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ORIGINAL ARTICLE

Impact of expanded diagnostic criteria for avoidant/restrictive food intake disorder on clinical comparisons with anorexia nervosa

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Abstract

Objective: Avoidant/restrictive food intake disorder (ARFID) and anorexia nervosa (AN) are restrictive eating disorders. There is a proposal before the American Psychiatric Association to broaden the current *DSM-5* criteria for ARFID, which currently require dietary intake that is inadequate to support energy or nutritional needs. We compared the clinical presentations of ARFID and AN in an outpatient sample to determine how a more inclusive definition of ARFID, heterogeneous for age and weight status, is distinct from AN.

Methods: As part of standard care, 138 individuals with AN or ARFID completed an online assessment battery and agreed to include their responses in research.

Results: Individuals with ARFID were younger, reported earlier age of onset, and had higher percent median BMI (%mBMI) than those with AN (all *p*s < .001). Individuals with ARFID scored lower on measures of eating pathology, depression, anxiety, and clinical impairment (all *p*s < .05), but *did not* differ from those with AN on restrictive eating ($p = .52$), and scored higher on food neophobia ($p < .001$).

Discussion: Allowing psychosocial impairment to be sufficient for an ARFID diagnosis resulted in a clinical picture of ARFID such that %mBMI was higher (and in the normal range) compared with AN. Differences in gender distribution, age, and age of onset remained consistent with previous research. Both groups reported similar levels of dietary restriction, although ARFID can be distinguished by relatively higher levels of food neophobia. Currently available measures of eating pathology may capture certain ARFID symptoms, but highlight the need for measures of impairment relative to ARFID.

KEYWORDS

avoidant/restrictive food intake disorder, anorexia nervosa, outpatient, restriction, food neophobia, impairment

1 | INTRODUCTION

Avoidant/restrictive food intake disorder (ARFID) and anorexia nervosa (AN) represent the two primary restrictive eating disorders described in the 5th edition of the *Diagnostic and Statistical Manual* (*DSM-5*; American Psychiatric Association, 2013). Both disorders are characterized by insufficient dietary intake, and individuals with either of these disorders are at risk for serious medical sequelae including bradycardia (Cooney, Lieberman, Guimond, & Katzman, 2017), low-weight status (Norris et al., 2014), amenorrhea (Thomas et al., 2017), gastrointestinal (GI) pain/dysfunction (Norris et al., 2014), and anemia (Kelly, Shank, Bakalar, & Tanofsky-Kraff, 2014) as well as similar

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psychological comorbidities including anxiety disorders and depression (Norris et al., 2014). However, explanatory mechanisms underlying dietary restriction are hypothesized to differentiate these two diagnoses. Specifically, restriction and food avoidance in the context of ARFID is not driven by the weight and shape concerns that typify AN (American Psychiatric Association, 2013; Nicely, Lane-Loney, Masciulli, Hollenbeak, & Ornstein, 2014; Thomas, Lawson, et al., 2017). Instead, motivations for dietary restriction in ARFID are derived from research on feeding disorders.

Prior to the release of *DSM-5*, there was no unifying classification system for the variety of feeding disturbances observed in children. Rather, several classification systems were proposed to account for clinical presentations that were not well-addressed by the *DSM-IV* "Feeding Disorder of Infancy and Early Childhood" diagnosis (e.g., children with faltering growth but at normal weights, children with limited diets at normal or higher weights, individuals with feeding difficulties emerging after early childhood; for a review see Bryant-Waugh, Markham, Kreipe, & Walsh, 2010). Bryant-Waugh et al. (2010) suggested that three general classifications best captured the heterogeneity of feeding difficulties, and these three are now used for the example presentations of ARFID described in *DSM-5*: inadequate food intake (i.e., lack of interest in eating); restricted range of foods due to smells, tastes, textures, temperatures, and appearances of foods (i.e., sensory sensitivity); and food avoidance following the development of a specific eating fear (i.e., a fear of aversive consequences from eating; American Psychiatric Association, 2013).

Research on childhood and infant feeding disturbances highlighted the heterogeneity of avoidant/restrictive eating and provided a framework for the ARFID diagnosis, allowing the characterization of these eating patterns beyond childhood. However, there remains ambiguity as to how ARFID, as described in *DSM-5*, can be diagnosed. The current wording of the text for criterion A states that ARFID can be diagnosed if an individual is failing to meet nutritional and/or energy needs as manifested by: "significant weight loss or failure to achieve expected weight gain or faltering growth" (A1); "significant nutritional deficiency" (A2); or "dependence on enteral feeding or oral nutritional supplements" (A3). However, a "marked interference with psychosocial functioning" is listed as the final sub-criterion (A4), even though this is not a manifestation of unmet energy or nutritional needs. As such, even expert clinicians and researchers have interpreted criterion A differently, with some interpreting psychosocial impairment as sufficient for the diagnosis, and some not (Eddy et al., 2018). To reduce confusion and improve diagnostic clarity, the field is considering a proposal to expand the ARFID diagnosis to include those who, due to their eating habits, describe significant psychosocial impairment, in the absence of weight loss, nutrition deficiency, or supplement dependence (American Psychiatric Association, 2018). It is, therefore, very timely to explore how a more inclusive definition may impact the clinical presentation of ARFID.

