

Single-Person Household Food Consumption

Final Report

Human-Computer Interaction

DePaul University

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Executive Summary

Individuals who live alone face unique challenges when planning, purchasing, and managing groceries. Many grocery products and packaging sizes are designed for larger households, making it difficult for single-person households to estimate appropriate quantities and minimize food waste. The goal of this study was to better understand how people living alone plan and manage groceries and to identify opportunities for technology-based solutions that could better support their needs.

We conducted a qualitative study consisting of both observational sessions and semi-structured interviews with eight adults living alone and independently managing their grocery shopping. During observation sessions, participants completed a grocery planning and ordering task while thinking aloud, allowing researchers to observe real-time decision-making processes, grocery planning strategies, and interactions with grocery apps and tools. Interviews provided deeper insight into participants' experiences with grocery planning, budgeting, cooking routines, and food waste.

We analyzed the data using the AEIOU framework, inductive coding of interview transcripts, and affinity diagramming to identify recurring behavioral patterns across participants. The findings suggest that grocery shopping for individuals living alone is an ongoing optimization process in which participants balance cost, convenience, preparation effort, and portion sizes. Food waste most commonly occurred when schedules changed unexpectedly, when food packaging sizes exceeded realistic consumption needs, or when ingredients were forgotten after purchase. Participants often adapted by freezing food, meal-prepping, purchasing smaller quantities, or making more frequent grocery trips.

Across both observation and interview data, participants expressed frustration that existing grocery tools primarily support list creation but provide limited support for tracking household inventory or monitoring food expiration. As a result, many participants relied on memory or informal tracking methods to manage their groceries. These findings highlight opportunities for lightweight technology solutions that better support single-person households by connecting grocery planning with household inventory awareness. Features such as expiration reminders, portion recommendations, and integrated inventory tracking could help individuals reduce food waste while maintaining efficient and flexible grocery routines.

Introduction

For many people, food waste happens quietly during everyday routines like grocery shopping and meal preparation. Individuals often buy ingredients with good intentions, yet some of that food ends up being unused. Large scale studies on global food systems estimate that a significant share of food produced for human consumption is never consumed, and a substantial portion of that waste occurs within households (FAO, 2013; UNEP, 2021). Part of the issue comes from how food is packaged and sold in stores. Many grocery items are designed for family sized consumption, which can make portion management difficult for people who shop and cook for themselves. Over time, this mismatch between packaging and individual consumption patterns can lead to spoilage, unnecessary spending, and inefficient food use.

The challenge can be especially noticeable for individuals living alone. A single person buying food has to think about things like how long ingredients will stay usable, how many meals they realistically have time to cook, and portion sizes. Research on household food waste shows that everyday routines and planning habits play an important role in how people buy and use food (Quested et al., 2013). Waste is rarely the result of someone deliberately throwing food away, and happens gradually when shopping decisions, meal preparation, and daily schedules do not match up.

Several digital tools attempt to support meal planning and grocery organization. For example, Mealime (<https://www.mealime.com>) provides structured meal plans and generates grocery lists based on selected recipes. AnyList (<https://www.anylist.com>) focuses on grocery list management and allows users to organize shopping tasks and store recipes. Another example is Eat This Much (<https://www.eatthismuch.com>), which automatically creates meal plans based on dietary preferences and nutritional goals while generating corresponding grocery lists. These applications help users plan meals and manage ingredients, but their primary focus is on general meal organization rather than the specific challenges faced by individuals shopping for one person.

Despite the availability of digital meal planning and grocery management tools, many of them do not directly address the practical challenges associated with portion sizes, ingredient longevity, and the mismatch between grocery packaging and individual consumption patterns. Research on household food waste indicates that planning routines and food management practices significantly influence how much food ultimately gets discarded (Stancu et al., 2016).

To better understand these challenges, this study examined how individuals living alone plan their weekly grocery shopping and make decisions throughout the process. Through observational research and interviews, we focused on how participants prepare before going to the store, how they decide what quantities to purchase, how budgeting influences their choices, and where breakdowns or frustrations occur during shopping.

