U.PORTO

MESTRADO EM PSICOLOGIA
PSICOLOGIA DA EDUCAÇÃO E DESENVOLVIMENTO HUMANO

Avoidant/Restrictive Food Intake Disorder in a community sample

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2026

Universidade do Porto

Faculdade de Psicologia e de Ciências da Educação

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Junho de 2026

Dissertação apresentada no Mestrado em Psicologia, especialização em Psicologia da Educação e do Desenvolvimento Humano, Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, orientada pela Professora Doutora **Eva Martins da Conceição** (FPCEUP).

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Agradecimentos

Gostava de começar por agradecer à Professora Eva Conceição pela orientação durante este estes últimos dois anos, e por me ter guiado nesta introdução ao mundo da investigação. Quero agradecer também a toda a equipa de investigação, nomeadamente às colegas de doutoramento e do mestrado, com quem pude partilhar várias reuniões e com quem aprendi tanto. Um agradecimento especial à Sofia, por ter partilhado comigo a aventura que foi a escrita da dissertação.

Quero também exprimir o meu mais profundo e sincero obrigada à minha família, por todo o apoio e o incentivo incondicional na procura pelo meu propósito. Tudo aquilo que sou como pessoa é fruto de todo o amor e carinho que sempre me mostraram e, por reconhecer que nem todos tivemos as mesmas oportunidades, espero ser para sempre merecedora de todo o esforço que fazem por mim. Não me poderia esquecer dos meus bichinhos – o Coral, o Caju e a Cacau – que, mesmo sem falar, foram sempre uma grande fonte de conforto.

Aos amigos que fiz na faculdade, especialmente ao Leo e à Gregório, obrigada por terem sido os meus mentores, e por me ajudarem a navegar esta fase da minha vida. Para além disso, um obrigada às minhas amigas da escola – a Andreia, a Rita e a Sara – por nos termos sempre mantido juntas, mesmo cada uma estando a trilhar caminhos diferentes. Por fim, a todos aqueles que marcaram este percurso, mas que infelizmente já não sou tão próxima, espero que saibam que estarão para sempre eternizados nesta bonita memória que foi a faculdade.

Finalmente, e por saber que nem sempre foi fácil, quero agradecer-me a mim própria por ter enfrentado este grande desafio. Mais uma etapa da vida concluída!

A todos os que, indiretamente ou diretamente, pela positiva ou pela negativa, influenciaram o meu percurso até aqui, o meu mais sincero obrigado!

Resumo

Objetivo: Este estudo explorou a frequência dos traços da Perturbação Restritiva/Evitativa da Alimentação numa amostra comunitária de adultos portugueses, e investigou a sua relação com os possíveis fatores associados: traços do espetro do autismo e tolerância ao sofrimento.
Método: Uma amostra de 365 participantes respondeu a questionário online, composto pela recolha de dados sociodemográficos e um conjunto de medidas de autorrelato, incluindo dados sociodemográficos, o *Nine Item ARFID Scale* (NIAS), o *Comprehensive Autistic Trait Inventory* (CATI), e o *Distress Tolerance Scale* (DTS). Este foi disseminado no campus académico e, através do método bola de neve, na comunidade.
Resultados: 49 (10.1%), 14 (2.7%), 37 (7.7%) dos participantes cotaram acima do *cutoff* das subescalas alimentação seletiva, medo de consequência negativas e pouco apetite, respetivamente. 5 (1.4%) cotaram acima do *cutoff* em todas as subescalas. A regressão linear múltipla [$F(6,359)=7.10$, $p<.001$, $R^2_{adj}=.09$] investigou qual das subescalas do CATI estavam mais associadas ao score total do NIAS, com apenas a alimentação seletiva sendo significativamente associada (b=.19, $t=2.82$, $p=.009$). O modelo de moderação testou o DTS como um moderador entre CATI sensibilidade sensorial e o score total do NIAS [$F(3,362)=14.35$, $p<.001$, $R^2=.11$]. Foi encontrado um efeito significativo da CATI sensibilidade sensorial ($b=.66$,$t=2.68$,$p=.008$), mas um efeito não significativo para o DTS ($b=.95$, $t=.59$, $p=.56$), como também um efeito de interação não significativo ($b=-.1$, $t=-1.41$, $p=.16$)
Conclusão: Traços elevados de perturbação restritiva/evitativa da alimentação estão associados com traços do espetro do autismo elevados, especialmente com sensibilidade sensorial, independentemente do nível de tolerância ao sofrimento.

Palavras-chave: Perturbação restritiva/evitativa da alimentação, Sensibilidade sensorial, Perturbação do espetro do autismo, Tolerância ao sofrimento

ABSTRACT

Objectives: This study explored the frequency of ARFID traits in a Portuguese adult community sample and investigated their relationship with potentially associated factors: autistic traits and distress tolerance.

Method: A sample of 365 participants responded to an online set of self-report measures disseminated in an academic campus and by snowball procedure in the community, including sociodemographic data, the Nine Item ARFID Scale (NIAS), the Comprehensive Autistic Trait Inventory (CATI), and the Distress Tolerance Scale (DTS).

Results: 49(10.1%), 14(2.7%), 37(7.7%) participants scored above the clinical cut-off of the subscales picky eating, fear of negative consequences, and lack of appetite, respectively, and 5(1.4%) scored above the cut-off in all subscales. Multiple linear regression [$F(6,359)=7.10$, $p<.001$, $R^2_{adj}=.09$] investigated which CATI subscales were most associated with NIAS total score, with only sensory sensitivity being significantly associated (b=.19, $t=2.82$, $p=.009$). Moderation model tested DTS as a moderator between CATI sensory sensitivity and NIAS total score [$F(3,362)=14.35$,$p<.001$,$R^2=.11$]. A significant main effect for CATI sensory sensitivity ($b=.66$, $t=2.68$, $p=.008$), but non-significant main effect for DTS ($b=.95$, $t=.59$, $p=.56$), and non-significant interaction effect ($b=-.1$, $t=-1.41$, $p=.16$) were found.

