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RESEARCH CONTRIBUTIONS:

Experiences of Healthcare Foodservice Workers during the COVID-19 Pandemic: A Qualitative Exploration

Exploring College Students' Plate Waste Behavior: An Application of the Theory of Reasoned Action and Emotion

Effects of a Smiley Face and Social Norms on Students' Recycling Behavior at College Cafeterias



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TABLE OF CONTENTS

Abstracts.....iii

Research Manuscripts

Experiences of Healthcare Foodservice Workers during the COVID-19 Pandemic: A Qualitative Exploration 1
By: Oscar C. C. Lam; Linda Mann, MBA, RD; and Phillip Joy, PhD, RD

Exploring College Students’ Plate Waste Behavior: An Application of the Theory of Reasoned Action and Emotion 8
By: Wenhao Zhang, PhD and Junehee Kwon, PhD

Effects of a Smiley Face and Social Norms on Students’ Recycling Behavior at College Cafeterias 17
By: Kiwon Lee, PhD and Seonjeong Ally Lee, PhD



ABSTRACTS

Research Manuscripts

Experiences of Healthcare Foodservice Workers during the COVID-19 Pandemic: A Qualitative Exploration

Healthcare foodservice workers provide important contributions to the care of patients despite low wages and physically demanding work. The objective of this study was to explore the experiences of healthcare foodservice workers during the COVID-19 pandemic. Semi-structured interviews were conducted with six healthcare foodservice workers who worked at a hospital or continuing care facility during the COVID-19 pandemic. Thematic analysis was conducted and four themes resulted: 1) navigating the changing workplace; 2) feelings of fear and disconnectedness; 3) feeling unsupported and unseen; and 4) feeling the rewards in their work. The participants experienced negative impacts to their wellbeing but recognized the importance of their work and a sense of reward from providing nutritional care to patients in their workplaces.

Exploring College Students' Plate Waste Behavior: An Application of the Theory of Reasoned Action and Emotion

This study explored the associations among the variables of the theory of reasoned action with emotions, behavioral intention, and self-reported food waste behavior of 450 participants in a university dining center. The participants' intention toward food waste reduction fully mediated the three pathways from attitudes, subjective norms, and emotions to self-reported food waste behavior. The findings of this research contribute to existing consumer behavior literature by examining human emotions as a determinant of sustainable behavior. Researchers and practitioners may use these results to better understand consumers' food waste attitudes, subjective norms, emotions, and intentions and reduce consumers' food waste behavior.

Effects of a Smiley Face and social norms on Students' Recycling Behavior at College Cafeterias

This study investigates ways to enhance college students' recycling behavior in college cafeterias, focusing on the role of emojis and social norms. A between-subjects field experimental design was conducted, comparing the effects of emoji and non-emoji signage near recycling bins in college cafeterias. Social norms were assessed through a survey, and recycling behavior was observed. The findings, derived from 121 participants, reveal that emoji use positively impacts recycling behavior, particularly when accompanied by a social norm. The implications of these results are discussed from both theoretical and managerial perspectives, offering insights into how to effectively promote recycling behaviors.

EXPERIENCES OF HEALTHCARE FOODSERVICE WORKERS DURING THE COVID-19 PANDEMIC: A QUALITATIVE EXPLORATION

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ABSTRACT

Healthcare foodservice workers provide important contributions to the care of patients despite low wages and physically demanding work. The objective of this study was to explore the experiences of healthcare foodservice workers during the COVID-19 pandemic. Semi-structured interviews were conducted with six healthcare foodservice workers who worked at a hospital or continuing care facility during the COVID-19 pandemic. Thematic analysis was conducted and four themes resulted: 1) navigating the changing workplace; 2) feelings of fear and disconnectedness; 3) feeling unsupported and unseen; and 4) feeling the rewards in their work. The participants experienced negative impacts to their wellbeing but recognized the importance of their work and a sense of reward from providing nutritional care to patients in their workplaces.

Keywords: foodservice, COVID-19, wellbeing, qualitative research

INTRODUCTION

When the World Health Organization (2020) declared COVID-19 as a global pandemic, countries around the world went into lockdown. While many people experienced job changes that impacted their mental health (Best et al., 2021; de Miquel et al., 2022; Liu et al., 2020), healthcare workers, including those in foodservice, did not have the opportunity to work from home to avoid infection. These workers reported increased workloads and decreased work-life balance that led to an increase in negative mental health symptoms, including fear, stress, anxiety, depression, and burnout since the start of the COVID-19 pandemic (Government of Canada, 2021; Shreffler et al., 2020).

Prior to the COVID-19 pandemic, the foodservice industry was characterized by low wages, low job autonomy, physically demanding work and a high rate of injury and illness among workers (Peters et al., 2020; Sorensen, Peters, et al., 2021). These job characteristics have been associated with reduced workers' motivation, work engagement, and job satisfaction that contributed to high absenteeism and turnover (Oldham & Hackman, 2010). Staff shortages and lack of equipment and food ingredients can also affect performance of foodservice workers (FSW), contributing to poor meal quality and service delays (Bertin et al., 2009).

Healthcare FSW significantly contribute to the care of patients (Collins et al., 2017; Laur et al., 2015; Murphy, 2017; Osman et al., 2021; Sorensen, Fletcher, et al., 2021) and food safety (Clayton et al., 2002; Isara et al., 2013; Lestantyo et al., 2017). They may be involved in providing meal choices (Barrington et al., 2018; Nor, 2010), offering meal assistance such as opening pre-packaged food and drink items, positioning trays (Sorensen, Fletcher, et al., 2021), and monitoring and reporting patient intakes, in addition to all other duties helpful to evaluating patient recovery progress (Budiningsari et al., 2016;

Tulloch et al., 2018). Healthcare FSW have acknowledged their role in patient care and believe it is meaningful (Bertin et al., 2009), but they often felt undervalued among other healthcare workers (Bertin et al., 2009; Collins et al., 2017).

The aim of this qualitative study was to explore the experiences of healthcare FSW during the COVID-19 pandemic, a topic currently lacking in the literature (Adler & Bhattacharyya, 2021; Janson et al., 2021; Rosemberg et al., 2021).

METHODS

A qualitative design with a poststructuralism lens was used to explore how experiences are socially constructed through the interrelationships of knowledge, discourses, and relations of power (Foucault, 1980). Within qualitative research, it is recognized that the knowledge produced is shaped by the positionality of the researchers (Holmes, 2020). The authors brought a range of experience in dietetic and nutrition education, poststructuralism, and foodservice management to this study. The first author is a dietetic intern who completed this project as part of a honours course. The intern also worked within hospital foodservice during COVID-19. Two authors are faculty members in accredited dietetic programs (one with expertise in foodservice).

Ethical clearance was obtained from Mount Saint Vincent University. Recruitment for this study was conducted across Canada through email lists of the first author, and various social media apps, including Facebook and Twitter. Potential participants had to self-identify as 18 years or older, be able to speak English, and be a healthcare FSW in any capacity (i.e.: dishwasher, head cook, server) at a hospital or continuing care facility during the COVID-19 pandemic. Potential participants were asked to return by email the signed informed consent if they agreed to participate.

Semi-structured interviews were conducted on Teams (MS Office 365) by the first author during the winter of 2022. The open-ended questions focused on participants' experiences in their work before and during the COVID-19 pandemic (Table 1). Each interview was approximately an hour in length, recorded and transcribed with Teams (MS Office 365). Participants were given an honorarium (\$25 CAN). They also reviewed and approved their transcripts; no changes were noted.

The thematic analysis process consisted of six phases: familiarization with the data by repeated reading the data; initial coding of the data by organizing data into each meaningful group; extraction and categorizing of different codes into themes and/or candidate themes; review of themes by reflecting on each individual theme and its relation to the data; defining and naming themes; and summarizing data (Braun & Clarke, 2014). Initial data coding was done in Word (MS Office 365) by the first author after repeated readings of the interview transcripts. After this initial coding, the research team met to discuss the coding. During these discussions, the team members merged and

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Table 1. Semi-Structured Interview Guide.

About the Participant	Demographic type of work questions
Relating to Work Before and During COVID-19	Can you tell me a bit about your usual role as a foodservice worker? What does your day to day work typically look like? Describe any differences in your job experience during COVID-19. What work have you been doing in the response to COVID-19? What has your facility done to support you and your foodservice worker team?
Relating to Wellbeing	How, if at all to you think your job has impacted your own overall wellbeing? How, if at all, did COVID-19 affect these impacts? How did you feel as a foodservice worker at your facility during COVID-19? Did COVID-19 affect any challenges you faced in your work? If so, how? How do you cope with these challenges? What types of supports have been available to you before and during COVID-19? How did you know about these supports?

grouped similar codes into candidate themes. These discussions also included resolving any conflicts about codes and grouping between the research team members. This was done by another review of the data and thorough discussion on the meanings of the data until a consensus was reached. After these discussions, each team member individually reviewed the candidate themes and reflected upon them. A final meeting took place in which the themes were finalized and named.

RESULTS

Table 2 summarizes the characteristics of the six healthcare FSW, all self-identifying as women, who participated in this study. Four main themes were created and quotes supporting these themes are provided.

Theme 1: Navigating the Changing Workplace

The COVID-19 pandemic created a sense of the unknown for participants in this study. This sense of the unknown created stress in their jobs. As one participant noted they felt many people did not think FSW had any concerns.

But I think it was just nobody thought it was as stressful for FSW, as they thought it was for nursing staff or doctors per se. I mean, we're all going through the same pandemic, you know, we all have the same concerns about it and yea you're going into healthcare facility. And I think as a FSW, some days it was even... like.... you're facing more unknown, because they are the care team upstairs. They might know if somebody was on the ward with COVID-19, whereas we wouldn't. You know, like we would not have that knowledge. So it's like we're actually dealing with more of that unknown stress. Whereas, it's like... you just don't know. They're (FSW) like, "oh great, we're not delivering trays again? like well...I don't know why...?" (P4).

For this participant, the unknown, more specifically the lack of knowledge and communication from other healthcare providers was a source of stress.

Prior to the COVID-19 pandemic, most participants felt their role as a FSW was physically demanding and daily work routines often included working in the trayline, dishroom, cleaning, food preparation, and patient food delivery and pick-up. All participants reported that the COVID-19 pandemic required new procedures including almost constant sanitizing and new safety and personal protective equipment (PPE) protocols. One participant explained their situation.

As a FSW, work required to of course put on masks and PPE. When there was an outbreak we were required to put on

gowns, while we were washing the dishes and goggles. And when we enter the facility we're required to have our temperatures checked, then we're required to fill a sheet with all of our like personal information as well as confirmation that we don't come into work with symptoms (P3).

Another participant spoke about how these new changes negatively impacted them.

I think [my job experience during COVID-19 had impacted me] in a negative way. It's like I'm suffocating 'cause it's already so hot in the kitchen, in the dining room, especially in the summertime with the mask on, and I'm sweating... the hot plate is on, and I'm running around trying to do a million things. I just know if I didn't have that mask on, I would be so much cooler (P6).

For this participant, new PPE procedures added to her physical discomfort. Overall, participants believed these new working conditions, routines, and PPE protocols made their work more difficult and negatively shaped their wellbeing experiences.