The goal of this research is to better understand how technology might support individuals living alone in managing grocery planning and portion decisions in ways that reduce food waste and unnecessary spending while fitting naturally into existing routines.

Research Question

How might digital tools better support individuals living alone in managing grocery purchases and meal planning in ways that reduce food waste and improve everyday food management?

Research and Analysis Methods

Observation Study

Participants

We conducted observations with 8 participants who live alone and manage their own grocery shopping. We recruited participants through Facebook groups and DePaul student events. All participants were adults between the ages of 23 and 33 (4 female, 4 male). Weekly grocery budgets ranged from \$40 to \$150, indicating variation in financial circumstances and purchasing patterns. During each session, participants planned and ordered groceries while thinking out aloud. (see Table 1: Observation Participants Summary)

Table 1: Observation Participant Summary

Participant	Gender	Age	Weekly Budget
P1	Female	28	\$ 100 - 150
P2	Female	29	\$120
P3	Male	24	\$ 100 - 150
P4	Male	25	\$80 - 120
P5	Male	23	\$40 - 80
P6	Female	32	\$50 - 80
P7	Male	31	\$120
P8	Female	33	\$150

Data Collection

We conducted four sessions in person and four remotely using Zoom. During each session, we asked participants to think aloud while completing a grocery planning and ordering task. We began by asking preliminary questions about their grocery shopping habits to understand their typical approach.

We then observed each participant as they planned and ordered groceries using various tools and platforms they normally relied on, including notes and list apps, grocery delivery services or store

websites. We noted their decisions, hesitations and reasonings throughout the task. We also noted any additional comments and key decision points that arose during the session.

After participants completed the task, we asked follow-up questions about food waste, browsing behavior and budget considerations. Each session lasted approximately 30-60 minutes.

Data Analysis

After collecting the data, we consolidated our field notes and organized them using the AEIOU framework. We then created an affinity diagram to identify common themes across participants. The diagram was used to summarize how solo shoppers plan, purchase and adjust their grocery shopping.

Table 2: AEIOU Table

Activity	• List Creation • Browsing • Price considerations • Add items to cart • Cart Review • Remove items not needed • Choose pick-up or Delivery
Environment	• Kitchen inventory • Online shopping ecosystem • Delivery platforms • Physical grocery stores
Interaction	• User-app interaction • Interaction with observer
Objects	• List apps • Sticky notes • Grocery apps • Recipe websites • Pantry/fridge inventory • Coupons/promotions
Users	• Individuals living alone managing food planning, purchasing, and consumption

Findings

Through our analysis, we identified five themes that help describe how individuals living alone plan grocery shopping, manage costs, and navigate food waste. These themes also informed a sequence diagram illustrating recurring patterns in grocery planning and purchasing behaviors.

A. Grocery Shopping Is a Recurring Optimization Cycle

Participants described grocery shopping as an ongoing, iterative process rather than a one-time activity. The process typically followed a repeated sequence: planning -> purchasing -> cooking -> managing leftovers or spoilage -> adjusting future decisions based on what worked and what did not.

Planning relied on lightweight tools and routines - Notes apps, mental lists, checking existing food, and revisiting familiar stores or apps. Participants adjusted their routines based on previous experiences with waste, cost, and meal satisfaction. P1 and P4 described not buying certain produce items after repeatedly failing to use them before they spoiled. Others described learning over time which staple quantities lasted them a full week and which consistently ran short, and calibrating their purchases accordingly.

B. Food Waste Is Driven by Packaging and Perishability Constraints

Participants described food spoilage as a result from constraints outside their control rather than a lack of intention to minimize waste. P6 noted that standardized package and portion sizes frequently exceeded what a single person needed, making it difficult to buy the right amount without ending up with excess. Recipe quantities posed a similar challenge, as most recipes produced more servings than participants could consume before expiring. Some items were only available in bulk or family-sized formats, which often led to leftover ingredients and spoilage even with careful planning.