In addition to describing and classifying various feeding difficulties, past research also compared certain presentations of feeding disorders to AN to better understand various forms of restrictive eating. A well-described presentation of inadequate food intake, Food Avoidance Emotional Disorder (FAED), could be challenging to differentially diagnose from AN and was characterized by insufficient dietary intake in response to negative emotional states such as sadness and anxiety (Bryant-Waugh et al., 2010; Higgs, Goodyer, & Birch, 1989). Compared with those with AN, those with FAED did not report weight and shape concerns and seemed to experience higher levels of anxiety unrelated to food (Higgs et al., 1989). Children described as selective, perseverative, and/or food neophobic engaged in food refusal of nonpreferred foods and sometimes also exhibited intolerance of eating around others, excessively slow eating, obsessive and compulsive symptoms, and social difficulties (Bryant-Waugh et al., 2010), all of which could also be present in and potentially challenging to distinguish from AN (e.g., Garner & Garfinkel, 1979; Kaye et al., 2004). Finally, children with a specific fears of eating (e.g., choking, swallowing, vomiting, gastrointestinal distress) tended to present as acutely ill, having rapidly lost a substantial proportion of their body weight such that their medical presentation was similar to those with AN (Bryant-Waugh et al., 2010).

Since the inclusion of ARFID in *DSM-5*, research has continued to explore avoidant and restrictive eating in relation to AN. Generally, previous studies have reported that those with ARFID present for treatment at a younger age than those with AN (Bryson, Scipioni, Essayli, Mahoney, & Ornstein, 2018; Cooney et al., 2017; Fisher et al., 2014; Forman et al., 2014; Nakai, Nin, Noma, Teramukai, & Wonderlich, 2016; Nicely et al., 2014; Norris et al., 2014; Ornstein, Nicely, Lane-Loney, Masciulli, & Hollenbeak, 2013) and, in outpatient settings, have a longer duration of illness than patients with AN (Fisher et al., 2014; Forman et al., 2014). A recent latent class analysis of children between the ages of 5 and 13 presenting to pediatric clinics or general psychological clinics reported that restrictive eating could be separated into two distinct classes: (1) a class similar to AN characterized by body dissatisfaction, fear of gaining weight, and over exercising; and (2) a class similar to ARFID characterized by somatic concerns and low levels of weight and shape concerns (Pinhas et al., 2017). Consistent across three samples from English-speaking countries (United Kingdom, Australia, and Canada), the class similar to ARFID was younger with elevated levels of anxiety and, though not statistically significant, a longer duration of illness (Pinhas et al., 2017). Interestingly, at higher levels of care, child and adolescent patients with ARFID have often shown similar illness duration to patients with AN (Nicely et al., 2014; Ornstein, Essayli, Nicely, Masciulli, & Lane-Loney, 2017; Strandjord, Sieke, Richmond, & Rome, 2015). In contrast, in one study, adult patients with AN presenting for outpatient care reported much longer illness duration than adult patients with ARFID (Nakai et al., 2016), suggesting that age of presentation and treatment setting may impact comparisons between AN and ARFID.

Similarly, some studies suggest that the proportion of males versus females in ARFID is higher than the proportion of males versus female in AN, particularly in outpatient samples (Bryson et al., 2018; Fisher et al., 2014; Forman et al., 2014; Nicely et al., 2014; Norris et al., 2014; Ornstein, Nicely, et al., 2013). However, the gender difference between ARFID and AN is less pronounced in adult samples (Nakai et al., 2016) and in patients requiring acute medical hospitalization (Strandjord et al., 2015).

All currently published studies have compared underweight individuals with ARFID to those with AN. Importantly, unlike AN, ARFID

can be diagnosed across the weight spectrum because low weight or faltering growth is only one of the potential expressions of the diagnostic criteria. Alternative manifestations defined by the current *DSM-5* criteria include nutritional deficiency and reliance on nutritional supplements or enteral feeding. For example, dietary avoidance of all but preferred foods—typically highly processed snack foods—can be associated with nutritional deficiencies in those with overweight or obese presentations of ARFID (Thomas & Eddy, 2019). Further, extending criterion A to include psychosocial impairment would allow individuals who are meeting energy and nutritional needs to be diagnosed with ARFID. As suggested in the proposal to revise *DSM-5* criteria, the following would represent significant impairment for diagnosis: "Inability to participate in normal social activities, such as eating with others, attending school or work or sustaining relationships as a result of the eating disturbance would indicate marked interference with psychosocial functioning. Substantial disruption of family functioning, such as marked restriction of foods permitted in the home or inordinate accommodations to provide foods from specific grocery stores or restaurants, may also satisfy criterion A4 (American Psychiatric Association, 2018)." Research examining how those with a broader range of avoidant and/or restrictive eating and body weights may compare to those with AN is needed to more adequately represent the heterogeneous presentations of ARFID.

