Moments That Matter: Co-designing Just-in-Time Support for Disordered Eating Behaviors

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Abstract

Eating disorder (ED) is a psychiatric condition that involves behaviors like binge and restrictive eating with severe health consequences, particularly prevalent among young women. While technology interventions exist, they typically focus on retrospective reflection or general management, missing the time window when an ED behavior is taking place. In this work, we conducted co-design sessions with 22 young women experiencing EDs to develop ideas for Just-in-Time (JIT) interventions, followed by interviews with five experts specialized in ED treatment. We found that eating plays varied roles in participants' lives—from a means of gaining autonomy to automatic physiological responses—leading to design ideas including behavioral warnings, appetite management, food option redirection, psychological support systems, etc. By examining the characteristics of these designs with expert perspectives, we discuss what JIT support means for ED care and how to make it effective and sustainable.

CCS Concepts

• **Human-centered computing** → **Empirical studies in HCI**; **Participatory design**; *Ubiquitous and mobile computing design and evaluation methods.*

Keywords

eating disorders, just-in-time intervention, co-design, health behavior

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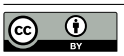

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1 INTRODUCTION

Eating disorders (ED) are psychiatric conditions including anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and other specified feeding or eating disorders (OSFED) [108, 130]. These conditions are characterized by an obsession with food, eating, and body image, often co-occurring with depression and anxiety [5, 118]. According to statistics, EDs are common worldwide: in Western countries, more than 7.3% of females and 2.1% of males are affected by EDs; in Asian countries like China, the rates among females aged 15 to 24 range from 1.3% to 5.21% [37]. While both biological (e.g., genes and epigenetic effects) and psychological factors (e.g., negative emotions and perfectionism) may contribute to ED behaviors [24, 125], sociocultural influences that associate thinness with beauty and self-value often play significant roles. This makes ED particularly prevalent among young women [55, 56, 120].

The treatment for ED often involves medication [124, 132] and psychological therapy [51, 105], combined with nutrition and diet management [53]. In psychological therapy, cognitive behavioral therapy (CBT) and interpersonal psychotherapy (IPT) are often applied to address individuals' inner struggles, distorted perception of body shape, and weight concerns [51, 105]. These approaches have shown effectiveness on early prevention of EDs by helping individuals build resilience against harmful media influences and foster a healthier relationship with their bodies [65]. Additionally, individuals experiencing ED may consult dietitians or nutritionists to receive personalized dietary plans that meet their health and weight goals [49, 84, 106].

At the same time, there has been technology support aimed at making ED support more accessible in daily lives. For instance, online education programs were widely used for ED prevention [44, 112, 115], and food journaling tools [60, 104] could help people reflect on their behaviors and practice mindful eating. In the HCI community, research on designing effective ED support systems has only emerged in the past decade [19, 20, 33, 34]. Some works focused on building tools such as social media plugins [20] and AI-powered chatbots [19]; others focused on examining technology appropriation for ED support, such as Eikey et al.'s study on how young women use weight loss apps for recovery [34].

While these works have advanced our understanding of individuals' needs for ED support, they primarily target promoting one's attitude towards food and reflections on their eating behaviors. Nonetheless, interventions that can enable ***immediate changes*** are equally important, particularly given that an individual's mental state can fluctuate significantly from the beginning to the end of an ED episode [35, 54, 82]. For example, one may experience a sense of excitement and fulfillment during a binge-eating episode but feels guilty afterwards [54, 82, 113]; or, in the case of restrictive eating, initial stress may eventually lead to a diminished sensation of hunger [35]. These temporal and emotional variations highlight the need for dynamically tailored support at different time points of behavioral episodes, which has not yet been adequately explored.

This kind of support aligns with the notion of **just-in-time (JIT)** interventions, which provides "*the right type of support at the right time*" [87]. For ED behaviors, there are promising opportunities to deliver behavioral interventions at several critical moments, such as when an urge to binge emerges or during periods of stress [9, 20, 101]. Additionally, with the rapid advances in wearable sensing technologies, it has become increasingly feasible to monitor physiological (e.g., glucose) and behavioral indicators (e.g., chewing actions) associated with ED behaviors in real time [61, 98, 102, 103], opening possibilities to mitigate ongoing ED behaviors. However, it remains unknown how to effectively communicate with individuals to regulate their behaviors and emotions during these moments.

As the first step in addressing this gap, we conducted individual co-design sessions with 22 young women experiencing ED, followed by interviews with five experts who specialized in ED treatment (professional psychological counselors, therapists, and psychiatrists). Specifically, we sought to answer: ***what design opportunities exist for JIT interventions to mitigate disordered eating behaviors, and what characteristics should such interventions embody?***

Our findings revealed various roles eating played in participants' lived experiences with ED behaviors, ranging from an emotional regulator and a means of gaining autonomy to an automatic physiological response and a social mediator. In response, they created multiple JIT design ideas, such as behavior warnings, appetite management, redirecting food options and attention, and situated psychological support to mediate the eating roles. These designs are characterized by features across sensory modalities, support forms, communication styles, and management objectives. For each feature, we incorporated experts' perspectives regarding the potential benefits and risks. Furthermore, some design ideas naturally incorporated use cases over time, such as recording individuals' responses to each JIT prompt for self-reflection. These ideas suggested participants' desires for embedding JIT interventions as building blocks into everyday support.

Drawing from the findings, we discuss what "just-in-time" means for ED care, focusing on the critical time points for intervention and related design features. The contributions of this work are threefold, grounded in both individuals' lived experience and ED professionals' clinical practice: (1) expanding the current understanding of eating disorders from a process-oriented, transdiagnostic perspective that views binge and restrictive eatings as two interconnected processes; (2) a micro timeline that maps an acute ED episode into distinct moments of receptivity (e.g., the impulse, start, and continuation of binge); and (3) implications of intervention characteristics tailored to manage the symptoms across an episode, and how these designs may support continued engagement over repeated use.

2 RELATED WORK

2.1 Eating Disorders (ED)

Eating disorders (EDs) are psychiatric disorders manifested as an obsession with food, eating, and body image [125]. While clinically classified into conditions such as anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and other specified feeding or eating disorders (OSFED) [108, 130], the most common behavioral patterns are restrictive eating, binge eating, and purging [125]. These behaviors often lead to severe health consequences, such as cardiac arrhythmias [7], dehydration, and gastrointestinal problems [121]. What is worse, mortality rates among individuals with EDs are nearly double those of the general population [108].

Various interconnected factors are associated with the development of EDs [24]. Biologically, genes and epigenetic effects, along with living environment, collectively contribute to the development of EDs [24]. Psychologically, negative emotions and neuroticism are found to closely tied to ED behaviors [24, 29, 35, 45]. For example, Espeset et al. found that many individuals with ED tended to inhibit their sadness and anger in social interactions and turn to restrictive eating and purging for coping [35]. Sociocultural pressures, especially the idealization of thinness, further intensify the risks by leading many young women to equate thinness with self-worth [55, 56, 120]. For instance, Ison et al. found that restrictive eating initially gave women confidence and control but later led to regret as their physical health declined [58]. Likewise, Dane et al. showed that social media use amplifies body image concerns and ED risk, particularly among women with higher BMI [26]. Together, these studies underscore the urgent need for accessible, effective support systems to help individuals navigate the complex biological, psychological, and sociocultural drivers of EDs.

2.2 Existing ED Interventions

Existing interventions for ED primarily combines psychological treatment and nutritional counseling [53]. Cognitive behavioral therapy (CBT) and interpersonal psychotherapy (IPT) are well-established approaches for mitigating bulimia nervosa (BN) and binge eating disorder (BED) [51, 105]. For individuals with anorexia nervosa (AN), therapy often involves personalized strategies, such as cognitive restructuring that helps one better recognize their body image and family member participation to promote treatment engagement [72, 122]. In severe cases, medications like olanzapine and desipramine are prescribed to manage weight fluctuations and co-occurring anxiety or depression [124, 132]. At the same time, nutritional counseling involves working with dietitians to create personalized meal plans based on individuals' health needs and recovery goals [49, 84, 106], along with education on weight management and body image to improve health literacy and reduce food-related anxiety [81]. In addition, we have seen strategies for early prevention of ED [65], including cognitive dissonance-based programs aimed at reducing an individual's pursuit of an unrealistic thin-ideal [25], mindfulness promotion focusing on directing one's

attention to the present moment in a non-judgmental way [10], and media literacy interventions that help young people learn to challenge unhealthy stereotypes on the Internet [126].

These strategies have also been expanded with technology support. Most commonly, mobile applications such as *Recovery Record* are designed to enable individuals to track their meals, emotions, and inner thoughts, with customizable eating reminders and health goals that can be shared with and configured by clinicians [104]. Recently, researchers have incorporated virtual reality (VR) and chatbots in ED support applications [19, 97]. For instance, Porras et al. used VR to simulate body figures with healthy BMI, which helped reduce the fear of gaining weight of AN individuals [97]. In another case, researchers also leveraged large language models (LLMs) to build WellnessBot, an empathetic chatbot specialized in ED support, which helped individuals make recovery plans and send tailored messages to encourage mindful eating [19].

Another line of research focuses on offering online consultation, education, and peer support, which allows people experiencing ED behaviors to communicate with clinicians through telemedicine platforms, and engage with self-care systems that analyze dietary data (e.g., meals, health goals, ED symptoms) to receive personalized advice [28, 93, 112]. Additionally, given the stigma that people with ED may face, there has been research on building peer support networks, where individuals can seek help, share experiences, and access nutrition knowledge [15, 33, 94].

These platforms, in a preventive or reactive manner, primarily focused on implementing and evaluating a one-size-fits-all solution, which has not accounted for the timing or stage of one's conditions, and thus may overlook moments during ED episodes with limited awareness [44, 51, 105]. A notable exception is FoodCensor, a social media plugin by Choi et al. that monitors users' digital food content consumption with reflective questions [20]. Through a field study, this approach successfully increased self-awareness about unconscious food content consumption habits and prompted healthier behaviors. Extending this work, we aim to explore other critical moments to mitigate ED-related behaviors as they emerge, unfold, and recur. This direction aligns with the notion of "just-in-time" interventions, which we elaborate on below.

2.3 Just-in-time (JIT) Health Intervention

The term "just-in-time (JIT)" originated in manufacturing, referring to producing or delivering materials exactly when they are needed [41, 57, 80]. Since then, the concept of JIT has been applied in various domains with an emphasis on tailored, instant responses, including education [12], and healthcare [21, 36, 59, 95, 116]. In health behavior change contexts, researchers characterize JIT interventions as "*providing the right type of support at the right time* [87]," by personalizing support to individuals' real-time needs [21, 95]. Advances in sensor and mobile technologies now allow continuous monitoring of individuals' physiological states and environments, enabling the possibilities of building JIT interventions to encourage healthy behaviors while discouraging unhealthy ones [36, 59, 89, 116]. For instance, Everitt et al. designed ImproveYourMood+ to prompt mindfulness exercises when negative moods were detected, reducing depressive thoughts [36]; Suh et al. used JIT prompts based on workload metrics, heart rate, and facial expressions to alleviate work stress [116].

In mitigating ED behaviors, recent research has begun to explore design opportunities for JIT interventions through continuous monitoring of physiological changes [98, 101–103]. For example, Presseller et al. showed that continuous glucose monitoring (CGM) could signal disordered eating by capturing hunger-satiety cycles [98]. Ralph et al. further demonstrated 91% accuracy in detecting ED episodes using machine learning on heart rate, electrodermal activity, and peripheral skin temperature [103]; their review also identified disorder-specific physiological patterns, such as reduced heart rate in anorexia nervosa (AN) and lower peripheral skin temperature (PST) in bulimia nervosa (BN) [102]. Following this approach, Juarascio et al. developed SenseSupport, a brief cognitive behavior therapy (CBT) intervention to reduce dietary restraint among individuals with BN and BED through CGM [61]. Through a 12-week experiment, the researchers found that individuals' intention of dietary restraint reduced more rapidly during JIT-on (push notification upon detecting relevant glucose changes) compared to JIT-off (treatment-as-usual) periods, demonstrating the potential for JIT interventions to augment existing support for ED [61].

While we see the technical feasibility to automatically and unobtrusively detect ED behaviors during or even before they occur in the near future, little research has examined how to design JIT interventions to act on these detections. Specifically, there is a lack of knowledge regarding what the critical intervention moments are, what forms of support are acceptable to individuals during these moments, how effective these supports can be from clinical perspectives, etc. Meanwhile, as ED recovery is often a long-term process, it warrants investigation into how JIT interventions can be integrated to complement mainstream approaches. Addressing this gap requires grounding designs in the lived experiences of individuals with ED and the clinical perspectives of experts. As an initial step toward addressing this gap, we start with a series of co-design sessions with young women experiencing ED, followed by interviews with domain experts to gather their perspectives on the design ideas.

3 METHOD

For the first step, we conducted individual co-design sessions with 22 young women to explore what types of JIT interventions they envisioned could support them in mitigating ED behaviors. Co-designing with end users has been widely adopted in healthcare research as a starting point to explore design opportunities, including health behavior promotion [30, 78, 90] and mental health support [43, 83]. This approach empowers users to actively contribute design ideas based on their lived experiences. Importantly, the co-designed artifacts are not treated as final solutions but as probes that reveal users' underlying needs that are difficult to articulate in conventional interviews [78, 128]. To complement individuals' limited clinical experience, we incorporated domain experts' perspectives by interviewing five ED experts, which helped evaluate the feasibility and effectiveness, as well as identify potential risks within the design ideas [43, 76, 78]. The study was approved by the authors' institutional ethics review committee.

3.1 Participants

Table 1: Participants' demographics and disordered eating experiences. All of them are female. For EAT-26 assessment, a total score of 20 or above is generally considered the threshold indicating risks of an eating disorder [32].

ID	Age	Occupation	EAT Score	Years of ED	Typical ED Behaviors	Struggles related to ED
P1	23	Social psychology grad student	49	2	Binge, restriction, purge	Body shape concern, gastrointestinal dysfunction, anxiety from ED behaviors
P2	23	Supply chain management grad student	51	3	Binge, purge	Stress from schoolwork and social relationships, fear of eating due to ED-related anxiety
P3	21	Computer science undergrad student	43	3	Restriction	Stress from schoolwork, food aversion, loss of appetite
P4	24	Sociology undergrad student, part-time model	62	4	Binge, restriction	Body shape concern, obsessive preoccupation with food and caloric intake, stress from schoolwork and menstruation
P5	27	Electrical engineer	42	1	Binge, restriction, purge	Body shape concern, linking self-worth to weight loss, self-denial
P6	22	Business administration undergrad student	37	2	Binge, restriction, purge	Body shape concern, linking self-worth to weight loss
P7	25	Product manager	32	1	Restriction	Body shape concern, self-denial, physical and mental exhaustion
P8	24	Business administration grad student	43	2	Binge, restriction, purge	Body shape concern, obsessive preoccupation with food and caloric intake, inflammation, irritability, anxiety from ED behaviors
P9	28	Commercial photographer	32	4	Binge, restriction, purge	Body shape concern, physical and mental exhaustion, relational difficulties
P10	20	Electronic and information undergrad student	27	0.5	Restriction	Stress from intimate relationship and schoolwork, loss of appetite
P11	18	Media integration tech & operation undergrad student, part-time actress	46	1	Binge, restriction	Strict body shape requirement of the actress work, stress
P12	28	Artwork designer	46	5	Restriction, purge	Body shape concern, physical and mental exhaustion, low immunity level, relational difficulties
P13	25	Chinese teacher	56	6	Binge	Body shape concern, self-denial
P14	22	Medical undergrad student	35	2	Binge, restriction	Body shape concern, self-blame, reduced work efficiency, anxiety from ED behaviors
P15	20	English undergrad student	33	6	Binge, purge	Body shape concern, gastrointestinal dysfunction, reduced work efficiency, relational difficulties
P16	21	Fashion design undergrad student	45	3	Binge, restriction, purge	Body shape concern, irritability, loss of appetite, stomachache, anxiety from ED behaviors
P17	27	Chemistry grad student	32	6	Restriction	Body shape concern, physical exhaustion
P18	24	Cultural industry management grad student	30	1	Binge	Body shape concern, stress from schoolwork, indigestion, anxiety from ED behaviors
P19	35	Corporate Lawyer	31	9	Binge, restriction	Stress from work, physical and mental exhaustion
P20	31	Human resource	36	2	Restriction	Body shape concern, stress from intimate relationship, loss of appetite, irritability, relational difficulties
P21	26	Unemployed	27	2	Binge, purge	Stress from work and menstruation, anxiety from ED behaviors
P22	21	Chemistry undergrad student	26	2	Binge	Stress from schoolwork, self-denial, stomachache, reduced work efficiency, relational difficulties, anxiety from ED behaviors

3.1.1 ED Participants. We recruited participants with ED from *RedNote*[1]. To meet the inclusion criteria, individuals must (1) be over 18 years old; (2) score over 20 in the EAT-26 test—the Eating Attitudes Test (EAT-26) [32], a widely used screening instrument for identifying symptoms and concerns characteristic related to eating disorders [40]; and (3) have interest in using technological solutions to manage their disordered eating behaviors. The third criterion was included because our study specifically investigates technology-enabled approaches to ED support. Recruiting participants with at least some interest in such solutions ensured the feasibility of design discussions and the relevance of insights to technology-mediated interventions. Among the 166 people who filled out the screening questionnaire, 52 met the inclusion criteria. We conducted and analyzed co-design sessions in parallel, continuing recruitment until we reached data saturation, a point at which no new insights related to our research questions emerged. After three consecutive participants without identifying new insights, we decided to stop recruiting additional participants, following a common sampling strategy in qualitative studies such as interviews [38]. As a result, we conducted co-design sessions with 23 participants in total. One participant was later excluded from analysis after it became apparent that their restrictive eating behaviors were primarily linked to prolonged engagement with mobile games rather than characteristics of an eating disorder, and thus fell outside the scope of our study. As such, we included data from individual co-design sessions with 22 participants for our analysis.