C. Budgeting Occurs Reactively During the Shopping Process

Participants did not typically plan strict grocery budgets in advance. Instead, budgeting occurred dynamically as part of the shopping experience. P5 and P6 used coupons and promotions when available and compared prices across stores and apps in real time. When total costs climbed higher than expected, participants adjusted quantities or removed non-essential items from their carts, prioritizing staples over discretionary purchases. Budget decisions occurred while shopping rather than being determined beforehand.

D. Efficiency and Routine Shape Planning and Purchasing Behaviors

Participants relied heavily on routine and efficiency to manage grocery shopping. Most returned to familiar stores and apps each week, built lists around staple items, and limited browsing to reduce the time and mental effort. P3, P5 and P6 organized their lists by store layout or food category to make in-store or in-app navigation faster. Some relied on "buy again" features or personal checklists that carried over from previous trips. These behaviors reflected a consistent effort to reduce decision fatigue and keep the shopping process manageable.

E. Preparation Effort Influences Whether Food Is Consumed or Wasted

Preparation effort affected whether food was actually used. Participants described choosing pre-prepared or pre-cut ingredients to reduce cooking time, and simplifying their meal plans around foods that were quick to prepare. During busier periods, participants avoided high-effort recipes and sometimes postponed meals that required more preparation. When meals were repeatedly postponed, the ingredients involved were more likely to be discarded. Lower-effort foods were used more consistently, while foods requiring greater preparation were at higher risk of waste.

Interview Study

Participants

For our interview study, we recruited eight participants through personal and academic contacts. All participants were adults between the ages of 23 to 35 (4 female, 4 male), who currently live alone and independently manage their grocery shopping, meal preparation and food storage. Participants are referred to by participant number throughout the report. (see Table 3: Interview Participant Summary)

Table 3 : Interview Participant Summary

Participant	Gender	Age	Weekly Budget	Time Living Alone
P1	Male	33	\$150	3 Years
P2	Female	24	\$80	1 Year
P3	Male	30	\$75 - 100	2.5 years
P4	Male	35	\$90 - 110	12 years
P5	Male	24	\$ 100 - 150	2 years
P6	Male	25	\$80 - 120	1 year
P7	Female	26	\$100	5 months
P8	Female	32	\$40 - 80	4 Years

Data Collection

We conducted all interview sessions individually, four in person and four online, via Zoom meetings. We screened all participants during recruitment to ensure they were currently living by themselves and managed their own groceries. We began each session with an overview of the project and obtained verbal consent from all participants before beginning the study.

The interview sessions were organized into four main sections, asking participants questions about their grocery planning and decision-making, food waste experiences, budgeting and current use of tools and technology in food management. We concluded each session with a short retrospective activity in which participants were shown four potential technology features and asked to share their reactions and preferences. Each interview session lasted approximately 30-40 minutes.

Data Analysis

Each researcher independently reviewed and applied descriptive, inductive codes to their interview transcripts in Atlas.ti. The initial coding process helped identify patterns from each participant's responses rather than from predefined categories. We then met as a team to compare codes and organize related observations into a unified affinity diagram in Miro, which helped us visually group similar codes across interviews. Based on these groupings, we developed a shared codebook to guide the subsequent analysis of interview transcripts.

Using the shared codebook, we re-coded all interview transcripts and examined the frequency and relative strength of recurring themes. The codes captured behaviors such as pre planning, checking prices mentally, relying on familiar routines and staples, buying smaller portions, forgetting leftovers, delayed cooking due to schedule conflicts and adapting behaviors. These themes centered on planning and decision making, causes of food waste and intentional learning and adaptation, informing our findings.

Findings

Through our interview data, we identified five broad themes describing how people living alone plan grocery shopping, manage food at home, and navigate food waste. These themes were planning and decision-making for groceries and food, causes of food waste, frustrations and pain points, intentions/learnings/adaptation, and opportunities for technology and design intervention.

Participants described grocery shopping for one person as driven by routine, and also shaped by changes in schedule, cost, perishability, and potential mismatches between available portion sizes and individual needs. Participants leaned on lightweight tactics such as phone notes, mental tracking, repeat meals, and visual reminders. However, these systems were not always enough when routines changed or food was forgotten.