Psychometric analyses have revealed that, consistent with diagnostic criteria, individuals with ARFID report less body image disturbance, drive for thinness, and concern about weight/shape and eating compared with those with AN, as well as fewer bulimic behaviors (Nakai et al., 2016; Ornstein, Nicely, et al., 2013). However, because ARFID is a newly defined disorder, retrospective study samples relied on clinical evaluations and measures that were designed for the assessment of psychopathology more reflective of AN than ARFID. Therefore, more research is necessary to describe ARFID in children, adolescents, and adults diagnosed through nonretrospective evaluations and with measures that may also assess ARFID symptomatology.

Although mood and anxiety disorders are highly comorbid with AN (Blinder, Cumella, & Sanathara, 2006; Hudson, Hiripi, Pope, & Kessler, 2007), less is known about comorbid internalizing disorders in relation to ARFID. Some research suggests that adolescents and children with ARFID are more likely to have anxiety disorders and less likely to have mood disorders compared with patients with AN (Fisher et al., 2014; Nicely et al., 2014). Similarly, the few studies that have explored self-reported mood and anxiety symptoms in those with ARFID have found that individuals with ARFID may be less likely to endorse depressive symptoms than anxiety symptoms (Cooney et al., 2017; Nicely et al., 2014). There are currently no self-report data on anxiety and depressive symptoms in adults with ARFID; however, there is some data on the relationship between ARFID symptoms and mood disturbances in adult community samples (Zickgraf, Franklin, & Rozin, 2016). Adults who self-identified as picky eaters and endorsed at least one consequence of their picky eating (e.g., weight loss, nutritional deficiency, reliance on nutritional supplements, or psychosocial impairment in work or with family/friends) endorsed comparable levels of internalizing distress (i.e., level of negative emotions experienced) as adults who reported symptoms consistent with traditional eating disorders (Zickgraf et al., 2016). Additional research is needed to determine if observed differences in anxiety and depression symptoms between individual diagnosed with ARFID or AN are evident across ages and eating-disorder severity to better explain clinical impairment associated with ARFID and aid in differential diagnosis.

The current literature exploring similarities and differences between individuals with ARFID or AN has revealed important information about the clinical picture of these two restrictive eating disorders. However, most existing study designs rely on retrospective chart reviews of patients who presented prior to the inclusion of ARFID in *DSM-5*. It is also largely unknown if results from previous studies apply only to the low-weight and/or the child/adolescent ARFID presentations, or whether these findings also generalize to normal/overweight and adult presentations. Importantly, these limitations are partially related to the remaining ambiguity around psychosocial impairment as a sufficient criterion for an ARFID diagnosis.

It is prudent to fill the gaps in our understanding of ARFID because there is a current proposal to alter the *DSM-5* ARFID diagnosis by removing the phase in the stem of criterion A which stipulates that the eating or feeding disturbance "manifests as a persistent failure to meet appropriate nutritional and/or energy needs" (American Psychiatric Association, 2018). In support of this proposal, prior classification schemes for childhood feeding disorders clearly identified children with selective eating and food neophobia who were not low weight or nutritionally deficient (Bryant-Waugh et al., 2010) and recent research suggests that selective eating in adults can be associated with significant psychosocial impairment (Zickgraf et al., 2016). It is, therefore, imperative to explore how a more inclusive definition of ARFID compares to AN to help inform how the proposed revision may impact the presentation of and impairment from restrictive eating disorders. Thus, the aim of the current study was to further differentiate restrictive eating disorders by comparing the clinical presentations of children, adolescents, and adults with either ARFID or AN seeking treatment at an outpatient eating-disorder clinic.

In the current study, we compared participant responses to self-report measures of eating, mood, anxiety, and clinical impairment. Unlike previous studies that have used relatively homogenous samples, we included participants across developmental and weight spectrums. To explore how the proposal to include psychosocial impairment as a criterion sufficient for an ARFID diagnosis may impact group comparisons on age of presentation, gender distribution, body weight, levels of anxiety, depression, and eating pathology, we assigned an ARFID diagnosis when nutritional and/or energy needs were unmet as well as when marked interference with psychosocial functioning was evident despite adequate energy and nutritional intake. We expected that this broadening of the diagnostic criteria would result in higher body weights, on average, for those diagnosed with ARFID compared with AN. As in previous studies, we hypothesized that, relative to individuals with AN, those with ARFID would be younger at treatment presentation and would report an earlier age of illness onset. We also hypothesized that patients with ARFID would score lower across measures of traditional eating pathology, higher on a measure of food neophobia, and, consistent with previous research, would report more anxious symptoms but fewer depressive symptoms than individuals with AN.

