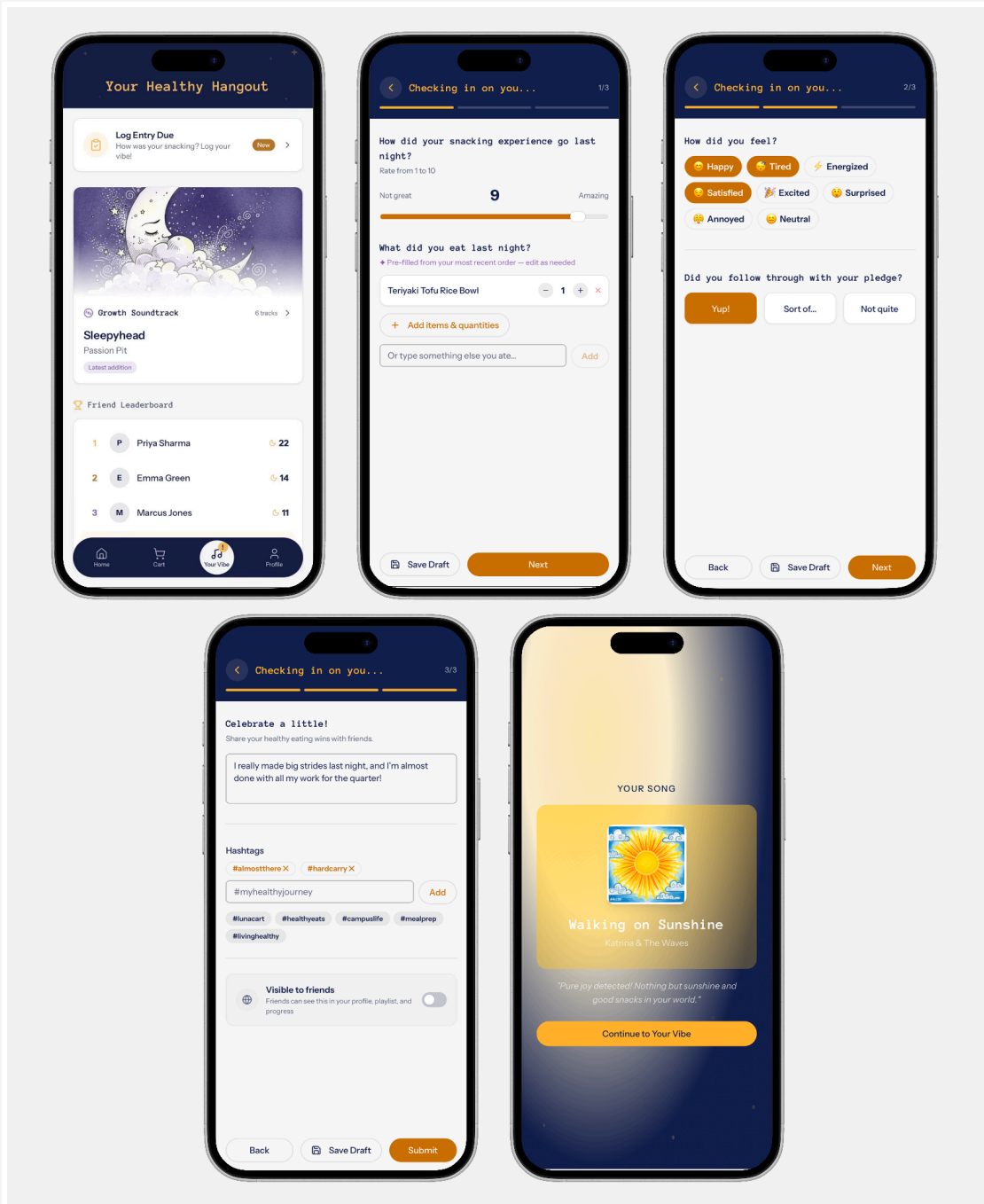


Fig 33. Task flow 2: Placing a group order.



**Fig 34.** Task flow 3: Completing a log entry.

Based on the moodboard and style tile, we standardized our buttons and color scheme across the board, which can be seen in all three flows above. Overall, we tried to incorporate a consistent nighttime atmosphere with soothing colors and procedures that calmed the user, while simultaneously exciting them at the prospect of ordering delicious and nutritious foods!

## Usability Testing

Read our full usability script [here](#).

Our usability testing was designed to evaluate how effectively users could navigate **LunaCart**'s three core flows while also assessing whether the app delivers on its goal of making healthy eating feel intentional, easy, and rewarding.

### Task 1: Place an Individual Order

Participants were asked to place a solo order to be delivered later in the evening.

Objective: Evaluate the clarity and ease of the core pre-commitment flow.

Key Questions:

- Can users easily browse and select items?
- Do they understand the concept of pre-ordering for later?
- Does the flow feel quick and satisfying (like checking off a task)?