Staff shortages seemed to be the most common source of stress, negative mental health, and negative physical health reported by participants.

For the first time ever I was being called, to come in early or to stay late because we were short people. I would come in and I would find out that I was doing two jobs instead of one. Physically, I was starting to suffer. My doctor gave me prescription pain medication for the first time, where I was controlling it without that before [...] Usually by the end of the work week I would get out of my car and I couldn't quite walk up to the house. My husband would come out to the car to grab anything that needed carrying because I would be hobbling up to the house. My lower back would hurt that bad... Yeah, so that's how my pre-existing condition worsened during COVID (P1).

For this participant COVID-19 resulted in extra work that was physically demanding and worsened her pre-existing conditions and limiting her ability to work. Another participant described how they felt an obligation to cover other people's shifts and the result to their mental wellbeing.

Staff shortages were huge on mental health because you're required to pick up and also do additional work to catch up for the employees that aren't there...our main full-time staff weren't able to work, so foodservice is really relied on casual staffs. So having to kind of hold foodservice together

Table 2. Characteristics of Participants.

P1	Dietary aide, full time (long term relief assignment), hospital, approximately 2 years, south Asian, 25 years of age, undergraduate and dietitian in home country.
P2	Dietary aide, causal, hospital and long-term care facility, approximately 3years, east Asian, 24 years of age, current undergraduate student
P3	Head Cook, previous fulltime (current resigned), rural hospital, more than 14 years, Canadian, 51 years of age, college diploma
P4	Foodservice worker, full time, hospital, approximately 10 years, Canadian, 42 years of age, college/undergraduate
P5	Dietary aid, causal, hospital and long-term care facility, more than 2 years, southeast Asian, 25 years of age, undergraduate in home country
P6	Dietary aid, part time, long-term care facility, approximately 2 years, Canadian, 24 years of age, undergraduate

(gesture holding up), it was definitely a huge stressor. Like, I feel like if I wasn't there, it would be in shambles, but yeah I think just definitely huge for myself and my fellow co-workers (P2).

For this participant, she felt the weight of holding together foodservices was a major stress to her wellbeing. Another participant shared similar experience but felt that the extra work was needed in order to serve patients food and ensure patient care.

If I know we're short on my days off, I'm gonna be going into work. Because we need people to be there to do this (provide service), people (patients) need to get fed. So for me it was like you're overworking yourself during COVID-19 [...] That feeling of 'well I can't really stay home if I know that there's like not going to be anybody there to do it, and somebody else is going to have to work at 12 hour today' (P4).

Another area of work participants had to navigate was the information about COVID-19 and work protocols they received. Participants noted that during the initial period of the COVID-19 pandemic there was a lack of reliable information and a lot of false understandings of the virus. This contributed to many mixed messages in their work that threatened their safety and the safety of the patients. As one participant described,

We are trained that if there's the contact precaution card in front of the room, we do not deliver the tray. Because that card means you should be fully PPE-ed up, you have [to have] your gown on, mask and you're following certain procedures. So, it was kind of always interesting... because the direct care team would be like "Oh no, it's like there bed-B. So, you can drop the tray off to bed A." and it is like... no, we can't... like we, we cannot do this. So, it was a bit of a frustrating experience (P4).

For this patient, mixed messages caused frustration in their work. Another participant related an incident in which they were viewed as not working because they were following their precaution orders.

There's a sign (precaution sign) that's why we don't serve in the room. But they (nursing) want us to serve inside the room. So, we're confused, why would we serve here? Because there's a sign that our supervisor instructed us, 'don't go inside the room if there's a droplets sign.' But they (nurses) are like (to our supervisor;), 'Oh your FSWs are not working. Because they're not serving their room' (P5).

Participants felt that the instructions and practices about meal delivery were inconsistent or lacking, noting circumstances where FSW entered a patient's room with no precaution signage to deliver meals and found out later that the patient that they served was potentially COVID-19 positive.

The pink zone (signage) means that this person is COVID positive or 'do not go near that bed.' It (the room) didn't had

anything (zone or signage) so I just went and delivered. When I came out of the room, a housekeeping lady was like, 'Oh, did you go into the room?' I said 'Yes.' 'but you should have not (said the housekeeping lady), because that patient is COVID positive' (P1).

The participant continued to explain how this incident triggered their anxiety and negatively impacted their wellbeing.

Theme 2: Feelings of Fear and Disconnectedness

Most participants expressed their fear of contracting a COVID-19 infection. As one participant said, this fear was an emotional drain.

It became an emotional drain, to have to worry about not only trying to keep yourself personally safe outside of work, but also now [at] work you're trying to (be safe) You're wondering, like, 'oh gosh, was my exposure to COVID-19 increased?' So you're stressing about that, I think it's just that mental toll. It became tiring for sure (P4).

Participants also expressed the fear of passing on a COVID-19 infection to their families and friends. At the start of the pandemic was particularly stressful, as described by a participant.

We didn't even have the kits in the initial days, right? So, we actually didn't know who is positive and who is not. And for me, it was my first year in Canada, first winters in Canada. And even if I caught like you know, a day off cold or common flu I was like maybe I have covid, you know. I was afraid for myself. I was afraid for my family, my siblings (P1).

For this participant, the fear felt at the start of the pandemic only intensified as it went on longer. She shared more of her story, noting her fear of passing COVID-19 onto the patients as well.

I was afraid of going to work, not because I don't want to work. [Yet,] because I was afraid that maybe I'm not having the symptoms, I am asymptomatic. But what if I had COVID? I'm delivering (meals) to the patient, and maybe God forbidden if I delivered the virus to them or what. You know that kind of dilemma was there every day (P1).

The fear also had direct consequences for the connections this participant had with others. She described first the implications to her family life.

And even though I got that love from them (sibling) like, uh, they call me Dida - that's what we use in India to respect their elders, and they were like "it's OK, you can hug us, right? That's OK. We will not catch anything, and you don't have any symptoms at all." But I used to push them aside like "no." I know I can have it. So yeah, you know that so was hard not just on the emotional kind of way, but physically (P1).

She then talked about the implications to her social connections at work.

We used to have potlucks in the kitchen, parties and get-togethers with supervisors. There's no difference, everybody drinks, everybody eats and that was all very nice. But now during COVID, we don't have any such thing. We are not doing any potlucks because we don't know where the food is coming from, who has cooked it and it can spread to everybody in the kitchen (P1).

COVID-19 restrictions prevented an essential way to connect with others, thus contributing to a loss of social connections and feelings of isolation. Another participant shared a similar experience.

No one wants to use the staff room because there's all these rules in the staff room, you have to sign in with the date and time you're in the staff room, you have to wear a mask, unless you're eating, you're not allowed to sit next to your co-worker. So almost everybody, even during the winter, we would go out to our cars and just sit in our cars and eat in our car, and be alone so that you don't have to wear a mask... I found myself this time last year for a couple months, almost every break sitting in my car if not crying... silent screaming. As I was doing it, I was like... "This is not normal." "I don't like this, I don't wanna do this anymore ... I don't want to do this anymore..." So... definitely... [impacted my mental health] I would sit there and I would realize my mental health is suffering (P3).

For this participant, COVID-19 restrictions prevented her from interacting with co-workers and resulted in her expressing her suffering by crying in her car during her break. Participants also noted a sense of shared isolation with patients who were not allowed visitors and, for those in long term care facilities, not allowed to leave their rooms even for mealtimes.

As soon as there was COVID in the building, every single resident was [in isolation] and they weren't allowed to come out of their room. It was like that for few months when there was COVID in the building. [...] the residents were just like sitting in their rooms all day long, not able to come out. It was really sad (P6).

This participant shared the felt empathy for the patients who were in isolation. This furthered her own sense of isolation and disconnection.

Theme 3: Feeling Unsupported and Unseen

A lack of support and leadership from facilities was noted by participants.

It felt like it lacked little bit of leadership. Like the leadership was missing. So we kind of were left to struggle... almost? And navigate these changes (by themselves) it felt like really on our own as an employee level team. It is like "okay sure, oh great here is another memo." But like what does that (the memo) really mean for us, and how do we really do this? So, I would just say the biggest difference (of working during COVID-19) was just the added level of stress (P4).

While these facilities provided information about resources and supports, participants felt that the delivery of this information in the form of memos or posters with lists of web sites lacked personalization and may not have been useful to employees who may not have been able to read English, as described by another participant.

They would post a poster on resources for mental health but I found that to be very unhelpful because it is just a

sheet of paper with different URLs. Some of the FSW I work with, they don't even read English, so how is that going to help? (P2).

These participants felt they needed to be responsible for their own mental and physical wellbeing while working during COVID-19 and believed that their organizations lacked an understanding of their workers' needs. However, training on safety, handwashing and use of PPE, when provided by a healthcare professional, was seen as supportive.

I mean they've definitely provided like masks and sanitizers, and appropriate cleaning and PPE for us during work. I guess there's that. And I think they've been forced like... monthly audits related to COVID-19 that were required to fill out to ensure that the protocols are being put in place. Other than that, I don't. I don't know if I see anything else (P2).

In addition to a perceived lack of support from their institution as a whole, participants also perceived a lack of support from other members of the healthcare team.

Sometimes when they [clinical staff] interact with us, FSW, you can feel the disrespect [...], they'll come across as rude and very snappy, which I totally understand, because of the circumstances we're in, but it can feel very like dehumanizing when you're a FSW and you're kind of treated like dirt (P2).

This participant described feeling disrespected by clinical staff under pressure from COVID-19. She recognized that the clinical team was also "extremely short on staff" but it still made her feel "a sense of inequity" and had a "dehumanizing" impact on her. Another participant discussed a similar incident.

Sometimes nurses are very... They always call our supervisor to complain like, "one of the foodservice workers didn't serve in the room." ... Because there is a sign (precaution sign on the door) that is why we didn't serve in the room (to bedside) ... it is like a balance (battle) between the other healthcare team members (P5).

Again, this participant felt conflict in her work from clinical staff. Other participants, however, noted that COVID-19 has made their experiences with other members of the healthcare team better noting they have a "greater appreciation of what foodservice does" (P4).

I think maybe the healthcare members have a greater appreciation of what foodservice does. You know 'cause when protocols have to change, they have to come and deliver the trays now. Like every tray they have to do that. And so I think they kind of have a better understanding of what we do...? So there is that better relationship I guess I think it's become less demanding, I think before COVID-19 it was like "hey, we need this and we need it now. So let's call down to the kitchen." It doesn't matter if we know that they're in the middle of serving dinner, but we need our cream right now (P4).

For this participant, the COVID-19 pandemic helped to give others a greater appreciation and understanding of the work of FSW.

Additionally, some participants noted that many of the social media postings and public acknowledgment recognized the hard work of healthcare workers but "there was no social media enhancement or encouragement for the dietary aides or FSW" (P1). This participant provided further discussion of this feeling of unappreciation.

I think initially, FSW were not a respectful job. You know the nurses and doctors were getting the respect when they are going into the field (continue working during COVID-19), but the initial three months (of COVID) we were just food delivery guys and we were not considered like (patient care, health care)... I feel that what I'm doing is good and I'm doing it for the community... I describe myself as a healthcare worker, but according to the media and according to the people... I'm not.... I know that I'm doing a job that is necessary, but they (the public) don't know that there is something known as FSW, or we are also the frontline... So, people don't know that there is occupation like this, or we are also working hard... but then it's like... they don't know, [so] it's [not] their fault. I know that I'm doing something good for the society so that's okay (P1).