A. Planning and decision making for groceries and food

Drawing from our interviews, participant responses were categorized into four subthemes, which are preparation efforts, time considerations, budget/cost, and portion sizing.

Preparation efforts

Interview participants commonly described preparing for grocery shopping through routines, notes apps, and repeat meal structures. P1 said, “Usually I keep a list in my phone and add things as I run out,” while P3 described using a grocery note divided by store so they could keep track of what to buy where. P2 similarly explained that they usually make a list in their notes app and gradually learned to build their pantry around ingredients that overlapped across multiple meals. These responses suggest that planning is often informal but systematic, with participants creating personal systems to make shopping more manageable.

Time considerations

Time constraints strongly affected when participants shopped and what they bought. P1 explained, “If I know I’ve got a busy stretch coming up, I’ll try to shop ahead,” and also said that when working late they bought food that was “easy to reheat or quick to cook.” P2 likewise said that ease of cooking time mattered because they were busy with school and work. P7 directly attributed store choice to walking distance and convenience. These accounts suggest that time considerations are a heavy factor in meal planning, shopping frequency, and ingredient/dish choice.

Budget/cost

Cost was a recurring consideration across interviews, although participants managed it in different ways. P1 said, “I try to be mindful. Costco helps for value on meat and bulk items, but Whole Foods can get expensive fast,” while P2 described trying to keep spending under a monthly target and comparing receipt photos against that budget. P3 also framed grocery costs as emotionally significant, explaining that large bulk trips felt expensive even when they may have saved money overall. Across participants, grocery spending was often tracked mentally rather than through formal budgeting systems, and concern about cost was closely tied to concern about waste.

Portion sizing

Portion sizing emerged as a major issue in shopping for one person. P1 said, “For vegetables or dairy, I try to be a little more realistic because those are the things that can go bad on me,” and later added, “A lot of stuff just feels made for bigger households.” P3 similarly described avoiding certain Costco items because the portions were too large for one person, especially bakery or snack items. P2 also noted that they had initially bought more vegetables than they needed when first living alone. P5, on the other hand, had a very intimate understanding of portion sizing, “Yeah, since I already have a pretty good quantity that I have that I will need in mind”. Together, these responses suggest that available package sizes often do not align with single-person households, especially for fresh or perishable foods.

B. Causes of food waste

From our interviews, participant responses relating to causes of food waste were categorized into three subthemes, which are forgetting stored food, over/under purchase, and unused food.

Forgetting stored food

A major cause of food waste discussed in interviews was forgetting what was already stored at home. P1 explained that leftovers are more likely to be forgotten “If it gets pushed to the back of the fridge,”. P3 described forgetting about items like strawberries, kimchi, or leftovers until they spoiled or sat unused for too long. This suggests that food waste often came less from deliberate overbuying and more from food becoming invisible once stored, rather than negligence. Participants were also receptive to the potential intervention to track expiration dates.

Overpurchase / underpurchase

Participants also described overestimating how much they would use, especially when buying in bulk, shopping aspirationally, or planning around ideal weeks rather than real ones. P1 said, “A lot of that stuff comes in more than I realistically need,” especially for produce and dairy. P3 described buying snacks, frozen items, or social-media-influenced products that later sat unused. Participants also described under-purchasing in some cases, such as when they delayed buying ingredients until the next trip or hesitated when portions did not match their needs. Overall, food waste was often connected to the difficulty of predicting future motivation, appetite, and schedule changes.

Unused food

Across interviews, the foods most likely to go unused were produce, herbs, leftovers, and specialty items bought for a single meal or impulse try. P1 said, “Usually vegetables, salad mixes, herbs, or sometimes yogurt” were what got wasted, while P8 identified basil, chilies, spring onions, and sweet potatoes as common problem items. P5 also mentioned that fresh food might go unused, they said, “So sometimes, like vegetables, they might get spoiled or rotten. So I’ll just throw them away”. Fresh food was especially vulnerable because it depended on timely preparation and consistent follow-through.