Table 1 presents an overview of the 22 participants' demographic information. All participants were young females aged from 18 to

[1] *RedNote* is a popular social media platform in China with over 200 million monthly active users: https://rednoteapp.cn/

35 (M = 24) who had exhibited ED behaviors for six months to nine years, with EAT-26 scores ranging from 26 to 62 (Mdn = 36.5). Fourteen participants are university students, including undergraduates and graduates from different majors such as computer science, management, and the arts. Two of these students had a part-time job as a model or actress (P4 and P11). Seven participants had a full-time job (e.g., electrical engineer, product manager, lawyer), and one was unemployed. Upon completing the co-design sessions, each participant received RMB 100 as study compensation.

3.1.2 ED Experts. To gather clinical perspectives on the designs created by the ED participants, we successfully recruited one psychological counselor, one psychotherapist, and two psychiatrists through *RedNote*, and another psychological counselor from a local charity organization dedicated to supporting individuals with ED. As shown in Table 2, these experts had extensive experience in treating EDs and worked in different clinical settings. Upon completing the interview, each participant received RMB 200 as study compensation, except E5, who declined the payment.

3.2 Co-design Sessions

Each session began with a warming up, followed by the co-design activity, and concluded with a debriefing interview. We conducted the sessions individually, rather than in groups, to capture the unique needs and circumstances of each participant and to minimize potential stigma [3]. All sessions were held online via *Tencent Meeting* [2] and were facilitated by one or two researchers. Each meeting lasted approximately 90 minutes.

3.2.1 Warming Up. To start, we introduced the research background and procedure, and invited participants to share their experiences related to eating disorders. We asked participants questions to understand the common triggers of their ED behaviors and how ED affected their daily life (e.g., "*When did you first become aware of your eating disorder and what was going on then,*" "*How has the eating disorder impacted different areas of your life?*"). We also invited participants to share a recent or memorable ED experience and whether they have used any coping strategies. These questions helped participants organize their thoughts and enabled us to understand their main struggles.

We then provided participants with an overview of physiological measures that can be used to indicate ED behaviors, including glucose, blood pressure, heart rate, heart rate variability, electrodermal activity, and peripheral skin temperature [102]. Next, we introduced the concept of JIT intervention, explaining how changes in these physiological indicators could enable timely, context-aware support. This exchange of information was essential for mutual learning between designers and participants in co-design activities [100], as it helped participants contextualize the concept of JIT design through concrete examples and reflect on moments when they engaged in ED behaviors, thereby effectively preparing them for the subsequent design activity (Figure 1 (A and B)).

3.2.2 Design Activity. After the warm-up session, we asked participants to envision JIT support systems aimed at alleviating their ED behaviors at the moment when these behaviors occur. Participants illustrated their ideas using *Excalidraw*[3], which is an online whiteboard that has been employed in prior co-design research [131]. To facilitate design ideation and foster a comfortable idea-sharing environment, we emphasized that (1) the primary goal of the co-design activity was for participants to express their thoughts and needs through visual creations rather than to evaluate their designs, and thus aesthetic quality and technical feasibility were not important; (2) they had full freedom to choose any device or platforms; and (3) they were encouraged to incorporate any additional features to complement their design. To provide additional design inspirations, we followed practice in prior co-design research [76, 128], prompting participants with examples of possible devices and platforms, including computer software, mobile apps, smartwatches, robots, and prepared functional widgets that they could directly use, such as notification banner, chatbot icon, and simple line charts of physiological data, as shown in Figure 1 (C).

During this process (Figure 1 (D)), we actively invited participants to consider their JIT support system design regarding (1) the ED behaviors it should monitor; (2) at which moments it would be activated; (3) the ways they preferred to respond to and interact with the system; and (4) the reasons for their design decisions. The design sessions followed a think-aloud approach, in which participants described their ideas while drawing on the shared whiteboard. Researchers supported this process by helping record participants' thoughts, refining their design drafts, and asking follow-up questions, such as "*why would this design help mitigate your ED behavior*?" and "*how can this design address your concerns mentioned earlier?*" Afterwards, the researcher worked with participants to construct a timeline mapping each intervention idea around the time points when the target behavior is supposed to occur.

3.2.3 De-briefing. At the end of the session, we asked participants to review their designs, identify the most important components, and any aspects of the designs they wished to improve. Finally, we expressed our thanks for their participation, and concluded with supportive remarks encouraging them to pay more attention to their well-being and build a healthier and comfortable relationship with food in the future.

3.3 Expert Interview

We conducted expert interviews after thematically coding 15 participants' co-design session data, which summarized design ideas focusing on different intervention moments and interaction forms. As shown in Figure 1 (E–G), each interview started with our introduction of the research goal—exploring opportunities for JIT support system design to mitigate ED behaviors, along with an overview of our ED participants (e.g., demographics, typical behaviors), and the design ideas they created. Next, we presented a set of representative ideas according to our initial themes (e.g., multisensory appetite management, various supporting devices, and agent roles), and invited expert participants to share their thoughts. These included the interpretation of the underlying needs that the ideas reflected, their clinical relevance, implementation feasibility, improvement suggestions, or potential misconceptions that the ED

[2] *Tencent Meeting* is a cloud-based video conferencing software: https://meeting.tencent.com/.

[3] Excalidraw is a collaborative online whiteboard featuring commonly used digital drawing widgets: https://excalidraw.com/

Table 2: Demographics of the ED expert participants, backgrounds, and related experiences. AN = anorexia nervosa, BN = bulimia nervosa, BED = binge eating disorder, OSFED = other specified feeding or eating disorders.

ID	Age/Sex	Professional Qualification	Work Setting	Years of Practice	Expertise
E1	30/M	Psychological counselor	Private clinic	3	Cognitive behavioral therapy for AN, BN, and BED
E2	49/F	Psychiatrist	Tertiary Hospital	30	Cognitive restructuring and medication for AN, BN, BED, and co-occurring anxiety and somatic symptoms
E3	26/F	Psychotherapist	Tertiary Hospital	1	Dialectical behavior therapy for AN, BN
E4	36/F	Psychiatrist	Tertiary Hospital	6	Cognitive behavioral therapy combined and medication for AN, BN, and co-occurring mental illness
E5	40/F	Psychological counselor	Charity organization	15	Psychological counseling for AN, BN, and OSFED

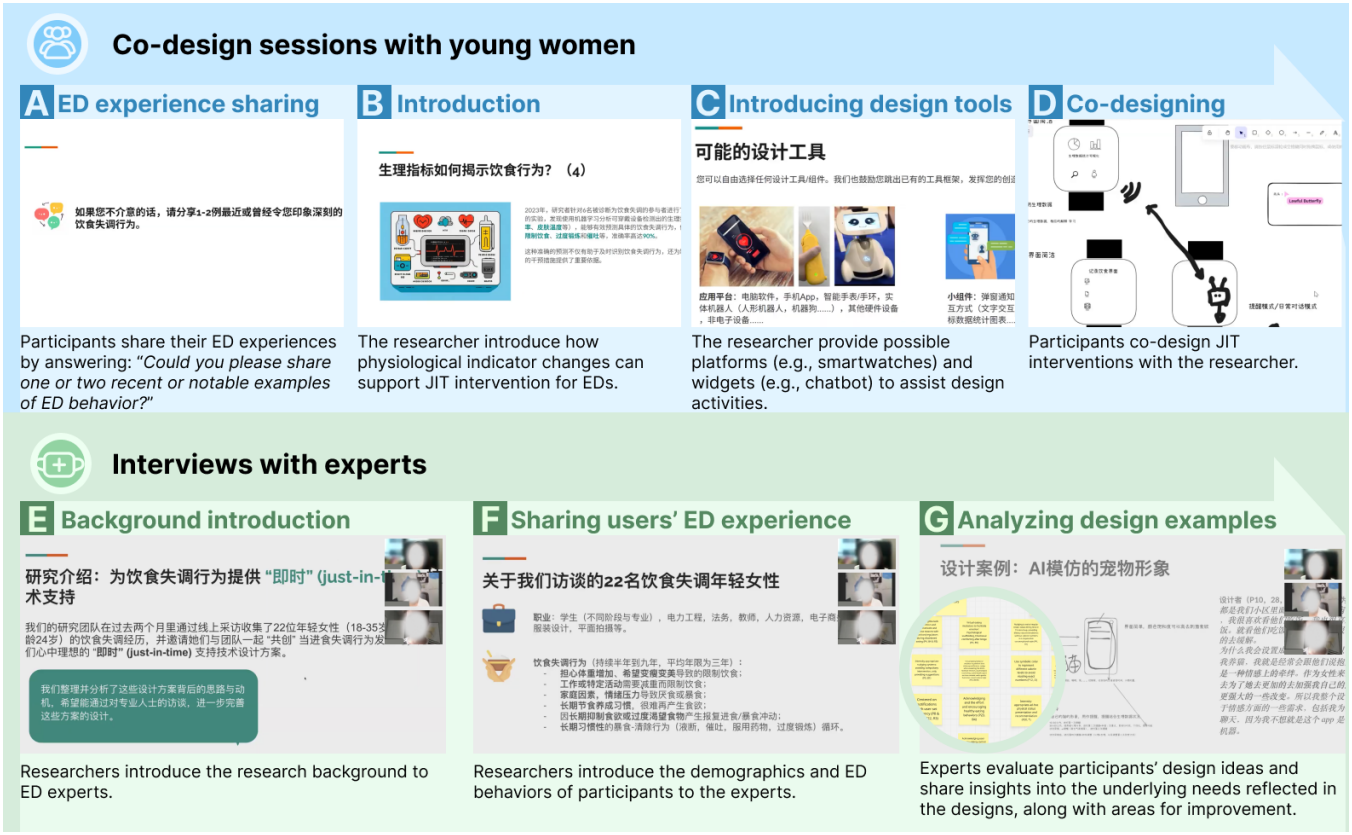


Figure 1: The procedures of co-design workshops (A–D) and interviews with experts (E–G), introduced by online meeting screenshots. As our ED participants and experts are native Chinese speakers, the workshops and interviews were conducted in Chinese. We provided English text descriptions for each phase.

participants may have. Each interview session lasted approximately one hour.

3.4 Data Analysis

For each co-design session, we recorded warm-up and debriefing interviews, the design process, and final design outcomes. All conversations were transcribed verbatim, and the design outcomes were organized. Expert interviews were also recorded and transcribed. In total, the dataset included 22 co-design sessions and five expert interviews, resulting in 27 recordings and approximately 40 hours of material.

To contextualize participants' design ideas within the timings and triggers of ED episodes, we first employed a bottom-up thematic analysis approach [13] to identify their behavioral patterns. The analysis started with independent coding involving the first (A1) and second authors (A2), where A1 analyzed data from 14 co-design sessions and A2 analyzed data from another four co-design sessions. They coded instances of disordered eating and related explanations using preliminary codes like "*food as a reward*" and "*eating as a venting channel*," which were later discussed with the full research team. After iterative discussion, we decided to adopt the framing "the role of eating" to describe ED behavior triggers

and consequences. The themes that emerged during this process included *emotional regulator* and *physiological response* to represent the different roles of eating. Then, A1 completed coding the remaining data using the themes developed, and the results were discussed with the research team for further validation and group consensus through weekly meetings.

In parallel, we examined participants' design ideas through a three-stage analysis. First, we clustered the ideas according to their intended functions, resulting in categories of technologies. Second, following a similar approach to analyzing eating roles, we identified cross-cutting characteristics across design ideas among the technology categories, resulting in overarching themes like *multi-sensory nudging* and *strict vs. gentle communication*. Third, we analyzed expert interviews to evaluate their clinical relevance, desirability, and potential risks participants might overlook. Additionally, we analyzed participants' ideas of extending these JIT designs to sustainable healthy eating habit formation, with findings triangulated using expert interview data.

We did not conduct an inter-rater reliability test because of the small sample size and our collaborative approach to coding. Instead, the research team discussed and refined all analyses and themes until consensus was reached, which is considered by qualitative scholars to provide stronger reliability than statistical agreement measures alone [91].

4 Findings

In this section, we first present the roles of eating in relation to participants' disordered eating behaviors, providing a foundation for situating their design ideas. We then offer an overview of these ideas and highlight their shared characteristics, which together inform potential future design solutions discussed in the following subsections. Figure 2 illustrates an overview of the findings.

4.1 The Roles of Eating in ED Behaviors

By analyzing participants' accounts of their diet practices, including the people, objects, and events that frequently triggered their ED behaviors as well as the consequences that ED led to, we identified five distinct roles that eating played in their lives: *means of gaining autonomy, emotional regulator, source of stress, physiological response, and social mediator*, as summarized in Table 3. Below, we elaborate on each of these roles.

First, participants pursuing fitness or weight loss for appearance goals often viewed controlling eating behaviors as a *means of gaining autonomy*. Some of them associate body image with self-value and capabilities: " *I want to look good because it proves that I can control my weight and have the ability to do so*" (P5). Others restricted their eating to comply with social or professional expectations, from modeling standards (P11) to university interview (P18). While restrictive eating was typically framed as goal-driven, experts pointed out its underlying motivation often stems from the desire for control through dietary and body regulation: "*By restricting their diet, individuals may experience a sense of empowerment—while they may feel unable to control aspects of their lives, such as academics or work, they can manage their food intake*" (E1).

Second, participants relied on eating as an *emotion regulator*. Some described food as a natural source of pleasure and comfort: "*I have always had a strong craving for food since I was young... I think there is genuine joy in the process of eating*" (P18). Others turned to food to cope with negative emotions such as stress and anxiety. For instance, after disrupting a lab-mate's experiment, P22 blamed herself and vented out through "*having three dishes and eating breads for half an hour.*" Yet, while eating initially offered a sense of relief or control, it often spiraled into a loss of control, most commonly in the form of binge episodes. As P19 disclosed: "*I felt a lot of work and psychological pressure. During that time, I often found myself eating a lot... I might have already been full or stuffed, but I would keep eating.*" In the meantime, negative emotions can lead to a loss of interest and appetite for food, causing unconscious restrictive eating: "*After the breakup, I lost my appetite and couldn't eat at all*" (P10).

Third, while helping with emotion coping, eating itself could be a *source of stress* for participants. After regaining clarity from binge episodes, many participants reported feelings of regret and guilt for being dominated by food. Over time, recurring binge cycles stimulated persistent concerns about calorie intake, body image, others' judgment, and self-esteem. For instance, P1 admitted "*I don't want others to notice that I've gained weight, as they might think I haven't been putting in effort in study recently.*" Additionally, binge-eating can disrupt daily routines and metabolic cycles, as P15 disclosed: "*After school around 10:30 pm, I also ate a large amount of food to relieve stress, and then I ended up throwing it up. By the time I was done, it was already past midnight.*"

Fourth, after experiencing ED for a sustained period, eating becomes an automatic *physiological response*. Rather than simply satisfying hunger, participants reported intense cravings often triggered by long-term restriction or physiological cycles such as menstruation, which often escalated into severe binge eating. For instance, P15 expressed: "*I planned to give myself a cheat day each week... As time went on, it escalated even more, and I began to experience binge eating. Now, it's become common for me to binge every couple of days.*" Conversely, cycles of binge and restriction also left participants with physical discomfort and health consequences: "*I've been feeling anorexic lately because I've been eating very little... I find myself lying in bed all day, completely drained and lacking motivation, and I've even experienced hair loss*" (P3).