This participant recognized the important work they do for patients in providing food to help patients recover. Another participant noted that many people do not realize the value of FSW, noting that “people seem to just forget that people (residents/patients) need to eat three times a day... and it is not the nurses who are doing it. For the most part, it is dietary workers” (P6).

Another participant also felt disappointed with public perception of FSW.

In the public eye, I think there'd be very few people that would be like, 'Okay, tell me about who works at a hospital?' 'Nurses and doctors.' It's just a complete, you're just... it's unseen... you're really unseen, and it (FSW) doesn't come to anybody's mind at the forefront when you think about 'hey, who works in healthcare?.. If anything it's (foodservice) just feel more devalued, because there's so much focus on everything else. It's just a completely.... at least in this district, it's a completely overlooked part. So if anything... foodservice is just even more overlooked and there's no understanding... (of our role and challenges,) it's just ...frustrating”(P4).

This participant believed that the public messages surrounding healthcare during COVID-19 were focused on nurses and doctors and felt discouraged that the rest of the support service workers were always overlooked.

Theme 4: Feeling the Rewards in their Work

Despite the many challenges faced by the participants, they all took pride in their work and attempted to make a positive contribution to the patients. P5 firmly believed that without foodservice, patients were “not going to get the nutrition that they needed to get better”. Another participant took pride in providing food to patients.

It is just something for me (that) being able to provide food and meal that might be the highlight of somebody's day... I wanted it (the tray) to look nice and just take that extra level of caring...somebody would feel like “oh there was some thoughts put in this (tray; P3).

For this participant, providing an extra level of care by making food look nice was critical to making someone have a better day. This belief was shared by another participant, saying

Being able to provide food and meals that might be the highlight of somebody's day [...] I just found that to be such a privileged and a rewarding feeling [...] I wanted it (the meal) to look nice and just take that extra level of caring. I guess... (hopefully) somebody would feel like, “Oh there was some thought put in this (meal).” Not somebody just ‘so here's a scoop of ice cream...’ or ‘Here's like scoop pudding’ and it's

all kind of messy (P4).

These participants found positive feelings in providing an attractive meal to patients. Although many participants noted their feelings of isolation and witnessing patient isolation, as in Theme 2, they also recognized the personal rewards from their work during COVID-19. For example, P6 experienced improvements in her mood as she connected in the ways she could with the patients. She further emphasized how “at the end of the day, [patients] just want to be heard” and felt that “when [clients] are happy [she is] happy. It makes [her] day a lot easier and a lot better.”

DISCUSSION

To our knowledge, this is the first qualitative study exploring the experiences of healthcare FSW during the COVID-19 pandemic. Although FSW often experience physically demanding workloads (Peters et al., 2020; Sorensen, Peters, et al., 2021), our findings indicate that healthcare FSW navigating the changing COVID-19 workplace faced many challenges that negatively impacted their wellbeing.

While it can be appreciated that there were evolving safety protocols during the early stages of the COVID-19 pandemic, it is the duty of healthcare facilities to ensure that those protocols are enforced consistently and to ensure effective communication when safety protocols are changed. Direct care providers were the most vulnerable and had the highest prevalence to COVID-19 virus exposure (Gómez-Ochoa et al., 2021; Nguyen et al., 2020). They also were the most likely to experience depression, anxiety, insomnia, and psychological distress (De Kock et al., 2021; Mohsin et al., 2021; Muller et al., 2020; van der Goot et al., 2021). Participants in this study also reported many fears, anxieties, and feelings of isolation in their work during COVID-19.

Staff shortages have become a major challenge since early 2021 and the foodservice sector is one that has been especially affected (Government of Canada, 2022). Staff shortages, turnover, and absenteeism have been found to be contributing factors to excessive workloads and stress for FSW and healthcare workers (Appelbaum et al., 2003; Nyashanu et al., 2022; Peters et al., 2020; Sorensen, Peters, et al., 2021). Again, COVID-19 has intensified these challenges (Government of Canada, 2022) and, as experienced by the healthcare FSW in this study, negatively affected their wellbeing.

Existing literature suggests that social disconnection and social isolation are key components that impacted healthcare workers' wellbeing (Huerta-González et al., 2021). The FSW in this study experienced a loss of social connections with their co-workers and a lack of support from their organizations, other health care workers and the general public. This, in turn, led to feelings of disconnection and frustration and could be expected to contribute to absenteeism, turnover and staff shortages. In earlier studies, organizational supports (Babin & Boles, 1996; Chatzittofis et al., 2021) and close connections between co-workers (Babin & Boles, 1996; LoGiudice & Bartos, 2021) were found to be associated with positive work outcomes and improved physical and mental health for healthcare workers. Organizational support has also been found to reduce the impact of the workplace stressors and contribute to employee self-efficacy resilience and growth (Niu, 2010).

Participants in this study recognized the importance of their work in providing nutritional care to patients in their workplaces. They had a sense of pride and accomplishment in knowing they were contributing positively to the healthcare team and such feelings

allowed them to move through the many challenges presented in their changing COVID-19 workplace.

While the sample size was small, in part reflective of challenges in recruitment from FSW who work long hours during a health crisis, we believe that meaning is found in the interpretation of data not in the repetitive nature of data (Braun & Clarke, 2021). Malterud et al. (2016) also suggested that sample size for qualitative studies be guided by 'information power' that is dependent on five considerations, including 1) the aim of the study, 2) sample specificity, 3) use of established theory, 4) quality of dialogue, and 5) analysis strategy. Studies that require a lower sample size are studies with narrow aims, high specificity of participants' experiences and knowledge, are grounded in a well-developed theoretical lens, contain strong dialogue from participants, and use an in-depth analysis process on the narratives or discourses within the data (Malterud et al. 2016). We suggest our study fulfils the criteria for a lower sample size. Our aim is narrow, the participants have specialized knowledge and experiences about working in food service during the COVID-19 pandemic, and our poststructural lens informs all aspects of the study. Additionally, concepts like data saturation are philosophically neo-positivist and not aligned with our poststructural theoretical lens. We presented strong dialogue from participants and analysed their narratives through thematic analysis, considering the discourses within the data.

The diversity within our sample is, however, limited in both geography, representation, and gender (all participants identified as women). Future studies could explore differences between rural and urban healthcare facilities, differences between hospital and continuing care facilities, and the influence of provincial and institutional regulations on FSWs' wellbeing. In relation to representation, future studies could explore the influence of gender, sexuality, and ethnicity. Finally, further studies are needed to more deeply investigate how to support FSWs, especially during healthcare crises.

CONCLUSION AND APPLICATIONS

While the COVID-19 pandemic has highlighted and exacerbated some pre-existing challenges in healthcare systems, such as shortages of staff, beds, medical supplies and PPE (Mehta et al., 2021; Ogoina et al., 2021), this study highlighted unique challenges faced by healthcare FSW.

Healthcare organisations should be reminded of the importance of clear and consistent leadership and messaging for all workers particularly during healthcare crises such as the COVID-19 pandemic. The importance of the work done by healthcare FSW should be acknowledged and the social connections among co-workers supported as this will contribute to job satisfaction, and reduced absenteeism, turnover (Oldham & Hackman, 2010). Ultimately this will support FSW in effective provision of nutritional care to patients (Tulloch et al., 2018).

The findings of this study also have important implications for foodservice and dietetic educators. We suggest educators make their teaching more critical. By using a more critical lens in teaching, educators can move their curriculum beyond merely acknowledging the mechanics of foodservice work to learnings about how the profession and those working in it, such as FSW, are socially constructed. Educators incorporating pedagogical strategies that critically explore relations of power that create working conditions and shape the health and wellbeing of workers (such as staffing) offer opportunities to their students to learn how to challenge such relations of power. Educators are also encouraged to emphasize

practical applications of leadership and motivation theoretical frameworks through case study analyses and, whenever possible, though learning directly from the experiences of FSW. It has been reported that the use of experiential learning activities, including concrete experience, reflection, and practical applications, within foodservice management courses can help students make better connections between theoretical and applied learning, as well as help develop managerial skills such as critical thinking, teamwork, and independence (Holik et al., 2021).

Joy and Numer (2018) also provide several pedagogical strategies that may help dietetic and foodservice educators be more critical within their teaching, including the use of stimulations and case studies, the use of films for discussion and student engagement, and inviting guest presenters with "embodied experience" to challenge students' biases. As DePalma (2020, p. 9) suggested, "embodied experience" is a way to bring different ways of knowing in the classroom. For example, the findings of this research could be discussed as a case study in classes with students asked to think of ways to address issues that negatively influence the health and wellbeing of FSW. Alternatively, FSW could be invited into classrooms to discuss their work, especially during healthcare crises such as pandemics. Teaching such skills to students who will be the next leaders of foodservice in hospitals would potentially enable them to address issues noted in our research, such as conflicting communication, easing fears and anxieties, addressing feelings of disconnection and being unseen at work, and creating workplace environments that would positively support the health and wellbeing of FSWs.

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EXPLORING COLLEGE STUDENTS' PLATE WASTE BEHAVIOR: AN APPLICATION OF THE THEORY OF REASONED ACTION AND EMOTION

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ABSTRACT

This study explored the associations among the variables of the theory of reasoned action with emotions, behavioral intention, and self-reported food waste behavior of 450 participants in a university dining center. The participants' intention toward food waste reduction fully mediated the three pathways from attitudes, subjective norms, and emotions to self-reported food waste behavior. The findings of this research contribute to existing consumer behavior literature by examining human emotions as a determinant of sustainable behavior. Researchers and practitioners may use these results to better understand consumers' food waste attitudes, subjective norms, emotions, and intentions and reduce consumers' food waste behavior.

Keywords: attitudes, subjective norms, emotions, intention, food waste behavior

INTRODUCTION

Environmental sustainability, focusing on maintaining and improving the integrity of the life-supporting systems of the earth, has become a challenge due to society's pursuit of infinite economic development (Moldan et al., 2012). Climate change resulting from increased greenhouse gas emissions is one of many examples of how human activities negatively influence the environment (Environmental Protection Agency [EPA], 2021). Landfills, where greater than 50% of municipal solid waste is deposited and decomposed, are the third most significant source of methane emission (EPA, 2020a; Food and Agriculture Organization of the United Nations [FAO], 2013). Food waste makes up one-fifth of the total municipal solid waste in the U.S., as each American discards an estimated 474.5 pounds of food annually (EPA, 2020b).

The foodservice industry generates over \$997 billion in sales and offers over 15 million jobs in the U.S. labor market (National Restaurant Association, 2023). Thus, it has a significant impact on environmental sustainability. Concerning solid waste, commercial and onsite foodservice operations generate the largest sources of food waste in the U.S. (FAO, 2013). Approximately 63 million tons of food waste was generated in 2018, which made up over 21% of total municipal solid waste in the U.S. (EPA, 2020a). Considering the significant environmental impact of waste generation, it is imperative to promote sustainable business practices, for example, by reducing plate waste in the foodservice industry.

