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The qualitative evaluation of the Yale Food addiction scale 2.0

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Abstract

Background: The Yale Food Addiction Scale 2.0 (YFAS 2.0) operationalizes food addiction (FA) by applying the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM 5) criteria for substance use disorder (SUD) to the overconsumption of highly processed foods. The YFAS 2.0 has been quantitatively validated across numerous populations, but has never undergone qualitative analysis.

Aims: Using qualitative methods we aimed to determine if the interpretation YFAS 2.0 is aligned with the DSM 5 conceptualization of SUD, to determine if any items are perceived as irrelevant to the lived-experience of FA, and to determine if there are constructs central to the lived-experience of FA that are not captured by the scale.

Methods: We interviewed 16 participants who met criteria for FA on the modified YFAS 2.0 using semi-structured interviews to understand each participants' interpretation of items on the scale and their perceptions of how the scale matched their lived-experience of FA. Reflexive thematic analysis was used to code responses and identify themes.

Results: Most interpretations aligned with the DSM 5 conceptualization of SUDs. Withdrawal and tolerance-related items were subject to some misinterpretations. Participants viewed problem-focused symptoms (e.g., interpersonal problems) as the least relevant to their lived-experience. Novel themes not included on the YFAS 2.0 (e.g., emotional eating) emerged.

Summary: Our study supports the validity of the YFAS 2.0 by showing consistency with the DSM 5 conceptualization of SUDs and consistency with the lived-experience of individuals who endorse FA. Future research should explore the novel themes that emerged in this study.

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Ethical statement

This research was conducted in accordance with the Declaration of Helsinki and was declared exempt by the University of Michigan Institutional Review Board (Qualitative Evaluation of the Yale Food Addiction Scale 2.0 - HUM 00162843) due to the low-risk nature of the research protocol. All participants were fully informed of their role and duties in completing the study prior to agreeing to participate and completed written informed consent before beginning the interviews. Participants were also informed that they could end their participation at anytime during the research protocol, and had the right to refuse to answer any of the interview questions.

We have no conflicts of interest to disclose.

Keywords

Food addiction; Qualitative research; Construct validation; Semi-structured interviews

1. Introduction

Food addiction (FA) is a controversial concept that has received growing interest in the field of psychology. FA theory posits that highly processed foods (i.e., foods with elevated levels of refined carbohydrates and fat; ice cream, pizza, French fries) are capable of triggering neuro-biological and behavioral responses akin to traditional addictive substances (e.g., alcohol, nicotine; Gearhardt et al., 2009; Schulte et al., 2015). Alternatively, FA theory posits that unprocessed (e.g., naturally occurring foods like fruits, vegetables, whole grains) or minimally processed foods (e.g., foods that have slightly altered without substantially changing the foods nutritional content; frozen fruits) are not capable of triggering the same addictive process. Currently, the Yale Food Addiction Scale 2.0 (YFAS 2.0) which applies the Diagnostic and Statistical Manual Fifth Edition (DSM 5) criteria for substance use disorders (SUDs) to the consumption of highly processed foods, is the most popular measure used to operationalize FA (Gearhardt et al., 2016). Although the YFAS 2.0 has received extensive psychometric validation (Aloi et al., 2017; Gearhardt et al., 2016; Horsager et al., 2020; Khine et al., 2019), it has not undergone qualitative validation. Qualitative validation of the YFAS 2.0 is essential in that it will allow researchers to determine if items on the scale are being subjectively interpreted in a manner that is consistent with the DSM 5 conceptualization of SUDs. If participants are regularly interpreting items in a manner inconsistent with the DSM 5, or if the items or instructions are found to be confusing or easily misunderstood, this poses a significant threat to the face validity of the YFAS 2.0.

To operationalize the concept of FA, the YFAS 2.0 applies the eleven DSM 5 criteria for SUDs (i.e., loss of control, tolerance, withdrawal) to the consumption of highly processed foods (see Table 1) and measures the impairment and distressed caused by addictive eating (American Psychiatric Association, 2013; Gearhardt et al., 2016). Each item on the scale is associated with one DSM 5 criteria for SUDs. For example, the criterion of ‘loss of control’ which is meant to capture the compulsive nature of addiction is measured by asking “When I started eating certain foods, I ate much more than planned.” In accordance with the DSM 5 criteria for SUDs, participants who meet threshold for at least two symptoms in addition to impairment and distress in daily life as a direct result of their FA meet criteria for the disorder (see Methods for additional detail on scoring; Gearhardt et al., 2016).

The YFAS 2.0 has been validated across multiple community and clinical samples, and consistently demonstrates strong psychometric properties. Specifically, the scale demonstrates internal consistency reliability and test-retest reliability (Gearhardt et al., 2016), in addition to convergent validity with constructs such as elevated body mass index (BMI), binge eating, emotional eating, and impulsivity and convergent, discriminant, and incremental validity (Aloi et al., 2017; Horsager et al., 2020; Khine et al., 2019). Further, the scale demonstrates discriminant validity with constructs such as substance use (Clark et al., 2019) and incremental validity by predicting binge eating frequency over and above

other constructs such as BMI (Gearhardt et al., 2016). A recent systematic review of 53 studies examining the YFAS 2.0 also demonstrated that the scale maintains strong psychometric properties (e.g., strong one-factor model, convergent and discriminant validity) across cultures (Oliveira et al., 2021) providing further evidence for the validity and utility of the YFAS 2.0.

Despite ample quantitative support for the validity and utility of the YFAS, to our knowledge a qualitative evaluation of the scale has never been conducted. The qualitative evaluation of psychometric scales is imperative as it allows researchers to understand the subjective experience of participants as they complete a measure. In so doing, researchers can explore how individuals subjectively interpret questions and prompts to determine whether or not a scale is being understood as expected (Brodey et al., 2018). Further, qualitative analysis may help to illuminate items and prompts that may be confusing or easily misunderstood (Brodey et al., 2018; Godderis et al., 2009). If participants interpret items in unexpected ways, or if items or prompts are easily misunderstood, this threatens the face validity of the scale and researchers may unintentionally capture phenomena unrelated to the construct the scale is intended to measure. Additionally, qualitative analysis utilizes follow-up questions, allowing participants to explain why they chose a specific response and to extrapolate on any caveats to their selection (Godderis et al., 2009). For example, participants may have the opportunity to describe contexts in which their original choice may not apply. Further, participants can identify aspects of their lived experience that are not captured by a scale and/or identify items on a scale that do not accurately reflect their lived experience. These insights can in turn be used to revise psychometric scales to better capture the lived experience of the construct being measured, increasing the validity of the measure and allowing for more accurate research (Brodey et al., 2018).

In the current study, we recruited individuals who self-identified as addicted to food and met criteria for FA on the modified version of the YFAS 2.0 (i.e., mYFAS 2.0; a screener version of the YFAS 2.0) to qualitatively assess the YFAS 2.0 in three ways. First, we qualitatively examined individual responses on the YFAS 2.0 to determine if participants understood items on the scale in a manner consistent with the DSM 5 conceptualization of SUDs. If participants regularly interpret the same questions in unanticipated ways this may be a threat to the overall face validity of the scale. Next, we used qualitative analysis to determine if participants perceived that common items on the YFAS 2.0 were inappropriate or irrelevant to the evaluation of FA. If the same items are reported to be unrelated to participants' lived experiences, the DSM 5 criteria for SUDs may not be appropriate for accurately operationalizing FA. Finally, we asked participants to describe other important aspects of their lived experience of FA that are not captured by the YFAS 2.0. If common themes emerged that are not captured by the current scale, this may allow future quantitative researchers to determine if these additional constructs may improve the prediction of FA when added to the YFAS 2.0.