2 | METHODS

2.1 | Participants

Participants were individuals or parents who consecutively called the intake line of an outpatient clinic in a tertiary care hospital and were scheduled for an evaluation appointment with a clinician. We did not include individuals who were evaluated but diagnosed with an eating disorder other than AN or ARFID (e.g., bulimia nervosa, binge eating disorder), as this was outside the scope of this article. As part of standard clinical care, all participants received a link via e-mail prompting them to complete an online battery of self-report questionnaires prior to their evaluation appointment. Upon following the link in the e-mail, participants were provided a description of the data repository including IRB-approved consent/assent documents and asked to indicate their consent via checking a box indicating if they did or did not want their responses to the questionnaires to be used for research purposes. Participants were encouraged to complete the questionnaires before being evaluated, because responses would be used for diagnosis and treatment planning. All individuals who provided consent for their responses to be used for research were included in this study, even if they were not followed by a clinician after their evaluation appointment.

Between 2014 and 2017, 138 individuals with either AN or ARFID agreed to have their responses on these questionnaires used for research and 25 did not. Independent *t*-tests revealed that these patients did not differ on study measures compared with those who were counted as participants in this study (all *p*'s > .42). Based on a formal clinical evaluation by a PhD- or MD-level clinician, 67 (49.46%) individuals were diagnosed with ARFID as their primary *DSM-5* diagnosis and 71 (51.54%) individuals were diagnosed with AN. Clinicians used an evaluation template derived from *DSM-5* criteria to diagnosis ARFID or AN. Questions related to the diagnosis of ARFID included: number of foods eaten regularly from each of the five major food groups (i.e., fruits, vegetables, proteins, grains, and dairy); self-reported sensitivity to the appearance, taste, texture, and smell of foods; appetite and enjoyment of food; experience of food-related trauma; presence/absence of nutritional deficiencies; reliance on nutritional supplements; weight status and weight history; and psychosocial impairment including, but not limited to, avoidance of social events/holidays for fear of being around new foods, frequency of skipped or forgotten meals, and arguments around meal times or accommodations to food/eating preferences and fears. Questions used to help diagnose AN included weight history and status, fear of weight gain, body image concerns, appearance comparisons, body checking and avoidance behaviors, typical daily intake, dietary rules, exercise behaviors, binge eating, and compensatory behaviors. For the most accurate diagnosis, self-reported nutritional deficiencies and growth trajectories were checked against recent medical visits when available. The Partners Human Research Committee approved this data collection.

2.2 | Measures

Most measures were included in the online battery of self-report questionnaires beginning in 2014. However, the Food Neophobia Scale (FNS) and the Center for Epidemiological Studies-Depression Scale Revised (CES-D) were added in 2017. Thus, fewer participants completed measures added later in data collection. All participants in the study completed the below measures and we asked that younger children complete the measures with assistance from their parents, if needed.

We collected self-reported age, gender, race, height, weight, and age of illness onset on a demographics questionnaire. Age of illness onset was assessed with the question: "How old were you when your eating or feeding disorder first started?"

2.2.1 | Eating pathology measures

The Eating Disorder Examination-Questionnaire (EDE-Q 6.0; Fairburn & Beglin, 2008) is 28-item measure that assesses the frequency and severity of eating-disorder symptoms on four subscales (Restraint, Eating Concern, Shape Concern, and Weight Concern) as well as a Global score (in the current sample, internal consistency for all scales was greater than .84). The Eating Pathology Symptoms Inventory (EPSI; Forbush et al., 2013) is a 45-item measure that examines eating-disorder pathology using eight scales: Body Dissatisfaction, Binge Eating, Cognitive Restraint, Purging, Restricting, Excessive Exercise, Negative Attitudes toward Obesity, and Muscle Building (internal consistency values in the current sample were above .85 for all subscales except Purging and Muscle Building where $\alpha = .67$ and $\alpha = .60$, respectively). Previous studies have used these measures in young adolescents and children, suggesting that participants as young as 11 on the EDE-Q (Wang & Borders, 2018) and 10 on the EPSI (Coniglio & Becker et al., 2018) are able to report on their symptoms.

2.2.2 | Acceptability of novel foods and appetite for palatable foods

The Food Neophobia Scale (FNS; Pliner & Hobden, 1992) is a 10-item measure that assesses willingness to try unfamiliar foods (in the current sample, $\alpha = .93$). The Power of Food Scale (PFS; Lowe et al., 2009) is a 15-item measure that assesses food responsiveness using three subscales: Food Available (e.g. "I find myself thinking about food even when I am not physically hungry"), Food Present (e.g. "I get more pleasure from eating than I do from almost anything else."), Food Tasted (e.g. "It's scary to think of the power that food has over me."; in the current sample, $\alpha = .87$, $\alpha = .83$, $\alpha = .85$, respectively) and a total score (in the current sample, $\alpha = .92$). Children as young as seven have completed the FNS with help from their parents (Koivisto & Sjödén, 1996). Children and adolescents between the ages of 11 and 18 have completed the PFS, and their results suggested the same 3-factor structure found with adult participants (Mitchell, Cushing, & Amaro, 2016).