Literature Review and Hypothesis Development

Food Waste Challenges

Globally, 33 to 50% of the total food produced for human consumption is lost or wasted (FAO, 2014). The significant amount of lost and wasted food comes at a steep environmental expense as land and water quality are adversely affected (EPA, 2020b). More

specifically, food waste generated from commercial and onsite foodservice operations represent a significant portion of total food waste in the U.S. (EPA, 2020b; FAO, 2013). The amount of plate waste in university foodservice facilities is estimated to be over 1 billion pounds per year, mainly due to their large-scale and the all-you-care-to-eat style of dining service (Vogliano & Brown, 2016). Recognizing their role in environmental sustainability, managers in university dining facilities have been working to reduce post-consumer food waste. They have taken various actions such as educating diners (Ellison et al., 2019; Whitehair et al., 2013), reducing portion sizes (Anderson et al., 2021; Richardson et al., 2021), and adopting trayless dining (Aramark, 2008; Rajbhandari-Thapa et al., 2018; Zhang & Kwon, 2022).

In particular, a straightforward messaging approach, exemplified by phrases such as "All Taste No Waste" and "Eat What You Take, Don't Waste Food," resulted in a 15% reduction in overall food waste, as observed by Whitehair et al. (2013). Studies conducted by Anderson et al. (2021) and Richardson et al. (2021) revealed a reduction of 16% and 35% in students' food waste, respectively, by introducing smaller or portioned plates. Furthermore, trayless dining has emerged as a viable method for enhancing the sustainability of university dining facilities, with several studies showing its positive impact on food waste reduction. For example, findings from Aramark (2008) indicated a significant (25–30%) decrease in individual plate waste following the removal of trays. Similarly, Rajbhandari-Thapa et al. (2018) reported that the number of dishes with at least a quarter of leftovers was reduced by almost 30% after the trayless dining implementation. Zhang and Kwon (2022) revealed that the amount of food selected and consumed was significantly reduced during trayless dining implementation. Previous research consistently underscores the effectiveness of educating diners, reducing portion sizes, and adopting trayless dining in mitigating food waste challenges within university dining centers.

Understanding Consumers' Food Waste Behavior

Understanding the contributing factors to consumers' food waste behavior is essential for reducing food waste. Social-psychological theories, such as the theory of reasoned action (TRA) and the theory of planned behavior, suggest that attitudes, beliefs, and norms have a significant impact on behaviors (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975, 2011; Stern, 2000; Stern et al., 1999). The TRA and theory of planned behavior posit that behavioral intention, the immediate antecedent of behavior, is influenced by the individual's attitudes toward the target behavior and subjective norms (Ajzen, 1985, 1991). Perceived behavioral control, an additional behavioral antecedent in the theory of planned behavior (Ajzen, 1985, 1991), explains the influences of resources and opportunities or barriers to performing a specific behavior.

This study adopted the TRA as its predominant theoretical framework. While the theory of planned behavior incorporates perceived behavioral control to address potential external factors'

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influences on food waste behavior (e.g., reducing portion size), the selected dining center presented no such external influences to reduce food waste. In other words, the diners in the selected dining center had complete control over the amount of food they selected and left on their plates. Therefore, the impact of perceived behavioral control was considered limited, making the TRA a more suitable theoretical framework for this study.

Antecedents of Food Waste Behavior

Previous studies have reported that consumers' food waste behavior was predicted by attitudes, subjective norms, and intention toward food waste reduction (Stancu et al., 2016; Stefan et al., 2013; Zhang & Kwon, 2022). The TRA suggests that attitudes and subjective norms determine people's behavioral intention, which ultimately influences their actual behaviors (Fishbein & Ajzen, 1975). The following section includes a summary of antecedents of food waste behavior according to the TRA and the emotion-as-feedback theory.

Attitudes

Many researchers have confirmed that attitudes toward a target behavior influence behavioral intention (Stancu et al., 2016; Stefan et al., 2013; Zhang & Kwon, 2022). Such attitudes are measured directly or indirectly: directly by an individual's behavioral belief regarding the target behavior and indirectly by their evaluation of the outcome (Francis et al., 2004). For example, a diner concerned with sustainability may believe that taking only the amount of food that can be finished helps to reduce food waste (behavioral beliefs). Such behaviors and outcomes (i.e., reducing food waste) could be viewed as positive or negative to the individual (outcome evaluations). Taken together, the direct and indirect measures reveal a broader spectrum of an individual's attitudes, from strong negative to strong positive attitudes toward plate-waste behaviors (Francis et al., 2004). These arguments lead to the first hypothesis.

H1: Diners' attitudes toward food waste are positively associated with their behavioral intention toward food waste reduction.

Subjective Norm

Subjective norms are also measured directly by asking "what important people think an individual should do." Normative beliefs, which may be injunctive or descriptive, when paired with the motivation to comply, can indirectly measure subjective norms about the target behavior (Fishbein & Ajzen, 1975, 2011; Francis et al., 2004). Injunctive normative beliefs are the inferences individuals make about what essential others want them to do, while descriptive normative beliefs are individuals' inferences about the actions those social referents take (Ajzen, 2015; Graham et al., 2015). For example, a person's food waste behavior could be influenced by how their important social group would like them to behave and by the actual food waste behavior of the social group when paired with the individual's motivation to comply with these social norms. Generally, the stronger the subjective norms, the stronger the intention to perform or not to perform the behavior (Ajzen, 1991; Ajzen, 2015), which leads to the second hypothesis.

H2: Diners' subjective norms toward food waste are positively associated with their behavioral intention toward food waste reduction.

Emotions

One of the main assumptions of the TRA is that individuals make rational and reasoned decisions (Fishbein & Ajzen, 1975, 2011). However, sometimes, individuals engage in behaviors without rationalization, and non-cognitive determinants, such as emotions,

may also play an essential role in consumers' behaviors. Therefore, in addition to attitudes and subjective norms, emotions may need to be considered to understand certain consumer behaviors better (Baumeister et al., 2007; DeWal et al., 2016; Lindsey, 2005; Russell et al., 2017).

Emotion is a mental feeling or affection distinct from cognition or volition (Lindsey, 2005). According to the emotion-as-feedback theory (Baumeister et al., 2007), people engage in certain behaviors to gain favorable emotions and avoid other behaviors to eliminate experiencing undesirable emotions. For example, people may feel embarrassed when others see them throw away a large amount of edible food. Therefore, to avoid feeling embarrassed in the future, this individual may change his/her behavior toward food waste (Russell et al., 2017), which leads to the third hypothesis.

H3: Diners' emotions toward food waste are positively associated with their behavioral intention toward food waste reduction.

Dependent Variables – Behavioral Intention and Self-reported Food Waste Behavior

The intention to perform a certain behavior, one of the dependent variables in the TRA, captures the motivational factors that ultimately influence the target behavior (Ajzen, 1985, 1991). It indicates how hard an individual is willing to try and how much time and effort they plan to exert to perform the behavior (Ajzen, 1991). Generally, the stronger the attitudes, subjective norms, and emotions, the stronger the intention to engage in a behavior, and the more likely a person would perform the target behavior (Fishbein & Ajzen, 1975, 2011), which leads to the following hypotheses.

H4: Diners' behavioral intention toward food waste reduction is positively associated with their self-reported food waste behavior.

H5: Diners' behavioral intention toward food waste reduction mediates the association between attitudes toward food waste and their self-reported food waste behavior.

H6: Diners' behavioral intention toward food waste reduction mediates the association between subjective norms toward food waste and their self-reported food waste behavior.

H7: Diners' behavioral intention toward food waste reduction mediates the association between emotions toward food waste and their self-reported food waste behavior.

Current Study

Previous studies that explored consumers' behaviors about their attitudes, subjective norms, emotions, and intention toward food waste reduction took place in retail operations (Baumeister et al., 2007; Webb & Sheeran, 2006) or in individual households (Russell et al., 2017; Stancu et al., 2016; Stefan et al., 2013). The contexts of these studies may have different characteristics from the onsite, buffet-style foodservice settings, such as university dining centers. In the retail or household settings, the predictability and directions of associations among emotions, behavioral intentions, and actual behavior varied from what we hypothesized would happen in the university dining centers. For example, previous studies reported that negative emotions were associated with greater intention toward food waste reduction but ultimately led to more significant amounts of self-reported food waste (Russell et al., 2017). Further research is needed to evaluate the influence of emotion on food waste behavior. On the other hand, studies that examined food waste behavior in university dining centers offered limited theoretical support (Anderson et al., 2021; Aramark, 2008; Kallbekken & Salen, 2013; Rajbhandari-Thapa et al., 2018; Richardson et al., 2021). Given the

limitations of these previous studies, theoretically driven findings about behaviors in university dining centers are needed to advance our understanding of what motivators can help to reduce food waste in general.

Therefore, this study aimed to 1) provide a theoretical framework for investigating food waste behavior in university dining centers; 2) predict diners' intention toward food waste reduction and their self-reported food waste behavior using the modified TRA model with attitudes, subjective norms, and emotions toward food waste as independent variables (Figure 1); 3) assess the associations among the variables above; and 4) test the indirect effects from attitudes, subjective norms, and emotions to self-reported food waste behavior, via the proposed mediator of behavioral intention toward food waste reduction.

METHODOLOGY

Population and Sample

The target population of this study was college students who attended colleges in the U.S. and consumed most of their meals in on-campus dining facilities. The study sample included college students who were 18 years or older and consumed most of their meals at a university dining center located in the Midwest region of the U.S. The selected dining center was an all-you-care-to-eat cafeteria for approximately 2,000 diners. Trays were made available to diners at the entrance to conveniently transport their selected food. Upon obtaining a tray, diners proceeded to one of the four service lines (Italian, Classic, Wok, or Grill) to receive an entrée served by kitchen staff. One entrée was served at a time; however, diners could queue for seconds as often as they desired. Self-serve stations for beverages, salads, and desserts were positioned either adjacent to the serving lines or at the center of the dining center. Participants consented to participate in the online survey, and the target sample size for the survey was 440 to conduct structural equation modeling with variables of interest (Wolf et al., 2013).

Instrument Development

To assess the study variables, the survey instrument was developed based on a literature review and focus groups. Results from three focus groups with 24 participants were summarized and used to create questions about attitudes and emotions. Once developed, the instrument was reviewed by foodservice and sustainability researchers and pilot-tested prior to data collection. The approval to use human subjects in research was obtained from the university's Institutional Review Board, where data collection occurred.

Survey Questions Under Each Construct

The overall survey followed the framework and question development protocols specified in the theory of reasoned action (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975, 2011; Francis et al., 2004) and the emotion-as-feedback theory (Baumeister et al., 2007). All questions directly measuring attitudes, subjective norms, emotions, behavioral intention, and self-reported behavior were asked using a five-point Likert-type scale from 1 to 5. For indirect measures of attitudes and subjective norms, a scale ranging from -2 to 2 was used for outcome evaluation (attitudes) and motivation to comply (subjective norms; Francis et al., 2004). The scores of each indirect measure set were computed using SPSS (version 26). All negatively worded questions were reverse-coded with the largest number, 5, reflecting the strongest attitudes, subjective norms, emotions, and intention toward food waste reduction, and the most positive self-reported food waste reduction behavior.