Conclusion: Increased ARFID traits were associated with increased autistic traits, specifically sensory sensitivity, independently of the degree of distress tolerance.

Key-words: ARFID, Autism Spectrum Disorder, Distress Tolerance

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Lista de abreviaturas

ED/EDs - Eating Disorder(s)

ARFID - Avoidant/Restrictive Food Intake Disorder

ASD - Autism Spectrum Disorder

AN - Anorexia Nervosa

FPCEUP - Faculty of Psychology and of Educational Sciences of the University of Porto

CATI - Comprehensive Autistic Trait Inventory

CATI_SOC - Social Interactions

CATI_COM - Communication

CATI_CAM - Social Camouflage

CATI_REP - Repetitive Behaviors

CATI_RIG - Cognitive Rigidity

CATI_SEN - Sensory Sensitivity

CATI_TOTAL - Comprehensive Autistic Trait Inventory Total Score

DTS - Distress Tolerance Scale

DTS_TOTAL - Distress Tolerance Scale Total Score

NIAS - Nine Item ARFID Inventory

NIAS_TOTAL - Nine Item ARFID Inventory Total Score

NIAS_PE - Picky Eating

NIAS_FE – Fear of aversive consequences

NIAS_AP – Lack of Appetite

ER - Emotional regulation

Introduction

Avoidant/Restrictive Food Intake Disorder (ARFID) was formally introduced in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a significant reformulation and expansion of the previous diagnosis of Feeding Disorder of Infancy and Early Childhood (American Psychiatric Association, 2022). This prior diagnosis was limited selective eating behaviors observed during infancy and early childhood years, whereas the revised conceptualization acknowledges that avoidant and restrictive eating patterns can persist, or even emerge, in older children, teens and adults (Thomas et al., 2017). According to the DSM-5-TR (APA, 2022), ARFID is characterized by the conscious avoidance or restriction of food intake driven by sensory sensitivities, fear of a negative experience related to food, and/or a lack of interest in eating. These presentations may manifest independently or in combination (Thomas et al., 2017).

The developmental trajectory of ARFID varies according to its underlying presentation. When driven by sensory sensitivities, the disorder tends to emerge during childhood and prevail into adulthood (Thomas et al., 2017). In contrast, presentations rotted in past traumatic experience, such as chocking, it can develop at any age (Thomas et al., 2017). Data collected from a large sample comprised of 2378 adults with ARFID showed that the most common presentation was lack of interest in eating (80%), followed by sensory avoidance (55%), and fear of negative outcomes (31%) (D'Adamo et al., 2023).

Although it can be identified across the weight spectrum (Aulinas et al., 2020; Bourne, Mandy & Bryant-Waugh, 2022; Kozak et al., 2023), the most clinical severe cases typically report significant weight loss and nutritional deficiencies, as a result of the persistent refusal to eat (APA, 2022; Aulinas et al., 2020). Such cases typically lead to the dependence on feeding tubes, oral nutritional supplements or, in more severe cases, parenteral nutrition (APA, 2022; Bourne et al., 2022; Walsh et al., 2016). Beyond these nutritional concerns, ARFID can also lead to severe health complications, including heightened risk for cardiovascular diseases, menstrual irregularities and potentional amenorrhea, as well as endocrine alterations, like thyroid dysfunction for example (Thomas et al., 2017; Stern et al., 2024). This disorder also brings a profound impact on

the individual's psychosocial functioning (Thomas et al., 2017; Farag et al., 2022). Because of the severe stress surrounding mealtime, it can negatively affect family dynamics and/or social engagements, leading to strained parent-child relationships and social isolation (APA, 2022; Borak et al., 2023; Farag et al., 2022; Thomas et al., 2017).

Comorbidities

ARFID also frequently co-occurs with other psychological conditions. Among psychiatric comorbidities, anxiety disorder and obsessive-compulsive disorder (OCD) are especially prevalent, as well as neurodevelopmental disorders, including Attention-Deficit/Hyperactivity Disorder (ADHD), intellectual disability, learning disorders and Autism Spectrum Disorder (ASD) (APA, 2022; Nicholas-Clow et al., 2024; Kambanis & Thomas, 2025; Richson, Abber & Wierenga, 2024; Sanchez-Cerezo et al., 2023). Additionally, ARFID is also correlated with gastrointestinal disorders, with up to 50% of patients in a sample of pediatric disorders of gut-brain interaction meeting criteria for ARFID (Kambasis & Thomas, 2025).

Mortality and suicide rates in restrictive eating disorders are high, but current empirical evidence regarding ARFID remains heterogeneous and limited (D'Adamo et al., 2023). While some studies indicate that suicide ideation among youth with ARFID is lower than those with Anorexia Nervosa (AN), others report no significant statistical differences between groups (D'Adamo et al., 2023). It is theorized that factors such as frustration during health assessments, diminished body trust due to traumatic experiences such as choking, as well as symptom duration, may exacerbate suicide ideation and self-harming behaviors in ARFID patients (D'Adamo et al., 2023). Furthermore, individuals with ARFID have lower treatment-seeking rates and a longer duration of illness before seeking medical intervention compared to those with other EDs (D'Adamo et al., 2023). These findings emphasize the urgent need for more research specifically designed to address the clinical needs of this specific population.

ARFID VS Anorexia Nervosa

Due to overlapping consequences and diagnostic criteria, namely significant weight loss and nutritional deficits, ARFID is frequently compared with AN within EDs

research (Izquierdo et al., 2018; Thomas et al., 2017). However, this comparison limits our understanding of ARFID and can make the development of tailored interventions more difficult (Aulinas et al., 2020).

A fundamental distinction between these disorders concerns the motivation for food restriction. While AN is motivated by an intense fear of weight gain and the underlying body dysmorphia that encourages the search for thinness (APA, 2023; Izquierdo et al., 2018; Walsh et al., 2016), ARFID's food avoidance stems from sensory aversion, fear of aversive consequences, or a fundamental lack of interest in eating (APA, 2022; Izquierdo et al., 2018; Walsh et al., 2016). Reinforcing this distinction, one study found that only 2% of adults with ARFID reported body shape concerns (Kambanis & Thomas, 2025).