2.2.3 | Anxiety, depression, and clinical impairment measures

The State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a 21-item measure of anxiety symptoms (in the current sample, $\alpha = .93$). The Center for Epidemiological Studies Depression Scale Revised (CES-D; Radloff, 1977) is a 20-item measure of depressive symptoms (in the current sample, $\alpha = .92$). The Clinical Impairment Assessment (CIA; Bohn & Fairburn, 2008) is a 16-item measure of psychosocial impairment due to eating-disorder symptoms (in the current sample, $\alpha = .95$). The CES-D has been

selected for use in studies with participants as young as 9 years of age and has demonstrated good reliability, internal consistency, and validity in predicting major depressive disorder in youth (Compas et al., 2015). The STAI has been used with children as young as 13 (Martin, Viljoen, Kidd, & Seedat, 2014) and the CIA has been used in adolescents as young as 15 (Reas, Stedal, Lindvall Dahlgren, & Rø, 2016). We asked that younger participants completed with the assistance of their parents, though we do not have data on which families did so.

2.3 | Data analysis

We conducted all analyses in SPSS version 23 (IBM Corp, 2016) and R (R Core Team, 2018) using the "effsize" package (Torchiano, 2016). We analyzed group differences with independent Student's t-tests and Analyses of Covariance (ANCOVAs) with Bonferroni correction to protect against Type I error. Based on previous research suggesting that individuals with ARFID tend to be younger at treatment presentation than individuals with AN (Fisher et al., 2014; Nicely et al., 2014; Norris et al., 2014; Ornstein et al., 2017), and because our sample was heterogeneous with regard to weight status, we entered age and percent median BMI for age (%mBMI) as covariates. We calculated %mBMI using patients' self-reported age, height, and weight using the following formula: BMI (kg/m^2)/median BMI for age (as predetermined by the National Center for Health Statistics) × 100. Because the growth charts available from the Center for Disease Control and Prevention (CDC) extend to just 20 years of age, we used 20 as the reference age to calculate the %mBMI for any participant 20 years old or older.

3 | RESULTS

Mean age of the sample at treatment presentation was 22.22 (*SD* = 11.88, range 10–78) and 73.8% (*n* = 96) were female. The ARFID group presented for treatment at a significantly younger age compared with the AN sample (AN = 26.38, ARFID = 18.01; $p < .001$; $d = 0.72$). Of the 67 individuals with ARFID, 34 (50.8%) were female and of the 71 individuals with AN, 67 (94.4%) were female. The ARFID sample included a significantly higher proportion of males compared with the AN sample ($p < .001$; $\phi = 0.51$). Over 90% of both groups (AN = 92.5%, ARFID = 93.0%) identified as Caucasian.

Age of eating-disorder onset was significantly younger in individuals with ARFID compared with individuals with AN (AN = 16.38 years, ARFID = 8.30 years; $p <. 001$; $d = 0.99$). There was a significant difference in %mBMI such that individuals with ARFID presented at a higher %mBMI compared with individuals with AN (AN = 84.57, ARFID = 101.55; $p < .001$; $d = 0.94$).

With regard to eating-disorder psychopathology, as hypothesized, individuals with ARFID scored significantly lower than those with AN on EDE-Q Global and all EDE-Q subscales. See Tables 1 and 2 for all comparisons. In addition, those with ARFID scored significantly lower compared with AN on all subscales of the EPSI, except Muscle Building and Restriction. Individuals with ARFID had significantly lower responsiveness to food and, specifically, Food Available compared with individuals with AN but did not differ on responsiveness to Food Present or Food Tasted. Also as hypothesized, individuals with ARFID scored significantly higher on the FNS compared to individuals with AN .

Individuals with ARFID scored significantly lower on the STAI, CES-D, and CIA compared to individuals with AN. Finally, because the AN group consisted of very few males ($n = 3$) and one individual who identified their gender as "other," we ran our analyses again (controlling for age and %mBMI) with only female participants. The pattern of significant and non-significant findings was identical to the analyses that included male participants. To the best of our knowledge, no previous studies have used the STAI, or the CIA in younger children close to the age of 10. Therefore, we also conducted analyses with the STAI and the CIA, excluding individuals under the age of 16. Results from these analyses were consistent with analyses including the entire sample.

4 | DISCUSSION

The primary purpose of this study was to examine the clinical presentation of individuals with ARFID compared with AN in an outpatient eating-disorder sample heterogeneous for age and weight status in order to provide early data showing the influence of including psychosocial impairment as a sufficient criterion for an ARFID diagnosis. We compared responses to self-report demographic, eating, mood, anxiety, and impairment measures in children, adolescents, and adults diagnosed with either ARFID or AN. Our findings replicated and extended previous research, and were consistent with our hypotheses. As shown in prior comparison studies of AN and ARFID (Fisher et al., 2014; Forman et al., 2014; Nicely et al., 2014; Norris et al., 2014; Ornstein et al., 2017; Strandjord et al., 2015), individuals with ARFID reported an earlier age of disorder onset and presented for treatment at a younger age than those with AN. Also as expected and consistent with other studies from eating-disorder programs (Fisher et al., 2014; Forman et al., 2014; Norris et al., 2014; Ornstein et al., 2017), a higher proportion of those with ARFID were males compared with the proportion of males with AN.