Additionally, eating also acts as a *social mediator*, shaping participants' social relationships. They reported reduced capacity for social engagement due to the physiological and psychological toll from ED, while families and friends expressed concerns about their abnormal eating patterns: "*My parents are always very concerned about me... my family does not mention weight in front of me. They worry it might hurt my self-esteem*" (P12). Relatedly, P9 shared that during a period of restriction, attempts by family members to intervene could escalate tensions: "*I knocked over the food to express my anger and my mother cried.*"

Table 3: Roles of eating in participants' lives and associated ED behaviors.

Eating role	Description	Enactment in our data	Relationship with ED	Description
Means of gaining autonomy	Controlling eating as a means of gaining the ideal body shape for realizing self-value.	Eating as a way to meet social expectations (P1, P4, P5, P11, P18)	Trigger of restriction and purge	Engaging in restrictive eating to manage work requirements.
		Eating as a compensation for lost control in life (P9)		Restricting diet or purging to regain the lost control in life.
		Eating as a pathway to achieve ideal body image (P1, P4–P9, P11, P12, P14, P15, P16, P20)		Restricting eating to attain an ideal body image and recognition from others.
Emotional regulator	Eating generates happiness or vents negative feelings, but may also be abandoned during emotional distress.	Eating naturally brings positive emotions (P4, P13, P18)	Trigger of binge	Finding joy in food, and could not help eating.
		Eating as a venting channel (P1, P2, P4–P8, P11, P13–P16, P18, P19, P21, P22)		Seeking temporary relief from stress in real-life challenges by turning to food.
		Eating as a neglected matter (P3, P10, P20)	Trigger of restriction	Losing interests in food due to emotional suffering.
Source of stress	Eating creates negative emotions, causing food obsession over time.	Eating causes immediate regret or guilt (P1, P2, P5, P6, P8, P9, P11, P15, P16, P18, P19, P21)	Consequence of binge	Experiencing regret and guilt about binge eating as it disrupts their diet plans, schedules, budget, and increases weight concerns.
		Eating causes constant mental battle or inner struggle (P1, P2, P4, P5, P8, P9, P13, P15, P17, P22)	Consequence of binge and restriction	Becoming overly concerned about eating, such as by meticulously calculating calories, expressing anxiety and self-doubt, and worrying about weight gain or others' views.
Physiological response	Eating becomes an automatic and negative physiological response.	Eating as an impulsive behavior to fulfill physiological urges (P4–P9, P15, P18)	Trigger of binge	Experiencing strong food cravings, especially after long restriction or when they are in menstrual cycle.
		Eating as a source of physical discomfort or disease (P1–P22)	Consequence of binge and restriction	Experiencing physical discomfort after binge eating or prolonged restrictive eating, which may result in health issues.
Social mediator	Eating shapes one's social activity and relationships with others.	Eating diminishes one's willingness and ability to engage in social activities (P1–P3, P5, P8, P9, P11, P20, P22)	Consequence of binge and restriction	Constant disordered eating can create passive attitudes and emotional states, leading to a loss of interest in social activities.
		Eating strains one's social relationships (P9, P11, P12, P19)	Consequence of binge and restriction	Experiencing disordered eating can make participants express negative emotions (e.g., anger, anxiety) towards others or cause distress and concern among those around them.

4.2 Just-in-Time (JIT) Support: Moments and Types of Interventions

After contextualizing the roles that eating played in participants' daily life, and how these roles are linked to ED behaviors (specifically binge and prolonged restriction), we constructed a timeline depicting how ED behaviors unfold and highlight the moments where participants envisioned receiving just-in-time" support.

As shown in the middle part of Figure 2, we found that participants conceptualized intervention moments differently for binge versus restrictive eating. For binge eating, they identified a sequence of intentions and actions, from the initial impulse, starting, continuing, to finally stopping the binge. Participants (P6, P8, P15, P22) reported that sometimes, they experience binge "cycles," where the end of a binge episode is followed by the impulse to binge again. For restrictive eating, where such clear behavioral boundaries are often absent, participants instead differentiated moments by the severity of health consequences (i.e., absent eating at meal times to prolonged restriction, and to constant, habitual restriction). Furthermore, they highlighted a cyclical connection between these two behaviors, echoing the roles of eating described earlier (e.g., source of stress and a physiological response). For example, habitual restriction can trigger compensatory binge eating, while binge may erode self-esteem and prompt restriction in turn.

Across this timeline, participants brought up several JIT interventions to mediate the roles of eating described in Table 3. While these intervention designs aimed at mediating different roles, most of them address eating as a source of stress and physiological discomfort, which are two immediate negative consequences of ED behaviors. In the following, we describe these intervention ideas with details:

- ***Eating behavior warning***: notifications to alert participants of ongoing or impending ED episodes, which are designed to mitigate binge eating at all action moments unless the behavior stops, as well as the early stages of restriction. The most common ideas involved lightweight nudges such as vibrations or visual alerts that highlighted physiological indicators like glucose levels, blood pressure, or heart rate, as shown in Figure 3 (A). In more severe situations, participants envisioned punitive warnings to "force" behavior regulation (P1, P5, P13), for instance, by signaling potential weight gain

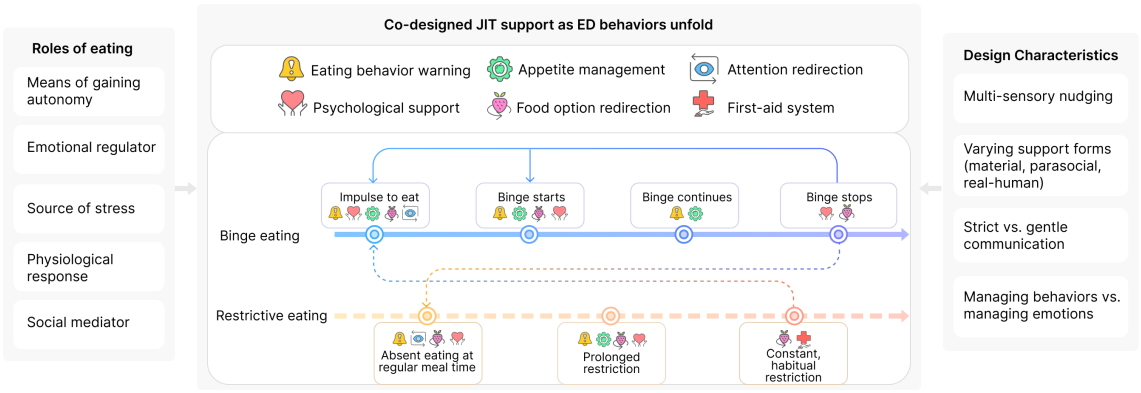


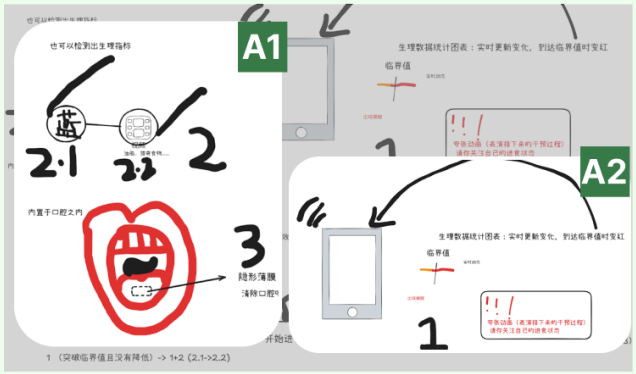
Figure 2: An overview of the findings from our co-design workshops and expert interviews. On the left side, we summarized the roles that eating played in the daily life of participants who experience eating disorders (ED). In the middle, we constructed a timeline mapping participants' co-design ideas of just-in-time (JIT) support as their ED behaviors unfold: intervention moments in binge eating were organized by a sequence of intentions and actions, whereas moments in restrictive eating were organized by the severity and persistence of restriction. This timeline also shows how binge and restrictive eating often occurred interchangeably, with one episode leading to the other. On the right side, we highlighted the key characteristics of these JIT interventions created by participants, incorporating experts' perspectives.

and health risks or aversive haptic feedback like electronic shocks or heat stimuli.

- ***Appetite management***: sensory stimuli designed either to suppress appetite across binge episodes (P1, P13, P18) or to stimulate appetite during prolonged restriction (P9). Ideas for appetite suppression included smart glasses that visually block food or oral patches that mask food smell. For increasing appetite during restriction, P9 proposed playful food emojis to encourage eating. By regulating appetite, participants aimed to manage the *physiological response* of food craving urges, which may trigger binge eating.
- ***Attention redirection***: interventions that redirect attention away from mental struggles related to eating when binge or restriction just begin to emerge. Typical scenarios include one experiencing an urge to binge or a loss of appetite due to negative emotions. For example, P22 envisioned technology could redirect her attention to activities that are not food-related, such as listening to music and practicing meditation, as presented in Figure 3 (B). This redirection support could manage the *physiological response* of binge impulses and served as *emotional regulators* that help reduce the negative emotions associated with EDs.
- ***Psychological support systems***: tools offering emotional encouragement, coping strategies, or therapeutic prompts, which are brought up to regulate one's emotions and behaviors at all identified moments, except during continuous binge and habitual restriction. Participants designed virtual agents to provide companionship, stress relief, or outlets for emotional expression when ED behaviors were linked to anxiety and negative self-perception. Some of them hoped the system could serve as a contact medium for their close relationships, such as family members and trusted friends, to disclose their feelings and receive comfort. Participants anticipated that these tools would function not only as *emotional regulators* but also as instruments to cultivate positive self-worth and body image perception, thereby reducing their dependence on eating as a *means of gaining autonomy* and their experience of constant mental struggle as a *source of stress*. Some participants (P3, P6, P8, P10, P19, P21) hoped technology can connect them to real humans for emotional support. This can help *mediate their social relationships* by enhance understanding from trusted contacts and maintain their social connections.
- ***Food option redirection***: food recommendations that guide food choices toward healthier options at all identified critical moments, except during continuous binge. As illustrated in Figure 3 (C), when eating impulses were detected, participants expected lighter alternatives with a healthy quantity; during restrictions, they suggested the system offering nutritionally balanced diets to mediate their *physiological responses* of appetite loss. Alternatively, after binge or restriction episodes, participants hoped the technology would recommend compensated foods to help recovery and avoid negative health consequences.
- ***First aid***: safety action for addressing severe *physiological responses*, which often occur during constant, habitual restriction. Participants hoped that such aid can automatically alert emergency services upon detecting critical conditions (e.g., fasting-induced arrhythmias), as shown in Figure 3 (C).

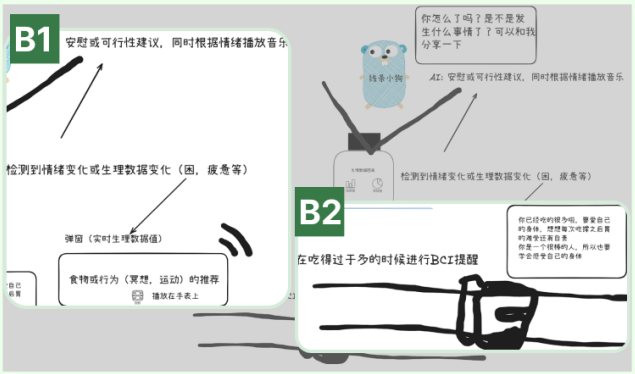
4.3 Design Characteristics of Interventions

For the abovementioned intervention ideas, we highlight their key characteristics with expert perspectives in the following: (1) multi-sensory nudging for behavior warnings and appetite management, (2) varying forms of support ranging from attention redirection to psychological comfort, (3) strict versus gentle communication styles for influencing eating behaviors, and (4) different focuses on managing behaviors versus addressing emotions (see the right side of Figure 2).



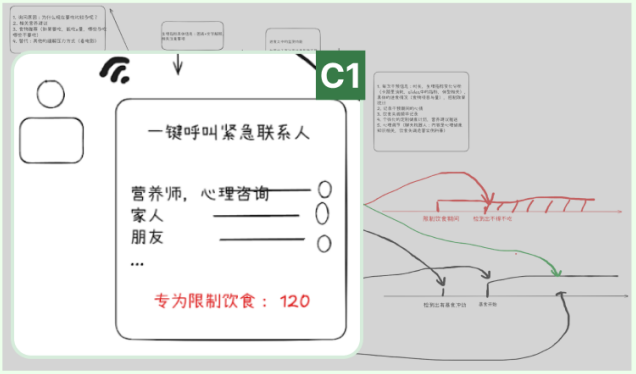
Appetite management (A1)
P18 designed a "three-step" system to suppress binge eating: (1) a blue vision background, (2) videos about greasy food, and (3) an oral patch that neutralizes smell and taste.

Eating behavior warning (A2)
The same participant also created a behavior warning system based on real-time physiological changes to remind themselves stop eating with text messages and vibrations on their phone.

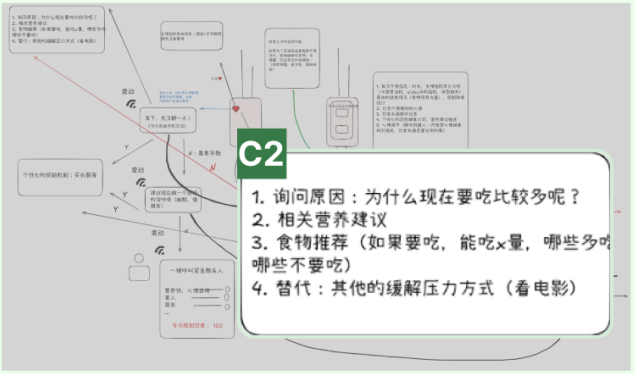


Redirect attention (B1)
P22 designed a system that automatically plays relaxing music, suggests meditation/exercises to redirect their attention from food when binge impulses triggered by negative emotions.

Psychological support (B2)
The participant also designed a "smart belt" to detect satiety levels. If binge eating continues, it would initiate a conversation with a mobile agent about self-worth and promote awareness of physiological sensations.



First-aid system (C1)
If physiological states signals health risks during constant restriction, P6 hoped that they could dial the emergency number with just one click.



Food option redirection (C2)
The participant anticipated that during restriction periods, the JIT support should provide nutritional suggestions tailored to their physiological states; during binge eating, they wanted the system to offer healthy food options with appropriate portion sizes.

Figure 3: Three examples of just-in-time (JIT) designs created by ED participants. Each example presents two ideas with distinct functions: appetite management (A1) and eating behavior warning (A2), redirect attention (B1) and psychological support (B2), as well as first aid system (C1) and food option redirection (C2). C1 and C2 are from the same participant's design. The key design elements are highlighted in corresponding screenshots. We provided English explanations for each design example, as the corresponding screenshots include Chinese.

4.3.1 ***Multi-Sensory Nudging.*** Participants frequently referred to systems with multi-sensory features, including visual, haptic, and auditory alerts, sometimes supplemented by chemosensory or somatic stimulation.

Specifically, visual nudges were designed to catch participants' attention on their ongoing ED behaviors (P1–P3, P8, P9, P12). For example, P3 expected a visually striking warning sign presented on a smartwatch when binge eating is detected. Others anticipated visual presentations to help manage appetite (P1, P9, P13, P18). For instance, after experiencing ED for four years, P9 often found themselves unconsciously fasting; they created a reminder interface using high-saturation colors and appealing food emojis, hoping to

promote their motivation to eat: "*I would like to use food emojis as a way to signal mealtimes. I find that looking at them often boosts my appetite, or at least makes me feel better.*" In contrast, P1, P13, and P18 hoped to control their binge behaviors by suppressing appetite; they mentioned using blue backgrounds or mosaic patterns to obscure food or food images they desire. In addition, as shown in Figure 3 (A), P18 suggested using a lightweight patch to be placed inside their mouth that can neutralize the smell and taste of food, which could further reduce their urge to eat: "*I get lots of pleasure by tasting the rich flavor of food. If those feelings were taken away, I would probably stop binge eating since it would not be enjoyable anymore.*"

For haptic prompts, they were commonly designed on mobile phones or wearable devices with varying intensities, from light vibrations (P2, P4, P5, P7, P8, P12, P13, P16, P21) to strong somatic stimulation (P5, P13). The intensity variation aligned with the severity of ED behaviors. For instance, P8 preferred synchronized light vibration alerts as the initial nudge to facilitate real-time recognition of early binge eating behaviors. P5 designed haptic interventions that delivered electronic shocks when prolonged binge eating continued: "*If I ignore the warning and keep eating, it (the smartwatch) could deliver a 'punishment' causing slight pain.*" They also expected the smartwatch to provide thermal feedback when restrictive eating continued despite earlier warnings.