Given these different motivators, it also produces distinct eating patterns. While patients with AN typically select low-calorie foods, individuals with ARFID often exclude certain food items or entire groups based on sensory preferences, which often leads them to choose more calorie-dense options, as these are the most bland (Aulinas et al., 2020).

Although the criteria for both disorders can co-occur, current guidelines mandate that AN must take precedence in such instances (Kambasis & Thomas, 2025). The clinical complexity of this distinction was illustrated in a study conducted by Noris and collaborators (2020), who found that in a sample of 77 patients initially meeting ARFID criteria, 6 were later reclassified as having AN.

Prevalence

As the result of the clinical complexity of ARFID, it's essential to determine the frequency of the disorder within the population. However, prevalence estimates remain the subject of an intense debate, partly due to the limited information available and the need to standardize screening measurements across different populations and cultural contexts (Sader et al., 2025). Moreover, limitations in studying this disorder persist in regions such as Asia and Africa, due to cultural attitudes toward food and eating that may affect ARFID symptoms (Mulkens, 2025; Kambanis & Thomas, 2025).

Considering both non-eating disorder community samples and clinical populations, ARFID traits have been more frequently identified in younger male

individuals (D'Adamo et al., 2023; Zickgraft et al., 2023; Nicholls-Clow et al., 2024). A meta-analysis conducted by Nicholls-Clow and collaborators (2024) suggested a prevalence rate of 4.5%, a percentage much higher than the more conservative 0.3% rate determined by the DSM-5-TR (APA, 2022). Nevertheless, the both estimates remain within the range estimated by Sanchez-Cerezo and collaborators (2023), of 0.3% to 15%. Taking this into consideration, Waller (2025) suggests that ARFID is far more prevalent than was previously thought, especially when compared to AN. This is supported by a large community investigation conducted by D'Adamo and collaborators (2023) in which a positive ARFID screen (4.7%) was slightly more prevalent than a positive AN screen (4.5%). Therefore, and as stated by both investigative teams, ARFID needs more innovative research into its own etiology, prevalence, assessment, and treatment (D'Adamo et al., 2023; Waller et al., 2025).

However, and despite the recent increase in research, no Portuguese-based studies have been conducted on the matter at hand, and data regarding the prevalence and presentation of ARFID in the Portuguese adult population remains limited. The only identified study was conducted by Neiva (2022), which, while representing a pioneering contribution to this field, was limited by a small sample size (N=9), of whom only 4 were diagnosed with ARFID, and it has not yet undergone peer reviewing. The absence of representative date highlights the need for investigations within the Portuguese context.

ARFID and Autism Spectrum Disorder

The relationship between ARFID and Autism Spectrum Disorders (ASD) has not yet received much attention in the literature, despite its potential importance in understanding the factors behind ARFID maintenance. The estimated co-occurrence rate of ASD and ARFID ranges between 12.5% to 33.3%, indicating that, while the association is significant, not all individuals with ARFID are on the autism spectrum (Kambasis & Thomas, 2025; Kozak et al., 2023; Sader et al., 2025).

ASD is a neurodevelopmental disorder characterized by cognitive rigidity, impaired social communication, and behavioral difficulties beginning in early childhood (Inal-Kaleli et al., 2025). These behavioral challenges manifest through rigid rules and repetitive actions that can manifest during mealtime, for example, by always choosing to eat with the same cutlery or plate or through the strict adherence to routine (Bourne et al.,

2022). These rituals cannot be deviated from without causing significant emotional distress to the individual (Bourne et al., 2022).

Another of its core characteristics is heightened sensory sensitivity, which in part is also known as risk factor for the development of EDs (Bourne et al., 2022; Nimbley et al., 2022). This atypical sensory perception manifests in selective eating, food neophobia, and aversion to certain textures, resulting in a diet of bland, starchy and beige foods, commonly known as "safe foods" (Bourne et al., 2022; Nimbley et al., 2022; Zickgraf et al., 2022). These substantial limitations regarding mealtime puts individuals on the spectrum at an increased risk of meeting the diagnostic criteria for ARFID (Bourne et al., 2022).

The role of distress tolerance

The relevance of emotion regulation difficulties in maintaining maladaptive eating patterns is well-established in literature regarding other eating disorders (Costorphine et L., 2007; Prefit, Cândea & Szentagotai-Tătar, 2019). However, research about these challenges in individuals with ARFID have not been formally established (Stern et al., 2024).

ER is defined as the process of monitoring, evaluating, and modifying emotional reactions to adapt to distress, for example, using problem solving strategies and cognitive reappraisal (Stern et al., 2024). Emotional regulation (ER) difficulties are also a core feature of ASD, associated with their lack of social skills, ability to recognize and display emotions, as well as low motivation to socialize with peers (Costorphine et al., 2007; Dell'Osso et al.,2023).

Poor distress tolerance, as manifested by the inability to regulate one's emotions and endure disconfort, puts individuals at a higher risk for emotional vulnerability and for the usage of maladaptive coping strategies, strengthening a negative feedback loop (Costorphine et al., 2007: Mattingley et al., 2022). Empirical studies now support a link between emotional regulation and eating behavior, concluding that distress tolerance may play a role in ED development and maintenance (Costorphine et al., 2007). Although there is a limited amount of research regarding these variables, some authors state that there may not be a significant difference between ARFID and other EDs regarding difficulties in emotional processing and regulation (Stern et al., 2024).

Consequently, there is a growing consensus among researchers calling for further investigation into psychological maintaining mechanisms, such as difficulties in

emotional regulation and abnormalities in sensory perception, as they may reinforce negative eating behaviors long term (Stern et al., 2024; Kambanis & Thomas, 2025).