2. Methods

The current study was designated as exempt by the University of Michigan Institutional Review Board (HUM00162843) in accordance with the provisions of the World Medical

Association Declaration of Helsinki. Additionally, this study followed the consolidated criteria for reporting qualitative studies 32-item checklist proposed by Tong et al. (2007). This study was not preregistered.

2.1. Participants

Participants were recruited through the University of Michigan Health Research website, a free recruitment resource open to the general public as well as University of Michigan students, staff, and faculty members. Potential participants indicated if they currently felt addicted to food, completed the modified Yale Food Addiction Scale 2.0 (mYFAS 2.0; Schulte & Gearhardt, 2017), and provided demographic information (e.g., age, race, gender) through a secure online portal. Adults over the age of 25 who self-identified as addicted to food and who met criteria for FA were eligible to participate. We opted to use 25 as the cut off age to avoid oversaturating our participant pool with undergraduate students who are largely reliant on the university's meal plans and who may experience other constraints specific to the college food environment, potentially uniquely influencing their experiences of FA and skewing the data. Individuals who did not self-identify as addicted to food, who identified as food addicted in the past but not currently, who did not meet criteria for FA, or who were unwilling to be audio recorded were not eligible to participate.

Four hundred and forty-four people indicated interest in the study. We aimed to interview between 15 and 25 participants for the current study based on average sample sizes from previous qualitative studies exploring FA (Meadows et al., 2017; Paterson et al., 2019; Ruddock et al., 2015). As a result, not every interested participant was screened for eligibility. Instead, purposive sampling was used to recruit a wide range of participants across gender, race, and age. Specific care was taken to ensure that the sample included a range of FA severity (i.e., mild, moderate, severe). Of those screened, potential participants were excluded primarily because they did not meet criteria for FA on the mYFAS 2.0 or because they self-identified as addicted to food in the past but not within the last year. Eighty-eight eligible participants were invited to complete the study. Fifty-six did not respond to the initial invitation or did not follow up to schedule an interview. Fourteen did not attend their scheduled interview. Two participants were excluded after their interviews, one for failing to provide detailed answers that could be analyzed qualitatively, and the other for attending the interview under the influence of substances. The final sample size was 16 participants.

2.2. Protocol overview

Interviews were completed on-site at the University of Michigan. First, participants completed written informed consent and the full YFAS 2.0. Participants then completed a qualitative interview about completing the scale. Finally, participants completed the Structured Clinical Interview for DSM 5 - Eating Disorders Module (First et al., 2016) to determine the presence or history of clinically significant eating pathology (e.g., anorexia nervosa, bulimia nervosa, BED). Afterward, participants were debriefed, offered a list of local resources for the treatment of disordered eating and compensated \$40.

2.3. Measures and interviews

The YFAS 2.0 The YFAS 2.0 is a 35-item, self-report questionnaire that applies the DSM-5 criteria for SUD to the consumption of highly processed foods (Gearhardt et al., 2016). Questions include, “I worried a lot about cutting down on certain types of food, but I ate them anyways,” and “I had problems with my family or friends because of how much I overate”. The questionnaire asks participants to only consider their eating behaviors in the last year and asks them to consider specific type of foods (e.g., sweets, salty snacks, sugary drinks, fast food). Items on the YFAS 2.0 range from 0 (Never) to 7 (Everyday) indicating the frequency that an individual engages in different FA behaviors. Each item on the scale represents a symptom from the DSM-5 diagnosis for SUD (e.g. withdrawal, loss of control). If a participant meets threshold on any item, they meet criteria for that symptom (see Table 1 for item thresholds). A participant must meet criteria for two symptoms and experience clinical impairment or distress to receive a diagnosis of FA. Mild FA is defined as meeting two to three symptoms, moderate is defined as meeting four to five symptoms, and to receive a diagnosis of severe FA an individual must meet six or more symptoms (Gearhardt et al., 2016).

Qualitative YFAS 2.0 Interview All interviews were conducted in-person at the University of Michigan by the first author, a white, cis-gender female doctoral candidate researcher studying clinical psychology. The interviewer received training in reflexive thematic analysis for qualitative research and studies FA from a SUD perspective. The interviewer did not have knowledge of participants background or FA history prior to the interviews, and participants were unaware of the interviewer’s personal beliefs about the nature or experience of FA. Participants were interviewed alone, and no other research staff were present during the interview.

Participants were asked two questions about each item on the YFAS 2.0: “Can you tell me what you were thinking when you answered that question?” and “Can you describe a specific example of when that happened to you in the last year?” Follow-up questions, such as “Can you tell me more about that?” were utilized when more detail was needed to understand a response. Participants were then asked three follow up questions: “Are there any other behaviors or experiences that you believe represent food addiction that are not on the YFAS 2.0?”. “Are there any items on the YFAS 2.0 that you feel are not characteristic of food addiction?”, and “Are there any questions on the YFAS 2.0 that were confusing or hard to understand?”. Follow-up questions such as “Can you give me more details?” were used to gather additional detail. Finally, participants were asked to identify any foods that they believed should be excluded or included on the list of highly processed foods at the top of the scale. Interviews ranged from 40 min to 2 h. No repeat interviews were conducted and transcripts were not returned to participants for review.

2.4. Data analytic plan

All interviews were audio-recorded and transcribed verbatim. Transcripts were uploaded into NVivo (QSR International Pty Ltd, 2020) for review and analysis. The first author used thematic analysis to analyze interviews and generate themes (Braun & Clarke, 2006). Reflexive thematic analysis was chosen as the pre-specified method of analysis because it

allows for flexibility and the ability to uncover rich, detailed patterns across participants. Experiential and semantic orientations were employed to develop themes, which center the participant's experience and assume that language reflects the reality of the participant. A combination of deductive and inductive approaches were used to analyze responses. To determine if participant responses were consistent with the DSM 5 conceptualization of SUDs, a deductive approach was used. After responses were analyzed deductively, an inductive approach was used to allow themes to emerge from the data.

Coding and analysis was conducted through an iterative process. The first author read each transcript multiple times to increase familiarity with the data. Initial thoughts and questions were noted, and relevant sections of text were highlighted. After familiarization, the first author coded each transcript. Codes reflected both deductive, theory driven assumptions about FA (whether or not responses were consistent with a DSM 5 conceptualization of SUDs) and inductive discoveries that emerged from participant responses. Memos and annotations were included to track the first authors subjective experience of the coding process (Birks et al., 2008). Deductive codes were reviewed by the second author using a coding reliability approach to reach agreement on participant's interpretation of each YFAS 2.0 item. Specifically, the first author independently rated responses as in alignment with the DSM 5 conceptualization of FA, not in alignment with the DSM-5 conceptualization of FA, or "cannot be determined". Next the second author reviewed the first authors codes for consensus. When disagreement occurred, the first and second author discussed discrepancies until consensus was met. Segments of inductive coding were also reviewed and discussed among all three authors. Next, transcripts were reviewed and codes were added or altered to ensure consistency across the data-set. Candidate themes were identified by reviewing patterns that emerged across the data set and relevant sections of text were collated under each theme. Finally, candidate themes were reviewed to ensure they were reflective of participant responses, to determine if themes should be combined, and to determine if additional themes should be added. Participants did not provide feedback to the investigators throughout the coding process. Transcripts are not publicly available to protect the identities of the study participants, but request for deidentified transcripts may be made to the first author.

3. Results

3.1. Participants

The sample ($n = 16$) included more women ($n = 11$) than men ($n = 5$). Participants were 40 years old on average and ranged from 25 to 63 years old. Based on BMI standards, two participants had healthy weight, four participants had overweight, and eight participants had obesity with an average BMI of 34.0 kg/m^2 ($S.D. = 11.15$). Two participants did not to provide height and weight. Nine participants identified as white, four identified as Black, one identified as Asian, and two identified as non-white Hispanic (see Table 2). Thirteen participants reported no history of eating disorders. One participant met criteria for past bulimia nervosa and two participants met criteria for current BED based on the Structured Clinical Interview for DSM 5 eating disorder module.