### Task 2: Place a Group Order

Participants were asked to initiate or join a group order with friends.

Objective: Assess usability of collaborative ordering and clarity of shared responsibility (e.g., payment, coordination).

Key Questions:

- Is it clear how to start or join a group order?
- Do users understand how payment is handled?
- Does the process feel inclusive and accessible from both sides (joining or initiating)?

### Task 3: Complete a Morning Log Entry

Participants were asked to log what they ate the previous night and reflect on their experience.

Objective: Evaluate the reflection flow and whether it supports self-awareness without feeling tedious.

Key Questions:

- Is the logging process straightforward and efficient?
- Does it feel meaningful or rewarding?
- Is there anything that feels particularly encouraging or discouraging?

## **Usability Testing Results**

Overall, the task flows were intuitive and easy to follow; usability testing uncovered several granular issues that could impact the user experience. The three most significant issues and their corresponding solutions are summarized below.

Read our complete Usability Report blog post [here](#).

### Issue 1: Lack of Customization and Ingredient Transparency

*Problem:* Users were unable to modify food items or clearly view ingredients, which raised concerns about dietary restrictions and allergies. One participant noted they would want to remove certain ingredients (e.g., sauces), while others emphasized the need for full ingredient visibility.

*Evidence:* Multiple participants explicitly mentioned allergies or preferences as a barrier to committing to an order.

*Solution:* In the final prototype, we added a customization feature allowing users to modify ingredients (e.g., remove or adjust components) and included an expandable “See Ingredients” section for each menu item. This improves both flexibility and trust in the ordering process.

### Issue 2: Hesitation to Commit Due to Changing Preferences

*Problem:* Participants expressed reluctance to pre-order food earlier in the day because cravings and appetite often change at night. This directly challenges the app’s core pre-commitment model.

*Evidence:* Users explicitly stated they might not want what they ordered later in the evening, creating friction in adoption.

*Solution:* We introduced an “Edit/Cancel Order” feature available up to one hour before delivery. This preserves the psychological benefit of pre-commitment while reducing perceived risk and increasing user control.

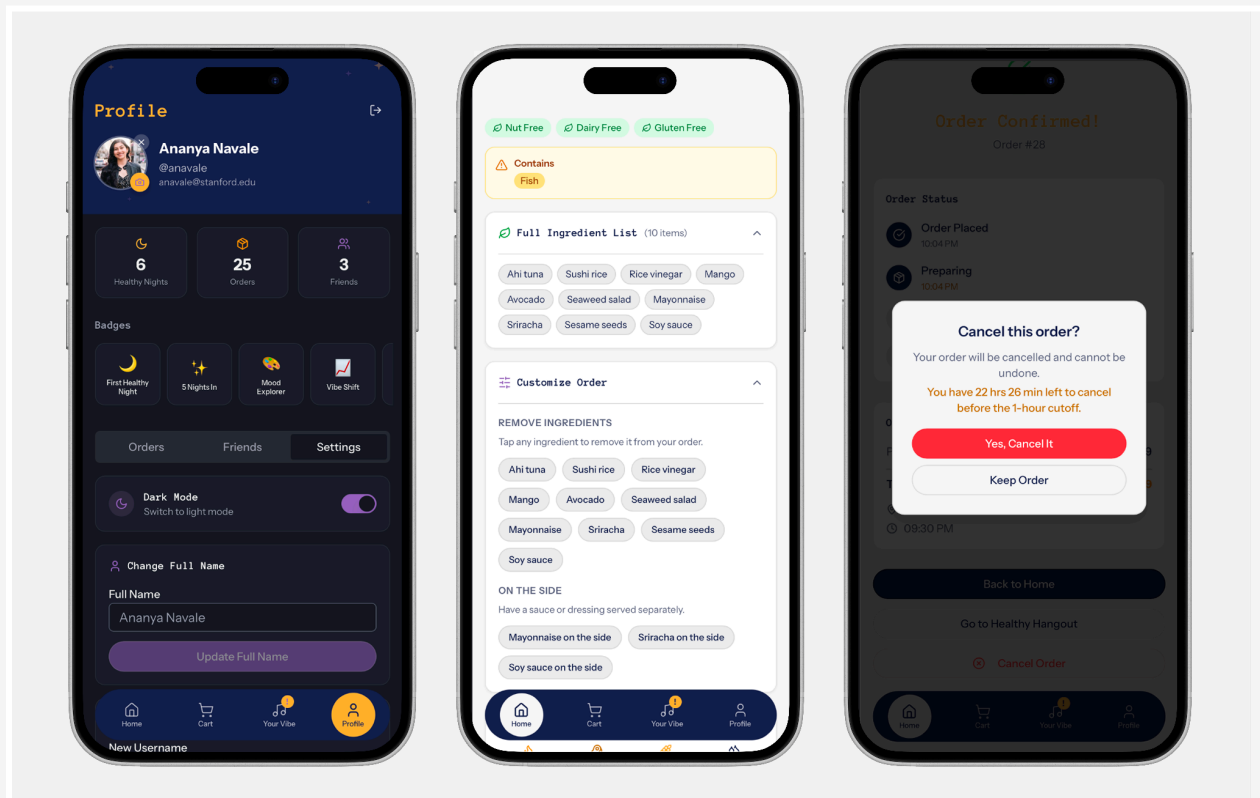
### Issue 3: Lack of Order Tracking & Feedback After Purchase