Objectives

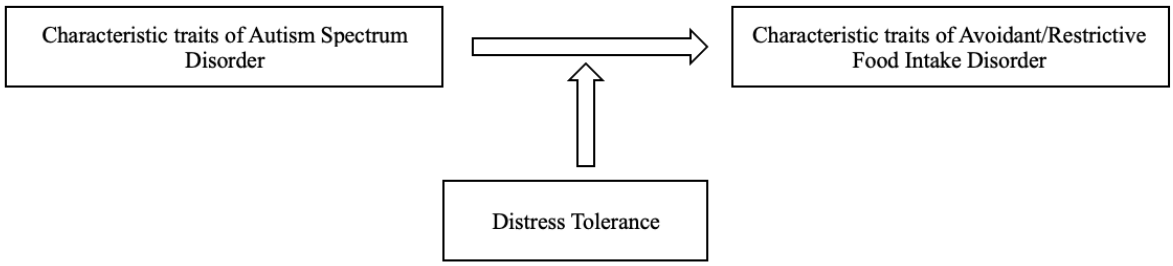
Due to the scarce number of research done on this community, the present study aimed to explore the prevalence and different presentations of ARFID traits within a Portuguese academic-based sample, while examining their relationship with potentially associated variables, namely ASD traits along with distress tolerance.

Furthermore, it will be investigated how these symptoms correlate with ASD traits, specifically poor social interactions, communication difficulties, social camouflage, repetitive behaviors, cognitive rigidity and sensory sensitivity, as well as distress tolerance. In addition, the predictive power of autistic traits and distress tolerance on ARFID traits will also be analyzed through multiple linear regression models.

Lastly, a moderation model was proposed to determine the moderation effect of distress tolerance in the relationship between predictive ASD traits on ARFID characteristic traits. This hypothesized model is schematically illustrated in Figure 1.

Figure 1

Relation between autistic traits and ARFID traits influenced by distress tolerance.



Methodology

Participants and procedure

Participants were adults over the age of 18 recruited from the community surrounding the academic campus. The sample used for this investigation was comprised of 446 individuals, academic-based, with no other exclusion criteria applied.

The online questionnaire was developed using both Google Forms and Limesurvey, and data collection took place between 2024 and 2026. It was shared using the University of Porto's institutional email network, which was forwarded towards students, professors and other non-lecturer workers. This questionnaire was also advertised through the Faculty of Psychology and Educational Sciences of the University of Porto's (FPCEUP) portal, and the social media profiles of the research team members. The dissemination message shared included a brief introduction to the study and the link to the questionnaire to be filled in by potentially interested participants. To maximize data collecting, a snowball sampling strategy was employed, by asking participants to share the questionnaire with others that may be interested in taking part in the investigation.

Following ethical guidelines and the approval of the Ethics Committee of FPCEUP (Ref.ª 2025-10-06b), before beginning to answer the questionnaire, the participants were informed about the approximate time required for completion, its objectives, and provided an informed consent section containing information about their rights of withdrawal, anonymity and confidentiality.

Instruments

Initially, participants were asked to respond to some sociodemographic assessment questions regarding age, gender, nationality, weight, height, academic qualifications, and employment status. Additionally, it was asked if the participants had any prior ED and/or ASD diagnoses, as these would be important to take into consideration during data analysis.

While the original questionnaire included other scales, such as the Three-Factor Eating Questionnaire (TFEQ) (Karlson et al., 2000), and the Eating Expectancy Inventory

(EEI) (Hohlstein, Smith & Atlas, 1998), these were excluded from this secondary analysis, as they were irrelevant to the investigation. Instead, this study utilized the Comprehensive Autistic Trait Inventory (CATI) (English et al., 2021), the Nine Item ARFID Scale (NIAS) (Murray et al., 2021; Zickgraf & Ellis), and the Distress Tolerance Scale (DTS) (Lucena-Santos et al., 2013; Simons & Gaher, 2005).

With the intent of evaluating ARFID symptoms, the NIAS (Murray et al., 2021; Zickgraf & Ellis, 2018) was included. It's a self-report questionnaire, with 9 items divided into 3 subscales, with 3 items each, aligned with the disorder's main presentations: picky eating (NIAS_PE), low appetite (NIAS_AP) and fear of negative consequences from eating (NIAS_FE). To answer, individuals responded on a 5-point Likert Scale, ranging from 0 "Strongly Disagree" to 5 "Strongly Agree". All 9 items were summed to calculate a total score (NIAS_TOTAL), that ranges between 0 to 45, with higher scores indicating elevated levels of avoidant and restrictive behavior towards eating. The proposed cutoff scores are as follows: 29 for the total score (NIAS_TOTAL), 10 for the Picky Eating and Fear of negative consequences from eating subscales, and 9 for the Low appetite subscale. In its original validation study (Murray et al., 2021), it was also reported Cronbach Alphas of .86, .90, and .91 for each of the subscales, respectively.

The CATI was the self-report instrument used for measuring autistic traits in adults (English et al., 2021). This inventory consists of 42 items, 7 for each of the 6 dimensions: Social Interactions (CATI_SOC) (α = .93), Communication (CATI_COM) (α =.83), Social Camouflage (CATI_CAM) (α = .86), Repetitive behaviors (CATI_REP) (α = .85), Cognitive Rigidity (CATI_RIG) (α = .81), and Sensory Sensitivity (CATI_SEN) (α = .80). Participants were asked to consider how well each statement describes them, choosing between the options of "Definitely Disagree", "Somewhat disagree", "Neither agree or disagree", "Somewhat agree", and "Definitely agree". The total sum was calculated (CATI_TOTAL) (α = .95), along with the respective subscales. Although the CATI cannot formulate a clinical diagnosis, a cut-off score of 134 was proposed by the authors for identifying clinically relevant levels of autistic traits.

Finally, the Portuguese adaptation (Lucena-Santos et al., 2013) of the DTS (Simons & Gaher, 2005) was also used in this investigation. It's a self-report instrument made up of 15 items, that measure an individual's level of tolerance to emotional anguish. It is divided into 4 dimensions, in addition to its the total score (DTS_TOTAL): Tolerance, Appraisal, Absorption and Regulation. For this particular study, the only

subscale used was the total score, which showed great internal consistency (α =. 85). Similarly to the other instruments, the participants rate their agreement with each statement, between “Strongly disagree”, “Mildly disagree”, “Feel neutral”, "Mildly agree” and “Strongly agree”. The DTS does not have a proposed cutoff score, but higher scores typically indicate an increased difficulty in tolerating emotional distress.