In contrast to previous literature (Bryson et al., 2018; Nakai et al., 2016; Nicely et al., 2014; Norris et al., 2014; Strandjord et al., 2015), the average %mBMI of individuals with ARFID in our study was within the normal range, and was higher than %mBMI for AN. This is distinct from previous studies comparing these disorders, which have reported higher weights for those with ARFID relative to AN, but still found that individuals with ARFID were, on average, within an objectively low-weight range (e.g., Fisher et al., 2014; Ornstein et al., 2013). Many of the published chart reviews on ARFID retrospectively classified individuals who had been evaluated before the inclusion of ARFID in the *DSM-5* (e.g., Nakai et al., 2016; Nicely et al., 2014; Norris et al., 2014; Ornstein et al., 2017). It is possible that individuals with certain presentations of ARFID, such as significant weight loss or reliance on enteral feeding, presented or were referred to eating-disorder programs because of complications related to low-weight, and that those with other forms of ARFID (e.g., those with nutritional deficiencies) were not captured in earlier comparison studies. Indeed, individuals with other presentations (e.g., sensory sensitivity) may have been more likely to present for treatment at clinics targeting anxiety or autism. A higher average %mBMI also reflects a significant change in

TABLE 1 Differences in eating pathology between individuals with anorexia nervosa (AN) and avoidant/restrictive food intake disorder (ARFID) controlling for age and %mBMI

	Group							
	AN			ARFID				
Outcome	*M*	*SE*	*n*	*M*	*SE*	*n*	*p*	η_P^2
EDE-Q								
Restraint	2.55	0.19	69	0.28	0.20	64	.000	.31
Eating concern	2.45	0.18	69	0.62	0.18	64	.000	.26
Shape concern	3.60	0.19	69	0.66	0.20	64	.000	.43
Weight concern	2.84	0.19	69	0.70	0.20	64	.000	.29
Global	2.85	0.17	69	0.56	0.18	64	.000	.38
EPSI								
Body dissatisfaction	14.79	0.90	67	3.10	0.94	62	.000	.36
Binge eating	7.45	0.77	67	3.86	0.81	62	.003	.07
Cognitive restraint	6.85	0.39	67	1.26	0.40	62	.000	.41
Purging	1.79	0.28	67	.05	0.29	62	.000	.11
Restricting	9.62	0.80	67	10.43	0.84	62	.515	.003
Excessive exercise	7.29	0.68	67	1.13	0.71	62	.000	.22
Negative attitudes toward obesity	4.44	0.60	67	1.68	0.63	62	.004	.07
Muscle building	1.87	0.32	67	1.45	0.33	62	.387	.006
PFS								
Food available	2.62	0.15	46	1.58	0.24	21	.001	.17
Food present	2.14	0.17	46	1.84	0.26	21	.373	.01
Food tasted	1.85	0.15	46	1.75	0.23	21	.720	.002
Total	2.24	0.13	46	1.71	0.21	21	.048	.06
FNS	40.65	3.35	19	58.62	2.17	40	.00	.24

Note: M, mean; *SE*, standard error of estimate; η_P^2, *partial eta-squared*; %mBMI, percent median BMI for age; EDE-Q, Eating Disorder Examination-Questionnaire; EPSI, Eating Pathology Symptom Inventory; PFS, Power of Food Scale; FNS, Food Neophobia Scale. The FNS was added to the online battery of self-report questionnaires in 2017, meaning all those who presented for treatment before that period did not complete this measure; number of participants (*n*) varies depending on how many participants completed each questionnaire.

TABLE 2 Differences in mood, anxiety, and clinical impairment between individuals with anorexia nervosa (AN) and avoidant/restrictive food intake disorder (ARFID) controlling for age and %mBMI

	Group							
	AN			ARFID				
Outcome	*M*	*SE*	*n*	*M*	*SE*	*n*	*p*	η_P^2
CES-D	24.13	2.76	18	11.45	1.77	39	.001	.20
STAI	56.62	1.42	66	41.35	1.48	61	.000	.28
CIA	24.54	1.49	68	11.09	1.57	62	.000	.21

Note: M, mean; *SE*, standard error of estimate; η_P^2, *partial eta-squared*; %mBMI, percent median BMI; CES-D, Center for Epidemiological Studies Depression Scale Revised. The CES-D was added to the online battery of self-report questionnaires in 2017, meaning all those who presented for treatment before that period did not complete this measure; STAI, The State–Trait Anxiety Inventory; CIA, Clinical Impairment Assessment; number of participants (*n*) varies depending on how many participants completed each questionnaire.

the topography of ARFID that may occur if the diagnostic threshold can be met via psychosocial impairment. Importantly, data collection for the current study began after the publication of *DSM-5*, when ARFID was formally categorized as an eating disorder. Thus, providers of and patients with varied presentations of ARFID may have felt more comfortable referring and seeking care specifically for disordered eating, even if they were not low weight. It will be important to see if future studies also find that individuals with ARFID present for eating-disorder evaluation and treatment across the weight spectrum.