*Problem:* After placing an order, users felt uncertainty about its status (e.g., when it would arrive), which reduced confidence and overall satisfaction.

*Evidence:* Participants asked about order progress and expected delivery timing during testing.

*Solution:* We implemented a real-time order tracking system, including status updates and estimated delivery times. This increases transparency and aligns the experience with user expectations shaped by other delivery platforms.

Some of the changes implemented after usability testing are already visible in the final flow images above; there are a few additional ones included in the figure below as well.



**Fig 35.** Revisions to prototype based on usability testing. Left to right: (1) dark mode toggle in settings, (2) full ingredient list and customizability for catering to dietary restrictions, (3) order cancellation with countdown.

## Reflection

If we had more time, we would expand both the scope and depth of testing.

First, we would test with a larger and more diverse sample. Our initial usability testing involved only three participants recruited via convenience sampling. Future testing should specifically include users with dietary restrictions or more frequent late-night eating habits to better validate the customization options and the effectiveness of the pre-commitment features.

Second, we would run a longitudinal study to evaluate whether the reflection log actually leads to sustained behavior change over time. Our current testing captures first impressions, but not habit formation, one of **LunaCart**'s core goals.

Third, we would explore behavioral edge cases, such as users who repeatedly cancel orders or ignore the morning log, to understand where the system may break down in real-world use.

## Final Product Space

From a competitor perspective, **LunaCart** attempts to fill the gap left in the bottom left corner of our comparative analysis map (external constraint and pre-commitment). It addresses the former aspect through two means: monetary commitment and physical intervention. By having users pay for their food ahead of time, they become monetarily invested in their consumption of this food, and will be less likely to disregard it; additionally, a driver arriving in person to deliver their order is a physical reminder and encouragement to follow through with their commitment to eat according to their preset plan. This product addresses the former through the process of ordering in the morning (or as early as possible) while they are not as heavily preoccupied with the completion of their work as they would be later on in the day.

From a user perspective, students default to unhealthy food late at night not because they want to, but because nothing better is available when they need it. Academic schedules conflict with dining hall hours, food is social, and what's open in the evening is almost exclusively greasy yet convenient.

Our baseline study confirmed that students don't want to eliminate late-night eating, and our intervention study validated that pre-commitment meaningfully shifts what they choose. It works through salience and autonomy, not restriction. Our solution

builds on that directly: advance ordering of healthy food, scheduled campus delivery, and a post-meal reflection loop built around college life, giving students the infrastructure to follow through on intentions their environment would otherwise override. We remove the mental preparation of having to put in effort to find food, add the thrill of waiting for a fresh, healthy yet flavorful delivery, and a very minimal, passive yet enticing reward system through the reflection logs.

# Conclusion

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## Ethical Considerations

### Problem

Late-night eating among college students is not a simple matter of poor self-control. It is a behavior deeply embedded in the structural realities of academic life, including challenging schedules that conflict with dining hall hours, social settings in which food functions as a bonding mechanism, and a campus food landscape that overwhelmingly favors cheap, calorie-dense, ultra-processed options during evening hours. Students who want to eat more healthfully at night face a genuine accessibility problem: the infrastructure around them does not support that choice.

### Impact

*LunaCart* intervenes at this intersection of individual intention and environmental constraint, but in doing so it enters ethically sensitive territory. Any product that frames certain foods as "healthy" or "unhealthy" risks reinforcing moralized relationships with eating, particularly among a population already confronting body image pressures, disordered eating tendencies, and the stress of early adulthood. The challenge is to improve access and support intentionality without inadvertently pathologizing a behavior that, for many students, serves real functional and social purposes.