Data treatment

All statistical analysis conducted using the data collected was performed using the Statistical Package for the Social Sciences (SPSS), version 28.0.1.0.

The initial phase of the data analysis used sociodemographic data to establish a detailed descriptive profile of the sample.

The following part focused on preliminary analyses of the primary variables of interest, namely the autistic traits, distress tolerance, and the ARFID traits, including descriptive statistics for all of the subscales and total scores. In this phase, it was deemed crucial to assess the distribution of the sample using the Shapiro-Wilk test, due to its size (N = 446). The test indicated that no subscale other than the CATI_TOTAL followed a normal sample distribution (p = .21). However, after further examination of the data through the visualization of the histograms, q-q plots, and the skewness [-.03, .13] and kurtosis [-.50, .25] values, it was concluded that all variables, apart from the NIAS_TOTAL, followed a normal distribution and it would be appropriate to conduct subsequent statistical analysis using parametric tests, such as the Pearson’s correlation test. As for the NIAS_TOTAL, it presented positive symmetry [1.02, .13] with a leptokurtic distribution [1.18, .25]. Based on this information, and after comparing the values between parametric and non-parametric tests, it was deemed appropriate to conduct Pearson’s correlation analyses when using this variable, as the results were similar in both approaches.

The subsequent part of the analysis details data treatment regarding the variables of interest. A series of Pearson’s correlation analyses were conducted, as well as two multiple linear regressions: the first focused on examining the predictive power of CATI and DTS total scores on NIAS_TOTAL, and the latter examining which individual CATI subscales strongly predicted ARFID characteristics. Both regression models were preceded by preliminary analyses conducted to ensure no violation of the statistical assumptions of multicollinearity through the inspection of the values of VIF, as well as

the independence and randomness of residuals, through the visual inspection of the Normal P-P Plot, histogram, and standardized residuals scatterplot in other to confirm that the errors were normally distributed and respected the assumption of homoscedasticity.

Finally,, a moderation analysis was performed to test whether distress tolerance (DTS_TOTAL) moderated the relationship between the sensory sensitivity (CATI_SEN) and ARFID traits. This CATI subscale was chosen following the multiple linear regression model that established it as the only significant predictor of ARFID traits.

Results

Sample characterization

The sample collected for this investigation (N = 446) primarily consisted of Portuguese citizens (n = 421; 94.4%), females (n = 320; 71.7%), and university students (n = 247; 54.9%), between the ages of 21 and 30 (n = 261; 58.5%). Additionally, 67.5% (n = 301) of participants had a higher education degree.

Regarding clinical history, 111 participants (24.9%) reported a psychiatric disorder diagnosis, most notably depression and generalized anxiety, followed by ADHD, obsessive-compulsive disorder (OCD) and social anxiety. Furthermore, 43 participants (9.6%) disclosed coping with an eating disorder, mostly AN, followed by binge eating disorder (BED) and, lastly, bulimia nervosa (BN). Finally, 6 participants (1.3%) reported a formal diagnosis of ASD. The sociodemographic breakdown of the results is detailed in Table 1.

Table 1

Sociodemographic characteristics of the sample

Variable	n	%

Age		
<20	79	17.7
21-30	261	58.5
31-40	56	12.6
41-50	32	7.2
51-60	13	2.9
>60	5	1.1
Gender		
Female	320	71.7
Male	120	26.9
Other	6	1.3
Level of education		
4th grade – 9th grade	10	2.2
High school	135	30.3
Bachelor's degree	199	44.6
Master's and Doctorate's degree	102	22.9
Nationality		
Portuguese	421	94.4
Brazilian	23	5.2
Other	2	.4
Employment status		
Student	245	54.9
Working student	87	14.5
Unemployed	12	2.7
Employed	100	22.4
Retired	2	.4
Psychiatric diagnosis		
Yes	111	24.9

Eating disorder diagnosis		
Yes	43	9.6
Autism spectrum disorder diagnosis		
Yes	6	1.3

Prevalence

Table 2 presents the descriptive statistics regarding each instrument and subscale used, namely their mean and standard deviation, the minimum and maximum scored values, as well as the Cronbach Alpha for establishing internal consistency within this sample.

In the absence of cutoff scores for the DTS, statistical indicators were used to interpret the general tendency in this academic based sample. This variable followed a normal distribution, with the 50 percentile scoring bellow 3 and 75 percentile below 4, on a scale from 1 to 5, with 57 people (13.1%) scoring above 4 and only 1 (0.3%) scoring the maximum score. This indicates that a low percentage of the sample has difficulty with emotional regulation. Further results are as presented in Table A, in the supplementary material section.

Following the reported cutoff criteria, a total of 123 (27.6%) participants scored above than the CATI threshold, suggesting a significant display of autism traits above the 75 percentile.

The NIAS scores did not follow a normally distribution, with only 11 participants (2.2%) scoring above the proposed cutoff score for the total sum. As for the remaining subscales, subsequent analyses revealed that participants mostly scored above the picky eating subscale cutoff (n= 49; 10.17%), followed by 37 (7.7%) scoring above threshold on the lack of appetite subscale, and, lastly, 14 (2.7%) above score set for the fear of negative consequences subscale cutoff. Further analysis of the NIAS scores' distribution revealed that the 75 percentile scored below 15, indicating very low scores of food avoidance/restriction presentend in the sample. Scores above the threshold only appear after the 95 percentile, with only one individual scoring the maximum score of 45 (0.3%).

Regarding gender differences, a Chi-square analysis was initially conducted to examine the relationship between gender and the clinical threshold on the NIAS_TOTAL score. However, the data selected violated the minimum expected cell frequency.

Consequently, a Fisher's exact test was performed. The estimated prevalence across genders were almost identical, with 3.1% (n=8/260) and 3.0% (n=3/101) prevalence rates for females and males, respectively. Fisher's exact test revealed no statistically significant association between gender and scoring above the NIAS threshold (p = 1.000).