C. Frustrations and pain points

Interview participants described grocery shopping for one as manageable but still filled with friction. A recurring frustration was that current tools supported list-making, but not inventory awareness or food-use planning. P1 said, “The list doesn’t really tell me what I already have at home or what’s about to go bad,” while P2 said remembering certain ingredients could become intimidating with a long running list. Participants also described the difficulty of buying fresh food with good intentions but not always having the time or energy to cook it. P1 said, “Sometimes I buy with good intentions and then work gets busy and I don’t get to it fast enough.” These frustrations show a gap between shopping support and managing food.

D. Intentions, learnings and adaptations

Participants were not passive about food waste and many described adapting their habits over time. P1 said, “Keeping things visible helps a lot. Freezing meat right away helps too,” and explained that they also tried to buy ingredients that could overlap across meals. P2 described labeling containers with the day they were stored, which helped make food in the fridge more visible and easier to track. P3 discussed developing systems around notes, frequent smaller trips, and organizing the fridge so food was easier to access and use. These responses suggest that living alone often involves a process of trial and error, where participants gradually build personal routines to reduce waste and make grocery shopping more sustainable.

E. Opportunities for technology / design intervention

Interview participants pointed to clear opportunities for lightweight tools that support one-person grocery routines without adding too much maintenance. P1 said alerts for items likely to expire would be “the most useful” and also responded positively to smaller-portion suggestions and prep-effort indicators for busy weeks. P2 said a food lifespan tool would help them “shop for veggies a lot better,” and called expiration alerts “amazing.” Participants also expressed interest in tools that could connect recipes to grocery lists or help track what was already in the fridge. At the same time, they emphasized that these tools would only be useful if they remained simple and low-effort. As P1 noted, “If it becomes too annoying or too much work to keep updated, then I probably wouldn’t use it.” Overall, the findings suggest the strongest design opportunity is a lightweight planning tool that connects grocery lists, food inventory, and reminders in a way that fits existing habits rather than replacing them.

Persona Spectrums

Before creating personas, we mapped all participants along several behavioral spectrums derived from the interview themes. These spectrums captured the range of strategies participants use when grocery shopping and managing food as a single-person household. The spectrums reflect variations in planning behavior, budgeting practices, cooking effort, and reliance on technology.



We then examined where individual participants clustered across these spectrums. Participants P2 and P6 clustered closely across multiple spectrums, particularly in planning style and technology use. P1 and P4 aligned more closely on planned purchasing behavior, with P1 positioned strongly toward routine and bulk purchasing. Other participants such as P5, P7 and P8 fell in the middle across several spectrums, showing mixed behavior rather than fitting within one consistent pattern. These clusters informed the development of the following personas, with each persona representing grocery shopping patterns drawn from the participants.

Personas



Alex Chen

The Routine Optimizer

Age: 33
Occupation: Software Engineer
Living Situation: Lives alone in an urban apartment
Weekly Grocery Budget: ~\$85-\$100

BIO

Alex has been living alone for several years and has developed a predictable grocery shopping routine. He shops at multiple stores depending on the type of item he needs and relies on familiar brands and staple purchases to reduce decision fatigue. Over time, Alex has refined a system that allows him to grocery shop quickly and efficiently, but he still occasionally struggles with estimating how much fresh food he will realistically consume during busy work weeks.

GOALS

- Maintain an efficient and predictable grocery routine
- Keep grocery spending within a comfortable monthly range
- Purchase foods that are quick and easy to prepare during the workweek

BEHAVIORS

- Buys staple foods regularly (rice, eggs, frozen foods)
- Shops at multiple stores depending on item type
- Prefers familiar brands when making purchasing decisions
- Cooks in bulk and relies on leftovers for multiple meals

PAIN POINTS

- Fresh produce sometimes spoils when work becomes busy
- Grocery package sizes are often designed for families rather than individuals
- Difficult to estimate realistic portion sizes for a single person

NEEDS + OPPORTUNITIES

- Tools that help estimate realistic portions for single-person households
- Expiration reminders for fresh ingredients
- Systems that integrate with existing shopping routines

"I COOK WITH THE IDEA THAT IT'S NOT GOING TO BE FOR A SINGLE MEAL... I'M USUALLY EXPECTING IT TO LAST AT LEAST TWO OR THREE MEALS."