In designing auditory nudges, most participants simply used them as a one-way alert of their ED behaviors through ringtones (P1, P3, P5, P7–P10, P15, P17, P18, P20, P22). Besides, some participants hoped that upon receiving the audio alert, they could enter into a conversation to "negotiate with" the alerting system through voice interactions (P1, P2, P5, P9, P10, P16, P19, P22). This could help them release negative emotions or receive some coping suggestions. For instance, in managing restrictive eating, P16 preferred talking with a virtual agent, which could provide dietary recommendations balancing health and taste. In handling binge eating, due to privacy concerns, P2 and P22 envisioned that audio-based interactions could be transformed into brain signals for communication: "*I want the voice to go directly into my brain, so that just me can hear it*" (P22).

Expert perspectives: E1 and E5 noted that sensory stimuli were already used in practice, such as suggesting clients hold ice cubes or smell peppermint oil to keep calm, which could reduce binge urges. However, they emphasized that the therapeutic purpose of sensory stimuli is to reconnect individuals' mental awareness with their bodily feelings (e.g., hunger and satiety) rather than to block their sensory channels. In particular, E5 expressed concerns regarding the design ideas that forcefully interrupt appetite (e.g., the patch inside the mouth that could neutralize the smell and taste of food): "*They (P18) said that they really, really love eating, but now they want to take that happiness away. You can imagine if they are forced not to eat (by blocking sensory channels) and don't find new ways to vent, they may quickly collapse.*" Instead, E5 recommended reconstructing sensations of taste and satiety to encourage intuitive eating, an approach that would allow individuals to better recognize fullness and stop eating more healthily and sustainably. To conclude, while multi-sensory stimuli can be useful in mitigating ED behaviors, they should serve to connect one's mental awareness to their bodily sensations, not to suppress them or to punish individuals.

4.3.2 ***Varying Supporting Forms: From Material and Parasocial to Real Human***. Participants' design incorporated varying forms of support, ranging from material support (non-agentic interfaces or objects without simulating social interaction) to parasocial support (virtual agents with anthropomorphic features). In some cases, participants would like the system to act as a bridge, which could connect them to a real human (e.g., family members, peers, clinicians) for help.

By analyzing the design ideas featuring purely material forms of support and their related rationale, we found that participants showed a strong aesthetic need for potential design interventions. Specifically, they chose decorative objects such as a necklace (P12), rings (P7, P21), and a wristband or smartwatch compatible with their dressing style (P4, P16). Some highlighted that the background of the user interface needs to be images or photos of their favorite drama or celebrities (P2, P5). As participants explained, these aesthetic needs were closely tied to their self-identities or values around beauty and attractiveness. In turn, this connection would motivate them to engage with the technology in daily life: "*I need the wristband as a fashion icon; even if I am not aware of its notifications, I am still willing to wear it in daily life*" (P4). Meanwhile, we found that some material form of support were intended to uphold participants' privacy in public spaces (P2, P9, P15, P17). For instance, P15 wanted their smartwatch (dedicated to ED behavior detection) to resemble the look of traditional watches. P2 customized a vocabulary of visual symbols to discreetly communicate their eating disorder behaviors, using symbols like a red heart to signify binge eating in a way that only they could understand.

On the other hand, participants incorporated parasocial support into their designs, including ideas such as chatbots, embodied avatars, or virtual companions capable of offering encouragement and emotional comfort (P1–P3, P5, P9, P11, P14–P16, P19, P22). Some envisioned these virtual agents as modeled on real humans, such as their trusted friends (P1, P15, P19), idols (P16), or experts in nutrition and psychology (P2, P5). The goal was to receive immediate support whenever needed without imposing their needs on others. For instance, P1 created a virtual agent to simulate their close friend, who has a medical background and always spoke in a serious tone, with whom they wished to have "video chats" while eating to help regulate how much and how fast they ate. To enhance the interaction experience, P1 suggested uploading photos and videos of this friend for the agent to mimic the facial expressions and tones of voice. Meanwhile, some participants preferred interacting with their favorite cartoon characters or virtual pets, which, while not resembling humans, could still display parasocial behaviors (P3, P9, P11, P14, P22). For example, P9 designed the virtual image of their cat to encourage eating during their restriction period, noting that since they had adopted the cat when it was a sick stray and enjoyed preparing food for it, their emotional bond deepened: "*It is an emotional bond. I can strengthen my willpower to make more changes for their (the cats) sake*" (P9).

While the forms of materials and parasocial support were frequently used to mitigate ED behaviors, several participants highlighted that they also expected support from real humans (P3, P6, P8, P10, P19, P21). Therefore, their technology design acted as a bridge to connect them with family members and professional psychological counselors for help: "*If someone still refuses to eat despite reminders, there may be underlying reasons that technology can't address. In such cases, it can be helpful to share these reasons with*

supportive parents or friends who are there for you" (P3). Relatedly, P6 suggested: "*I believe that prolonged restriction stems from anxiety. Thus, it is necessary to include a function for direct contact with psychological counselors.*"

Expert perspectives: Experts generally affirmed the potential of AI-powered virtual agents to act as eating mediators, adapting roles to participants' individualized needs (E2, E4, E5). They noted that such agents could provide accessible, always-available support and even create a safe space for sharing personal thoughts and feelings: "*Fear of criticism from society often makes some patients hesitant to disclose their situations. AI agents provide a more comfortable way for self-disclosure and help uncover their underlying concerns*" (E4). At the same time, they all highlighted the necessity of involving human support, which offers unique emotional resonance and a sense of being genuinely understood. They cautioned that exclusive reliance on AI could foster overdependence, while interpersonal connection and social exposure are critical for recovery, as E5 pointed out: "*(The design should) try to push ED participants to interact more with others, meet and have actual conversations with real people instead of relying solely on AI.*" Taken together, experts recommended a hybrid approach that leverages both the convenience of agents and the empathetic understanding from real people.

4.3.3 ***Strict vs. Gentle Intervention.*** From analyzing participants' design ideas involving communication with JIT systems, we identified two contrasting approaches: strict interventions that focused on behavior enforcement with limited flexibility, and gentle interventions that favored flexible suggestions and user autonomy. Participants who doubted that simple reminders could help them manage ED behaviors often proposed stricter interventions (P1, P8, P13). They expected direct and sometimes confrontational feedback, which involved revealing "sensitive information," such as the calorie count and projecting negative consequences of health and body image (P1, P13). For example, upon detecting binge eating impulse, P13 proposed a simulation that dynamically illustrated how glucose levels would fluctuate after eating unhealthy foods, while P1 envisioned a "distorting mirror" that exaggerated body size changes. P1 also wanted their virtual agent to speak in a controlling tone: "*Stop eating now! You just promised me that you would only eat a bit!*" Similarly, P8 designed repeated reminders that encourage regular eating and made it strict to disable this intervention during restrictive periods, where they had only three chances per month to skip meals for urgent work or study tasks. Taking this a step further, some participants sought to escalate the interventions if prior warnings were ignored in both restriction and binge episodes (P1, P5, P9, P13, P18). For instance, P5 and P13 designed punitive signals, such as electronic shock, when they could not stop binge eating. P9 further proposed: "*if I cannot control my ED impulse, I hope my virtual cat would show an angry face to me.*"

In contrast, some participants preferred gentle, friendly, and occasionally humorous interventions that prioritized their agency (P3, P4, P7, P19, P20, P21). P4 expected the JIT system to focus on dietary suggestions rather than strict behavior regulation: "*Rather than restricting me from eating certain foods, it would be better if it provided suggestions for alternative foods.*" Similarly, P20 designed simple reminders to eat without endless follow-ups: "*whether I follow it (the alert) is up to me. I don't think further follow-up is necessary.*" Even when allowing ED behaviors to occur, some participants wanted the technology to acknowledge their struggles and provide encouragement for future improvement (P2, P11, P15, P22). When it came to revealing sensitive information, P11 underlined that including calorie counts in the alert messages was "*absolutely not allowed,*" stating that it would cause them to "*drop into the trap of struggling with weight.*" Meanwhile, P19 highlighted the system should provide a physical data report one day after their binge episode for later reflection, as they felt "*monitoring every minor detail in-situ might actually cause more anxiety.*"

Expert perspectives: Experts unanimously agreed that strict communication is neither appropriate nor feasible for ED support. They cautioned that punitive tones, angry expressions, or calorie-focused messages could increase psychological stress, trigger resistance, and reinforce restrictive mindsets, ultimately perpetuating the restriction-binge cycle. Experts interpreted that the preferences for strict interventions might reflect participants' inner perfectionism and desire for control (E1, E2, E3), noting that they might have expected strong interventions to restore a sense of security from eating. Nevertheless, experts recommended replacing strict tones with mild and supportive communication and avoiding calorie counts altogether. Expanding on this principle, E1 proposed a "mode switching" approach that allows moderately intensified JIT interventions, including persuading individuals to stop current ED behaviors, as a situational mode, while maintaining motivation-focused encouragement as the default mode to balance efficacy during acute ED episodes with gentle support in daily use. To summarize, experts believed that strict interventions may exacerbate individuals' ED conditions; thus, they advocated for more friendly and supportive approaches.

4.3.4 ***Managing Behaviors vs. Managing Emotions.*** Across the design ideas, we found that participants pursued two overarching goals: either directly managing ED behaviors or focusing on addressing the underlying emotions that led to those behaviors.

To directly manage ED behaviors, participants shared design ideas around alerts and appetite management (as described in Section 4.3.1). They also brought up ideas related to food option redirection across different phases of disordered eating behaviors. In binge eating cases, these ideas sought to direct eating impulses toward healthier alternatives that could reduce calorie gain (P4, P6, P8, P11, P22) and suggest appropriate quantities of food based on participants' remaining calorie budget during eating (P1, P5, P6). Regarding the early stage of restrictive eating, participants expected diets tailored to physiological requirements and practical feasibility (P7, P8, P9, P12, P16, P20). For instance, P7 preferred food guidance considering their current nutritional needs, and P16 wanted meals accommodating their taste preferences and ingredient availability to enhance eating motivation. Following episodes of binge eating or restriction that caused physiological discomfort, participants expressed a desire for personalized suggestions for future food plans that could help mitigate the adverse effects of ED behaviors and support recovery (P6, P7, P10, P11, P19). For example, P6 suggested: "*If I eat too much heavy food, the system can recommend compensatory foods, like apple cider vinegar.*"

As eating often served as an *emotional regulator* or a *source of stress*, several design ideas focused on managing their emotions.

Differing from redirecting their attention to other food options, participants would like interventions to recommend alternative activities such as meditation, relaxing music, or games that could shift their focus away from food (P2, P6, P11, P19, P22). For instance, P6 expected the system to guide them in practicing deep breathing and meditation during moments of strong binge urges; P19 preferred to be immersed in virtual environments, such as serene natural landscapes or playing intense games. Many also sought psychological counseling or supportive conversations, either with virtual agents or real humans (P2, P3, P5, P6, P9, P10, P11, P19, P22). These designs emphasized comfort and affirmation, as described in Figure 3 (B). P22 also expressed: "*It's like having someone remind me to love myself. Because of this, I realize I need to prioritize self-love and avoid overeating. This encouragement strengthens my determination to resist binge eating.*" After experiencing a ED episode that they could not control, participants saw emotional support crucial for alleviating regret and guilt and fostering healthier attitude towards eating (P2, P15): "*If the intervention fails, I hope it can comfort me, reminding me that it's not a big deal, we can accept it and return to normal eating afterward*" (P2).

Expert perspectives: Experts echoed the need to address both behaviors and emotions. E1 and E4 stressed the necessity for nutritional supplementation plans to support ED recovery. Meanwhile, they all agreed that negative emotions (e.g., stress from work and relationships) are the main drivers of ED behaviors. In clinical practice, E1 and E2 highlighted the importance of offering individuals emotional support, such as showing empathy for their eating struggles during counseling sessions. E1 also guided individuals to express their inner feelings during ED episodes, for example, by asking whether they felt "*anxious, lonely, or rejected.*" Regarding participants' designs, E5 recommended that for ED behaviors triggered by negative emotions, interventions should focus primarily on raising individuals' awareness of their current emotions and addressing the underlying distress rather than offering food-related suggestions that might further strengthen preoccupation with eating. Besides taking healthy diets, E5 pointed out that helping individuals develop the habit of regular eating is important: "*We found that urging individuals to eat at regular times and in appropriate amounts is effective to prevent ED behaviors. It's OK to add some preferred snacks during the meals.*" Therefore, effective management of ED behaviors requires both behavior regulation with tailored nutrition to diet plans, while prioritizing individuals' emotional needs.

4.4 JIT Interventions as Everyday Building Blocks of Sustainble Support

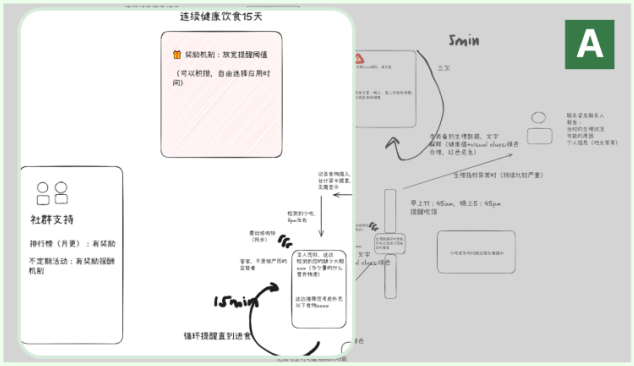
During the co-design sessions, participants naturally expanded their design ideas beyond immediate support, hoping the systems they created could provide regular psychological therapy (P1, P6, P9–P12, P14–P16), deliver nutritional education (P6, P7, P9, P11, P12), and build a community where they could share their experiences and seek peer connection (P5, P8, P9, P11, P14, P19). E3 and E5 echoed these aspirations, emphasizing that to fundamentally address ED behaviors, interventions need to be sustainable in resolving the inner struggles of individuals and promoting their ability to regulate emotion beyond immediate behavior change.

Moreover, both participants and experts brought up ideas of making JIT interventions part of daily routines and extending their effects beyond the immediate time-frame of occurrence. They envisioned JIT interventions not only to interrupt ED behaviors in situ, but also to adapt to their situations over repeated use and enrich post-behavior reflection. These envisioned expansions position JIT interventions not merely as emergency tools, but as ongoing contributors to healthy eating habit formation. In the following section, we detail these design concepts to illustrate pathways for embedding JIT effects for extended use.

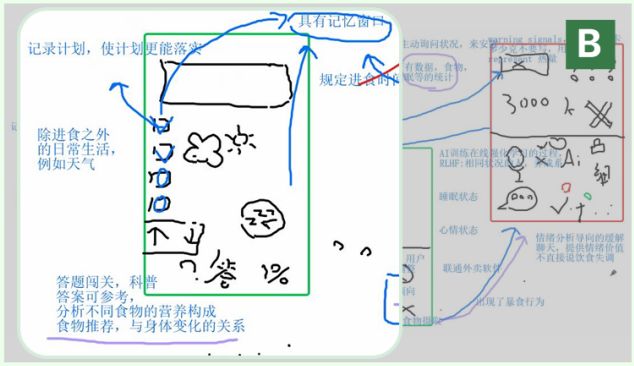
4.4.1 ***Evolving JIT Interventions Through Adaptive Learning Into Progressive Support***. Some participants expected the system to track and learn from their emotional and physiological changes following prior interventions, as well as their daily eating habits and preferences. Following this, the system could autonomously adapt and evolve, tailoring the timing, content, and intensity of future suggestions to each individual's needs, which would help reinforce the benefits of interventions and better support sustained behavioral change (P8, P11, P15). As illustrated in Figure 4 (A), P8 hoped that the intervention system could record and analyze their eating patterns, and if they were able to maintain a healthy diet for a sustained period (e.g., "healthy eating for 15 consecutive days"), the system would reward them by allowing slightly greater flexibility, such as more intakes of their favorite foods as long as it does not lead to binge eating. Furthermore, P11 hoped the system can update dietary recommendations based on previous records on how they responded to the JIT prompts, which is especially useful in reinforcing positive changes during emotionally venerable moments: "*if a certain recommended food is detected to increase happiness, then the system should recommend the food next time to reinforce the improvement*" (Figure 4 (B)). Additionally, P11 and P15 expressed a need for an adaptive communication style: "*It would be ideal if the system could remember previous conversations as it reminds me. As I continue to interact with it, it will gradually understand my personality and optimize the content it sends*" (P15).

Expert perspectives: All experts acknowledged that JIT interventions should continue to evolve by considering individuals' historical reactions. E1 proposed a similar strategy where the technology sets personalized eating goals tailored to the user's ED severity and self-regulatory capacity, thus avoiding overwhelming them with unattainable expectations. The system would then reward achievements to validate effort and boost motivation. Crucially, it would guide users toward progressively advanced goals that evolve with their recovery, promoting sustainable change over short-term behavioral regulation. E2 echoed these ideas, underscoring that such an adaptive approach could help users feel that the system "knows them" and responds to their unique circumstances. In their view, this sense of being understood could reduce resistance to interventions, foster a stronger therapeutic alliance with the technology, and ultimately increase the effectiveness of JIT support. In general, all experts recognized that JIT interventions should dynamically adapt to individuals' situations and personal traits, so as to maintain their motivation to continuously make progress and positive changes.