Symptom endorsement ranged from two to 11, with an average symptom count of 5.81 ($S.D. = 3.20$). Twelve participants met criteria for a FA diagnosis on the day of their interview. Two qualified for mild FA, three qualified for moderate, and seven qualified for severe. Four participants did not endorse the impairment or distress criterion, preventing them from meeting threshold for FA at the time of the interview. This may have been due to the passage of time between the online screener and the completion of the interview, which ranged from four days to three weeks. Additionally, participants may have felt less comfortable sharing the severity of their experiences while face-to-face with the interviewer. Despite these discrepancies, each participant who did not meet for impairment or distress at the time of the interview still met the multiple-symptom criterion, one for mild FA, one for moderate FA, and two from severe FA. Further, research has demonstrated that individuals who do not meet the impairment/distress criterion for FA do not differ meaningfully from individuals who do meet the impairment/distress criterion on expected markers of psychological distress, specifically quality of life and depressive symptoms (Ouellette et al., 2018). Given these findings, paired with each individual meeting the symptom count criteria, we ultimately chose to include these individuals in the final analysis. Across all participants, the most commonly endorsed symptoms were the inability to cut down ($n = 10$) and withdrawal ($n = 12$). Failure to fulfill role obligation ($n = 5$) and craving ($n = 7$) were the least endorsed.

3.2. Interpretation of individual food addiction symptoms

The majority of responses were consistent with the DSM 5 conceptualization of SUD. The following examples represent common themes that emerged in how participants discussed each symptom first for responses consistent with the DSM 5, next for those that were inconsistent with DSM 5, and finally for symptoms that were difficult to categorize. Additional illustrative quotations are shown in Table 3.

3.2.1. Responses Consistent with the DSM 5—*Loss of Control*. The ‘loss of control’ criterion represents consuming highly processed foods in larger amounts than intended or eating past the point of hunger or until uncomfortably full (Gearhardt et al., 2016). A female participant (age 28, moderate FA) stated, “*I was thinking about kind of this history over the past two or three years where, if certain foods are put in front of me, I can just eat the entire bag. The entire box of cookies, the entire bag of potato chips, an entire loaf of bread. And usually when I sit down to eat bread, I’m not like, “I’m gonna eat this whole loaf.” But it is the thing I do.*” She clearly recognizes her intention to eat a smaller portion of food, but then goes on to eat whatever is in front of her, representing the compulsion to continue once she started eating.

Cut Down. The second criterion of SUD is the persistent desire or unsuccessful efforts to cut down or control consumption (American Psychological Association, 2013). This can be represented by actual efforts to cut down or the intention to cut down. One female participant (age 28, moderate FA) demonstrated the former stating, “*I can’t even count the number of times that I’ve been like, “This is the last time. I’m not gonna do this again.” And I’ve tried different methods. I’ve tried keeping a notebook and listing what I did each day, what I eat each day, whether or not I exercised. I’ve tried keeping a white board on*

my wall ... I've tried making promises to myself ..., but of course, I never keep to them." It is clear that she has made several attempts to cut down but has never experienced long-term success despite her best efforts.

Withdrawal. Withdrawal can be considered in two ways. First, it can be marked by negative emotional (e.g., irritability) or physical experiences (e.g., headaches) after the substance is removed from the system (American Psychological Association, 2013). Alternatively, withdrawal is defined as the use of a substance to avoid or relieve those negative consequences (American Psychological Association, 2013). A female participant (age 45, severe FA) described the experience of negative physical and emotional consequences when eliminating sugar and carbs from her diet: *"It's usually when we cut carbs. So, the first couple of days, you kinda feel sluggish. And I was irritable, cutting away those sugar items. I was very short with my daughter, who's 13. So my tolerance for things that normally wouldn't bother me, it's like ... Or with the dogs. Like, "Oh my God, here we go, muddy feet again." It's not just like, "Oh my God, muddy feet," no, it's, "Oh my god! There's muddy feet! Get out of my house!" I'm just ... I have zero patience or tolerance for things that normally wouldn't bother me. And then stopping carbohydrates, you get the headaches, being lethargic about it. So the first four to six days of stopping eating anything, I think that's the bulk of when that happens.*" Most participants who endorsed withdrawal symptoms reflected the first pattern. Few endorsed using food to avoid the experience of withdrawal.

Tolerance. Tolerance is also defined in two ways, either as the need to consume more of a substance in order to achieve the desired effects (e.g., pleasure, stress relief) or as the markedly diminished effect of a substance after repeated consumption (American Psychological Association, 2013). Most participants who endorsed tolerance reported experiences of diminishing pleasure from the same amount of food. For example, a female participant (age 62, severe FA) stated, *"The food doesn't give me as much enjoyment as it did before. So I'm eating the same amount but it doesn't seem to give me the same endorphin high or whatever. I don't know ... I'm just waiting for it to come back.*" Other participants acknowledged that tolerance was not relevant to their experience of FA. For example, a female participant (age 45, mild FA) noted, *"I didn't feel like I had a tolerance that I was developing, and that you had ... Like it was another substance, where you gotta keep having more to achieve the same high. I never felt like it was something like that."*

Craving. Craving is defined as a strong desire or urge to use a substance, or significant preoccupation with using the substance making it difficult to think of anything else (American Psychological Association, 2013). Participants described both experiences. For example, a female participant (age 20, moderate FA) described a strong urge to eat stating, *"If I see food somewhere at a party, or something, I'm just like "I need to eat that. That's the thing that I wanna eat. And I need to eat it before anyone else does." I make sure, I get to have it.*" Alternatively, another female participant (age 30 severe FA) described preoccupation with food stating, *"That happens a lot. Last time it happened, I had to wait 'till my sister got [home] so we could go out for food 'cause we said we were gonna go to a certain restaurant. I had to wait for her to go, so I was just thinking about it*

all day. We decided we were going to go at 9:00 o'clock in the morning but she doesn't get off until 4:00 or something like that. So it just takes up your whole day thinking about it," demonstrating her significant preoccupation with eating specific foods which impaired her ability to focus on other things.

Time Spent. The time spent criterion reflects three separate constructs: A great deal of time spent obtaining the substance, significant time spent using the substance, or a large amount of time spent recovering from the effects of a substance (American Psychological Association, 2013). All three experiences were endorsed and described across interviews. For example, a female participant (age 53, severe FA) described spending a significant amount of time obtaining food stating, *"I would literally go from Meijer to Kroger [grocery stores] if they didn't have the specific ice ... It was coffee ice cream. If they didn't have any, if they were out, I would leave that store and go to another."* Alternatively, another female participant (age 26, severe FA) described spending significant time eating stating, *"The actual amount of time that I've spent eating has been a bit like, "Oh wow, you were eating breakfast and you were snacking all the way until lunch. And then you were still snacking until dinner."* Still other participants endorsed recovery from excess consumption. For example, a female participant (age 62, severe FA) stated, *"It's not really the end of the day, it's like, right after dinner, which isn't that late, but I'm done. I'm like, 'Okay, I'm on the couch now, 'cause I'm tired, 'cause I overate.' And what I ate too ... I'm sure that makes me tired too. A lot of carbs."*

Activities. This criterion is defined as important social, occupational, or recreational activities given up or reduced because of substance use (American Psychological Association, 2013). In the current sample, activities were given up most often in social or recreational settings. For instance, a female participant (age 28, moderate FA) stated, *"That's most often on those binging days when someone reaches out and wants to do something, and I say no. And again, it's partly so I can keep eating. But the other main reason is I'm so ashamed. And a lot of those times, I feel like I actually appear bloated on those days both because of how much I've taken in and fluid retention. And just I'm like, "I don't wanna go out and have anyone know that this is happening today."*

Interpersonal Problems. The DSM 5 defines this criterion as substance use causing or exacerbating persistent social or interpersonal problems (American Psychological Association, 2013). In the current study, interpersonal problems most commonly occurred when a loved one disapproved of the amount or types of food a participant was consuming. For instance, a male participant (age 63, 4 symptoms, no impairment/distress (-I/D)) described a strained relationship with his daughter, stating *"My daughter telling me, "Dad, you shouldn't eat so much, it's gonna make you sick. Dad, you shouldn't eat so much, that stuff's bad for you. Too much of that can ... Gives people heart attacks." And that type of stuff, so right off the bat, I thought about my daughter."* Alternatively, many people recognized that their FA was not interfering with important social relationships and appropriately did not endorse these items.