Attitude Toward Food Waste

Both direct and indirect measures of attitude were used to increase the internal reliability of the measurement within the same construct (Francis et al., 2004). Four direct measure questions for attitudes toward food waste (e.g., "food waste is a major issue in the U.S.") were developed using a 5-point scale (from 1 strongly disagree to 5 strongly agree). Additionally, three sets of indirect measurement questions regarding behavioral beliefs and outcome evaluations were developed (e.g., "the food I waste could be used to feed those who are hungry in my community," from 1 strongly disagree to 5 strongly agree, was paired with an outcome evaluation question which assessed the level of desirability in the behavioral belief statements, from -2 extremely undesirable to 2 extremely desirable). Each set of indirect measures was used to calculate participants' attitudes by multiplying the behavioral belief score by the outcome evaluation score. For example, if an individual strongly agreed (5 points) to the behavioral belief question and perceived the outcome as extremely desirable (2 points), their attitude toward the indirect measure would be 10 ($5 \times 2 = 10$). The range of each indirect measure was from -10 to 10. A positive score represents attitudes in favor of the behavior, a negative score represents attitudes against the behavior, and a score of zero represents a neutral attitude (Francis et al., 2004). Overall attitudes toward food waste were evaluated as a latent variable to reduce measurement errors under statistical analyses.

Subjective Norms Toward Food Waste

Similar to attitudes, subjective norms were also assessed with both direct (six questions) and indirect measurements (three sets of

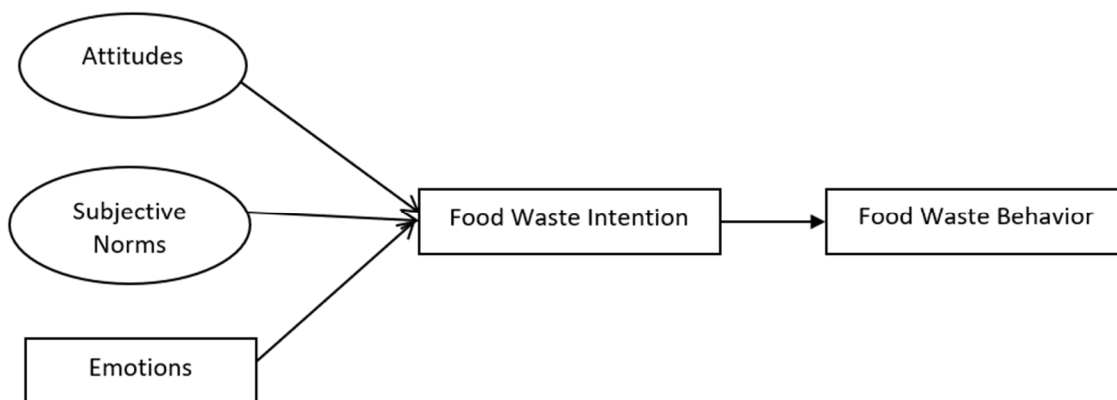


Figure 1. The Impact of Attitudes, Subjective Norms, Emotions, and Intention toward Food Waste Reduction on Self-reported Food Waste Behavior (A Modified TRA Model).

questions) to increase internal reliability (Francis et al., 2004). A direct measure of opinions on food waste from the social referents was phrased as “it is expected of me that I eat all my food on my plate and not be wasteful,” from 1 strongly disagree to 5 strongly agree. Indirect measures included an injunctive norm question (e.g., “my friends think I should not waste food.”), paired with a motivation to comply (e.g., “my friends’ opinion of me wasting food is important to me.”) from -2 not at all important to 2 extremely important. The range of each indirect measure was from -10 to 10. A positive score represents an individual’s sense of strong social pressure and the likelihood of complying, and a negative score represents weak social pressure and an individual’s lack of motivation to comply (Francis et al., 2004). Overall subjective norms toward food waste were evaluated as a latent variable to reduce measurement errors under statistical analyses.

Emotions Toward Food Waste

Emotion was used as an additional independent variable to determine its influence on diners’ food waste behavior. Based on the focus group findings, we identified specific emotions (i.e., bothered, embarrassed, worried, self-conscious, frustrated, annoyed, disappointed, and concerned) toward food waste. Eight questions were developed to assess emotions toward food waste (e.g., “when I throw away a large amount of food at the end of my meal, I am embarrassed.”).

Behavioral Intention Toward Food Waste Reduction

The researchers collected the survey data without the interference of external influencers or interventions (e.g., a food waste reduction campaign), which could have led to changes in behaviors such that the original measure of intention would no longer predict the target behavior (Ajzen, 1985, 1991). Three questions were developed to measure intention toward food waste reduction (e.g., “I plan to have no plate waste at the end of my meal.”).

Self-reported Food Waste Behavior

Finally, four questions were asked directly about the frequency and amounts of an individual’s plate waste to evaluate the participants’ food waste behavior. Osbaldiston (2013) contended that asking about the general extent or frequency of behaviors is too subjective as researchers do not have any information about the criteria that participants used when they indicate general frequency. To overcome this challenge, researchers recommended asking dichotomous and specific questions. For example, instead of asking, “how frequently do you leave food on your plate?” this study asked, “do you always have food left on your plate after finishing your meal?” In addition, to assess how much edible food participants discarded at the end of each meal, they were asked to indicate, “normally, I have no plate waste, ¼ of plate waste, ½ of plate waste, ¾ of plate waste, more than one plate of food waste.”

Demographic Information

Demographic information, including age, gender, academic colleges and majors, length of residency at the resident halls, dining frequency in the dining hall, and the type of meal plans, were collected at the end of the survey. Some variables (e.g., gender, academic colleges and major, and length of residency at the resident halls) were used as control variables in the model testing. The rest of the demographic information was collected to describe the study participants.

Data Collection

A pilot study was conducted with 20 participants one week before survey data collection. Upon agreement, participants received a written statement describing the purpose, importance, and contact

information about the study. They completed the survey and provided the researchers with comments on clarity, ease of completion, and the survey flow. Accordingly, changes were made to the survey instrument based on the participants’ feedback.

After the pilot study, a URL and a QR code for the online survey were distributed to participants entering the selected dining center. They were informed about the confidentiality and voluntary nature of the survey, and each participant was offered a one-dollar cash payment after showing the confirmation page of the completed survey to one of the two researchers as they exited the dining center.

Data Analysis

SPSS (version 26) was used for data analysis. Descriptive statistics were computed to identify the participants’ demographic characteristics and summarize the data. Cronbach’s alpha coefficient was calculated to determine the internal consistency of each construct, where $\alpha > .70$ was considered appropriate. Pearson bivariate correlations were calculated to assess associations among variables of interest.

Structural equation modeling (SEM) among the exogenous variables (attitudes, subjective norms, and emotions), endogenous variables (self-reported food waste behavior), and a mediator (intention) was run using Mplus. Good model fit was determined with RMSEA value $< .05$, CFI and TLI values $> .95$, SRMR values $< .1$, and χ^2 being insignificant. A path analysis was then used to test the hypothesized associations among different variables with a significance level set at $p < .05$. Bootstrapping procedures were used to test the indirect effects of emotions, attitudes, and subjective norms on self-reported food waste behavior via its effect through the proposed mediator of behavioral intention. A total number of 2,000 bootstraps were conducted in accordance with this model. Significant indirect effects were interpreted when the 90% confidence intervals for the bootstrapped indirect effects did not include zero (Preacher & Hayes, 2008).

RESULTS

Descriptive Statistics

A total of 450 usable responses were included in the final data analysis. On average, the participants were 19 years old, with the majority (84%) between 18 to 20 years. More female participants took part in the survey (54%), and most of these participants had either a 14-meals-per-week meal plan (48%) or an unlimited access meal plan (43%). Most participants (64%) were in their second-semester dining in the facility when data collection occurred. In addition, 267 (59%) participants typically ate twice daily in the dining center where data collection occurred (Table 1).

Measurement Reliability and Correlations Between Variables

Pearson bivariate correlation coefficients and Cronbach’s alpha are presented in Table 2. The correlations between the direct and indirect measure of attitudes ($r = .61, p < .01$) and subjective norms ($r = .54, p < .01$) were strong, indicating close associations of direct and indirect measures for these two constructs. Participants’ intention toward food waste reduction correlated strongly with their emotions toward food waste ($r = .62, p < .01$), indicating that the stronger the emotions they experienced toward food waste, the more likely they presented positive behavioral intention toward food waste reduction. Participants’ intention toward food waste reduction also was moderately correlated with their attitudes (direct: $r = .39, p < .01$; indirect: $r = .49, p < .01$) and subjective norms (direct: $r = .37, p < .01$; indirect: $r = .40, p < .01$) toward food waste.

Table 1. Descriptive Statistics of Respondents (N = 450).

	N	Percent (%)
Age		
18 years	90	20
19 years	214	48
20 years	70	16
21 years	38	8
22 years or over	38	8
Gender		
Male	197	44
Female	241	54
Other	6	1
Prefer not to disclose	6	1
Affiliated College		
Agriculture	86	19
Architecture, Planning, and Design	10	2
Arts and Sciences	101	22
Business Administration	64	14
Education	35	8
Engineering	77	17
Human Ecology	61	14
Veterinary Medicine	4	1
Other	12	3
Type of Meal Plan		
14 meals/week	217	48
Unlimited	192	43
Off-campus meal pass	41	9
Frequency of Dining Experience		
Once a day	68	15
Twice a day	267	59
Three times a day	95	21
More than three times a day	20	4
Length of Dining Experience		
One semester	26	6
Two semesters	286	64
Three semesters	11	2
Four semesters	64	14
Five semesters	5	1
Six or more semesters	58	13

Participants who reported moderate to strong intention toward food waste reduction ($r = .55, p < .01$), moderate attitudes (indirect, $r = .35, p < .01$), subjective norms (direct, $r = .33, p < .01$), and emotions ($r = .44, p < .01$), had also high reported frequencies of not wasting food. Consistent with previous studies (Stancu et al., 2016; Stefan et al., 2013), participants' attitudes, subjective norms, and emotions toward food waste were significantly associated with their intention toward

food waste reduction. Also, participants' behavioral intention was significantly associated with their self-reported food waste behavior.

Cronbach's alpha scores for all scales, except self-reported food waste behavior ($\alpha = .63$), were greater than 0.7, indicating good internal consistency. An exploratory factor analysis was conducted to evaluate the reliability of the self-reported food waste behavior measurement. All questions under this construct showed as one factor with an average inter-item correlation of $M = 0.3$, indicating an acceptable range of inter-item measures (Piedmont & Hyland, 1993).

All the direct measures had a scale from 1 to 5, with 3 being neutral. Therefore, the means from direct measures indicated that the participants (a) held moderately positive attitudes ($M = 3.89, SD = 0.89$), subjective norms ($M = 3.34, SD = 0.75$), and emotions ($M = 3.68, SD = 0.74$) toward food waste reduction, (b) had somewhat high intention toward food waste reduction ($M = 4.08, SD = 0.86$), and (c) reported somewhat positive food waste reduction behaviors, including low amount and frequency of food waste ($M = 3.96, SD = 0.63$). Meanwhile, all indirect measures had a range from -10 to 10. The results from the indirect measures indicated that most participants had strong attitudes against food waste ($M = 5.61, SD = 3.60$), and experienced moderate subjective norms, but had low motivation to comply with these norms ($M = 1.88, SD = 3.73$).