Maya Patel

The Busy Planner

Age: 30
Occupation: Graduate Student/Working Professional
Living Situation: Lives alone in a small apartment
Weekly Grocery Budget: ~\$45-\$80

BIO

Maya attempts to plan groceries around her weekly schedule, but her routine often changes due to work demands and personal commitments. When this happens, ingredients she intended to cook with may go unused. She prefers meals that are easy to prepare after long workdays and tends to prioritize convenience over complex recipes.

GOALS

- Reduce food waste and save money
- Spend less time deciding what to cook
- Maintain a manageable grocery budget

BEHAVIORS

- Plans grocery trips around her weekly schedule
- Uses a phone notes app to track grocery items
- Buys ingredients for specific meals she intends to cook
- Often chooses quick or low-effort meals

PAIN POINTS

- Fresh ingredients sometimes go unused when plans change
- Forgetting about ingredients already in the fridge
- Difficulty coordinating ingredients across multiple meals

NEEDS + OPPORTUNITIES

- Systems that track ingredients already in the fridge
- Notifications when food is nearing expiration
- Meal planning tools that adapt to changing schedules

"A LOT OF THAT STUFF COMES IN MORE THAN I REALISTICALLY NEED. ALSO I MIGHT PLAN TO COOK ONE THING AND THEN MY SCHEDULE CHANGES, SO THE PRODUCE JUST SITS THERE."

BIO

Daniel recently transitioned to living alone and is still learning how to plan groceries effectively for a single household. He often shops based on recipes or meal ideas but sometimes realizes later that he has forgotten an ingredient or purchased more than he can realistically consume. Because many grocery items are packaged for families, Daniel frequently struggles to match portion sizes with his actual needs.

GOALS

- Learn how much food to buy for one person
- Improve cooking confidence and meal planning
- Reduce wasted food and unnecessary spending

BEHAVIORS

- Buys ingredients based on meal ideas or recipes
- Shops primarily at nearby grocery stores
- Uses simple grocery lists on his phone
- Occasionally forgets ingredients when shopping

PAIN POINTS

- Difficulty estimating appropriate quantities for one person
- Purchasing ingredients that go unused
- Food spoiling before he has time to cook it

NEEDS + OPPORTUNITIES

- Portion recommendations for common grocery items
- Recipe-based grocery list generation
- Suggestions for smaller package alternatives

Daniel Ramirez
The Busy Planner
Age: 25
Occupation: Early career professional
Living Situation: Recently began living alone
Weekly Grocery Budget: ~\$70-100

"I LOVE BREAD, BUT I PURPOSELY DO NOT BUY IT BECAUSE I KNOW I WON'T FINISH IT BEFORE IT GOES BAD."

Scenarios

The following scenarios illustrate common challenges participants described and envision ideal interactions with a system that could help them better manage groceries and reduce food waste.

Scenario 1: Managing Groceries During a Busy Work Week

Alex plans a weekly grocery trip after work. Since he expects to have a busy week ahead, he purchases ingredients that can be used across multiple meals, including vegetables, rice, and chicken. However, as the week progresses his work schedule becomes more demanding than expected. By the time he returns home late in the evening, he often chooses quick meals instead of cooking the recipes he originally planned. Some of the fresh ingredients remain unused and eventually spoil.

In an ideal scenario, Alex could use a grocery planning tool that tracks the ingredients he purchased and highlights items that should be used soon. When he opens the app after work, the system shows a short list of quick meal options based on the ingredients already in his fridge and how much time he has available to cook. The tool also adjusts future grocery recommendations based on Alex's past cooking habits and schedule, helping him purchase more realistic quantities for busy weeks.

Scenario 2: Planned Meals Disrupted by Schedule Changes

Maya purchases groceries for several meals she plans to cook throughout the week. She buys vegetables, herbs, and ingredients for two recipes she intends to make after work. Midway through the week, unexpected work commitments leave her with less time to cook. Instead of preparing the planned meals,

she chooses quicker alternatives or orders takeout. By the weekend, some of the ingredients she purchased earlier in the week had already gone bad.