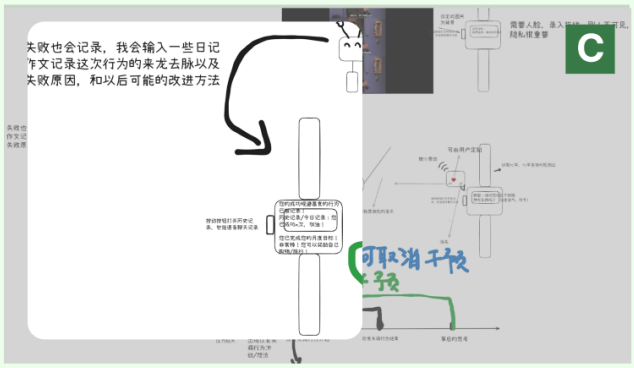
4.4.2 ***From Situated Awareness to Enriched, Lasting Reflection***. Participants mentioned that JIT interventions could elicit

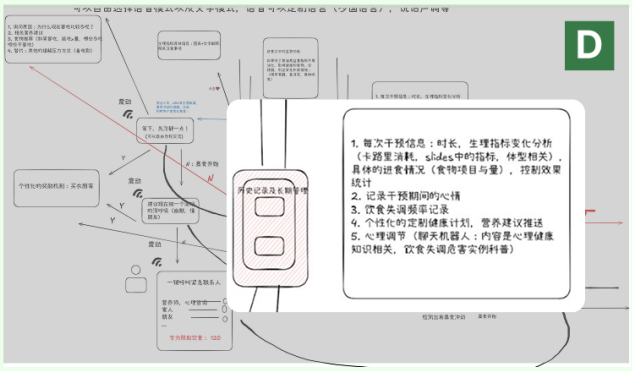


Rewarding mechanism based on daily diet
P8 wanted the system to send messages based on their eating habits and deliver rewards if they are able to sustain healthy eating for 15 days.



Adaptive learning into lasting support
P11 hoped the system could learn from their historical interaction and then update the communication style and food recommendation accordingly.





Enhance reflection with interaction logs
P2 wanted to review the conversation logs between the agent and themselves for reflection purposes, which could help them explore triggers of ED behaviors and potential regulation strategies.
P6 expected the system to log intervention frequency, physiological changes, and emotional states during JIT interactions for post-ED reflection.

Figure 4: Four examples (i.e., rewarding as long-term baseline (A), adaptive learning into lasting support (B), and enriching reflection using JIT interaction logs (C and D)) of expanding just-in-time (JIT) designs beyond immediate support created by ED participants. Similar to Figure 3, we provide text descriptions in English under each example to improve the readability.

situated reflection on their intentions and reasons for binge or restrictive eating, and hoped that such reflection could be carried forward to the post-episode context. A representative case is documenting the triggering events of restrictive eating to cultivate mindful eating (P12, P15). For instance, P12 expected a memo space to record memorable experiences and emotions associated with abnormal eating behaviors and set healthy eating goals, fostering a habit of regulating eating behaviors themselves. The memos could also record daily meaningful activities beyond the eating goals, such as "*visiting the art exhibition*" and "*camping*." To deepen reflection, other participants suggested linking eating episodes with tracked physiological and emotional changes (P2, P5–P7, P10, P11, P14, P19). For instance, P14 proposed that the system could record the changes in their physiological and emotional status induced by food intake, including the type of food and quantity, which would provide them with a clearer understanding of how binge eating affected their physical health and emotional well-being. P5 further added that physiological data should be accompanied by interpretive text explanations.

Moreover, participants wanted to review their reactions and adherence to the interventions in JIT scenarios, such as whether they ignored, snoozed, or followed the prompts, as these responses could provide valuable data for self-reflection (P2, P5, P6). As described in Figure 4 (C), P2 wanted the system to track whether they successfully resisted binge impulses. As such, the successful cases would build their confidence in self-regulation, while the failures would provide an opportunity to examine the root causes of their ED behaviors and explore coping strategies accordingly. Similarly, P6

envisioned reflecting on the patterns of their binge frequency and comparing physiological and psychological differences between healthy eating and disordered states, as shown in Figure 4 (D).

Expert perspectives: Echoing participants' ideas, experts also emphasized that data transparency is essential for enabling long-term reflection. E1 suggested that the JIT interface should clearly present the user's progress in managing ED behaviors, supplemented by related data and explanations, to help individuals recognize their improvements over time and motivate them to stay on track. Besides, E2 believed that such a progress indicator should be framed positively and encouragingly: "*Real-time health status tracking and recording provides a high level of transparency, which can enhance individuals' understanding and trust in treatment, ultimately boosting their confidence in recovery.*" Overall, experts suggested that data gathered from the JIT interventions, including individuals' occurring behaviors, physiological signals, and responses to the reminders serve as valuable building blocks for everyday reflections, which could sustain their engagement with the system and cultivate healthy habits.

5 DISCUSSIONS

Expanding existing research on ED interventions, our findings highlight two important design opportunities centered on a "just-in-time (JIT)" perspective. First, we synthesize varied and complex roles eating plays both within ED episodes (e.g., *eating naturally brings positive emotions*) and in everyday life (e.g., *Eating strains one's social relationships*), which shapes, and in turn influences, individuals' mental and physical status as well as their social relationships. This comprehensive view differs from prior work that mainly focuses on examining broad influencing factors (e.g., personality traits [24, 96], thinness idealization [96, 120]) or immediate triggers and consequences (e.g., acute stress [88]) of EDs. Thus, the findings provide important implications for JIT support to address ED not only at the behavioral level but also at the root causes.

Second, integrating perspectives of participants and ED experts, we offer a set of intervention designs and their characteristics critical to mitigating ED behaviors. These characteristics are more than technical specifications; they reflect individuals' underlying needs regarding modality, form, style, and ultimate goals. Compared to prior designs of static interventions (i.e., those applying a consistent approach for ED support) [25, 65, 81, 122], our work highlights the need for designing varying forms of a JIT intervention that adapts to individuals' physiological and mental conditions over the course of an ED episode. Furthermore, our findings extended beyond momentary assistance to achieving sustained effects, highlighting that the mainstream supports (e.g., preventative education, post-behavior reflection) and JIT interventions are not mutually exclusive, but complementary. Below, we connect our work with previous literature on JIT health support to explore what "just-in-time" means for ED care, and discuss factors that could affect the effectiveness of such support.

5.1 What does JIT Intervention Mean for Disordered Eating Behaviors?

In prior literature aimed at promoting behavior change, JIT has primarily focused on a single "opportune" moment when the target behavior is detected [47, 61, 89]. For instance, in smoking and alcohol recovery programs, systems sent JIT notifications when users approached smoking areas or bars [47, 89]. In our study, participants conceptualized multiple intervention moments (Figure 2), including when individuals experience ED impulses, initiate ED behaviors, persist in those behaviors while undergoing abnormal physiological changes (e.g., low glucose levels), and stop ED behaviors. Such diversity implies that when early-stage interventions fail, there are still opportunities to mitigate ED behaviors as they continue or even when they end. Although early mitigation should be prioritized, post-behavioral interventions also hold significant potential to reduce relapse and support recovery. Specifically, referring to the transitions between binge and restrictive eating, psychological support could alleviate the *source of stress* and help inhibit purging behaviors, and food option redirection could prevent negative *physiological response* and compensatory overeating. Recent HCI work has also acknowledged that opportunities for behavior change extend beyond the exact moment of action, particularly through situated reflection immediately afterward [68, 73, 74]. For instance, in reducing smartphone use, interventions are applied to encourage reflection not only when users unlock their phones but also when they fail or succeed to maintain focus [68].

Second, the type of support proposed by participants often overlapped between binge and restrictive eating, suggesting the same intervention strategy could be applied to both behaviors. For example, *eating behavior warnings* and *appetite management* were considered useful in the early-to-middle stages of the two behaviors, while *attention redirection* was seen as effective at the onset of binge impulses or skipping meals. This overlap likely reflects the way binge and restriction frequently occur interchangeably, with one episode leading to the other [7, 108, 125]. It also aligns with the dual roles of eating as both a trigger and a consequence of disorders (e.g., eating as an emotional regulator or as a source of stress), as shown in Table 3. Therefore, JIT systems aimed at mitigating ED behaviors could adopt a holistic design approach by incorporating shared interventions across the phases of binge and restrictive eating. For instance, researchers can implement *food option redirection* and *psychological support* throughout the binge and restrictive eating episodes, addressing evolving needs from managing cravings and emotional struggles to physical discomfort that follows.

Another interesting observation is that as ED behaviors progressed, participants envisioned fewer types of interventions, especially for binge eating. As several participants noted that once a binge had already begun, some interventions, such as food options and attention redirection, might become less useful. This may be because, once immersed in the binge episode, there could be a stronger loss of control, which diminished receptiveness to external nudges [23, 127]. Thus, in our study, interventions during the "binge continues" phase emphasized more direct and intensified behavioral control methods, such as punitive warnings and direct appetite suppression. In the case of restriction, food option redirection remains a useful intervention in all phases, possibly because individuals often acknowledged their need to eat but struggled to initiate or maintain adequate intake [31, 66]. Besides, the reduced type of interventions as restrictive eating escalate may stem from participants' perceptions of restriction as a source of

pride or achievement, rather than a problem to be solved (P1, P5, P6, P8). This mindset could reduce participants' openness to supportive interventions over time, which was also found by prior work [55, 56, 120]. In such cases, experts noted that redirecting individuals' attention away from eating can be more effective than directly regulating eating behaviors. Therefore, future JIT designs can prioritize mitigating triggers (e.g., negative emotions and compensatory eating plans) at the early stage of ED behaviors, while avoiding overly frequent or repetitive prompts that appear to be strict and forceful.

5.2 How to Make JIT Interventions Effective?

Here, by synthesizing the roles of eating in participants' lives and the key characteristics of their design ideas, we discuss the factors that could shape the effects of JIT interventions and outline implications towards effective designs, including identifying the root causes of EDs, tailoring the "roles" of the supporting system to individuals' needs, and confidence building.

5.2.1 Identifying the Roles of Eating for Individuals. Table 3 presents triggers and consequences of ED behaviors across both episodes and daily life, revealing participants' shifting physical and mental states before, during, and after eating, and showing that these behaviors are not merely psychiatric symptoms but situated responses shaped by personal social pressures and relational dynamics [45, 96, 129]. This synthesis helps researchers better understand the root drivers of EDs and, beyond the specific co-designed ideas, offers broader design implications for how JIT interventions might address these underlying causes.

Mediating different eating roles requires tailored design strategies. For example, in cases where ED stems from sociocultural pressure, designs of JIT system could refer to individuals' social contexts for timely support. Drawing inspiration from Choi et al.'s design of FoodCensor that delivers reflective prompts during digital food content searches [20], we could expand the JIT moments across media activities. For example, the opportune moments may also be when people browse content related to weight-loss and body-comparison, or engage in discussions about dieting and beauty. Interventions in such contexts could be nudges that promote positive body image, mindful eating, and healthier coping strategies, which counteract sociocultural pressures. Additionally, while prior work situates ED behaviors within broader sociocultural factors [26, 96], work- and study-related stress stand out as a major driver in our data. One possible explanation is that prior research on ED was primarily conducted in Western countries [37, 52, 108], whereas our participants reside in Mainland China, where cultural norms shaped by modernization emphasize hard work and perseverance as important life goals [110]. Therefore, our findings suggested the need for ED support systems to incorporate work stress reduction strategies [16, 75, 85] and culturally relevant motivational framing [42, 119]. For example, when binge eating impulses are detected, relaxation techniques considering one's workplace settings can be integrated into JIT interventions, such as guided breathing or short progressive muscle relaxation exercises to relieve work stress. Meanwhile, dietary persuasion messages could be framed around the benefits of regular eating for productivity and professional success (e.g., "*Regular eating helps maintain energy levels and improves academic performance*").

5.2.2 Supporting Aesthetic- and Role-Adaptive Customization in ED Interventions. A fundamental requirement for the adoption of JIT interventions is that they resonate with individuals' personal values, preferences, and self-concepts. We found that participants envisioned JIT designs in a variety of modalities and forms, ranging from visual, haptic, to audio signals, as well as purely material artifacts, parasocial agents, and even real human connections. These varying modalities and forms underscore that there is no one-size-fits-all solution to ED; instead, the design of ED interventions, especially JIT support, should be tailored to individuals' unique needs. For example, in designing material artifacts, participants constantly highlighted visual appearances of the system, not only in its forms but also aesthetic fit (e.g., pure digital devices or accessories like necklaces, wristbands, or rings, etc). This finding aligns with prior research showing that technology designs consistent with users' aesthetic preferences can foster positive emotions, strengthen perceived usefulness, and build trust in both commercial and healthcare contexts [27, 109]. For JIT systems targeting ED, we believe that aesthetic designs are especially critical: individuals with ED often hold heightened self-image standards, making it more likely they will adopt and consistently wear or interact with technologies that complement their identity.

Similarly, participants designed virtual agents that embodied different social roles to strengthen adherence through emotional bonds, as P9 reported feeling committed to maintaining healthy eating habits for their virtual pet, and P1 favored a trusted friend persona to increase the persuasiveness of eating suggestions. Moreover, they expected pet or friend roles during ED episodes, while preferring a professional AI chatbot to provide psychological or nutritional support in everyday contexts. These expectations may indicate that intimate characters are perceived with stronger emotional bonds and thus more effective in promoting positive changes [23, 127]. Besides, some of these agents have a physical form while others are purely virtual on screens; some can send haptic signals while others focus on text or audio interaction. We believe that these variations can greatly shape the emotional bonds between individuals and agents, as shown in prior research on AI companions [86, 131].

However, there is no single optimal way to integrate every aspect of individuals' needs into supporting systems. Many preferences, such as the system's appearance or the role of trusted real-life contacts, are highly personal, often only becoming apparent as users begin interacting with the system. To address this variability, future JIT interventions could incorporate customization during the initial setup, allowing users to define not only the agent's persona and select appearance options [69, 131], but also how different personas are activated across behavioral contexts. Rather than relying on a static persona, JIT systems could flexibly shift between intimate roles (e.g., friends or pets) during ED episodes to enhance individuals' receptiveness, and more professional roles for health advice and guidance. These settings could then be continuously refined based on users' interaction experiences. As shown in previous research, systems or agents with customizability are more likely to improve

individuals' adherence to their recommendations compared to the non-customizable versions [63, 69].

5.2.3 Sensory Interventions as Gateways to Bodily Awareness. During co-design sessions, participants proposed multi-sensory ways to manage appetites, such as glasses that visually block food and oral patches that mask its flavor. Rather than targeting cognition or behavior, these ideas directly intervene in urges and cravings by altering sensory input. Experts acknowledged the creativity of such proposals and drew parallels to their own practice to use ice cubes or peppermint to help people calm down, temporarily interrupting compulsive ED behaviors. Technically, prior work has investigated simulating olfactory sensations such as warmth or freshness through lightweight nose-mounted devices [14] and augmenting these perceptions via other modalities like haptic feedback from a sensory sleeve [18]. While promising, stability issues of these systems, such as delayed feedback and limited battery life, still constrain their use in everyday contexts and highlight the need to situate sensory interventions within broader therapeutic goals rather than treating them as stand-alone solutions.

Crucially, experts stressed that sensory-stimulus-based interventions should help rebuild connections between bodily sensations and food rather than distort the perception of food. This stance aligns with mindful eating approaches, which encourage non-judgmental awareness of hunger and satiety cues so that individuals can respond to internal needs instead of external or emotional triggers [46, 70]. Conversely, blocking food-related sensations risks provoking psychological reactance that enhances the desirability of restricted foods [114]. To support more constructive engagement, future sensory designs could embed brief messages inviting people to notice bodily cues and articulate what they are experiencing. For example, mindful prompts asking users to think aloud about their hunger and emotions (e.g., "*How hungry or full are you currently feeling?*") can turn sensory interventions into reflection opportunities rather than control [73, 76]. Beyond single prompts, systems could scaffold small eating experiments, such as observing changes in hunger and emotion around meals, and using text or audio notes to link sensations, thoughts, and context. Qualitative syntheses of self-guided digital ED interventions show that, when customizable to individual needs, tools supporting self-monitoring and reflection can help people translate new insights into mindful eating [17]. Building on this, sensory systems might allow individuals to configure which cues to track, how often to engage with them, and whether to share selected summaries with supporters. Such experiments can then be reviewed in treatment to align technology use with therapeutic goals, making the system a gateway to better interoceptive awareness and gradual reconnection with food.