Role Obligations. This criterion is defined as the inability to fulfill major role obligations at work, school, or home as a result of substance use (American Psychological Association, 2013).

Psychiatric Association, 2013). In the current study, many participants interpreted these items in a manner consistent with DSM 5, but felt that their addictive eating did not interfere with role obligations. However, some participants described experiences of failing to complete important tasks, most commonly reflecting on daily chores and household responsibilities. For example, a male participant (age 32, severe FA) reported, *“Not cleaning up. I let the kitchen just get out of control. Like I said, I won’t even get dressed. The kitchen and the rest of the house will be really out of control but all I want to do is get some snacks and get back in the bed and watch TV.”*

Consequences. The consequences criterion refers to the continuation of substance use despite negative physical (e.g., lung cancer, liver cirrhosis) or psychological (e.g., anxiety, depression) outcomes resulting from or exacerbated by problematic use (American Psychological Association, 2013). In the current sample, most participants described psychological or emotional problems resulting from their FA. For example, a female participant (age 28, moderate FA) stated, *“The actual eating brings me instantaneous joy. But, far outweighing that is how bad I feel afterward and just whether it’s shame, sadness, guilt, whatever. And that has not stopped me for about two years.”* Others described physical consequences, such as weight gain, fatigue, cardiovascular concerns, and diabetes-risk. For example, a female participant (age 26, severe FA) stated, *“I had my annual physical recently and my doctor was like, ‘Yo! Your A1C is in the diabetic range.’ And I was like, ‘Wow, that doesn’t make any sense. I’m not diabetic.’ And it’s literally just because I’ve been eating like trash these last two months or whatever.”*

Dangerous. The dangerous use criterion reflects use when it is physically hazardous (e.g., driving under the influence, consuming alcohol despite liver disease; American Psychological Association, 2013). Participants who interpreted these items in line with the DSM 5 conceptualization of SUD most commonly referenced eating while driving or distracted driving due to preoccupation with food. For example, a female participant (age 45, severe FA) stated, *“You make a last minute decision that you need something. So maybe you’re not paying close attention and you cut someone off. Or you didn’t look if someone was in your blind spot, because you’re gonna change lanes because now you need to turn to go to Jimmy John’s, or something like that.”* Here, her preoccupation with food could have resulted in an accident, representing the dangerous use criterion. Alternatively, many participants interpreted these items correctly but did not have personal experience.

Impairment/Distress. Across diagnostic categories in the DSM 5, symptoms of any disorder must result in clinically significant impairment or distress to qualify for a diagnosis (American Psychological Association, 2013). Participants cited both distress and impairment in response to their FA. For example, a male participant (age 32, severe FA) describing the distress he experiences noted, *“It’s like the pre, the before eating. It’s this weighing in my head of, ‘Do I eat it? Do I not eat it? Is it gonna really hurt me if I just have a little?’ And then of course, if I eat a lot, then it turns into, ‘Oh, I feel terrible. I feel terrible about myself. I’m just making my health worse. What did I do?’”* Another female participant (age 28, moderate FA) discussed impairment reporting, *“I would say problems with health, I think both physically and mentally. It’s definitely been a thing that’s*

made me very sad to feel out of control in this way and also just not liking the way my body looks or feels compared to what it used to look and feel like has been a huge downer. And then physical health, I don't think I'm knocking on the door of cardiovascular disease. I'm pretty young and I'm lucky to have pretty good genes. But I also know that the way that I've been eating is not healthy and that my physical health has declined since this started."

Overall, impairment and distress in both mental and physical domains were commonly endorsed for participants.

Responses Inconsistent with the DSM 5. Few responses were coded "inconsistent" with the DSM 5 criteria for SUD. Most inconsistent responses were tied to withdrawal and tolerance related items. Inconsistent responses outside of these symptoms did not result in coherent themes.

Withdrawal. Nine participants interpreted at least one item related to withdrawal inconsistent with the DSM 5 conceptualization of SUD. Most of these inconsistencies were related to the tendency to eat to cope with negative emotions rather than the emergence of negative emotion in response to cutting back on highly processed food. For example, a male participant (age 32, severe FA) stated, *"The emotional thing is big for me. I definitely eat stuff to feel better."* Another male participant (age 51, moderate FA) reflected more globally on this experience stating, *"I suppose that's the problem with a lot of people who overeat. You stuff things into places so you don't have to feel."* Thus, participants described a general tendency to eat in response to negative affect rather than abstaining from highly processed foods.

Tolerance. Five participants interpreted questions related to tolerance in a manner inconsistent with the DSM 5 conceptualization of FA. Across these responses, participants described experiencing less pleasure because of the shame and guilt associated with eating addictive foods rather than receiving less pleasure from the food itself. For example, in response to item 24, a female participant (age 46, 2 symptoms, -I/D) noted, *"Because of the guilt. When I was a kid, I ate those foods and I loved them. But when I got older I tried to be healthy. Super, super healthy. So I guess the enjoyment is less because of that conflict."*

Responses that were Difficult to Categorize. Some participant responses were difficult to categorize across symptoms. These responses clustered around three main themes.

Caffeine. Eight participants responded to items while considering coffee or other caffeinated beverages. This is problematic because caffeine can cause physiological changes similar to other addictive substances (Uddin et al., 2017), making it unclear if symptom endorsement was related to the consumption of the nutritional properties of the caffeinated beverages (e.g., sugar, cream). This was particularly common in the context of withdrawal. For example, a male participant (age 32, severe FA) stated, *"If I drink a lot of pop then I start to get a headache from not having pop. I might feel like I want a glass of pop too ... It's like if you drink pop and then you stop your body wants that sugar."* Many participants also discussed coffee and other caffeinated beverages in response to items about craving and cutting down on highly processed foods. For example, a female participant (age 45, severe FA) stated, *"Mountain Dew. I've given it up several times and it creeps back into my life."*

That's what I was thinking of specifically. I've tried to walk away several times" As a result, it was difficult to determine if the nutritional properties of the soda drove these symptoms rather than or in conjunction with the effects of caffeine.

Unrelated Causes. Six participants recognized that factors outside of eating led to symptom endorsement, making their responses difficult to interpret. Many of these participants noted other physical conditions, such as obesity or diabetes which can cause physical sensations described on the YFAS 2.0. For example, in response to the YFAS item five, a male participant (age 51, moderate FA) stated, *"I wasn't sure about that particular question. A lot of that goes with being obese. Sluggish and tired is part of the deal. Do I eat myself into food comas? No. But even if you eat a reasonable meal you can feel a little sluggish."* making it difficult to interpret his response.

Inconsistent Foods. Five participants described behaviors consistent with FA but referenced foods that are not highly processed (e.g., fruits, vegetables). For example, in response to spending time eating throughout the day, a male participant (age 63, 4 symptoms, -I/D) stated, *"I pick and pick throughout the day. So, sometimes, just like in the car right now, I've got banana, apple and granola bar. And then at night, I might eat something really nasty for me. So it varies all over the place."* Given that FA posits that only certain, highly processed foods are capable of triggering an addictive response (Gearhardt et al., 2016), descriptions with minimally processed foods were difficult to interpret. However, despite some discussion of minimally processed foods, participants overwhelmingly referenced highly processed foods when describing their experiences of FA symptoms. Further, at the end of the interview when participants were asked to review the foods listed in the prompt at the beginning of the YFAS 2.0, the only items that participants felt were missing were other types of highly processed foods (e.g., 'soul food', mango sticky rice). When prompted, no participants felt that vegetables, fruits, or other forms of non-processed foods should be added to the examples of addictive foods.