In an ideal scenario, Maya could use a system that keeps track of the ingredients currently in her fridge and sends reminders when certain items need to be used soon. When her schedule changes, the system suggests faster meal options that still use the ingredients she already purchased. It may also recommend ways to repurpose ingredients across multiple simple meals, helping Maya reduce food waste when her plans change.

Scenario 3: Learning How Much Food to Buy

Daniel recently moved into his own apartment and is still figuring out how much food he needs to buy each week. While grocery shopping, he often chooses items based on recipes he wants to try. However, many grocery items come in portions designed for families. After cooking one or two meals, he is often left with extra ingredients that he does not finish before they spoil.

In an ideal scenario, Daniel could use a grocery planning tool that adjusts recipe ingredients and grocery quantities based on a single-person household. When he selects recipes, the system automatically scales ingredient amounts and estimates how much he should purchase at the store. The tool could also suggest alternative package sizes or nearby stores that sell smaller quantities, helping Daniel reduce food waste and grocery costs while he learns to plan meals for himself.

Customer Journey Map

Alex Chen's Journey



- Plans meals for the week but struggles to estimate portions for one person
- Buys groceries in bulk since most items are packaged for families
- Stores excess ingredients for later use
- Skips cooking on busy days when schedule changes
- Forgets about some items already in the fridge
- Throws away expired or unused food at the end of the week

Actions

- "How much food do I actually need for myself?"
- "Most grocery options are not designed for single households"
- "I should use what I already have before buying more"
- "A tool to track ingredients or suggest quantities would help"

Thoughts

- Frustrated when food goes to waste
- Guilty about wasting money and groceries
- Overwhelmed by planning and managing meals
- Motivated to find a better system

Feelings

Maya Patel's Journey



- Shops for groceries weekly and plans meals in advance
- Buys larger quantities due to limited single portion options
- Cooks some meals but adjusts plans based on work schedule
- Leaves some ingredients unused longer than expected
- Forgets items stored at the back of the refrigerator
- Discards expired food while cleaning

Actions

- "Better meal planning could reduce waste"
- "Portion sizes should be designed for single households"
- "Reminders could help me use food on time"
- "I need a more organized way to manage groceries"

Thoughts

- Slightly annoyed when forgetting ingredients
- Concerned about wasting food
- Frustrated with poor portion options
- Interested in better planning tools

Feelings

Daniel Ramirez's Journey



- Chooses ingredients that can be used across multiple meals
- Purchases items in larger quantities than needed
- Cooks some meals but occasionally orders takeout
- Leaves groceries unused when schedule becomes unpredictable
- Stores leftovers but forgets about them
- Discards spoiled food while cleaning the fridge

Actions

- "My schedule makes meal planning difficult"
- "I need a better way to track what I already have"
- "Planning tools could help reduce waste"
- "Reminders or inventory tracking would be useful"

Thoughts

- Slightly frustrated by repeated food waste
- Indifferent at times
- More aware of wasted money
- Interested in simpler grocery management solutions

Feelings

Priority Matrix

To develop the priority matrix, we reviewed the main pain points and needs identified through our affinity mapping, personas, and customer journey analysis. We then discussed possible features that could address these issues and evaluated each one based on its potential impact on users and its feasibility. The resulting matrix helped us identify which design opportunities may offer the most value for future development.