5.2.4 "Microdosing" Confidence Across an ED Episode. In our study, the ideas of participants who designed stricter interventions reflected cycles of struggling to control ED impulses, indulging in ED behaviors, and experiencing guilt afterward. Such repeated failures might have developed self-denial that undermined their self-efficacy in overcoming ED behaviors (the belief in one's ability to regulate and change behaviors [8]). Consequently, these participants might project their desire for greater self-control into technology designs, envisioning interventions that imposed rigid behavioral restrictions as a way to avoid post-episode discomfort and self-blame [1, 82].

Regarding the crucial role of self-efficacy in promoting health behavior change, such as weight control, exercise adherence, and dietary practices [22, 69, 79, 107], our experts and prior literature highlighted that strict control might intensify stress, undermine long-term therapy engagement, thereby exacerbating ED behaviors [64]. On the other hand, non-judgmental nudges are more effective in sustaining individuals' trust and adoption of interventions [71, 123]. Therefore, unless clinically indicated, future JIT support should avoid punitive strategies and strict language and prioritize fostering intrinsic motivation through acknowledging small successes, validating any coping efforts, and framing lapses non-judgmentally [6, 117], which is known as "microdosing" confidence in [67]. Moreover, moving beyond prior work focusing on offering general education and post-behavior encouragement [4, 77], microdosing confidence in ED management, with the shared underlying mechanism of acknowledging the intention and effort to make changes, should be situated in the different ongoing behavioral contexts and timings. For instance, when binge starts, supportive reinforcement may acknowledge emotional strain and emphasize recent progress. Meanwhile, at the initiation of prolonged restriction or when abnormal physiological states are detected, the communication can gently affirm confidence in natural, healthy appearance, while emphasizing timely nourishment.

5.3 How to Extend the Impact of JIT Interventions Beyond Immediate Support?

As emphasized in prior work and by our expert participants, mitigating ED behaviors is a long-term process, including psychological therapy and nutrition management to foster a healthy understanding of body shape and food intake [51, 81, 105]. Therefore, we believe that merely regulating EDs at the behavioral level is insufficient; it is essential to explore how JIT interventions can sustain effectiveness to complement the abovementioned support that has been well established.

One opportunity, as participants brought up, was to develop adaptive learning systems that track how prompt language and suggestion content positively influence mood and health states, thereby updating intervention strategies to reinforce these beneficial effects. Such adaptivity would not only make participants feel recognized by the system [2, 62] but also encourage authentic disclosure of their ED experiences rather than suppress them [3], which is a crucial step toward recovery. In addition to learning historical interaction context, prior research emphasized the need to integrate individuals' living contexts, such as real-life challenges, into health behavior promotion [69, 111]. Building on this, future interventions can leverage data from individuals' daily routines (e.g., calendars, maps) to deliver timely reminders and recommend practical actions such as redirecting food options to what is healthy and available nearby.

Moreover, participants hoped they could proactively reflect on their physiological and emotional changes, along with their adherence to JIT interventions. In this case, JIT interventions can serve as a bridge between situated reflection (reflection-in-action) and post-behavior reflection (reflection-on-action), enriching reflective practices and shifting individuals from passive receivers of interventions to active self-regulators. Prior work in HCI also highlighted

the necessity of mindful reflection in persuasive technology design: since health behavior change is a gradual process, the cognitive effort to actively understand, practice, and sustain these changes is irreplaceable, while solely relying on passively following interventions may disrupt this process [39, 48, 99]. In the context of acute ED behaviors (e.g., overeating or inducing vomiting), individuals often experience a loss of control that limits their receptiveness to situated reflective questions, while existing evaluations of health behavior interventions indicate that such receptiveness also diminishes over time [11, 23, 92, 127]. Therefore, we suggest that JIT systems focus on capturing people's states, behaviors, and responses to interventions, and incorporate this information into post-behavior reflection to improve self-awareness or serve as references for developing personalized coping strategies. Designers can also implement transparent and intuitive visualization for individuals to understand their own behavioral patterns. Furthermore, lightweight reflection mechanisms, such as mindful diaries and memos, can be aggregated to support lasting self-reflection without overwhelming users. Lastly, for privacy and ethical considerations, given the sensitive information that can be collected, it is important to note that users should retain full data ownership and decide what data to record, who else has access to the data (e.g., friends, family members, or psychological counselors) [50, 76].

5.4 Limitations and Future Work

Our sample demonstrated limited diversity in gender (i.e., female), age range (i.e., 18-35 years), and cultural background (i.e., Chinese). Meanwhile, to increase our sample size, we set the inclusion criterion of scoring 20 or higher on the EAT-26 test, which assesses ED-related symptoms but does not provide clinical diagnoses. Besides, ED participants mainly exhibited binge eating, restrictive eating, and purging behaviors, with no instances of atypical behaviors such as night eating syndrome. These sampling constraints may limit the representativeness of our results across broader ED populations. Nonetheless, given that binge eating and restrictive eating are among the most prevalent ED behaviors [125] and that EAT-26 is one of the most widely adopted screening tools in both clinical and research settings [40], our findings remain valuable, especially for researchers studying EDs in Asian cultural contexts, where empirical evidence is scarce. Meanwhile, our sample size of 22 participants is considered reasonable compared to existing co-design studies [76, 128].

The richness of our data—collected from multiple stakeholders and analyzed iteratively—allowed us to carefully generate and refine themes from ED participants' design ideas while incorporating clinical perspectives. Building on the lessons learned, our next step is to develop JIT interventions that can be deployed in longitudinal field studies, where we plan to examine how timely support can benefit the ED population over time.

6 CONCLUSION

In this work, we conduct individual co-design sessions with 22 young women exhibiting disordered eating behaviors and interviews with five experts in eating disorder (ED) treatment, to explore how "just-in-time" (JIT) intervention should be designed to mitigate disordered eating behavior. During the sessions, individuals shared ED experiences and designed tailored interventions for moments they believed as critical across behavioral timelines. The experts offered insights into the design rationales and suggestions regarding implementation feasibility and improvement directions. Our findings revealed what roles eating played in individuals' disordered eating behaviors and how they design JIT technologies on the timeline, including various functions and characteristics, to mediate these eating roles. Meanwhile, we analyzed how JIT interventions can serve as building blocks of mainstream ED support. With the design implications we provide, our work can serve as a valuable reference for future JIT designs for ED support.

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References

[1] Lisa Adler, Tiffany A Brown, Megan E Shott, Skylar Swindle, and Guido KW Frank. 2022. I know I am not out of control, but I just cannot shake the feeling: Exploring feeling out of control in eating disorders. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 27, 2 (2022), 839–845. https://link.springer.com/article/10.1007/s40519-021-01211-7

[2] Tarek Ait Baha, Mohamed El Hajji, Youssef Es-Saady, and Hammou Fadili. 2023. The power of personalization: A systematic review of personality-adaptive chatbots. *SN Computer Science* 4, 5 (2023), 661. https://link.springer.com/article/10.1007/s42979-023-02092-6

[3] Kathina Ali, Louise Farrer, Daniel B Fassnacht, Amelia Gulliver, Stephanie Bauer, and Kathleen M Griffiths. 2017. Perceived barriers and facilitators towards help-seeking for eating disorders: A systematic review. *International Journal of Eating Disorders* 50, 1 (2017), 9–21. https://pubmed.ncbi.nlm.nih.gov/27526643/

[4] Molly J. Allison and Colleen Keller. 2004. Self-Efficacy Intervention Effect on Physical Activity in Older Adults. *Western Journal of Nursing Research* 26, 1 (2004), 31–46. https://doi.org/10.1177/0193945903259350 arXiv:https://doi.org/10.1177/0193945903259350 PMID: 14984643.

[5] Daniele Marano Rocha Araujo, Giovana Fonseca da Silva Santos, and Antonio Egídio Nardi. 2010. Binge eating disorder and depression: A systematic review. *The World Journal of Biological Psychiatry* 11, 2-2 (2010), 199–207. https://doi.org/10.3109/15622970802563171 arXiv:https://doi.org/10.3109/15622970802563171 PMID: 20218783.

[6] Rikke Aune Asbjørnsen, Mirjam Lien Smedsrød, Lise Solberg Nes, Jobke Wentzel, Cecilie Varsi, Jøran Hjelmesæth, and Julia EWC van Gemert-Pijnen. 2019. Persuasive system design principles and behavior change techniques to stimulate motivation and adherence in electronic health interventions to support weight loss maintenance: scoping review. *Journal of medical Internet research* 21, 6 (2019), e14265. https://www.jmir.org/2019/6/E14265/

[7] Evelyn Attia and B Timothy Walsh. 2009. Behavioral management for anorexia nervosa. *New England Journal of Medicine* 360, 5 (2009), 500–506. https://www.nejm.org/doi/abs/10.1056/NEJMct0805569

[8] Albert Bandura. 1982. Self-efficacy mechanism in human agency. *American psychologist* 37, 2 (1982), 122. https://doi.org/10.1037/0003-066X.37.2.122

[9] Anna M Bardone-Cone, Lyn Y Abramson, KD Vohs, Todd F Heatherton, and TE Joiner Jr. 2006. Predicting bulimic symptoms: An interactive model of self-efficacy, perfectionism, and perceived weight status. *Behaviour Research and Therapy* 44, 1 (2006), 27–42. https://pubmed.ncbi.nlm.nih.gov/16301012/

[10] Ariel L Beccia, Corina Dunlap, Douglas A Hanes, Brendan J Courneene, and Heather L Zwickey. 2018. Mindfulness-based eating disorder prevention programs: A systematic review and meta-analysis. *Mental Health & Prevention* 9 (2018), 1–12. https://doi.org/10.1016/j.mhp.2017.11.001

[11] Niranjan Bidargaddi, Daniel Almirall, Susan Murphy, Inbal Nahum-Shani, Michael Kovalcik, Timothy Pituch, Haitham Maaieh, and Victor Strecher. 2018. To Prompt or Not to Prompt? A Microrandomized Trial of Time-Varying Push Notifications to Increase Proximal Engagement With a Mobile Health App. *JMIR Mhealth Uhealth* 6, 11 (29 Nov 2018), e10123. https://doi.org/10.2196/10123

[12] Dale C. Brandenburg and Andrea D. Ellinger. 2003. The Future: Just-in-Time Learning Expectations and Potential Implications for Human Resource Development. *Advances in Developing Human Resources* 5, 3 (2003), 308–320. https://doi.

org/10.1177/1523422303254629 arXiv:https://doi.org/10.1177/1523422303254629
[13] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (2006), 77–101. https://doi.org/10.1191/1478088706qp063oa
[14] Jas Brooks, Shan-Yuan Teng, Jingxuan Wen, Romain Nith, Jun Nishida, and Pedro Lopes. 2021. Stereo-Smell via Electrical Trigeminal Stimulation. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) *(CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 502, 13 pages. https://doi.org/10.1145/3411764.3445300
[15] Patricia A Cavazos-Rehg, Melissa J Krauss, Shaina J Costello, Nina Kaiser, Elizabeth S Cahn, Ellen E Fitzsimmons-Craft, and Denise E Wilfley. 2019. "I just want to be skinny.": A content analysis of tweets expressing eating disorder symptoms. *PloS one* 14, 1 (2019), e0207506. https://pubmed.ncbi.nlm.nih.gov/30650072/
[16] I-Chiu Chang, Wei-Chen Cheng, and Wen-Chuan Kung. 2019. A Stress Relief App Intervention for Newly Employed Nursing Staff: Quasi-Experimental Design. *JMIR Mhealth Uhealth* 7, 12 (18 Dec 2019), e15785. https://doi.org/10.2196/15785
[17] Lauryn Gar-Mun Cheung, Pamela Carien Thomas, Eva Brvar, and Sarah Rowe. 2025. User Experiences of and Preferences for Self-Guided Digital Interventions for the Treatment of Mild to Moderate Eating Disorders: Systematic Review and Metasynthesis. *JMIR Ment Health* 12 (3 Jan 2025), e57795. https://doi.org/10.2196/57795
[18] Mi Hyun Choi, Joshua Lee, and Frank L Hammond III. 2018. Wearable Olfactory Augmentation Device for Hazardous Gas Detection. In *Frontiers in Biomedical Devices*, Vol. 40789. American Society of Mechanical Engineers, V001T10A014. https://doi.org/10.1115/DMD2018-6953
[19] Ryuhaerang Choi, Taehan Kim, Subin Park, Jennifer G. Kim, and Sung-Ju Lee. 2025. Private Yet Social: How LLM Chatbots Support and Challenge Eating Disorder Recovery. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 642, 19 pages. https://doi.org/10.1145/3706598.3713485
[20] Ryuhaerang Choi, Subin Park, Sujin Han, and Sung-Ju Lee. 2024. FoodCensor: Promoting Mindful Digital Food Content Consumption for People with Eating Disorders. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '24)*. Association for Computing Machinery, New York, NY, USA, Article 991, 18 pages. https://doi.org/10.1145/3613904.3641984
[21] Woohyeok Choi, Sangkeun Park, Duyeon Kim, Youn-kyung Lim, and Uichin Lee. 2019. Multi-Stage Receptivity Model for Mobile Just-In-Time Health Intervention. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 3, 2, Article 39 (June 2019), 26 pages. https://doi.org/10.1145/3328910
[22] Matthew M Clark, David B Abrams, Raymond S Niaura, Cheryl A Eaton, and Joseph S Rossi. 1991. Self-efficacy in weight management. *Journal of consulting and clinical psychology* 59, 5 (1991), 739. https://psycnet.apa.org/buy/1992-03853-001
[23] Susan L Colles, John B Dixon, and Paul E O'brien. 2008. Loss of control is central to psychological disturbance associated with binge eating disorder. *Obesity* 16, 3 (2008), 608–614. https://doi.org/10.1038/oby.2007.99
[24] Kristen M Culbert, Sarah E Racine, and Kelly L Klump. 2015. Research Review: What we have learned about the causes of eating disorders–a synthesis of sociocultural, psychological, and biological research. *Journal of child psychology and psychiatry* 56, 11 (2015), 1141–1164. https://doi.org/10.1111/jcpp.12441
[25] Antonios Dakanalis, Massimo Clerici, and Eric Stice. 2019. Prevention of eating disorders: current evidence-base for dissonance-based programmes and future directions. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 24, 4 (2019), 597–603. https://pubmed.ncbi.nlm.nih.gov/31147968/
[26] Alexandra Dane and Komal Bhatia. 2023. The social media diet: A scoping review to investigate the association between social media, body image and eating disorders amongst young people. *PLOS Global Public Health* 3, 3 (2023), e0001091. https://doi.org/10.1371/journal.pgph.0001091
[27] James L Denison-Day, Sarah Muir, Ciaran Newell, and Katherine M Appleton. 2023. The role of aesthetics in intentions to use digital health interventions. *PLOS digital health* 2, 6 (2023), e0000274. https://doi.org/10.1371/journal.pdig.0000274
[28] Anjali Devakumar, Jay Modh, Bahador Saket, Eric P. S. Baumer, and Munmun De Choudhury. 2021. A Review on Strategies for Data Collection, Reflection, and Communication in Eating Disorder Apps. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) *(CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 547, 19 pages. https://doi.org/10.1145/3411764.3445670
[29] Alexandra Dingemans, Unna Danner, and Melissa Parks. 2017. Emotion Regulation in Binge Eating Disorder: A Review. *Nutrients* 9, 11 (2017). https://doi.org/10.3390/nu9111274
[30] Maoliosa Donald, Heather Beanlands, Sharon E Straus, Michelle Smekal, Sarah Gil, Meghan J Elliott, Gwen Herrington, Lori Harwood, Blair Waldvogel, Maria Delgado, Dwight Sparkes, Allison Tong, Allan Grill, Marta Novak, Matthew Thomas James, K Scott Brimble, Susan Samuel, Karen Tu, Janine Farragher, and Brenda R Hemmelgarn. 2021. A Web-Based Self-Management Support Prototype for Adults With Chronic Kidney Disease (My Kidneys My Health): Co-Design and Usability Testing. *JMIR Form Res* 5, 2 (9 Feb 2021), e22220. https://doi.org/10.2196/22220
[31] Lorenzo M Donini, Daniela Marsili, Maria Pia Graziani, Michele Imbriale, and Carlo Cannella. 2004. Orthorexia nervosa: a preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 9, 2 (2004), 151–157. https://link.springer.com/article/10.1007/bf03325060
[32] EAT-26. 2025. https://www.eat-26.com/.
[33] Elizabeth V. Eikey. 2016. Privacy and Weight Loss Apps: A First Look at How Women with Eating Disorders Use Social Features. In *Proceedings of the 2016 ACM International Conference on Supporting Group Work* (Sanibel Island, Florida, USA) *(GROUP '16)*. Association for Computing Machinery, New York, NY, USA, 413–415. https://doi.org/10.1145/2957276.2996282
[34] Elizabeth V. Eikey and Madhu C. Reddy. 2017. "It's Definitely Been a Journey": A Qualitative Study on How Women with Eating Disorders Use Weight Loss Apps. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA) *(CHI '17)*. Association for Computing Machinery, New York, NY, USA, 642–654. https://doi.org/10.1145/3025453.3025591
[35] Ester MS Espeset, Kjersti S Gulliksen, Ragnfrid HS Nordbø, Finn Skårderud, and Arne Holte. 2012. The link between negative emotions and eating disorder behaviour in patients with anorexia nervosa. *European Eating Disorders Review* 20, 6 (2012), 451–460. https://doi.org/10.1002/erv.2183
[36] Nicole Everitt, Jaclyn Broadbent, Ben Richardson, Joshua M. Smyth, Kristin Heron, Samantha Teague, and Matthew Fuller-Tyszkiewicz. 2021. Exploring the features of an app-based just-in-time intervention for depression. *Journal of Affective Disorders* 291 (2021), 279–287. https://doi.org/10.1016/j.jad.2021.05.021
[37] Yiou Fan, Yanping Li, Ailing Liu, Xiaoqi Hu, Guansheng Ma, and Guifa Xu. 2010. Associations between body mass index, weight control concerns and behaviors, and eating disorder symptoms among non-clinical Chinese adolescents. *BMC Public Health* 10, 1 (2010), 314. https://link.springer.com/article/10.1186/1471-2458-10-314
[38] Jill J Francis, Marie Johnston, Clare Robertson, Liz Glidewell, Vikki Entwistle, Martin P Eccles, and Jeremy M Grimshaw. 2010. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology and health* 25, 10 (2010), 1229–1245. https://doi.org/10.1080/08870440903194015
[39] Feng Gao. 2012. Design for reflection on health behavior change. In *Proceedings of the 2012 ACM International Conference on Intelligent User Interfaces* (Lisbon, Portugal) *(IUI '12)*. Association for Computing Machinery, New York, NY, USA, 379–382. https://doi.org/10.1145/2166966.2167053
[40] David M Garner, Marion P Olmsted, Yvonne Bohr, and Paul E Garfinkel. 1982. The eating attitudes test: psychometric features and clinical correlates. *Psychological medicine* 12, 4 (1982), 871–878. https://doi.org/10.1017/S0033291700049163
[41] Damodar Y Golhar and Carol Lee Stamm. 1991. The just-in-time philosophy: a literature review. *The International Journal of Production Research* 29, 4 (1991), 657–676. https://www.tandfonline.com/doi/abs/10.1080/00207549108930094
[42] Zhun Gong, Xinian Jiao, Xinlei Xia, Haixin Yu, and Cixian Lv. 2022. The relationship between academic encouragement and academic self-efficacy: A moderated mediation model. *Frontiers in Psychology* 13 (2022), 644243. https://doi.org/10.3389/fpsyg.2022.644243
[43] Andrea K Graham, Jennifer E Wildes, Madhu Reddy, Sean A Munson, C Barr Taylor, and David C Mohr. 2019. User-centered design for technology-enabled services for eating disorders. *International Journal of Eating Disorders* 52, 10 (2019), 1095–1107. https://pmc.ncbi.nlm.nih.gov/articles/PMC7265747/
[44] MA Green, A Kroska, A Herrick, B Bryant, E Sage, L Miles, M Ravet, M Powers, W Whitegoat, R Linkhart, et al. 2018. A preliminary trial of an online dissonance-based eating disorder intervention. *Eating Behaviors* 31 (2018), 88–98. https://pubmed.ncbi.nlm.nih.gov/30199771/
[45] Catherine G Greeno, Rena R Wing, and Saul Shiffman. 2000. Binge antecedents in obese women with and without binge eating disorder. *Journal of consulting and clinical psychology* 68, 1 (2000), 95. https://psycnet.apa.org/buy/2000-13544-010
[46] Hannah S Grider, Steve M Douglas, and Hollie A Raynor. 2021. The influence of mindful eating and/or intuitive eating approaches on dietary intake: a systematic review. *Journal of the Academy of Nutrition and Dietetics* 121, 4 (2021), 709–727. https://doi.org/10.1016/j.jand.2020.10.019
[47] David H. Gustafson, Fiona M. McTavish, Ming-Yuan Chih, Amy K. Atwood, Roberta A. Johnson, Michael G. Boyle, Michael S. Levy, Hilary Driscoll, Steven M. Chisholm, Lisa Dillenburg, Andrew Isham, and Dhavan Shah. 2014. A Smartphone Application to Support Recovery From Alcoholism: A Randomized Clinical Trial. *JAMA Psychiatry* 71, 5 (05 2014), 566–572. https://doi.org/10.1001/jamapsychiatry.2013.4642
[48] Lars Hallnäs and Johan Redström. 2001. Slow technology–designing for reflection. *Personal and ubiquitous computing* 5, 3 (2001), 201–212. https://link.springer.com/article/10.1007/PL00000019
[49] Susan Hart, Suzanne Abraham, Georgina Luscombe, and Janice Russell. 2008. Eating disorder management in hospital patients: current practice among dietitians in Australia. *Nutrition & Dietetics* 65, 1 (2008), 16–22. https:

//doi.org/10.1111/j.1747-0080.2007.00174.x
[50] Muneeb Ul Hassan, Mubashir Husain Rehmani, and Jinjun Chen. 2020. Differential Privacy Techniques for Cyber Physical Systems: A Survey. *IEEE Communications Surveys & Tutorials* 22, 1 (2020), 746–789. https://doi.org/10.1109/COMST.2019.2944748
[51] Phillipa Hay. 2013. A systematic review of evidence for psychological treatments in eating disorders: 2005–2012. *International Journal of Eating Disorders* 46, 5 (2013), 462–469. https://doi.org/10.1002/eat.22103
[52] Phillipa Hay, Federico Girosi, and Jonathan Mond. 2015. Prevalence and sociodemographic correlates of DSM-5 eating disorders in the Australian population. *Journal of eating disorders* 3, 1 (2015), 19. https://link.springer.com/article/10.1186/s40337-015-0056-0
[53] Alana Heafala, Lauren Ball, Jessica Rayner, and Lana J Mitchell. 2021. What role do dietitians have in providing nutrition care for eating disorder treatment? An integrative review. *Journal of Human Nutrition and Dietetics* 34, 4 (2021), 724–735. https://doi.org/10.1111/jhn.12927
[54] Todd F Heatherton and Roy F Baumeister. 1991. Binge eating as escape from self-awareness. *Psychological bulletin* 110, 1 (1991), 86. https://pubmed.ncbi.nlm.nih.gov/1891520/
[55] Leigh Anne Hohlstein, Gregory T Smith, and Jana G Atlas. 1998. An application of expectancy theory to eating disorders: Development and validation of measures of eating and dieting expectancies. *Psychological Assessment* 10, 1 (1998), 49. https://psycnet.apa.org/record/1998-00298-007
[56] Kristin Homan. 2010. Athletic-ideal and thin-ideal internalization as prospective predictors of body dissatisfaction, dieting, and compulsive exercise. *Body Image* 7, 3 (2010), 240–245. https://doi.org/10.1016/j.bodyim.2010.02.004
[57] David Hutchins. 1999. *Just in time*. Gower Publishing, Ltd. https://www.abebooks.co.uk/9780566077982/Time-Hutchins-David-0566077981/plp
[58] Julie Ison and Sarah Kent. 2010. Social identity in eating disorders. *European Eating Disorders Review* 18, 6 (2010), 475–485. https://doi.org/10.1002/erv.1001
[59] Jillian A Johnson, Matthew J Zawadzki, Martin J Sliwinski, David M Almeida, Orfeu M Buxton, David E Conroy, David Marcusson-Clavertz, Jinhyuk Kim, Robert S Stawski, Stacey B Scott, Christopher N Sciamanna, Paige A Green, Emily M Repka, Meynard John L Toledo, Nicole L Sturges, and Joshua M Smyth. 2025. Adaptive Just-in-Time Intervention to Reduce Everyday Stress Responses: Protocol for a Randomized Controlled Trial. *JMIR Res Protoc* 14 (22 Jan 2025), e58985. https://doi.org/10.2196/58985
[60] Jourvie. 2025. https://onemindpsyberguide.org/guide/apps/jourvie/.
[61] Adrienne S Juarascio, Paakhi Srivastava, Emily K Presseller, Mandy Lin, Anna G G Patarinski, Stephanie M Manasse, and Evan M Forman. 2022. Using Continuous Glucose Monitoring to Detect and Intervene on Dietary Restriction in Individuals With Binge Eating: The SenseSupport Withdrawal Design Study. *JMIR Form Res* 6, 12 (14 Dec 2022), e38479. https://doi.org/10.2196/38479
[62] Aicha Kallel, Norchène Ben Dahmane Mouelhi, Walid Chaouali, and Nicholas Patrick Danks. 2024. Hey chatbot, why do you treat me like other people? The role of uniqueness neglect in human-chatbot interactions. *Journal of Strategic Marketing* 32, 2 (2024), 170–186. https://doi.org/10.1080/0965254X.2023.2175020 arXiv:https://doi.org/10.1080/0965254X.2023.2175020
[63] Jin Kang, Jomara Binda, Pratik Agarwal, Bruno Saconi, and Eun Kyoung Choe. 2017. Fostering user engagement: Improving sense of identity through cosmetic customization in wearable trackers. In *Proceedings of the 11th EAI international conference on pervasive computing technologies for healthcare*. 11–20. https://doi.org/10.1145/3154862.3154878
[64] Aaron Keshen, Thomas Helson, Joel Town, and Karly Warren. 2017. Self-efficacy as a predictor of treatment outcome in an outpatient eating disorder program. *Eating Disorders* 25, 5 (2017), 406–419. https://doi.org/10.1080/10640266.2017.1324073 arXiv:https://doi.org/10.1080/10640266.2017.1324073 PMID: 28498014.
[65] Eyza Koreshe, Susan Paxton, Jane Miskovic-Wheatley, Emma Bryant, Anvi Le, Danielle Maloney, Stephen Touyz, and Sarah Maguire. 2023. Prevention and early intervention in eating disorders: findings from a rapid review. *Journal of Eating Disorders* 11, 1 (2023), 38. https://link.springer.com/article/10.1186/s40337-023-00758-3
[66] Anne Korinth, Sonja Schiess, and Joachim Westenhoefer. 2010. Eating behaviour and eating disorders in students of nutrition sciences. *Public health nutrition* 13, 1 (2010), 32–37. https://pubmed.ncbi.nlm.nih.gov/19433007/
[67] Toby Lea, Nicole Amada, Henrik Jungaberle, Henrike Schecke, Norbert Scherbaum, and Michael Klein. 2020. Perceived outcomes of psychedelic microdosing as self-managed therapies for mental and substance use disorders. *Psychopharmacology* 237, 5 (2020), 1521–1532. https://doi.org/10.1007/s00213-020-05477-0
[68] Zhuoyang Li, Minhui Liang, Ray Lc, and Yuhan Luo. 2024. StayFocused: Examining the Effects of Reflective Prompts and Chatbot Support on Compulsive Smartphone Use. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '24)*. Association for Computing Machinery, New York, NY, USA, Article 247, 19 pages. https://doi.org/10.1145/3613904.3642479
[69] Minhui Liang, Jinping Wang, and Yuhan Luo. 2025. SmartEats: Investigating the Effects of Customizable Conversational Agent in Dietary Recommendations. In *Proceedings of the 7th ACM Conference on Conversational User Interfaces (CUI '25)*. Association for Computing Machinery, New York, NY, USA, Article 63, 16 pages. https://doi.org/10.1145/3719160.3736635
[70] Jake Linardon, Tracy L Tylka, and Matthew Fuller-Tyszkiewicz. 2021. Intuitive eating and its psychological correlates: A meta-analysis. *International Journal of Eating Disorders* 54, 7 (2021), 1073–1098. https://doi.org/10.1002/eat.23509
[71] CE Lloyd, A Wilson, RIG Holt, C Whicher, P Kar, Language Matters Group, Partha Kar, Anne Cooper, Naresh Kanumilli, Jill Hill, et al. 2018. Language matters: a UK perspective. *Diabetic Medicine* 35, 12 (2018), 1635–1641. https://doi.org/10.1111/dme.13801
[72] James Lock, W Stewart Agras, Kathleen Kara Fitzpatrick, Susan W Bryson, Booil Jo, and Kate Tchanturia. 2013. Is outpatient cognitive remediation therapy feasible to use in randomized clinical trials for anorexia nervosa? *International Journal of Eating Disorders* 46, 6 (2013), 567–575. https://doi.org/10.1002/eat.22134
[73] Yuhan Luo, Young-Ho Kim, Bongshin Lee, Naeemul Hassan, and Eun Kyoung Choe. 2021. FoodScrap: Promoting Rich Data Capture and Reflective Food Journaling Through Speech Input. In *Proceedings of the 2021 ACM Designing Interactive Systems Conference* (Virtual Event, USA) *(DIS '21)*. Association for Computing Machinery, New York, NY, USA, 606–618. https://doi.org/10.1145/3461778.3462074
[74] Yuhan Luo, Bongshin Lee, Young-Ho Kim, Eun Kyoung Choe, et al. 2022. NoteWordy: Investigating Touch and Speech Input on Smartphones for Personal Data Capture. *proc. of the ACM on Human-Computer Interaction, Interactive Surfaces and Spaces (ISS), (To appear)*. https://doi.org/10.1145/3567734
[75] Yuhan Luo, Bongshin Lee, Donghee Yvette Wohn, Amanda L Rebar, David E Conroy, and Eun Kyoung Choe. 2018. Time for break: Understanding information workers' sedentary behavior through a break prompting system. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–14. https://doi.org/10.1145/3173574.3173701
[76] Yuhan Luo, Peiyi Liu, and Eun Kyoung Choe. 2019. Co-Designing food trackers with dietitians: Identifying design opportunities for food tracker customization. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–13. https://doi.org/10.1145/3290605.3300822
[77] Aleksandra Luszczynska, Maciej Tryburcy, and Ralf Schwarzer. 2006. Improving fruit and vegetable consumption: a self-efficacy intervention compared with a combined self-efficacy and planning intervention. *Health Education Research* 22, 5 (10 2006), 630–638. https://doi.org/10.1093/her/cyl133 arXiv:https://academic.oup.com/her/article-pdf/22/5/630/1513929/cyl133.pdf
[78] Yaxuan Mao, Yanheng Li, Duo Gong, Pengcheng An, and Yuhan Luo. 2025. 'Can I Decorate My Teeth With Diamonds?': Exploring Multi-Stakeholder Perspectives on Using VR to Reduce Children's Dental Anxiety. *Proc. ACM Hum.-Comput. Interact.* 9, 7, Article CSCW346 (Oct. 2025), 25 pages. https://doi.org/10.1145/3757527
[79] Bess H Marcus, Vanessa C Selby, Raymond S Niaura, and Joseph S Rossi. 1992. Self-efficacy and the stages of exercise behavior change. *Research quarterly for exercise and sport* 63, 1 (1992), 60–66. https://doi.org/10.1080/02701367.1992.10607557
[80] Ron McLachlin. 1997. Management initiatives and just-in-time manufacturing. *Journal of Operations management* 15, 4 (1997), 271–292. https://doi.org/10.1016/S0272-6963(97)00010-7
[81] Caitlin M McMaster, Tracey Wade, Janet Franklin, and Susan Hart. 2020. Development of consensus-based guidelines for outpatient dietetic treatment of eating disorders: A Delphi study. *International Journal of Eating Disorders* 53, 9 (2020), 1480–1495. https://pubmed.ncbi.nlm.nih.gov/32662177/
[82] Caroline McNamara, Anna Chur-Hansen, and Phillipa Hay. 2008. Emotional responses to food in adults with an eating disorder: a qualitative exploration. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association* 16, 2 (2008), 115–123. https://pubmed.ncbi.nlm.nih.gov/17680589/
[83] Alyssa Clare Milton, Ashlea Hambleton, Mitchell Dowling, Anna Elizabeth Roberts, Tracey Davenport, and Ian Hickie. 2021. Technology-Enabled Reform in a Nontraditional Mental Health Service for Eating Disorders: Participatory Design Study. *J Med Internet Res* 23, 2 (16 Feb 2021), e19532. https://doi.org/10.2196/19532
[84] Anne M Mittnacht and Cynthia M Bulik. 2015. Best nutrition counseling practices for the treatment of anorexia nervosa: A Delphi study. *International Journal of Eating Disorders* 48, 1 (2015), 111–122. https://doi.org/10.1002/eat.22319
[85] Dan Morris, AJ Brush, and Brian R Meyers. 2008. SuperBreak: using interactivity to enhance ergonomic typing breaks. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '08)*. ACM, 1817–1826. http://doi.org/10.1145/1357054.1357337
[86] Meredith Ringel Morris and Jed R. Brubaker. 2025. Generative Ghosts: Anticipating Benefits and Risks of AI Afterlives. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 536, 14 pages. https://doi.org/10.1145/3706598.3713758