Model Fit

This study used the construction of two latent variables of attitudes and subjective norms toward food waste, and three observed variables of emotions, intention, and self-reported food waste behavior to test SEM, with control variables (i.e., gender, affiliated colleges, and length of dining experience). The proposed model was a good fit for the data [$\chi^2(178) = 450.19, p < .05$; RMSEA = .05 (90% CI .05, .06); CFI = .93; SRMR = .05]. Standardized factor loadings of attitudes toward food waste ranged from .43 to .84, and subjective norms toward food waste ranged from .26 to .71, indicating that both variables could be measured adequately as latent variables (Figure 2).

The Test of the Structural Model

SEM results indicated that higher scores of participants' attitudes ($b = .21, s.e. = .06, \beta = .24, p < .01$), subjective norms ($b = .15, s.e. = .09, \beta = .14, p < .01$), and emotions ($b = .49, s.e. = .08, \beta = .42, p < .01$) were significantly associated with higher scores on intention toward food waste reduction. Therefore, hypotheses 1 to 3 were accepted. Additionally, hypothesis 4 was also accepted because a higher score of intention toward food waste reduction was significantly associated with a higher score on self-reported food waste reduction behavior ($b = .32, s.e. = .05, \beta = .43, p < .01$).

The model using TRA variables only (i.e., attitudes, subjective norms) explained only 27.9% of the variance in intention (Table 3). When "emotion" as an antecedent was added, the percent variance

Table 2. Correlations and Descriptive Statistics among Attitudes, Subjective Norms, Emotions, and Intention Toward Food Waste Reduction, as Well as Self-reported Food Waste Behavior (N = 450).

Variables	M (SD)	a	1	2	3	4	5	6	7
1. Attitudes (Direct)	3.89 (0.89)	.80	-						
2. Attitudes (Indirect)	5.61 (3.60)	.73	.61**	-					
3. Subjective Norms (Direct)	3.34 (0.75)	.75	.35**	.28**	-				
4. Subjective Norms (Indirect)	1.88 (3.73)	.80	.36**	.33**	.54**	-			
5. Emotions	3.68 (0.74)	.82	.39**	.51**	.53**	.49**	-		
6. Intention	4.08 (0.86)	.85	.39**	.49**	.37**	.40**	.62**	-	
7. Self-reported Food Waste Behavior	3.96 (0.63)	.63	.21**	.35**	.33**	.28**	.44**	.55**	-

** $p < .01$. (Two-tailed).

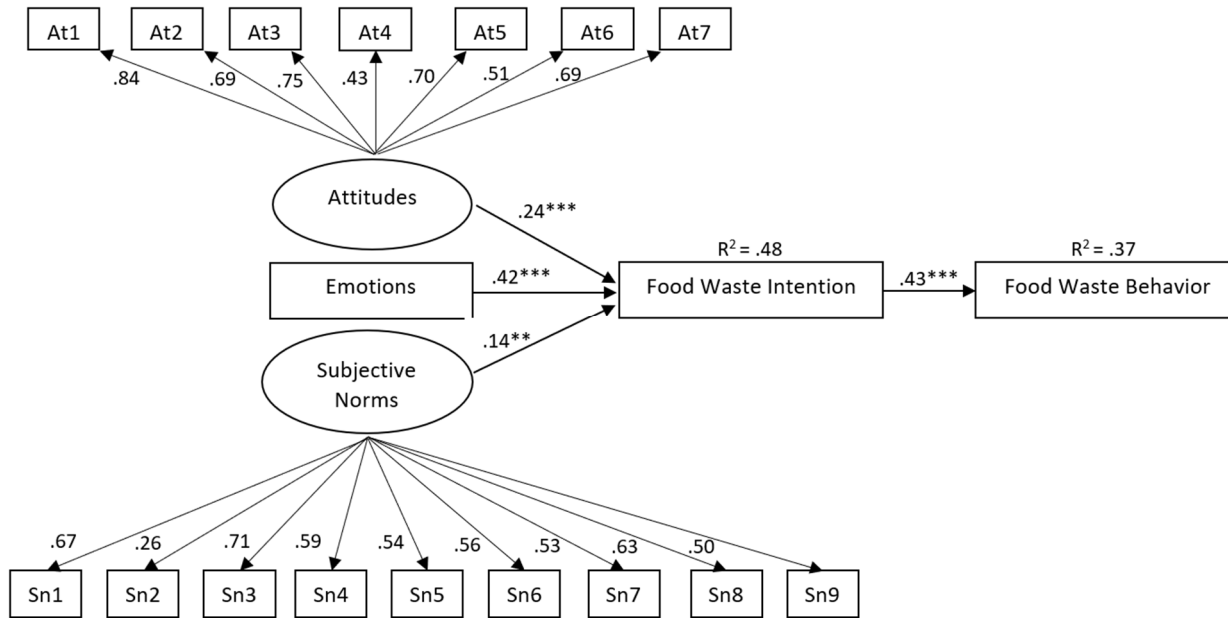


Figure 2. Structural Model of Attitudes, Subjective Norms, Emotions, and Intention Toward Food Waste on Self-reported Food Waste Behavior.

Note: This analysis also controlled for several variables, including gender, affiliated college, and length of the dining experience. These control variables are not shown here to ease the interpretation of the primary model. At1 to At7 are items from the attitudes scale, and Sn1 to Sn9 are items from the subjective norms scale. ** $p < .01$. *** $p < .001$ (one-tailed).

explained improved to 47.6%, showing a significant added effect of emotion. Attitudes, subjective norms, emotions, and intention, along with control variables, explained 37.1% of the variance in self-reported food waste behavior.

The bootstrapped indirect effects from attitudes to self-reported food waste behavior via its effect through intention toward food waste

Table 3. Unstandardized, Standardized, and Significance Levels (standard errors in parentheses; n=450).

Parameter Estimate	Unstandardized	Standardized	p
Structural Model			
Attitudes à Intention	.21 (.06)	.24	<.01
Attitudes à Food Waste Behavior	.04 (.04)	.06	.37
Subjective Norms à Intention	.15 (.09)	.14	<.01
Subjective Norms à Food Waste Behavior	.08 (.06)	.10	.19
Emotions à Intention	.49 (.08)	.42	<.01
Emotions à Food Waste Behavior	.08 (.06)	.10	.17
Intention à Food Waste Behavior	.32 (.05)	.43	<.01
Gender à Intention	-.11 (.05)	-.08	.04
Gender à Food Waste Behavior	-.10 (.04)	-.11	.02

Note: For all control variables including gender, affiliated college, and length of dining experience, only significant associations are shown here.

reduction was significant ($b = .07, p < .01, CI\ 90\% [.04, .10]$), indicating that one unit increase in attitudes toward food waste was associated with a .07 unit increase in self-reported food waste reduction behavior. Also, the indirect effects from subjective norms on self-reported food waste behavior via the intention toward food waste reduction behavior was significant ($b = .05, p < .05, CI\ 90\% [.01, .10]$), indicating that one unit increase in subjective norms was associated with a .05 unit increase of self-reported food waste reduction behavior. The indirect effects of emotions on self-reported food waste behavior via the intention toward food waste reduction behavior was also significant ($b = .15, p < .01, CI\ 90\% [.11, .21]$), indicating that one unit increase in emotions was associated with a .15 unit increase of self-reported food waste reduction behavior (Table 4). Participants' intention toward food waste reduction fully mediated all three indirect effect paths. Therefore, hypotheses 5 to 7 were accepted.

DISCUSSION

By evaluating both traditional cognitive factors such as attitudes and subjective norms and a less studied factor of emotions in relation to food waste reduction intention, the current study established a comprehensive model of self-reported food waste behavior at a university dining center. The results of this study showed that participants' attitudes, subjective norms, and emotions toward food waste predicted their intention toward food waste reduction, which ultimately predicted their self-reported food waste behavior.

Participants' attitudes were positively associated with their intention toward food waste reduction. These associations indicated that participants who had a better realization of their behavioral outcome and were more in favor of food waste reduction also had a higher intention toward food waste reduction. For example, participants who expressed strong behavioral beliefs regarding the potential use of edible food waste to help mitigate hunger challenges in the

Table 4. Mediating Effects with Attitudes, Subjective Norms, and Emotions as Independent Variables, Intention as Mediators, and Food Waste Behavior as the Outcome Variable. Bootstrap Analyses of the Magnitude and Significance of Mediating Pathways (standardized solution; N = 450).

Predictor	Mediator	Outcome	<i>b</i>	CI	<i>β</i>
Attitudes →	Intention →	Food Waste Behavior	.07**	.04, .10	.10
Subjective Norms →	Intention →	Food Waste Behavior	.05 *	.01, .10	.06
Emotions →	Intention →	Food Waste Behavior	.15**	.11, .21	.18

Note: Indirect paths tested with 2,000 bootstraps. CI = 90% confidence interval, unstandardized.

**p* < .05. ** *p* < .01 (one-tailed).

community also reported higher intention toward food waste reduction. These findings were consistent with the TRA (Fishbein & Ajzen, 1975; Fiske & Taylor, 1991) as well as previous studies on food waste behavior, which reported a significant association among consumers' attitudes and intention toward food waste reduction (Stancu et al., 2016; Stefan et al., 2013; Zhang & Kwon, 2022).

Participants' subjective norms were also positively associated with their behavioral intention. However, despite the overall subjective norms showing significant associations with the intention, the coefficient and significance levels were not as high as other predictors. This may be explained by the low scores on indirect measures of subjective norms. Participants in this study reported moderately high expectations of themselves not to waste food (*M* = 3.34). However, the indirect measure that took account of participants' motivation to comply was low (*M* = 1.88). One of the normative belief questions, "y family thinks I should not waste food." had a mean of 4.08, but the mean of motivation to comply was only 0.68. These results indicated that the participants might be aware of the strong social pressure toward food waste reduction, yet they lacked the motivation to comply with the norms.

These results may explain why SEM analysis showed a significant but weak association between subjective norms and intention toward food waste reduction. Researchers have suggested that the normative construct of subjective norms in the TRA is often not a strong predictor of intention compared to other antecedents (Armitage & Conner, 2001; Armitage et al., 2002), or they have found it an insignificant predictor of intention, and behavior (Stefan et al., 2013).

Emotions toward food waste were positively associated with participants' food waste reduction intention. In fact, the effect size of emotion toward intention was significantly larger than all other antecedents. Participants in this study reported strong emotions such as the feeling of embarrassment, frustration, and disappointment toward leaving food waste. Participants may label these feelings as undesirable emotions and, therefore, avoid behaviors (i.e., wasting food) that may lead them to feel these emotions. A study conducted with British consumers (Russell et al., 2017) reported that negative emotions toward food waste had a strong positive association with the intention toward food waste reduction, which was consistent with the results from this study.

The study's findings indicated a strong association between intention toward food waste reduction and self-reported food waste behavior. Specifically, participants who expressed a strong intention to leave no food waste at the end of their meals also reported lower frequencies and amounts of food waste. This result was consistent with our expectations based on the TRA (Fishbein & Ajzen, 1975; Fiske & Taylor, 1991). Furthermore, participants' intention toward food waste reduction fully mediated all three indirect effect paths from attitudes, subjective norms, and emotions to self-reported food waste behavior, suggesting the significant impact of behavioral intention on behavior.