This is the first study, to our knowledge, to show that those diagnosed with ARFID differentially endorse symptoms consistent with the ARFID diagnosis on self-report measures that specifically assess dietary restriction (compared with dietary restraint) and difficulty trying new foods when compared with AN. As hypothesized, those with ARFID scored lower than AN on the EDE-Q and most subscales of the EPSI (i.e., cognitive restraint, body dissatisfaction, binge eating, purging, excessive exercise, and negative attitudes toward obesity), but reported higher food neophobia. Interestingly, both the AN and ARFID groups scored higher on the FNS compared with the undergraduate student sample used in the original development study (Pliner & Hobden, 1992). Thus, in our study, both groups reported food avoidance, but those with ARFID reported even more difficulty trying new foods than those with

AN, representing the only scale endorsed more strongly by those with ARFID than those with AN. This pattern replicates findings from an online community sample in which adults with normative eating behaviors reported lower scores on the FNS than those with eating disorder attitudes but adults with both selective eating and ARFID symptoms showed the highest scores on the FNS (Zickgraf et al., 2016). Notably, we found no differences between the groups in endorsement of dietary restriction on the EPSI Restriction subscale. However, compared with results from previous studies, both groups in the current study scored higher than college (Coniglio et al., 2018; Forbush et al., 2013), community (Coniglio et al., 2018; Forbush et al., 2013), and general psychiatric (Forbush et al., 2013) samples. Thus, individuals with ARFID, like those with AN, were aware of and able to report on how little they were eating. Given these findings, we suggest that the Restriction subscale of the EPSI and the FNS could be clinically useful measures for detecting ARFID symptoms in ages 10 and older and across the weight spectrum. In particular, the FNS might be useful for differential diagnosis of AFRID versus AN.

Interestingly, the AN and ARFID groups showed distinct response patterns on the PFS. AN and ARFID groups scored similarly on the Food Tasted and Food Present subscales but lower than published means in a community sample of adults (Lipsky et al., 2016), indicating that neither clinical group reported high levels of pleasure in eating or difficulty in resisting eating palatable foods. However, individuals with AN scored higher than those with ARFID on the Food Available subscale, suggesting that those with AN report higher urges to eat and thoughts about food when food is not present than those with ARFID. This finding may be relevant to effortfully controlling or attempts at cognitively controlling eating behaviors—a defining characteristic of AN but not ARFID (American Psychiatric Association, 2013). Indeed, a subset of individuals with ARFID report a disinterest in (rather than a preoccupation with) food and eating (American Psychiatric Association, 2013; Thomas & Eddy, 2019). Thus, the Food Availability subscale of the PFS may also be particularly helpful in differentiating individuals with AN versus those with ARFID who report a lack of interest in eating as their primary symptom and represent arguably the most challenging presentation to differentiate from AN (Thomas, Hartmann, & Killgore, 2013).

Surprisingly, individuals with ARFID reported lower levels of depression and anxiety symptoms compared with those with AN. Although we expected that the ARFID group would, on average, endorse fewer depressive symptoms than those with AN, we did not expect individuals with ARFID to also report lower levels of anxiety than those with AN. Despite the unexpected direction of this finding, it is also important to note that the average level of anxiety endorsed by those with ARFID in this study reached clinically significant levels (Ercan et al., 2015; Kvaal, Ulstein, Nordhus, & Engedal, 2005). A dimensional model of ARFID symptoms suggests that the presentation of fear of aversive consequences (e.g., choking, vomiting, GI distress) is more common in those with overall higher levels of anxiety (Thomas, Lawson, et al., 2017). Given that the fear of aversive consequences presentation of ARFID can lead to rapid weight loss and require urgent action due to acute food refusal (Thomas, Brigham, Sally, Hazen, & Eddy, 2017; Thomas & Eddy, 2019), it is possible that previous studies of acutely ill patients requiring stabilization and urgent intervention had a higher proportion of ARFID patients with the fear of aversive consequences presentation than in our less acute outpatient sample. As support for this hypothesis, descriptive data on ARFID presentations from a partial hospitalization program for young adolescents (mean age of 11.4 $\pm$ 1.5 years) showed that 65% of the sample listed fears of vomiting, choking, or GI pain as reasons for dietary restriction (Bryson et al., 2018), but the fear of aversive consequences presentation was only present in 13.2% of an older adolescent population in an outpatient setting (Fisher et al., 2014). Future studies should examine whether anxiety and mood symptoms differ among ARFID presentations, age, and treatment setting.