Further cross-tabulation analyses confirmed that 7 participants (1.9%) scored above both the CATI_TOTAL and NIAS_TOTAL cutoff scores, whilst 4 other (1.1%) scored only above the NIAS, but not the CATI. A Fisher's exact test found a statistically significant association between autistic traits and restrictive eating (p=.02), indicating that the two conditions tend to co-occur. Additionally, 25 individuals (6.8%) scored above the CATI_TOTAL and NIAS_PE (p < .001), 14 (3.8%) above the CATI_TOTAL and NIAS_AP (p =.26), and 7 (1.9%) above CATI_TOTAL and NIAS_FE (p =.13).

Table 2

Descriptive statistics of the instruments

Scales		Min	Max	M	SD	α
CATI						
	CATI_TOTAL	53	195	118.51	26.18	.93
	CATI_SOC	7	35	19.74	6.02	.86
	CATI_COM	7	31	15.28	4.47	.74
	CATI_CAM	7	35	19.11	6.16	.85
	CATI_RIG	7	35	23.76	5.75	.82
	CATI_REP	7	35	20.50	6.79	.84
	CATI_SEN	7	35	20.30	6.04	.80
DTS						
	DTS_TOTAL	1	5	3.07	.84	.93
NIAS						
	NIAS_TOTAL	0	45	10.06	8.41	.86
	NIAS_PE	0	15	4.62	4.10	.87
	NIAS_AP	0	15	3.11	3.57	.87
	NIAS_FE	0	15	2.33	3.21	.88

Key: CATI_TOTAL (Total score of Comprehensive Autistic Trait Inventory), CATI_SOC (Social Interaction), CATI_COM (Communication), CATI_CAM (Camouflage), CATI_RIG (Cognitive

Rigidity), CATI_REP (Repetitive Behavior), CATI_SEN (Sensory Sensitivity), DTS (Total score of Distress Tolerance Scale), NIAS_TOTAL (Total score of Nine-Item ARFID Scale), NIAS_PE (Picky Eating), NIAS_AP (Low Appetite), NIAS_FE (Fear)

Association between test variables

In other to examine the relationships between autistic traits (CATI), distress tolerance (DTS) and avoidant/restrictive traits (NIAS), a series of Pearson's correlation analyses were conducted. The majority of the correlations were statistically significant, with effect sizes ranging from weak to moderate. These results are provided in Table B, in the supplementary material section.

The strongest positive correlations observed were between CATI_TOTAL and NIAS_TOTAL (r (364) = .31, p < .001), followed by CATI_SEN and NIAS_TOTAL (r (364) = .30, p<.001). In contrast, only two correlations were not statistically significant, namely CATI_SOC and NIAS_AP (r (364) = .09, p = .90), and CATI_SOC and NIAS_FE (r (364) = .08, p =. 14).

Multiple linear regression between CATI, DTS total score and NIAS total score

This regression model was statistically significant [F(2,363) = 20.77, p <.001, R^2 = .10], indicating that CATI_TOTAL and DTS_TOTAL explain approximately 10.3% of the variance in NIAS_TOTAL scores. The CATI_TOTAL had a positive and statistically significant predictive effect on food avoidance ($\beta = .25, t = 4.13, p < .001$). However, the DTS_TOTAL was not a statistically significant predictor for ARFID traits in this model ($\beta = -.11, t = -1.79, p = .07$).

Multiple linear regression between CATI subscales and NIAS total score

Following the prior multiple linear regression, a second multiple linear regression analysis was conducted to determine the predictive power of the CATI subscales on the NIAS total score, and therefore identifying autistic dimensions mostly associated with ARFID symptoms.

The overall regression model was statistically significant [F(6, 359) = 7.10, p < .001, R^2 = .11)], indicating that the six collective CATI subscales explain approximately 11% of the variance in NIAS_TOTAL. However, on a individual level, all subscales failed to predict the outcome variable, besides the CATI_SEN (Sensory sensitivity) trait, a statistically significant predictor of the NIAS_TOTAL ($\beta = .19$, t = 2.82, p = .009).

Moderation analysis

Based on our hypothesized model and taking into consideration the findings of the preceding multiple linear regression analyses, a moderation analysis was conducted to understand if the relationship between CATI_SEN, established as the only significant predictor of ARFID traits, and the NIAS_TOTAL was significantly moderated by distress tolerance (DTS_TOTAL).

The model was deemed statistically significant [F (3,362) = 14.35, p = .00, R^2 = .11], and CATI_SEN demonstrated a positive predictive effect on the NIAS_TOTAL (b =.66, t (362) = 2.68, p = .01). However, the DTS_TOTAL did not have a significant moderative effect on the outcome variable (b = .95, t(362) = .59, p = .56), and the interaction between CATI_TOTAL and DTS_TOTAL was not statistically significant (b = -.10, t(362) = -1.41, p = .16). These results indicate that the positive relationship between autistic traits and food restriction is not affected by the level of distress tolerance of the individual.

Discussion

Despite ARFID's clinical complexity, international prevalence data remains inconsistent, and research within Portuguese adults is scarce. Heightened sensory perception, cognitive rigidity, and behavioral difficulties - common traits in individuals on the autism spectrum (ASD) - constitute a significant risk factor for the development of ARFID. Additionally, difficulty in tolerating psychological distress has been considered a maintaining factor of restrictive eating disorders.

Given these circumstances, this study aimed to explore how ARFID traits present in a Portuguese academic sample, whilst analyzing their relationship with ASD traits and distress tolerance. The results obtained offered new insights into this population.

Prevalence

Consistent with what would be expected for a scale measuring clinical traits in a community sample, the NIAS scores were not normally distributed, with only a small minority of individuals scoring above the clinical threshold. Nonetheless, the observed 2.2% prevalence rate aligns with the estimated prevalence percentage proposed by Sanchez-Cerezo and collaborators (2023), though it differs slightly from other sources,

falling slight bellow 4.5% and 4.7% (D'Adamo et al., 2023; Nicholls-Clow et al., 2024), but well above 0.3% (APA, 2022) .