[87] Inbal Nahum-Shani, Shawna N Smith, Bonnie J Spring, Linda M Collins, Katie Witkiewitz, Ambuj Tewari, and Susan A Murphy. 2017. Just-in-Time Adaptive Interventions (JITAIs) in Mobile Health: Key Components and Design Principles for Ongoing Health Behavior Support. *Annals of Behavioral Medicine* 52, 6 (12 2017), 446–462. https://doi.org/10.1007/s12160-016-9830-8 arXiv:https://academic.oup.com/abm/article-pdf/52/6/446/38625111/abm_52_6_446.pdf

[88] Katherine R Naish, Michele Laliberte, James MacKillop, and Iris M Balodis. 2019. Systematic review of the effects of acute stress in binge eating disorder. *European Journal of Neuroscience* 50, 3 (2019), 2415–2429. https://doi.org/10.1111/ejn.14110

[89] Felix Naughton, Sarah Hopewell, Neal Lathia, Rik Schalbroeck, Chloë Brown, Cecilia Mascolo, Andy McEwen, and Stephen Sutton. 2016. A Context-Sensing Mobile Phone App (Q Sense) for Smoking Cessation: A Mixed-Methods Study. *JMIR Mhealth Uhealth* 4, 3 (16 Sep 2016), e106. https://doi.org/10.2196/mhealth.5787

[90] Deirdre O'Donnell, Éidín Shé, Mary McCarthy, Shirley Thornton, Thelma Doran, Freda Smith, Barry O'Brien, Jim Milton, Bibiana Savin, Anne Donnellan, Eugene Callan, Eilish Mcauliffe, Simone Gray, Therese Carey, Nicola Boyle, Michelle O'Brien, Andrew Patton, Diarmuid O'Shea, and Therese Marie. 2019. Enabling public, patient and practitioner involvement in co-designing frailty pathways in the acute care setting. *BMC Health Services Research* 19 (11 2019). https://doi.org/10.1186/s12913-019-4626-8

[91] Cliodhna O'Connor and Helene Joffe. 2020. Intercoder Reliability in Qualitative Research: Debates and Practical Guidelines. *International Journal of Qualitative Methods* 19 (2020), 1609406919899220. https://doi.org/10.1177/1609406919899220

[92] Joonyoung Park and Uichin Lee. 2023. Understanding Disengagement in Just-in-Time Mobile Health Interventions. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 2, Article 72 (June 2023), 27 pages. https://doi.org/10.1145/3596240

[93] Jessica Pater, Fayika Farhat Nova, Amanda Coupe, Lauren E. Reining, Connie Kerrigan, Tammy Toscos, and Elizabeth D Mynatt. 2021. Charting the Unknown: Challenges in the Clinical Assessment of Patients' Technology Use Related to Eating Disorders. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) *(CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 548, 14 pages. https://doi.org/10.1145/3411764.3445289

[94] Jessica A. Pater, Oliver L. Haimson, Nazanin Andalibi, and Elizabeth D. Mynatt. 2016. "Hunger Hurts but Starving Works": Characterizing the Presentation of Eating Disorders Online. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing* (San Francisco, California, USA) *(CSCW '16)*. Association for Computing Machinery, New York, NY, USA, 1185–1200. https://doi.org/10.1145/2818048.2820030

[95] Olga Perski, Emily T. Hébert, Felix Naughton, Eric B. Hekler, Jamie Brown, and Michael S. Businelle. 2022. Technology-mediated just-in-time adaptive interventions (JITAIs) to reduce harmful substance use: a systematic review. *Addiction* 117, 5 (2022), 1220–1241. https://doi.org/10.1111/add.15687 arXiv:https://onlinelibrary.wiley.com/doi/pdf/10.1111/add.15687

[96] Janet Polivy and C Peter Herman. 2002. Causes of eating disorders. *Annual review of psychology* 53, 1 (2002), 187–213. https://doi.org/10.1146/annurev.psych.53.100901.135103

[97] Bruno Porras-Garcia, Marta Ferrer-Garcia, Eduardo Serrano-Troncoso, Marta Carulla-Roig, Pau Soto-Usera, Helena Miquel-Nabau, Laura Fernández-Del castillo Olivares, Rosa Marnet-Fiol, Isabel de la Montaña Santos-Carrasco, Bianca Borszewski, Marina Díaz-Marsá, Isabel Sánchez-Díaz, Fernando Fernández-Aranda, and José Gutiérrez-Maldonado. 2021. AN-VR-BE. A Randomized Controlled Trial for Reducing Fear of Gaining Weight and Other Eating Disorder Symptoms in Anorexia Nervosa through Virtual Reality-Based Body Exposure. *Journal of Clinical Medicine* 10, 4 (2021). https://doi.org/10.3390/jcm10040682

[98] Emily K. Presseller, Megan N. Parker, Mandy Lin, James Weimer, and Adrienne S. Juarascio. 2020. The application of continuous glucose monitoring technology to eating disorders research: An idea worth researching. *International Journal of Eating Disorders* 53, 12 (2020), 1901–1905. https://doi.org/10.1002/eat.23404 arXiv:https://onlinelibrary.wiley.com/doi/pdf/10.1002/eat.23404

[99] Stephen Purpura, Victoria Schwanda, Kaiton Williams, William Stubler, and Phoebe Sengers. 2011. Fit4life: the design of a persuasive technology promoting healthy behavior and ideal weight. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Vancouver, BC, Canada) *(CHI '11)*. Association for Computing Machinery, New York, NY, USA, 423–432. https://doi.org/10.1145/1978942.1979003

[100] Xiang Qi and Junnan Yu. 2025. Participatory Design in Human-Computer Interaction: Cases, Characteristics, and Lessons. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 804, 26 pages. https://doi.org/10.1145/3706598.3713436

[101] Tauhidur Rahman, Mary Czerwinski, Ran Gilad-Bachrach, and Paul Johns. 2016. Predicting "About-to-Eat" Moments for Just-in-Time Eating Intervention. In *Proceedings of the 6th International Conference on Digital Health Conference* (Montréal, Québec, Canada) *(DH '16)*. Association for Computing Machinery, New York, NY, USA, 141–150. https://doi.org/10.1145/2896338.2896359

[102] Christina Ralph-Nearman, Kimberly D. Osborn, Rose Seoyoung Chang, and Kathryn E. Barber. 2024. Momentary physiological indices related to eating disorders: A systematic and methodological review. *European Eating Disorders Review* 32, 4 (2024), 700–717. https://doi.org/10.1002/erv.3062 arXiv:https://onlinelibrary.wiley.com/doi/pdf/10.1002/erv.3062

[103] C Ralph-Nearman, LE Sandoval-Araujo, A Karem, CE Cusack, S Glatt, MA Hooper, C Rodriguez Pena, D Cohen, S Allen, ED Cash, et al. 2024. Using machine learning with passive wearable sensors to pilot the detection of eating disorder behaviors in everyday life. *Psychological medicine* 54, 6 (2024), 1084–1090. https://pmc.ncbi.nlm.nih.gov/articles/PMC10939805/

[104] RecoveryRecord. 2025. https://www.recoveryrecord.com/.

[105] Elizabeth Rieger, Dorothy J. Van Buren, Monica Bishop, Marian Tanofsky-Kraff, Robinson Welch, and Denise E. Wilfley. 2010. An eating disorder-specific model of interpersonal psychotherapy (IPT-ED): Causal pathways and treatment implications. *Clinical Psychology Review* 30, 4 (2010), 400–410. https://doi.org/10.1016/j.cpr.2010.02.001

[106] Tetyana Rocks, Fiona Pelly, and Paul Wilkinson. 2014. Nutrition Therapy during Initiation of Refeeding in Underweight Children and Adolescent Inpatients with Anorexia Nervosa: A Systematic Review of the Evidence. *Journal of the Academy of Nutrition and Dietetics* 114, 6 (2014), 897–907. https://doi.org/10.1016/j.jand.2013.11.022

[107] Andrew Sayer. 1986. New developments in manufacturing: the just-in-time system. *Capital & Class* 10, 3 (1986), 43–72. https://journals.sagepub.com/doi/abs/10.1177/030981688603000105

[108] Ulrike Schmidt, Roger Adan, Ilka Böhm, Iain C Campbell, Alexandra Dingemans, Stefan Ehrlich, Isis Elzakkers, Angela Favaro, Katrin Giel, Amy Harrison, et al. 2016. Eating disorders: the big issue. *The Lancet Psychiatry* 3, 4 (2016), 313–315. https://pubmed.ncbi.nlm.nih.gov/27063378/

[109] Aiqin Shi, Faren Huo, and Guanhua Hou. 2021. Effects of design aesthetics on the perceived value of a product. *Frontiers in Psychology* 12 (2021), 670800. https://pmc.ncbi.nlm.nih.gov/articles/PMC8359925/

[110] Ziteng Shi, Wei Huang, and Yuhui Liang. 2023. Work values and cultural background: a comparative analysis of work values of Chinese and British engineers in the UK. *Frontiers in Psychology* 14 (2023), 1144557. https://doi.org/10.3389/fpsyg.2023.1144557

[111] Donghoon Shin, Gary Hsieh, and Young-Ho Kim. 2023. PlanFitting: Tailoring Personalized Exercise Plans with Large Language Models. *ArXiv* abs/2309.12555 (2023). https://api.semanticscholar.org/CorpusID:262217198

[112] Rebecca M Shingleton, Lauren K Richards, and Heather Thompson-Brenner. 2013. Using technology within the treatment of eating disorders: a clinical practice review. *Psychotherapy* 50, 4 (2013), 576. https://pubmed.ncbi.nlm.nih.gov/23527906/

[113] Huma Shireen, Samantha Castelli, Maurice Legault, Yair Dor-Ziderman, Julia Milad, and Bärbel Knäuper. 2022. Phenomenological support for escape theory: a qualitative study using explicitation interviews with emotional eaters. *Journal of Eating Disorders* 10, 1 (2022), 174. https://link.springer.com/article/10.1186/s40337-022-00690-y

[114] Kvido Smitka, Petra Prochazkova, Radka Roubalova, Jiri Dvorak, Hana Papezova, Martin Hill, Jaroslav Pokorny, Otomar Kittnar, Martin Bilej, and Helena Tlaskalova-Hogenova. 2021. Current aspects of the role of autoantibodies directed against appetite-regulating hormones and the gut microbiome in eating disorders. *Frontiers in endocrinology* 12 (2021), 613983. https://doi.org/10.3389/fendo.2021.613983

[115] Eric Stice, Shelley Durant, Paul Rohde, and Heather Shaw. 2014. Effects of a prototype Internet dissonance-based eating disorder prevention program at 1-and 2-year follow-up. *Health Psychology* 33, 12 (2014), 1558. https://pubmed.ncbi.nlm.nih.gov/25020152/

[116] Jina Suh, Esther Howe, Robert Lewis, Javier Hernandez, Koustuv Saha, Tim Althoff, and Mary Czerwinski. 2024. Toward Tailoring Just-in-Time Adaptive Intervention Systems for Workplace Stress Reduction: Exploratory Analysis of Intervention Implementation. *JMIR Ment Health* 11 (12 Sep 2024), e48974. https://doi.org/10.2196/48974

[117] Alycia N Sullivan and Margie E Lachman. 2017. Behavior change with fitness technology in sedentary adults: a review of the evidence for increasing physical activity. *Frontiers in public health* 4 (2017), 222909. https://doi.org/10.3389/fpubh.2016.00289

[118] Jessica Swinbourne, Caroline Hunt, Maree Abbott, Janice Russell, Tamsen St Clare, and Stephen Touyz. 2012. The comorbidity between eating disorders and anxiety disorders: Prevalence in an eating disorder sample and anxiety disorder sample. *Australian & New Zealand Journal of Psychiatry* 46, 2 (2012), 118–131. https://doi.org/10.1177/0004867411432071 arXiv:https://doi.org/10.1177/0004867411432071 PMID: 22311528.

[119] Hui Tang, Jesus Alfonso D Datu, Zhijun Liu, Jiefei Shen, and Qiang Xing. 2023. The engaged lives of encouraged students: Academic encouragement, grit and academic engagement in Chinese first year undergraduate students. *Current Psychology* 42, 23 (2023), 19526–19536. https://link.springer.com/article/10.1007/

s12144-022-03057-3

[120] J Kevin Thompson and Eric Stice. 2001. Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current directions in psychological science* 10, 5 (2001), 181–183. https://doi.org/10.1111/1467-8721.00144

[121] Laura M Thornton, Hunna J Watson, Andreas Jangmo, Elisabeth Welch, Camilla Wiklund, Yvonne von Hausswolff-Juhlin, Claes Norring, Barry K Herman, Henrik Larsson, and Cynthia M Bulik. 2017. Binge-eating disorder in the Swedish national registers: Somatic comorbidity. *International Journal of Eating Disorders* 50, 1 (2017), 58–65. https://doi.org/10.1002/eat.22624

[122] S. Touyz, D. Le Grange, H. Lacey, P. Hay, R. Smith, S. Maguire, B. Bamford, K. Pike, and R. Crosby. 2015. Treating Severe and Enduring Anorexia Nervosa: a Randomized Control Trial. *European Psychiatry* 30 (2015), 357. https://doi.org/10.1016/S0924-9338(15)30281-9 Abstracts of the 23rd European Congress of Psychiatry.

[123] Ashley Twigger, Amos Yong Soon Lee, and Jackie Amos. 2024. Clinician and lived experience perspectives on non-judgemental family care, in working with childhood maltreatment and intergenerational trauma: A pilot narrative review. *Australian and New Zealand Journal of Family Therapy* 45, 4 (2024), 388–400. https://doi.org/10.1002/anzf.1611

[124] Ella van Beers, Irene de Vries, Caroline Planting, Carolien Christ, Edwin de Beurs, and Elske van den Berg. 2025. Biological treatments for co-occurring eating disorders and psychological trauma: a systematic review. *Frontiers in psychiatry* 16 (2025), 1523269. https://doi.org/10.3389/fpsyt.2025.1523269

[125] B. Timothy Walsh. 2011. The importance of eating behavior in eating disorders. *Physiology & Behavior* 104, 4 (2011), 525–529. https://doi.org/10.1016/j.physbeh.2011.05.007 Proceedings from the 2010 meeting of the Society for the Study of Ingestive Behavior (SSIB).

[126] Simon M Wilksch, Anne O'Shea, and Tracey D. Wade. 2018. Media Smart-Targeted: Diagnostic outcomes from a two-country pragmatic online eating disorder risk reduction trial for young adults. *International Journal of Eating Disorders* 51 (2018), 270–274. https://api.semanticscholar.org/CorpusID:3782476

[127] Mudan Wu, Mechthild Hartmann, Mandy Skunde, Wolfgang Herzog, and Hans-Christoph Friederich. 2013. Inhibitory control in bulimic-type eating disorders: a systematic review and meta-analysis. *PloS one* 8, 12 (2013), e83412. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0083412

[128] Katie Xue, Yaxuan Mao, Junnan Yu, and Yuhan Luo. 2025. Toward Interactive Reading: Co-designing With Adolescents to Explore Opportunities for Overcoming Reading Challenges. In *Proceedings of the 24th Interaction Design and Children*. 904–909. https://dl.acm.org/doi/10.1145/3713043.3731503

[129] Elise Zanella and Eunro Lee. 2022. Integrative review on psychological and social risk and prevention factors of eating disorders including anorexia nervosa and bulimia nervosa: seven major theories. *Heliyon* 8, 11 (2022). https://pubmed.ncbi.nlm.nih.gov/36406673/

[130] Yafu Zhao and William Encinosa. 2006. Hospitalizations for Eating Disorders from 1999 to 2006. http://europepmc.org/books/NBK53970

[131] Xi Zheng, Zhuoyang Li, Xinning Gui, and Yuhan Luo. 2025. Customizing Emotional Support: How Do Individuals Construct and Interact With LLM-Powered Chatbots. (2025). https://doi.org/10.1145/3706598.3713453

[132] April J Zhu and B Timothy Walsh. 2002. Pharmacologic Treatment of Eating Disorders. *The Canadian Journal of Psychiatry* 47, 3 (2002), 227–234. https://doi.org/10.1177/070674370204700302 arXiv:https://doi.org/10.1177/070674370204700302 PMID: 11987473.