3.3. Common experiences not addressed by the YFAS 2.0

Throughout the interview, several participants identified unique experiences that are not addressed by the scale. The following themes emerged as constructs that may be relevant to FA but are not included on the YFAS 2.0.

Emotional Eating/Eating to Cope. Fourteen participants identified emotional eating or eating to cope with stress or negative emotions as central to their experience of FA. For example, a female participant, age 30 with moderate FA noted, *"I definitely eat foods to feel better if I'm sad about life circumstances"* and a female participant (age 30, severe FA) specifically noted that she has 'feel-good foods' (e.g., ice cream, chocolate) for when she is sad. Other participants explicitly described the use of food to cope. For example, a female participant (age 25, 4 symptoms, -I/D) stated, *"It's my coping mechanism. It helps me be less distressed."* Thus, emotional eating or eating to cope was strongly associated with the lived experience of FA for the current sample.

Secretive Eating. Eight participants recognized that secretive eating or hiding their eating behaviors from other people was relevant to their experience of FA. For example, a female

participant (age 28, moderate FA) stated, *“I also try to hide it from the people. So that might involve eating my first plate of food with one group of people and then being like, ‘Oh, I’m just gonna go grab a couple more chips,’ which is me filling a plate. And then moving to a different group so that they don’t know I’ve already eaten a massive amount of this food.”* Other participants described eating in isolation or late at night so family members or roommates would not notice their behaviors or lied about consumption to others.

Weight Gain. Thirteen participants stated that weight gain was a significant consequence of their FA and believed weight and shape concerns to be significant a source of distress. For example, a female participant (age 53, severe FA) stated, *“I’ve gotten so big. I’ve gained is much weight. I mean, it’s bad. And it’s just from that. Not being able to control it. Not having a sense of being able to say ‘Oh, I can have just one.”* Many weight related concerns were related to body image and the potential for social judgement. For example, a female participant (age 45, severe FA) stated, *“It’s very socially acceptable to consume food. Now, once you get so big, then it’s not socially acceptable. Now you’re morbidly obese and you’re disgusting, and you should be treated like you’re a fat slob and you’re lazy and you can control this.”* reflecting that people are often encouraged to eat highly processed foods, but once they gain weight they begin to experience societal shame.

Weight-related distress was also discussed in relation to the physical consequences associated with weight gain and obesity. For example, a male participant (age 32, severe FA) stated, *“Just the health. It’s like I have to use a CPAP machine [...] and I have to take all these pills every morning for my blood pressure, and things like that. So ya, it’s just like an everyday reminder type of thing that it could just all be gone I guess, if I changed.”* Thus, in addition to experiences of social stigma, weight gain was also problematic for physical health.

3.4. Other considerations for the validity of the YFAS 2.0

In addition to concerns about interpretation, related behaviors, and relevance, two additional themes emerged.

Overlapping Responses for Problems and Consequences. Over half of the participants responded to problem focused items across symptom categories in a very similar way. That is, rather than thinking of the consequences that may arise from FA as unique, separate experiences (i.e., interpersonal problems, difficulty fulfilling role obligations, or giving up important activities), most participants considered impairment or consequences more globally. For example, in response to item 20, a male participant (age 32, severe FA) stated, *“I put a zero for that one, ‘cause like I said, avoiding work or school or stuff because of food, that’s not something I ever experience really ... or even the next one, avoiding social situations because people wouldn’t approve of how much I ate. I don’t think it’s that bad.”* Overall, a male participant (age 51, moderate FA) summed up this pattern by simply stating, *“You gotta do what you gotta do.”* Generally, most participants felt that their eating behavior had either not interfered in any way or only interfered minimally across all of these areas.

Opposite Meaning. On many occasions, the lack of endorsement of items on the YFAS 2.0 may have actually been indicative of FA. This pattern emerged most often around three

different symptoms; giving up important activities in order to eat, time spent obtaining, using or recovering from substance use, and interpersonal problems.

Important Activities Given Up. Eight participants failed to endorse items related to giving up important activities, but their interview responses suggested that their lack of endorsement was actually indicative of FA. For example, when reflecting on giving up important activities, rather than their lack of avoidance demonstrating normative eating patterns, many participants described the presence of highly processed, addictive foods as their reason for attending many events. For example, a female participant (age 42, 11 symptoms, -I/D) stated, *“I don’t think I’ve avoided anything. Most of the time I would go to social functions at work because they have the foods. Like this morning, I volunteered for a breakfast function because I knew that I could eat all of the food once I was finished volunteering.”* Many participants recognized that a desire for highly processed foods was a motivational force to go to activities rather than avoid them.

Time Spent. Five participants recognized that spending more time focusing on food or eating may actually be indicative of healthy eating behaviors rather than FA because of how convenient and ubiquitous highly processed foods have are. For example, a male participant (age 39, mild FA) stated, *“I don’t spend a lot of time preparing food, and I think that’s part of the problem, because I think when you prepare stuff, any meal to make that’s relatively healthy is gonna take some work, some finding certain recipes and getting the ingredients and stuff. For me, eating is really all about just convenience and quickness, how fast ... That’s why I end up eating a lot of pre-packaged, processed-type foods. So, I don’t spend a lot of time preparing food. And really, I wouldn’t say I spend a lot of time eating, either. I tend to eat in bursts of time.”* Therefore the act of spending time preparing or eating throughout the day may not always be maladaptive.

Interpersonal Problems. Finally, nine participants recognized that they did not experience interpersonal problems as a result of their FA because their friends and family also ate in an addictive way. For example, in response to item nine, a female participant (age 62, severe FA) stated, *“I have not had any problems with that. My friends are overweight too. I mean, birds of a feather ... I just don’t feel uncomfortable being there. I’m not gonna feel bad eating because everyone else is eating. You know?”* Other participants went so far as to discuss the broader cultural acceptance of food and eating in the United States as a reason for not endorsing these items. For example, a female participant (age 45, severe FA) noted, *“I think I answered never to several of them. Because food has been so readily available and socially acceptable, it hasn’t interfered with my life or personal relationships.”* Thus, many participants recognized that the general acceptability and accessibility of highly processed foods actually perpetuated their FA.

4. Discussion

4.1. Insights about the validity of the YFAS 2.0

The primary aim of this qualitative study was to understand how individuals interpret items on the YFAS 2.0 and whether those interpretations align with the DSM 5 conceptualization of SUD. If participants were to interpret items on the YFAS 2.0 in unexpected ways, this

would threaten the face validity of the scale as it may not measure the underlying construct researchers expect it to measure (Brodey et al., 2018). Overwhelmingly, participants in the current study interpreted items on the YFAS 2.0 in alignment with the DSM 5 conceptualization of SUDs, suggesting that participants understand and engage with the scale as expected. Not only did participants describe accurate and detailed examples of all eleven symptoms of FA that paralleled traditional SUDs, they were also able to articulate their reasons for not endorsing items in a manner which confirmed that their understanding of these items aligned with researchers intended interpretations. Additionally, participants felt the scale was not confusing, and felt that most items on the YFAS 2.0 were well-written, clear, and easy to understand. Finally, while some participants believed that certain items did not pertain to their personal experience of FA, most participants denied that any items on the scale felt inappropriate or unrelated to the phenomenon of FA overall. Thus, participants' understandings of individual items on the YFAS 2.0 do appear to support the face validity of the scale.