These different rates could be explained by the evaluation of a non-clinical sample using clinical tools, reflecting the presence of perceived symptoms that do not represent a formal clinical diagnosis. Additionally, the fact that ARFID was identified based on a self-report measure may also have contributed to an over-estimation of prevalence rates in this population. The literature has shown that self-reports assessment may tend to overestimate the diagnosis of eating disorders and other psychological disorders (Fairburn and Beglin, 1994; Zimmerman, 2024). Future research should focus on prevalence studies to properly identify and clinical diagnose based on DSM-5 criteria. Given the low prevalence rates of ARFID, larger samples should also be recruited to increase the power of future findings.

Furthermore, the prevalence rates were similar across genders, contrasting with previous literature that suggest male predominance (D'Adamo et al., 2023; Zickgraft et al., 2023; Nicholls-Clow et al., 2024). This also contrasts with the higher prevalence rates of other eating disorders, such as AN and Bulimia Nervosa, which are usually more prevalent among women (van Eeden, van Hoeken and Hoek, 2021). Our sample was constituted mostly by female participants, with a smaller sample size of male participants which might have had an effect in these results.

Regarding the NIAS subscales, the highest scoring dimension above clinical threshold was picky eating, diverging from the existing literature, which generally identifies lack of appetite as the most prevalent presentation of ARFID (D'Adamo et al., 2023). This pattern may also reflect the particular influence of the prevalence of food neophobia in our population. Food neophobia is defined as the reluctance to try unknown or new food items. This typically emerges in the toddler developing stage, and gradually diminishes as children ages (Torres, Gomes & Mattos, 2020). This characteristic is essential for human development, as it prevents the consumption of foods that might be harmful to our health, coinciding with the developmental stage where toddlers start experimenting with self-feeding, and are becoming more physically independent (Zickgraf et al., 2022). As the child becomes familiar with the food available in its environment, this selectivity starts to decline naturally and eating habits start to form (Zickgraf et al., 2022). In some individuals, however, this might not be the case, as this reluctance to try new foods persists or intensifies (Zickgraf et al., 2022). The development and maintenance of food neophobia is shaped by multiple factors involving, not only

individual, psychological, and biological factors, but also economic, anthropological and sociocultural indicators (Torres, Gomes & Mattos, 2020). Parental influence is also an important factor, as children learn how to experience mealtime by modeling parental behavior (Torres, Gomes & Mattos, 2020).

Nevertheless, anxiety has also been posed as a driver for food avoidance (Zickgraft et al., 2022). Anxiety has been the center of theoretical models designed to understand the etiology of eating disorders and have long focused on fear and anxiety as being conditioning processes that contribute to the development of disordered eating behaviors (Harris et al., 2019; Anderson et al., 2021). Consistent with these models, research indicates that children with ARFID or selective eating patterns have been found to display elevated anxiety symptoms (Harris et al., 2019).

Lastly, fear of negative outcomes is the subscale with the lowest scoring rate above the threshold. This finding is consistent with the existing literature, which it identifies that this subscale is a key component for the differential diagnosis between ARFID and other atypical eating patterns (Gianneschi et al., 2024; Murray et al., 2021). For the majority of people, eating is not simply seen as a basic need, or even the source of potential negative outcomes, butt something associated with pleasure, social bounding, and the key for participating in one's culture (Torres, Gomes & Mattos, 2020). It is therefore expected that the fear presentation would be the rarest in a non-clinical community based sample, as most individuals would enjoy partaking in a joint family meal and being around food, for example.

Autism spectrum disorder traits and ARFID

The hypothesized relationship between ARFID and ASD traits was partially supported by the present investigation A series of Pearson's correlation analyses revealed that ARFID dimensions were almost all positively correlated with all autism characteristics, at different magnitudes, ranging from low to moderate. Most notably, the correlations found to be the strongest were the ones involving the sensory sensitivity trait and all the ARFID subscales, which goes with what is presented in literate. Furthermore, sensory sensitivity was, surprisingly, the only statistically significant predictor of selective eating in second multiple linear regression model.

These findings are partially aligned with prior research. Approximately 90% of individuals within the autism spectrum have atypical sensory processing mechanisms

(Balasco, Porvenzano & Bozzi, 2020), that lead to either hyper or hypo reactivity to stimuli, namely sight, smell, taste, hearing and touch (Balasco, Porvenzano & Bozzi, 2020; Palti & Kaple, 2023). Specifically, oral texture sensitivity has been shown to be a more specific predictor of selective eating then other senses, despite all being involved in the process of eating (Zickgraft et al., 2022).

This sensitivity to sensory stimuli is not exclusive to the atypical individuals. Research in the general population found that about 30% of the population scores high in sensory processing sensitivity measures - a personality trait characteristic of individuals that are highly sensitive to external and internal stimuli (Weyn et al., 2026). When the intensity of the sensory input surpasses what a individual can handle, it can result in overstimulation, and even low levels of sensory input can overstimulate a highly sensible person (Weyn et al., 2026). This might ultimately explain the importance of the sensory sensitivity trait in explaining restrictive and avoidant eating patterns in a community sample.

However, other subscales such as the cognitive rigidity and repetitive behaviors, although among the subscales that showed the strongest correlations with NIAS_TOTAL, did not emerge as a significant predictor of restrictive behaviors, ultimately contradicting what was previously understood, in light of existing literature. Restrictive eating disorders, like AN, have been long been associated with key components of executive functioning, like low cognitive flexibility, as it reinforces dietary restriction. Executive functioning involves the capacity to consider other solutions in emotionally challenging intense situations, that can be hindered by prolonged restricted eating, leading to low weight and malnutrition (Rodgers, Smith and Murray, 2022). It is possible that the effect of cognitive rigidity and of repetitive behaviors in eating behavior is weaker in a community sample rather than in clinical populations as these characteristics might be less pronounced in neurotypical individuals. Future research using clinical samples should have a particular focus on executive functioning, as to better understand these associations.