Of note, although all participants in our sample presented to an outpatient eating-disorder clinic with symptoms severe enough for a diagnosis of either AN or ARFID, the CIA did not capture impairment related to ARFID symptoms. Individuals with ARFID had a mean impairment score of 11.09. This is lower than the CIA cut-off score of 16, which signifies clinically significant impairment secondary to an eating disorder (Bohn & Fairburn, 2008). In contrast, those with AN scored well above this cut-off, with a mean CIA score of 24.54. Likely, this is because current impairment measures, including the CIA, target symptoms of eating disorders, such as weight and shape concerns, which are irrelevant for ARFID. However, evidence indicates that significant clinical impairment is evident for those with ARFID. For example, ARFID constitutes an identifiable and considerable percentage of eating-disorder patients at inpatient, day programs, and adolescent medicine clinics (Fisher et al., 2014; Forman et al., 2014; Nakai et al., 2016; Nicely et al., 2014; Strandjord et al., 2015). Patients with ARFID report significant psychological and medical symptoms (Cooney et al., 2017; Fisher et al., 2014; Norris et al., 2014; Thomas & Eddy, 2019), can be as low weight or lower weight than AN, (Nakai et al., 2016; Strandjord et al., 2015), may be obese with associated medical risks (Thomas & Eddy, 2019), and ARFID can persist into adulthood (Nakai et al., 2016; Thomas & Eddy, 2019). Moreover, in this sample a subset of patients were referred for an eating disorder evaluation by other medical providers because of irregular eating habits and associated risks and/or medical sequelae and others were self-referred due to distress associated with their symptoms. Using a modified version of the CIA that excludes thoughts about weight, shape, eating, and exercise (Wildes, Zucker, & Marcus, 2012), adults from an online community sample, who identified as picky eaters and endorsed ARFID symptoms, reported equivalent levels of impairment from eating behaviors as adults who endorsed traditional eating pathology (i.e., concern about weight, shape, and eating; Zickgraf et al., 2016). Given these findings and knowledge of our sample, we cannot conclude that individuals with ARFID have lower levels of life impairment associated with their eating behaviors than individuals with AN or lack insight into their symptoms.

On the contrary, evidence from the current study indicates that individuals with ARFID have insight into their eating behaviors and endorse symptoms consistent with their clinical presentation (i.e., dietary restriction, fear of trying new foods). Therefore, future studies should aim to develop impairment measures specific to the ARFID diagnosis to help determine the severity of ARFID symptoms (e.g., Bryant-Waugh et al., 2018), especially when individuals are not low-weight and it is difficult to determine treatment needs. Items that could be relevant in considering ARFID severity could include number of foods consumed in each of the five basic food groups, how

frequently the exact same meals are repeated, avoidance of trying new foods and important social eating opportunities, fears related to eating (choking, vomiting, allergic reactions, GI distress), and the need for major family accommodation of aberrant eating behaviors (e.g., Bryant-Waugh et al., 2018; Thomas & Eddy, 2019).

4.1 | Limitations

All data used for analyses were self-report including weight, height, and symptom onset. Despite the known limitations of self-report data, our results replicate and extend studies showing that individuals with ARFID report lower levels of depression and traditional eating-disorder psychopathology, present at younger ages to treatment, and report an earlier age of disorder onset, compared with those with AN. Importantly, our data did not allow us to explore the proportion of participants who were presenting for the first time for eating disorder treatment nor if individuals had previously been diagnosed and/or treated for an eating disorder. Also, future studies should seek to determine if observed differences in %mBMI between ARFID and AN persist in outpatient samples when height and weight are measured directly and compare those presenting for the first time for treatment for ARFID to those with previous diagnoses and/or treatment. While most of our measures have been used with younger respondents and we asked parents to assist their children in completing the assessment battery, these results should be replicated using child versions of relevant questionnaires such as the STAI. Future studies should also seek to explore if differences and similarities observed between AN and ARFID remain consistent when comparisons are examined within childhood, adolescent, and adult age groups. Additionally, results from previous studies indicate that the clinical presentation of ARFID differs depending on setting (outpatient, partial programs, inpatient) and treating services (e.g., pediatric clinics, gastrointestinal clinics, adolescent medicine clinics, psychological clinics), possibly reflecting the heterogeneity of the diagnosis. Thus, future studies should explore if these results replicate across clinical and community settings and if findings depend on ARFID presentation.

5 | CONCLUSIONS

Notwithstanding limitations, findings from this study add to our understanding of restrictive eating disorders. The addition of psychosocial impairment as a criterion sufficient for an ARFID diagnosis seems to alter the presentation of ARFID in expected ways such that, without the requirement for insufficient energy intake or presence of nutritional deficiencies, the ARFID sample was, on average, within a normal weight range. However, differences in the age of onset, age of treatment presentation, and gender distribution were similar to previous results comparing AN and ARFID. Our results also suggest that individuals with either a diagnosis of AN or ARFID report high levels of dietary restriction but, as anticipated, those with AN report elevated cognitive restraint or effortful attempts to reduce food intake, urges to eat, and thoughts about food. On the other hand, those with ARFID report greater discomfort around new foods and very low levels of effortful control over eating. Our sample of ARFID participants is unique to the literature in that we included adults and individuals at normal and higher body weights, and our results were not dependent on body weight, age, or gender. Thus, these findings suggest that differences in mood, anxiety, and eating symptoms represent true distinctions between these disorders and measures of these constructs may assist in differential diagnosis.

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