Some responses were inconsistent, particularly in response to items about withdrawal and tolerance. In the context of withdrawal, responses that were coded as inconsistent were most often descriptions of eating when participants felt negative emotions rather than participants experiencing negative emotions because they had not consumed highly processed foods. Thus, it may be helpful to explicitly instruct participants not to consider emotional eating or eating to cope with negative emotions when responding to withdrawal-focused items. With regard to tolerance, inconsistent responses occurred most often in response to items focused on experiencing less pleasure from eating the same amount of highly processed foods. However, instead of experiencing less pleasure because the amount of food was no longer adequate, participants described experiencing competing emotions such as guilt and shame which subsequently lowered the overall pleasure of the experience. Thus, much like withdrawal items, it may be helpful to instruct participants not to consider competing emotions when responding to items related to tolerance on the YFAS 2.0. Further qualitative investigation is needed to identify the most appropriate way to describe withdrawal and tolerance on the YFAS 2.0 to reduce the possibility of misinterpretation and increase the face validity of these symptoms.

One remedy that may reduce misinterpretation or inappropriate item endorsement is the development of a semi-structured clinical interview. Clinical interviews are often considered the “gold standard” of assessment in clinical research and treatment (Zimmerman, 2003). Interviewers can probe for additional information helping to clarify vague or inconsistent responses which in turn leads to more accurate diagnosis (Basco, 2003; Craig, 2012). In the context of the YFAS 2.0, a trained interviewer could probe more deeply about commonly misinterpreted items to determine if a participant's responses reflect the DSM 5 conceptualization SUD. For example, if an individual describes emotional eating in response to a withdrawal-related item, a trained interviewer could skillfully disentangle emotional withdrawal symptoms from eating to cope or emotional eating to ensure symptoms are appropriately endorsed (Boness et al., 2019).

Finally, some participant responses were difficult to classify because participants referenced the consumption of caffeine. Because caffeine can mimic the effects of addictive substances

by producing symptoms such as withdrawal and tolerance (Uddin et al., 2017), it was difficult to determine if participants experienced FA symptoms as a result of the caffeine or the nutritional properties of the beverage they referenced. If participants experience FA symptoms only as the result of caffeine, it could lead to inappropriate item endorsement and threaten the validity of the YFAS 2.0. It may be helpful to utilize semi-structured interviews to determine if these symptoms occur with non-caffeinated foods.

Similarly, some participants referenced minimally processed foods (e.g., fruit) when discussing their answers on the YFAS 2.0. However, it is important to note that overwhelmingly participants referenced highly processed foods when responding to items on the YFAS 2.0. Additionally, when asked to review the foods listed in the prompt at the beginning of the scale, no participants felt that minimally processed foods such as fruits or vegetables should be added to the list of examples. Thus, although inconsistent foods were sometimes mentioned in response to individual items on the scale, most participants endorsed the highly processed foods that are posited by FA theory to trigger an addictive response. Further, every participant who discussed minimally processed foods in the current study also endorsed FA symptoms when reflecting on the consumption of highly processed foods. In fact, when asked to expand on responses that did reference minimally processed foods, most participants clarified that their consumption of minimally processed foods felt qualitatively different than their consumption of highly processed foods. For example, while one participant did state that she eats more than planned regardless of the food she is eating, she rarely experienced distress or impairment when she consumed minimally processed foods in this way (age 26, severe FA). Similarly, when asked if they would go out of their way to obtain minimally processed foods in the same way participants described feeling compelled to obtain highly processed foods, every participant who described eating minimally processed foods denied that they would do this. However, despite these clarifications, future research is needed to continue to clarify which foods are most implicated in addictive eating.

4.2. Problem-focused symptoms

In the current study, several items on the YFAS 2.0 were rarely endorsed by participants or were described as “too severe” to be relevant to their personal experience, even for participants with severe FA. Overwhelmingly, this occurred in relation to items about the problems caused by FA (i.e., interpersonal problems, giving up activities, failure to fulfill role obligations). Interestingly, this also occurs in the context of traditional SUDs (Lacroix & von Ranson, 2021; Lane & Sher, 2015), especially in relation to substances that do not result in intoxication (Baker et al., 2012). For example, many studies demonstrate a low prevalence of failure to fulfill major role obligations in the context of tobacco use disorder, as smoking is legal and often permitted in social, occupational, and recreational environments (Shmulewitz et al., 2011). In fact, the DSM 5 recognizes the rarity of these symptoms in the context of tobacco and suggests that endorsement of items such as failure to fulfill role obligation and interpersonal problems may be indicative of a more severe disorder (American Psychological Association, 2013). This may also be true of highly processed foods, which are not only legal and non-intoxicating, but

also socially accepted and often incorporated into social, occupational, and recreational environments.

Additionally, many participants recognized that specific life circumstances prevented them from experiencing consequences. For example, some participants did not have responsibilities towards others (e.g., single, no dependents), while others had friends and family members who also ate addictively, reducing the probability of consequences. These experiences reflect concerns about the DSM 5 criteria for SUDs more broadly. Specifically, Martin et al. (2014) described the DSM 5 criteria as problematic because consequences of substance use depend upon personal factors (e.g., age, socioeconomic status, gender, race) suggesting that certain individuals may be more likely to experience negative outcomes regardless of their actual patterns of use. Thus, failure to endorse problem-focused symptoms in the context of FA may be more reflective of an individuals' lifestyle, identity, or appearance rather than an indication of FA severity.

4.3. Novel constructs not captured by the YFAS 2.0

Some behaviors not measured by the YFAS 2.0 such as emotional eating/eating to cope and secretive eating emerged as central to participant's experience of FA. Specifically, participants described using food as a method to cope with uncomfortable emotions such as anxiety or boredom. These findings parallel research on traditional SUDs where using substances to cope is associated with more problematic patterns of intake (Corbin et al., 2013; Watson et al., 2012). Further, hiding substance use from others is often a reaction to perceived stigma around substance use (Luoma et al., 2007) and has been included on measures of problematic substance use as an indicator of severity (Dennis et al., 2003). These findings suggest that behaviors common to FA that are not measured on the YFAS 2.0 are also consistent with traditional SUDs.

Previous qualitative research has also uncovered behaviors associated with FA that are not captured by the YFAS 2.0 (Paterson et al., 2019). As a result, it has been proposed that the FA model does not accurately capture the lived experience of FA and alterations to the YFAS 2.0 are necessary (Paterson et al., 2019). However, it should be noted that while many behaviors are associated with problematic substance use (e.g., using to cope, secretive use; Chaney et al., 2019; Smith & Cyders, 2016), they are not included as diagnostic criteria (American Psychological Association, 2013). Instead, these factors are recognized as severity indicators or related behaviors that may help to clarify an individual's clinical presentation and course of treatment. However, because of the established associations between SUDs and these constructs, it may be worth exploring if emotional eating or secrecy may improve diagnostic sensitivity. Additionally, secrecy is a diagnostic criterion for BED (American Psychological Association, 2013), further warranting the exploration of this construct. Future quantitative research should use item response theory to determine if the addition of emotional eating or secrecy would result in better prediction of FA. If they do, it may warrant their inclusion as diagnostic indicators.

4.4. Relevance of weight gain

Most participants, across gender and FA severity, discussed weight gain as the most significant consequence of FA. Weight gain in the context of FA has led to criticism about the construct more broadly. First, critics argue that distress and impairment as a result of weight gain are only products of social stigma and if cultural values shifted, weight gain would no longer be perceived negatively, and FA would no longer be problematic (Lacroix & von Ranson, 2021). However, social stigma also exists against traditional substance use (Kulesza et al., 2013; Yang et al., 2017), leading to negative experiences such as stereotyping, status loss, and discrimination (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). Despite these consequences, rates of substance use remain elevated, indicating the compulsive nature of addiction and the tendency to continue use despite consequences. We propose that the persistence of addictive eating in the face of social stigma reflects the ability of highly processed foods to drive compulsive consumption, even in the face of significant social consequences.