### Ethical Reflection

Throughout this project, our team confronted several ethical tensions. Primarily, we confronted the risk of reinforcing diet culture within a population where eating disorders and disordered eating are prevalent. We mitigated this risk by deliberately avoiding any restrictive behavior, calorie counting, and other mechanisms that felt too invasive and objective. Features such as the optional commitment checkbox, the ability to modify orders, and the more open-ended log questions with more conversational options were intentional decisions designed to preserve autonomy and prevent shame. We also evaluated the implications of social accountability features: although peer visibility can motivate, it may also induce pressure, comparison, and anxiety, especially among students with sensitive relationships to food. Consequently, we classified these features as beta rather than alpha, allowing time to assess their effects before broad deployment. An unintended consequence

we continue to monitor is the potential for the app to increase total food consumption by adding a pre-ordered healthy snack atop existing late-night eating rather than substituting for it or the possibility of encouraging students who do not already have a predisposition to eat late at night to *start* developing this habit. More broadly, any product that curates food options exercises a form of cultural classification, and we acknowledge the responsibility inherent in defining what constitutes "healthy" for a diverse user base with varying cultural backgrounds, dietary requirements, and personal relationships with food.

## **Summary of Findings**

### **Takeaways**

This project demonstrated that behavior change design requires a fundamentally different approach than conventional product design. Initially, we assumed that late-night eating was the problem to solve and that our role was to help students stop this behavior. However, the baseline study compelled us to abandon this idea and pivot to our ultimate focus: students did not wish to completely cease eating at night; rather, they desired better options when they did.

This shift, from eliminating a behavior to improving its surrounding conditions, influenced every subsequent design decision and reinforced a key lesson throughout the quarter: the designer's initial problem framing can be flawed, and research serves to identify these errors before they become embedded in the product. Additionally, we observed a significant gap between stated preferences and actual behavior. Our assumption tests showed that students would select healthy menu items in hypothetical scenarios but defaulted to burgers and chicken sandwiches when asked about their actual choices. This intention-action gap emerged as a critical finding, guiding us to design for salience and pre-commitment rather than merely expanding the menu. At the team level, we recognized the importance of distributing ownership across distinct research and design phases to ensure that no single individual's assumptions remained unchallenged.

### **Successes & Failures**

The intervention study confirmed the core mechanism of our product: pre-commitment is effective primarily by putting healthy eating at the forefront rather than by restricting choice. The optional commitment checkbox was particularly effective; participants reported that its non-coercive framing fostered a sense of voluntary choice rather than rule compliance. Our shift from "stop eating at night" to

"eat better at night" was also successful, aligning the product with students' actual desires rather than our initial assumptions. From a design perspective, the home feed concept functioned well as a centralized node, and participants found the ordering flow intuitive during usability testing. Our intervention study menu was a limitation that continues to need investigation. Although our partnership with Step One Foods provided functional options, many participants found the offerings unappealing or misaligned with their cravings. One participant explicitly stated a preference to pay for desired items rather than receive free items that did not appeal to her. This finding revealed a research gap: we had extensively studied when and why students eat at night but insufficiently explored what they actually want to eat. Additionally, we underestimated the importance of external reminders for maintaining engagement with the pre-commitment form. Without daily nudges, participants acknowledged they would likely have forgotten to complete it, indicating a dependency on notifications that the final product must address.

### **Next Steps**

Given more time, we would prioritize three areas. First, we would conduct deeper research into the specific foods students crave at night, across a range of cultural backgrounds and palate preferences, to build a menu that feels genuinely desirable rather than prescriptive. The intervention menu was designed around nutritional value, but our evidence suggests that appeal and fit matter more than health credentials when it comes to actual adoption; however, our fictitious menu seemed to attract more attention and spark greater joy – this might be a clue! Second, we would prototype and test the social accountability features that sit between alpha and beta, particularly the friends system and group ordering. These features carry both notable potential and significant risk: peer visibility can motivate, but it can also introduce comparison, pressure, and anxiety. We would want to run targeted studies with students who have varying relationships with food to understand where the line falls between supportive accountability and harmful surveillance. Third, we would explore adaptive notification strategies that learn from a user's behavior over time, adjusting the timing and frequency of pre-commitment prompts to when they are most likely to engage, rather than defaulting to a fixed morning reminder.

### **Future Behavior Design**

Moving forward, we would try to incorporate several methodological commitments from this project into future work. Foremost is the avoidance of finalizing problem framing before completing research. Our initial assumption that late-night eating was inherently undesirable nearly resulted in a product that felt preachy and disconnected

from users' lived experiences. The willingness to pivot, even after weeks of work, was crucial to the product's viability. We will also approach behavior change with greater respect for the gap between intention and action, designing not only for stated desires but also for the contextual pressures influencing actual behavior. This necessitates increased investment in situated research methods such as diary studies and contextual inquiry, rather than relying solely on interviews and surveys. Finally, we will adopt a more deliberate approach to ethical guardrails from the outset. In this project, concerns regarding food moralization and the paternalism of curated menus emerged gradually rather than being integrated into design principles from the beginning. Future efforts will establish ethical boundaries as a formal step during ideation rather than as a retrospective exercise after product development.

***Thanks for reading!***

***~ Greg, Austin, Ananya, Shuman, & Jasmine***