This result indicated that the independent variables could only impact self-reported food waste behavior through the participants' intention toward food waste reduction.

LIMITATIONS AND FUTURE STUDIES

Although this study included a variety of factors that may influence participants' food waste behavior, other influencers such as knowledge of food waste challenges, motivation to avoid food waste, and food waste habits may also have potential influences on consumers' food waste behavior (Aschemann-Witzel et al., 2015; Russell et al., 2017). Furthermore, consumers' cultural backgrounds, genders, and perceptions of convenience to reduce food waste may also affect their food waste behavior (Koivupuro et al., 2012). Therefore, future studies could helpfully evaluate the factors above along with variables explored in this study to improve variance explained in food waste behavior.

In addition, because data collection occurred at only one university dining facility located in the Midwest region of the U.S., the findings of this study may not be generalizable to other facilities of different types, their internal structures, or geographical locations. Future studies may consider collecting data at multiple dining facilities that operate under different structures to overcome limited generalizability issues. For example, participants may be recruited from university dining centers offering all-you-care-to-eat dining services and dining facilities offering order-off-the-menu dining services to compare different food waste behaviors under different dining settings to better inform dining hall practices that aim for reduced waste.

Finally, using self-reported data only from a single-time assessment may result in researcher and social desirability biases. Although this study kept the participants anonymous and distributed surveys online to limit social desirability bias, participants might have felt pressure to answer questions in a socially acceptable manner regardless of their true feelings toward a topic. To reduce the social desirability bias, researchers may need to avoid phrasing survey questions in a way that reflects more socially desirable attitudes, behaviors, or perceptions (Podsakoff et al., 2003). In addition, researchers may employ the technique of indirect questioning, which asks the participants to answer questions from the perspective of another person or group to mitigate the effect of social desirability (Fisher, 1993). Furthermore, asking participants to rate the desirability of each item, including a social desirability scale to detect social desirability bias issues (Nederhof, 1985), or pairing survey responses with actual behavior to capture more accurate consumer behavior may mitigate such biases.

CONCLUSIONS AND APPLICATIONS

The current study evaluated the associations among attitudes, subjective norms, emotions, intention, and self-reported food waste behavior in a university dining center. The results indicate that participants' intention toward food waste reduction fully mediated

the three pathways from attitudes, subjective norms, and emotions to self-reported food waste behavior. The findings contribute to the existing consumer behavior literature and may guide and support practitioners who aim to influence customers' food waste behavior.

First, few researchers have provided theoretical frameworks for food waste studies conducted in university foodservice operations. By adopting a modified TRA model and adding the less assessed variable of emotions, this study has provided theoretical support for future research in an onsite foodservice setting. In addition, only a few researchers have examined emotions as a predictor of behavioral intention and behavior. In those few studies, the predictability and directions of associations of emotions on behavioral intention and behavior varied (Russell et al., 2017). This study revealed that emotion significantly predicted self-reported food waste behavior. Specifically, strong emotions toward food waste positively predicted consumers' intention toward food waste reduction and their self-reported food waste reduction behaviors. Therefore, by adding the antecedent of emotion, this study more adequately evaluated the psychological antecedents of food waste behavior and provided additional theoretical support to existing literature on consumer behaviors about food waste.

Practically, this study guides practitioners who aim to influence their customers' food waste behavior and ultimately reduce the amount of food waste. Interventions seeking to influence consumers' attitudes, subjective norms, and emotional reactions toward food waste may effectively change consumers' intentions and food waste behavior. Specifically, university dining center operators may influence consumers' attitudes toward food waste by informing and educating them about its consequences. Table tents may be employed to display reminders about food waste reduction. Stickers may be posted with each serving line and at the self-serve station to remind consumers only to take the amounts they can finish. University dining operators may also apply findings regarding the strong subjective norms, with an intervention revealing the amount of their plate waste. To trigger strong emotional responses toward food waste, which we've shown to be a stronger antecedent toward intention than other antecedents from TRA, university dining center operators may utilize digital appliances such as TVs and projectors in the dining center to display messages and pictures related to food waste challenges or otherwise convey the consequences of food waste.

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EFFECTS OF A SMILEY FACE AND SOCIAL NORMS ON STUDENTS' RECYCLING BEHAVIOR AT COLLEGE CAFETERIAS

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ABSTRACT

This study investigates ways to enhance college students' recycling behavior in college cafeterias, focusing on the role of emojis and social norms. A between-subjects field experimental design was conducted, comparing the effects of emoji and non-emoji signage near recycling bins in college cafeterias. Social norms were assessed through a survey, and recycling behavior was observed. The findings, derived from 121 participants, reveal that emoji use positively impacts recycling behavior, particularly when accompanied by a social norm. The implications of these results are discussed from both theoretical and managerial perspectives, offering insights into how to effectively promote recycling behaviors.

Keywords: Emoji Use, Social Norm, Recycling Behavior, College Cafeteria

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INTRODUCTION

Protecting the natural environment has been a historical topic of debate and concern (Schröder et al., 2020). According to the World Bank (2018), waste generation is expected to increase from 2.01 billion tons in 2016 to 3.40 billion tons in 2050. The extensive growth of solid waste and its management is a major concern for many countries (Haj-Salem & Al-Hawari, 2021). To reduce waste, recycling is considered one of the easiest and most accessible ways for individuals to protect the environment (Chao et al., 2021). Engaging in recycling behavior is a pro-environmental practice that demands minimal effort from individuals but yields significant benefits in waste reduction. (Haj-Salem & Al-Hawari, 2021). Recycling behavior not only enhances sustainable business but also mitigates risks to the natural environment (Chao et al., 2021).

Governments have developed various programs to promote recycling behavior, such as implementing multiple recycling services and creating public awareness campaigns. The recycling rate increased from 7% in 1960 (U.S. Census Bureau, 2021) to 32% in 2018 (U.S. Environmental Protection Agency, 2022). However, the rate of recycling behavior is still under 50% among most developed countries (Ayalon et al., 2013).

Individuals' daily behavior is an important factor to lower environmental damage (Panda et al., 2020). Encouraging recycling practices among college students holds significance. In the Fall of 2021, the nationwide enrollment of undergraduate students reached 15.44 million (Hanson, 2024). College students have a reputation for pro-environmental behaviors and attitudes (Levine & Strube, 2012). Their familiarity with environmental issues equips them with a

heightened understanding of effective waste management practices in their day-to-day lives. Zhang et al. (2017), for instance, advocated that university campuses could play a central role in promoting college students' recycling behavior because college students tended to be early adopters and advocates of protecting the environment. According to the Resource Recycling Systems (2021), 63% of the 312 sampled universities in the U.S. have implemented recycling programs on campus. However, the average recycling rate among college students was only 24%. To address this gap between pro-recycling attitudes and actual recycling behavior, it is worthwhile to explore what would be an effective intervention that enhances college students' recycling behavior (Hansen et al., 2008).

One of the effective interventions to attract college students' attention to their recycling behavior can include using emojis. Emojis are pictographs that communicate facial expressions, people, places, or things and they perform as part of the language (McShane, et al., 2021). Emojis are ubiquitous in daily communications (McShane et al., 2021) and the younger generation tends to rely on emojis in their daily communication. Emoji use is supported in the emotion as social information (EASI) theory (Van Kleef, 2009). The EASI theory predicts one's behavioral change due to emotional contagion effects. According to the EASI theory, emojis are viewed as a form of affective signaling (Van Kleef, 2009). Thus, it is predicted when college students are exposed to the recycling bin with emojis, they might be more attentive to the recycling bins, which would eventually enhance their recycling behaviors. Prior research identified the effective use of emojis in promoting recycling behavior. For instance, Baek et al. (2022) identified when the smiley-face emoji was included in assertive X (formerly known as Twitter) messages, people showed stronger behavioral intentions to recycle.

In addition, social norms play an important role in influencing people's pro-environmental behaviors (Chao et al., 2021). A social norm refers to the influence of others on one's behaviors (Ajzen, 1991). The importance of social norms is supported in the Theory of Planned Behavior (Ajzen, 1991). The Theory of Planned Behavior is one of the most extensively used theories in environmental psychology. The theory predicts the psychological components of a recycling behavior, such as a subjective norm (Ceschi et al., 2021). College students' recycling behavior can be observable by others and each college student can see what other peers do with their waste in the cafeteria. Thus, the act of recycling holds the social nature in its behavior. Due to this social nature of recycling behavior, social approval or peer effects becomes important in the recycling behavior (Ceschi et al., 2021). Prior research supports the effects of social norms on recycling behavior. For instance, Sorkun (2018) explained the positive effects of social norm on household recycling behavior in collectivistic societies, such as Turkey. In their study, the influence of social norms on recycling behavior was mediated by perceived convenience. Viscusi et al. (2011) also confirmed the effects of social norms in promoting recycling behaviors.

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Even though promoting college students' recycling behavior is important, prior research lacks an understanding of an effective way to promote college students' recycling behavior. The use of emojis is expected to enhance college students' recycling behavior as supported in prior research (Baek et al., 2022) and the EASI theory (Van Kleef, 2009). In addition, this study proposes the moderating role of social norm on the relationship between emojis and recycling behaviors (Ajzen, 1991), predicting that college students' recycling behavior will be enhanced when peers are present compared to when peers are not present. Based on the prevalence of emoji use in daily communication among college students and the moderating influence of social norms, this study aims to answer the following research questions.

Research question 1: What are the effects of emoji use on college students' recycling behaviors?

Research question 2: What are the effects of social norms on the relationship between emoji use and college students' recycling behaviors?

METHODS

Study Design

A between-subjects experimental design was used to investigate the effects of emoji use and social norms on college students' recycling behaviors. Signage indicating "RECYCLE" on a plain white background was posted on dominant area above a recycling bin for a no emoji condition. Signage indicating "RECYCLE" and a smiley face was used for an emoji condition. The recycling bin has a campus-wide instructions attached, encouraging individuals to recycle clean and dry plastic bottles and jugs, paper and newspaper, cardboard, aluminum and steel cans, and glass bottles. The stimulus used in the experiment is represented in Figure 1. The experiment was conducted at two campus cafeterias. At each cafeteria, the condition of no emoji and emoji was implemented for four days (Monday-Thursday), respectively between 11 am – 2 pm during November and December 2022 (Table 1).

Researchers observed how customers discarded meal items completely into the garbage bin or discarded single-use items (e.g., plastic forks) separately in a recycling bin. Each individual's recycling behavior was recorded as either yes, if single-use items were discarded into a recycling bin, or no, if all items were discarded into regular trash bins. Each person was assigned a random code for matching with their survey responses. Following the observations, each individual was approached by researchers for to solicit their participation in the online survey. Those who consented to participate in the survey were given a QR code that directed them to the survey and a random code which they entered into the survey to be matched



No Emoji condition: Signage indicating "RECYCLE" on a plain white background was posted.	Emoji condition: Signage indicating "RECYCLE" and a smiley face was posted.
	

Figure 1. Stimulus used in the experiment.

Table 1. Implementation of the Emoji Intervention at College Cafeterias.