In addition to social concerns, participants also recognized that weight gain contributed to significant health consequences (e.g., elevated blood pressure, increased risk for diabetes, elevated A1C levels, decreased in physical performance), leading to distress and impairment. Thus, weight gain may represent the most common health consequence in the context of FA. Further, the presence of weight-related health consequences suggests that even if the social stigma surrounding weight gain did change, weight-related health consequences in the context of FA may still occur. As a result, it will be important for both qualitative and quantitative research to explore how weight gain itself leads to additional consequences in the context of FA.

4.5. Limitations and future directions

The current study provides the first qualitative analysis of the YFAS 2.0, but there are important limitations to consider when interpreting the results. First, the recruitment strategy included only individuals who self-identified as having FA. Thus, individuals who meet criteria for FA on the YFAS 2.0, but do not self-identify as FA, were not included in the current study. Therefore, the experiences of individuals who exhibit addictive eating but do not perceive themselves to be addicted were missing from our analyses. In the context of SUDs, research demonstrates that many individuals with problematic consumption underestimate their consumption, the duration of their problem and the impact a substance has on their well-being, and overestimate their ability to control substance use (Rinn et al., 2002). Thus, as a result, many individuals demonstrating problematic substance use often deny that they have a SUD or do not seek treatment (Bettinardi-Angres & Angres, 2010). It is reasonable to believe that this may also occur in the context of FA. While some qualitative research has explored differences between individuals who self-identify as addicted to foods versus those who do not (Meadows et al., 2017; Ruddock et al., 2015), more is likely needed to continue examining the similarities and differences between these groups. Future research should prioritize the recruitment of individuals who do not believe themselves to be addicted to food but still demonstrate problematic eating behaviors to understand how their experiences and perceptions of FA may differ from individuals who do believe themselves

to be addicted to food. This may help to improve interventions for FA and increase treatment seeking.

Further, there may be individuals who perceive themselves to be addicted to food but do not meet criteria for FA as measured by the YFAS 2.0. These individuals may be labeling non-addictive eating behaviors, or low frequency addictive eating behaviors as FA. It will be important for researchers to examine how their experiences identifying as foods addicted differ from individuals who do qualify for FA on the YFAS 2.0. This may help to clarify the difference between clinical and subclinical presentations of FA. Further, if these individuals are subclinical, prevention efforts can be developed to reduce the risk of the development of future FA. Although four participants in the current study did not reach threshold for the impairment/distress criterion and therefore did not meet criteria for FA, no major theme or themes arose from their responses to potentially qualify the differences in their lived experiences versus the experiences of participants who did reach impairment/distress. Thus, conducting research on individuals who do not meet criteria but still perceive themselves to be addicted to food may help to uncover important differences between these populations.

Additionally, while our intention was to recruit participants who met clinical threshold for FA, four participants failed to meet threshold for the impairment and distress criterion at the time of their interview. However, all four of these individuals met threshold for two or more symptoms, the minimum number required for diagnosis (Gearhardt et al., 2016) and perceived themselves to be addicted to food at the time of the study. Further, past research demonstrates little difference in pathology between individuals who meet full FA criteria, including the impairment and distress criterion, and those who only reach symptom threshold (Ouellette et al., 2018). Additionally, participants who did not reach criteria for FA on the YFAS 2.0 in the current study still produced detailed descriptions of their addictive-eating that paralleled the DSM 5 conceptualization of FA and the experiences of other participants. Future research on the utility of the clinical significance threshold on the YFAS 2.0 is needed.

Overall, because qualitative methods were employed and our sample was not intended to be representative, the results of this study cannot be generalized to broader populations. While our themes and insights may help to inform future quantitative research, they should not be used to support interventions or prevention efforts without quantitative support. It will be important to conduct additional qualitative studies in different contexts and with different samples to determine if similar themes arise or if the interpretation of the YFAS varies across conditions. Additionally, because participants were not invited to share reflections on the coding and theme generation process due to resource and time constraints related to the COVID 19 pandemic, these studies may be further bolstered by the addition of this process. Despite these limitations, the current study provides numerous insights about the face validity and subjective interpretation of the YFAS 2.0. Future quantitative research should use these insights to inform future research studies which will ultimately increase our understanding of the lived experience of FA and help to improve the accurate measurement of the condition.

5. Conclusion

Together, these findings indicate that, overwhelmingly, participants interpret the YFAS 2.0 in alignment with the DSM 5 conceptualization of SUDs, providing evidence for the face validity of the scale. Participants also identified that highly processed foods were most likely to be consumed in an addictive manner. Further, participants perceived most items as appropriate and relevant to their lived experience of FA, supporting the face validity of the scale. As some responses were difficult to interpret, and withdrawal and tolerance related items were occasionally misinterpreted, the development of a clinical interview may be an important next step to increase the utility of the YFAS 2.0. The current findings provide qualitative support for the validity of the YFAS 2.0 as a tool for measuring the experience of addictive intake of highly processed foods.

Declaration of competing interest

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Table 1

Scoring thresholds for individual items on the YFAS 2.0

| Item Number | Threshold to Meet Criteria for Symptom Endorsement - Frequency (Score out of 7) |
|---------------------------------------|--|
| 9, 10, 19, 27, 33, 35 | Once per month (2) |
| 8, 18, 20, 21, 34 | Two to three times per month (3) |
| 3, 11, 13, 14, 22, 28, 29 | Once a week (4) |
| 5, 12, 16, 17, 23, 24, 26, 30, 31, 32 | Two to three times per week (5) |
| 1, 2, 4, 6, 7, 15, 25 | Four to six times per week (6) |

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Table 2

Participant demographics, YFAS scores, and eating disorder status.

| ID | Gender | Age | Race/Ethnicity | BMI | mYFAS 2.0 | YFAS 2.0 | Eating Disorder Status |
|----|--------|-----|----------------|--------------|-----------|------------------------------|------------------------|
| 1 | Male | 51 | White | 60.9 | Mild | Moderate | None |
| 2 | Male | 39 | White | 26.4 | Severe | Mild | None |
| 3 | Female | 62 | Black | 28.2 | Severe | Severe | None |
| 4 | Female | 53 | White | 35.5 | Severe | Severe | None |
| 5 | Female | 42 | White | 53.2 | Severe | Severe, Impairment not met | None |
| 6 | Female | 45 | White | 31.7 | Severe | Severe | None |
| 7 | Male | 32 | Black | 28.7 | Severe | Severe | Past Bulimia Nervosa |
| 8 | Female | 25 | White | 32.4 | Severe | Moderate, Impairment not met | None |
| 9 | Female | 26 | Black | 36 | Severe | Severe | Current BED |
| 10 | Female | 30 | White | 22.5 | Moderate | Moderate | None |
| 11 | Male | 63 | White | 26.4 | Mild | Moderate, Impairment not met | None |
| 12 | Female | 30 | Black | 34 | Moderate | Severe | None |
| 13 | Female | 46 | Asian | 21 | Mild | Mild, Impairment not met | None |
| 14 | Female | 28 | White | Not reported | Mild | Moderate | Current BED |
| 15 | Male | 32 | White | 39.7 | Mild | Severe | None |
| 16 | Female | 45 | Hispanic | 29.3 | Mild | Mild | None |

Table 3
Exemplary quotes illustrating food addiction symptoms by consistency with DSM 5 criteria for substance use disorder.