No	Feature	Feature Category	Priority	Impact	Feasibility
1	Grocery inventory tracking	Food Management	High	High	Medium
2	Food expiration reminders	Food Management	High	High	High

3	Portion size recommendations for single households	Meal Planning	High	High	Medium
4	Meal planning assistance	Meal Planning	High	High	Medium
5	Recipe suggestions based on available ingredients	Meal Planning	Medium	High	Medium
6	Grocery list generator based on meal plans	Grocery Planning	Medium	High	Medium
7	Notifications for unused ingredients	Food Management	Medium	Medium	Medium
8	Integration with grocery shopping apps	Grocery Planning	Medium	Medium	Low
9	Budget tracking for groceries	Cost Management	Low	Medium	Medium
10	Tips for reducing food waste	Educational	Low	Medium	High

Discussion

Prior research shows that single-person households generate higher per-person food and packaging waste than larger households (Narva et al., 2024), and that standardized packaging, routine constraints and limited portion flexibility are key structural drivers of this problem (Langley et al., 2021; WRAP, n.d.). Our findings from both the observation and interview studies confirm these patterns and reveal how they shape real-time grocery decisions and daily food management for people living alone.

In this project, we aimed to answer the question, ‘What are user needs in a technology-based solution that helps people living alone purchase food in smaller portions to reduce waste and stay within budget?’. By analyzing data from both studies, we identified several key implications for design.

A. Supporting Ongoing Planning Cycles

Active Learning and Adaptation

Participants across both studies treated grocery shopping as a repeated adjustment process, continuously modifying quantities, storage habits and shopping frequency based on prior use, waste and satisfaction outcomes. Participants developed intentional adaptation strategies such as freezing meat immediately, labeling containers, and shifting to smaller more frequent trips after learning that bulk shopping led to spoilage. Our solution should support this iterative process by carrying information forward across shopping cycles, such as surfacing patterns, flagging unused items, and integrating with existing habits, rather than replacing them with complex new workflows.

B. Supporting Decision-Making Around Effort, Cost, and Portion Sizing

Preparation effort, time constraints, budget awareness, and portion sizing were identified as the four key factors shaping every grocery decision. Participants optimized for speed and convenience, managed budgets reactively during cart review rather than in advance, and consistently struggled with package sizes that exceeded single-person needs. Participants across both studies also connected food waste directly to wasted money, meaning that over-purchasing and waste are not separate problems.

Our solution should reduce planning effort by supporting low-effort meal planning that fits around real schedules, showing real-time cost visibility during shopping, and providing single-serving quantity guidance at the point of purchase. This way, users can buy amounts that better match their actual consumption and avoid the financial loss that comes with over-purchasing.

C. Managing Food Waste, Inventory, and Perishability

Both studies showed that waste resulted from two overlapping causes. The first was structural, oversized package formats, short produce shelf lives, and multi-serving recipe yields that made it difficult to buy the right amount regardless of intent. The second was behavioral, such as, food forgotten at the back of the fridge, overestimating how much would be cooked, and fresh ingredients going unused when schedules changed unexpectedly. Participants did not waste food because they failed to plan, they wasted food because the purchasing environment was not designed for one person.

Addressing both causes point to the need for more realistic portion recommendations and smaller-package purchasing options. In addition, better inventory visibility and expiration reminders at home could help reduce waste.

D. Opportunities for Technology

Participants were receptive to expiration alerts, smaller-portion suggestions, and prep-effort indicators, but emphasized that tools must remain simple and low-effort to maintain. The strongest design opportunity is a tool that bridges the gap between shopping lists, home inventory, and real-life schedule changes, rather than a complex system that adds to the cognitive load participants are already managing.

Limitations

The study included eight observation participants and eight interview participants between the ages of 23 and 35, limiting both sample size and demographic diversity. The participant pool skewed toward younger adults in urban settings, which may not reflect the experiences of older adults, varied incomes, or those with limited access to grocery delivery services. Observation sessions focused on digital grocery planning rather than in-store behavior, and sessions reflected short-term single-session decision-making rather than longitudinal consumption patterns.

Future Work

Future research should broaden the participant sample to include a wider range of ages, income levels, and geographic contexts. Comparative studies examining both online and in-store shopping behaviors would provide a more complete picture of where key decisions are made. Longitudinal diary studies tracking real food purchases, usage, and waste over several weeks would capture behavioral patterns that single-session observations cannot. Finally, prototype testing of specific features such as expiration tracking, single-serving quantity guidance, inventory visibility, and prep-effort indicators would help determine which interventions most effectively reduce food waste and support solo grocery planning in practice.

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