Cafeteria	Week 1	Week 2	Week 3	Week 4
A	No emoji ^a	Emoji ^b		
B			No emoji ^a	Emoji ^b

^a Signage indicating "RECYCLE" on a plain white background was posted on dominant areas above recycling bins.

^b Signage indicating "RECYCLE" and a smiley face was posted on dominant areas above recycling bins.

with their recycling behavior. The manually recorded recycling behavior was entered for each individual by the random code before data analysis. Once the survey was completed, participants received a password and submitted it to researchers to receive a \$5.00 gift card.

Survey

The survey included three sections. The first section provided an informed consent form and explained the purpose of this study and participants' rights.

The second section included questions about environmental concerns and social norms. Environmental concern might interfere with the main effect of emoji use on recycling behavior, thus was measured to be controlled during data analysis. The participants' environmental concern was measured by five items (Chao et al., 2021) based on a 7-point Likert scale, "1" being "strongly disagree" and "7" being "strongly agree." Example items are "I think it is important to protect and improve wildlife habitat" and "I think it is important to contribute to the wellbeing of the environment." The Cronbach's alpha of 0.952 confirmed reliability of the five items (Nunnally & Bernstein, 1994). Social norms was measured by one item, "were you with someone else when you used trash bins?" It is acceptable to measure a construct with one item if the situation is straightforward (Bergkvist & Rossiter, 2007).

The last section asked about participants' age, gender, and ethnicity. Also, participant's status of student, faculty, staff or other was asked to screen out non-student participants. This study was approved by the Institutional Review Board at a large Midwestern state university.

Data Analysis

A total of 131 people participated in the survey and their recycling behaviors were observed. After removing three incomplete and seven non-student (e.g., faculty or staff) responses, 121 responses were used for data analysis. The effect of emoji use (no emoji condition versus emoji condition) on students' recycling behavior (recycled or not) was analyzed by a chi-square analysis. The effect of social norms (present versus not present) on the relationship between emoji use and recycling behavior was tested by a chi-square analysis and a logistic regression analysis.

RESULTS AND DISCUSSION

Among 121 participants, 78% were female, 16% were male, and 6% were non-binary/third gender or preferred not to disclose gender. The majority (93%) were between 18-24 years old, followed by 25-34 years old (7%). Almost 84% were Caucasian and the rest were composed of Asian (5%), African American (5%), and other.

A chi-square analysis showed a significant effect of emoji use on recycling behavior ($\chi^2(1, N=121) = 5.53, p=0.019$; Table 2). Students recycled more when they saw the smiley face (emoji use) above a recycling bin compared to those who saw only the text of RECYCLE. It implies that the emoji use in addition to traditional text promotions

Table 2. The Effect of Emoji Use on Recycling Behavior.

Recycling behavior	n (%)			χ^2 (1, N=121) =5.53 p=0.019
	No Emoji ^a	Emoji ^b	Total	
Not Recycled	49 (79.0)	35 (59.3)	84 (69.4)	
Recycled	13 (21.0)	24 (40.7)	37 (30.6)	

^a Signage indicating "RECYCLE" on a plain white background was posted on dominant areas above recycling bins.

^b Signage indicating "RECYCLE" and a smiley face was posted on dominant areas above recycling bins.

attracted students' attention and encouraged them to recycle more actively. Emoji use has been studied in various contexts and research fields, ranging from education to marketing (Bai et al., 2019). The visual features of emoji helped students better learn concepts even with language barriers and facilitated effective communication in online courses (Brody & Caldwell, 2019). In marketing activities, emoji attracted potential consumer's attention, enhanced positive purchasing experiences, and improved future purchase intention (Das et al., 2019). This study supports other findings of positive impact of emoji use and the impact on recycling behavior (Baek et al., 2022). Emoji use has been studied extensively in computer mediated communication because it makes up for the lack of expressions in the unique communication setting. With that, it was especially meaningful to confirm the emoji impact on recycling behavior in a real life setting as the previous study (Baek et al., 2022) proved it in digital platforms. This study took place in naturally occurring social settings, thus it has better external validity.

Further analyses revealed that the effect of emojis were apparent only when students were with someone else (Table 3). Specifically, when students were with someone else, significantly more students recycled in the emoji condition, $\chi^2(1, N=76) = 8.769, p=0.003$. However, when students were alone, no significant difference in recycling behavior was found between no emoji and emoji conditions, $\chi^2(1, N=45) = 0.002, p=0.965$.

To confirm the effect of social norms, we used a logistic regression analysis with emoji use (no emoji vs. emoji), social norms identified from the survey (not present vs. present), and their interaction. Environmental concerns were included as a control variable but did not have a significant impact on recycling behavior. The interaction term was marginally significant at p value of 0.056. The condition of no emoji and existence of social norms was significantly different from the reference condition of no emoji and no existence of social norms ($\beta = -1.648$, odds ratio = 0.192, $p = 0.006$). Other conditions (emoji with/without social norms) were not significantly different from the reference condition. In sum, a pivotal determinant of college students' recycling behavior was the presence of another individual at the time of utilizing trash bins. Notably, the emoji itself did not exert any discernible influence.

The strong effect of social norms on students' recycling behavior is consistent with previous findings that social norms influence pro-environmental behavior (Farrow et al., 2017). Social norm interventions reduced energy consumption by almost 2% (Costa & Kahn, 2013), encouraged college students to turn off lights in a public restroom (Oceja & Berenguer, 2009), and increased intention to recycle (Fornara et al., 2011). People tend to take actions that are approved and expected by others in general. Younger generations, including college students, are known for being active in protecting the environment. Gen Z is willing to purchase sustainable brands, and pay more on sustainably produced items (Petro, 2021). Gen Z and Millennials actively discuss climate change and the need for action, seeing and engaging on social media with relevant contents (Tyson et al., 2021). Ironically, their recycling behavior is not aligned well with these notions, as the average recycling rate of college students was found to be 24% (Resource Recycling Systems, 2021). The results of this study suggests that colleges utilize social norms to encourage college students to be actively engaged in recycling behavior on campus.

IMPLICATIONS AND CONCLUSION

Theoretical and industry implications

One of the most extensively used techniques to protect the environment is the three Rs- reduce, reuse, and recycle resources. Derived from the importance of recycling, this study explored how to promote college students' recycling behavior. While previous research investigated factors influencing college students' intrinsic and extrinsic recycling motivations (Chao et al., 2021), it underexplored strategies to promote such behavior. This study focused on the intervention of using emojis and extended the applicability of their use, derived from EASI theory. Emojis, prevalently used in digital communications, have shown positive effects on customer engagement (Wang et al., 2023) and purchase intention (Das et al., 2019). Building on this, our study extends the role of emojis in promoting pro-environmental behavior, particularly, recycling. Furthermore, our research revealed that the impact of emoji use is contingent upon the existence of social norms. In the absence of such norms, emoji use alone does not exert a significant influence. This study contributed to the importance of social norms in encouraging pro-environmental behaviors. Consistent with the

Table 3. The Different Effects of Emoji Use on Recycling Behavior by Social Norms.

Recycling behavior	Students without social norms			$\chi^2(1, N=45)=0.002$ p=0.965
	No Emoji ^a	Emoji ^b	Total	
Not Recycled	17 (70.8)	15 (71.4)	32 (71.1)	
Recycled	7 (29.2)	6 (28.6)	13 (28.9)	
Recycling behavior	Students with social norms			$\chi^2(1, N=76)=8.769$ p=0.003
	No Emoji ^a	Emoji ^b	Total	
Not Recycled	32 (84.2)	20 (52.6)	52 (68.4)	
Recycled	6 (15.8)	18 (47.4)	24 (31.6)	

^a Signage indicating "RECYCLE" on a plain white background was posted on dominant areas above recycling bins.

^b Signage indicating "RECYCLE" and a smiley face was posted on dominant areas above recycling bins.

significant role of social norms in pro-environmental behaviors (Thoo et al., 2022), this study identified the positive influence of social norms in college students' recycling behavior in the college cafeteria.

Practical industry implications include adapting incorporating simple, attention-grabbing cues, like emojis, near recycling bins. People unconsciously discard their trash into the trash bins. Exposure to the emoji can transform people's behavior from discarding everything into the trash can to engaging in recycling behavior. More broadly, the finding of effective emoji use could be applied in health communication. Using visual appeals in message-based health interventions was found to promote attitude and behavioral intention (Niu et al., 2020). Emojis are universally recognized visual symbols irrespective of the context, thus can be more readily employed than content-based visuals in various health interventions. Adding a smiley face next to calorie labels on menus would positively influence people's food selections. It is crucial to highlight that within the college cafeteria setting, leveraging tools that tap into social norms becomes imperative, as the mere presence of emojis alone may not yield substantial influence. Consideration could be given to placing recycling bins strategically in open, public areas rather than isolating them. Additionally, incorporating messages that evoke and reinforce social norms may prove to be beneficial in encouraging college students' recycling behavior. For example, it is advisable to use a majority message (e.g., "70% of college students advocate recycling") that captures attention through visually appealing designs. The message should be clear and simple, accompanied by credible sources (National Social Norms Center, n.d.).

Limitations and suggestions for future research

While this study provides useful implications, there are limitations. It was conducted in the college cafeterias to explore college students' recycling behavior and is, therefore, not ideal for generalizing recycling behavior overall. The proposed relationships can be applied to other foodservice domains contexts to increase the generalizability of the results.

This study explored the presence versus absence of emoji use and social norm on college students' recycling behaviors. Subsequent research could delve into additional facets of emoji use, such as the valence of emojis, to understand how different types may influence recycling behavior. Furthermore, exploring someone else's recycling behavior or relationship type could provide further insights.

This study did not examine potential differences between participants and non-participants. It's possible that individuals who recycled are more inclined to participate in the survey. While people might not be aware of the survey's focus before taking part, it would be beneficial to compare recycling behaviors between those who participated and those who did not. In addition, examining gender effects could be interesting, given that our study predominantly involved female students. Women tend to recycle more, support environmental regulations, possess greater knowledge of the scientific aspects of climate change, and express more concern about its effects (Somerville, 2018). This is often attributed to the perception among men that environmental behavior is feminine (Brough et al., 2016). Assessing the gender effect in various aspects, including the comparison between participants and non-participants, could offer deeper insights into understanding recycling behavior.

This study explored only recycling behaviors. Future research can explore various pro-environmental behaviors to investigate the impact of emoji use across different contexts. For instance, exploring the role of emojis in shaping college students' food waste reduction

behaviors, given that food waste in college cafeterias often signals issues to foodservice operations (Stein, 2021), would be a valuable avenue for future research.

It's important to note that this study specifically focused on the effects of emojis and social norms on actual recycling behaviors at on-campus cafeterias. However, it did not uncover the underlying mechanisms explaining why students exhibited these behaviors. The findings from this study prompt researchers to explore the potential mediators in the relationships between emojis, social norms, and recycling behavior. Investigating whether emojis trigger psychological reactions beyond simply capturing attention would be particularly interesting.

We should not take this planet for granted. Emphasizing the promotion of pro-environmental behavior, this study identified that social norms and a simple sign, such as emoji use, can serve as a persuasive cue to promote college students' recycling behaviors. Building upon this research, more research should be conducted to explore effective ways to promote recycling behavior with the aim of lowering the environmental harm to our precious planet.

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