| | Consistent with DSM 5 | Inconsistent with DSM 5 | Can't be Categorized |
|------------------------------|--|---|--|
| Loss of Control | <p>"I transferred my alcohol addiction to ice cream and sugar. It got to be that I would buy a carton of ice cream and I'm like, "I'm only gonna have a half a bowl", or whatever, and I would end up eating the entire carton. There's just no stopping."</p> <p>Female, 53, severe FA, YFAS item 3</p> | <p>"I started using that app, Noom. And tracking calories and I was able to lose 10 pounds which I felt helped and was really good for self-esteem, but tracking calories, I was like, "Oh, wow. I don't need to eat nearly as much as I do normally." And since then, I've noticed like, "Oh ... " I wouldn't even identify this as a feeling before of where I feel sluggish, or just bloated."</p> <p>Female, 30, moderate FA, YFAS item 3</p> | <p>"I think a lot of the times, I'm just bored, so I'm eating even though I don't actually feel the signs of hunger. It's like if I'm in front of the computer for a really long time or especially if other people are eating. I just feel like I need to be eating too."</p> <p>Male, 63, 4 symptoms, -I/D, YFAS item 2</p> |
| Inability to Cut Down | <p>"I can't even count the number of times that I've been like, "This is the last time. I'm not gonna do this again." And I've tried different methods. I've tried keeping a notebook and listing what I eat each day. I've tried keeping a white board on my wall [...] I've tried making promises to myself, or making deals with myself ... "If I don't overeat this month, I can eat as much as I want on Thanksgiving." And, of course, I never keep to it."</p> <p>Female, 28, moderate FA, YFAS item 31</p> | <p>"I eat in short chunks of time and I kinda do it as I'm doing something else. If I'm heading out to go walk in the woods for pictures, I'll grab an apple and eat that while I'm out, when I begin to walk [...] Or snack in the car. So that I'm not spending a lot of time dedicated to it 'cause I got so many other things going on."</p> <p>Male, 63, 4 symptoms, -I/D, YFAS item 6</p> | <p>"I would go back to times where you're trying to be more carb-restrictive, especially. But I think my body knew, whether I was trying to deny it or not, that I needed more of something like that if I wanted to have the same physical activities that I was trying to do. "</p> <p>Male, 51, moderate FA, YFAS item 31</p> |
| Time Spent | <p>"I would literally go from Meijer to Kroger if they didn't have the specific ice cream ... It was coffee ice cream. If they didn't have any, I would leave that store and go to another [...] So yeah, I would definitely go out of my way. It was really pathetic, leaving a store to go to another and get ice cream. Why couldn't I have vanilla?"</p> <p>Female, 53, severe FA, YFAS item 7</p> | <p>"I wasn't sure about that particular question because a lot of that goes with being 300 months pregnant (i. e., being overweight/obese). Sluggish and tired is part of the deal that directly relates to food."</p> <p>Male, 51, moderate FA, YFAS item 5</p> | |
| Activities Given Up | <p>"I didn't wanna go to this event, because I kind of had it in my head that I was done eating for the day and if I go there, I'm going to order a drink, and get a snack and stuff, and</p> | | <p>"I think that I'm not as focused with people around me 'cause I'm thinking of food, and I'm not able to do as much because I feel like</p> |

| | Consistent with DSM 5 | Inconsistent with DSM 5 | Can't be Categorized |
|-------------------------------|---|---|---|
| | I don't want to do that even though I probably should be more social." Female, 30, moderate, YFAS item 10 | | the important things have been done when I eat. That's the most important thing." Female, 62, severe FA, item 18 |
| Interpersonal Problems | "My husband. Sometimes, he's just like, "Really? You know how much you can eat. How does this happen?"; So, he gets frustrated." Female, 45, severe FA, YFAS item 9 | | |
| With-drawal | "Stopping sugar is ... that's definitely an irritating thing. Once you get past three or four days, it's fine. But you can definitely tell it's not a good thing. I get very short-tempered, kinda like quitting smoking. Just, "Don't talk to me." I wanna just pretend that nothing is going on and just get through this. And once you do that it's fine. It's like, "Wow, I feel so much better after this." Female, 53, severe FA, YFAS item 11 | "I definitely eat foods to feel better if I'm sad about life circumstances." Female, 30, moderate FA, YFAS item 11 | "I'm so emotional that it's physical ... I think I do feel a tiredness ... Even though I feel sluggish after eating, when I don't eat certain foods, I feel tired. It's probably psychosomatic." Female, 62, severe FA, YFAS item 12 |
| Tolerance | "The food doesn't give me as much enjoyment as it did before, so I'm eating the same amount but it doesn't seem to give me the endorphin high or whatever. I don't know, I just ... I'm just waiting for it to come back." Female, 62, severe FA, YFAS item 24 | "I suppose that that's the problem with a lot of people who overeat. You're stuffing things into places so you don't have to feel, right? So, if I'm having a bad day, "I wanna have a cookie, I'm gonna have a cookie" ..." Female, 45, severe FA, YFAS item 26 | "I was thinking about how when you were a kid and you got a slice of pizza or two, and you were just so happy with that one or two slices. And now I have one or two slices and I'm like, "This was nothing, I need something else." And it's either more pizza, or some type of vegetables or something." Female, 30, severe FA, YFAS item 24 |
| Role Obligation | "Not cleaning up. I let the kitchen just get out of control. I won't even get dressed. So it's like the kitchen and the rest of the house will really be out of control, and all I want to do is get some snacks and get back in the bed and watch TV." Male, 32, severe, YFAS item 19 | | "When I get a hungry or if I want food, I'm gonna eat. So whatever, it's gonna have to hold on for a minute." Female, 30, severe FA, YFAS item 19 |

| | Consistent with DSM 5 | Inconsistent with DSM 5 | Can't be Categorized |
|--------------------------------|--|-------------------------|---|
| Consequences | <p>"I shouldn't say it has not in any way made me happy because the actual eating brings me instantaneous joy. But, far outweighing that is how bad I feel afterward ... whether it's shame, sadness, guilt, whatever."</p> <p>Female, 28, moderate FA, YFAS item 16</p> | | <p>"I [had] just left the doctor's office, and of course things were getting a little better, but I'm still not in the clear. So it's just on my mind but I would still go out and get whatever I want to eat afterward and not think about it. Then it comes back later about the guilt, but yeah, it seems like sometimes it's almost like even if I was just reminded 5 min ago, it won't matter 5 min from now."</p> <p>Male, 32, severe FA, YFAS item 22</p> |
| Craving | <p>"When I have certain cravings, like nothing is satisfying. So that's ... I would go to the store to get that certain food or that certain taste. If I ... Like I have a taste for chocolate then I have to have chocolate. It doesn't matter if I got other snacks or candy or anything, I want the chocolate ones."</p> <p>Female, 30, severe FA, YFAS item 30</p> | | |
| Hazardous Use | <p>"Driving the car [...] if I'm grabbing lunch somewhere or something, there's always the possibility of killing someone or myself. I'll reach in the back seat for something, and instead of just waiting until I got to where I was going, no, I'm gonna grab it, and then I'm like, "I could kill somebody."</p> <p>Female, 45, severe FA, YFAS item 33</p> | | <p>"I have high blood pressure and I know I should cut out all the salt and fat or whatever, but I still eat them." [asked if doctor has said anything?] No, usually they just say, "Oh, eat lean chicken, or whatnot."</p> <p>Female, 45, mild FA, YFAS item 28</p> |
| Impair-ment or Distress | <p>"I've gotten so big, I've gained so much weight, I mean, it's bad. And it's just from that, not controlling it, not have any sense of being able to say, "Oh, I can have one." It's really ... It's depressing to think about."</p> <p>Female, 53, severe FA, YFAS item 16</p> | | <p>"I would feel more distress 'cause I've, in the past, used the tracking apps for breaking down calories, macronutrients for each meal. I was doing that probably to the point where it wasn't healthy, then it was stressing me out 'cause I had to be on there checking how much do I got left for the day."</p> <p>Female, 45, mild FA, YFAS item 16</p> |