Distress tolerance and ARFID

Contrary to theoretical expectations, the distress tolerance was not identified as a significant predictor of restrictive and avoidant food intake traits. Moreover, it did not significantly moderate the relationship of CATI_SEN and NIAS_TOTAL in our

hypothesized model. These findings suggest that the association between ARFID traits with ASD traits operates independently from one's capacity to tolerate emotional anguish. These findings diverge from existing literature on maintaining factors for eating disorders, suggesting that distress tolerance may play a more limited role in non-clinical selective eating than previously proposed. It seems that ARFID traits are mostly motivated by sensory sensitivity, and not emotional regulation difficulties. This sets ARFID apart from other eating disorders, like AN and Bulimia, that have previously been associated with maladaptive coping mechanisms to distress as reinforcing factors (Costorphine et al., 2007; Stern et al., 2024). Research indicates that a possible reasoning behind engaging in purging, for example, is the expectation that this behavior will be capable of alleviating negative affect (Mattingley et al., 2022).

In contrast, other emotional regulation variables have been significantly implicated in other research, as they may be influencing this restrictive and avoidant behavior. Specifically, the emotional responses of fear, anxiety and disgust that have been identified as possible psychological mechanisms relevant in the reinforcing of restrictive eating behaviors, besided sensory sensitivity (Harris et al., 2019; Anderson et al., 2021).

Studies suggest that high disgust sensitivity may be a more robust predictor for restrictive eating, food neophobia, and food-related textural aversions. (Egolf, Siegrist & Hartmann, 2018; Harris et al., 2019; Menzel et al., 2019; Anderson et al., 2021). Disgust is defined as an adaptive functional system, utilizing sensory facets such as olfactory, visual, and tactile characteristics, intended to protect against infections or toxic agents transmitted by rotten food or bodily waste (Egolf, Siegrist & Hartmann, 2018; Breiner et al., 2023). It is also one of the first emotions to emerge in child development (Gianneschi et al., 2024).

On the other hand, anxiety has been the center of theoretical models designed to understand EDs, with a particular focus on fear and anxiety being conditioning processes that contribute to disordered eating behaviors (Harris et al., 2019; Anderson et al., 2021). Consistent with these theoretical models, research indicated that children with ARFID or selective eating patterns display elevated anxiety symptoms (Harris et al., 2019). Accordingly, evidence supports that anxiety and disgust provide differential contributions to ARFID classifications and selective eating severity, suggesting that the association between anxiety and food avoidance may be largely mediated by disgust (Anderson et al., 2021).

Furthermore, there are studies now implying that intolerance to uncertainty, another common feature of ASD, may be a potentially relevant emotional construct playing an important role in the development of EDs. Intolerance to uncertainty is described as difficulty in enduring cognitive, emotional and behavioral effects caused by lack of information, resembling a perceived threat (Dell'Osso et al., 2023; Kesby et al., 2019). This construct is well-established within research and treatment for anxiety disorders and OCD and presents a significant risk for multiple other psychiatric disorders who present anxiety as a significant clinical feature, such as EDs. This construct has been studied in relation to AN, in which it is theorized that food restriction may represent an attempt to avoid the uncertainty about the calories in certain food items or the consequences of ingestion, namely weight gain (Kesby et al., 2019). Although no other studies related the concept to ARFID, IU is thought to play a role in avoidance behaviors (Kesby et al., 2019). Notably, these behaviors can manifest through food, and consequently as ARFID, specifically in the presentation of fear of negative consequences, as a way to prevent negative consequences like gastrointestinal discomfort.

Clinical and practical implications

As one of the few studies conducted on ARFID within the Portuguese academic context, this study carries several clinical and practical implications.

First, the identification of sensory sensitivity as a primary predictor of ARFID traits in this sample suggest that interventions for ARFID should potentially prioritize sensory desensitization strategies and implement structured programs for a gradual food exposure rather then, or in addition to, approaches mainly targeting emotional coping mechanisms. This is particularly relevant given that there isn't an established treatment protocol for ARFID, a notable gap that researchers have highlighted as an urgent priority (Kambanis & Thomas, 2025).

Second, the statistically significant co-occurrence of elevated autistic traits and ARFID presentations in this sample highlights the importance of screening for ARFID in individuals presenting with ASD, and vice-versa. Healthcare professionals working with autistics adults should be attentive to dietary patterns, as they can have significant nutritional and psychosocial consequences. individuals presenting with ARFID symptoms should also be assessed for autistic traits, particularly heightened sensory sensitivities, as it may influence the treatment approach

Finally, the findings reinforce the importance continuing to explore this topic, as well as raising public awareness about ARFID and its presentations prevailing into adulthood. Increased awareness may facilitate parents of picky eaters and individuals with higher food neophobias to find appropriate interventions in hope of improving quality of life.

Limitations and future directions

Several limitations should be acknowledged, particularly regarding this study's methodology and data collection procedure.

The use self-report screening measures in an online questionnaire has some limitations, as the participants might be influenced by social desirability bias. Additionally, the participants' varying interpretations of the questionnaire items may have affected the accuracy of their responses and ultimately influenced the quality and reliability of the data collected.

Another limitation concerns the sociodemographic variables. Age and weight were mistakenly collected using multiple choice categories rather than continuous measures, which restricted data analysis. These variables could have been used to further characterize our sample and accurately measure the prevalence of ARFID our community. Furthermore, as more authors push for the study of selective eating in individuals with higher body mass index (Aulinas et al., 2020), weight would also have been an important variable to analyze during this investigation.

Lastly, the relatively long duration of the questionnaire may have been an obstacle for the adherence of the participants, as some abandoned the survey mid-way, ultimately limiting our sample size and its accurate representation.

Future research should seek to replicate and expand these findings using clinical samples composed of individuals with formal ARFID diagnoses.

Conclusion

This study represents another pioneering effort in the investigation of Avoidant/Restrictive Food Intake Disorder traits within the Portuguese adult community. By addressing the often-neglected intersection between restrictive eating patterns and

autistic traits, this work reinforces that sensory sensitivity is a core component in the etiology of these eating behaviors. Notably, among all autistic traits analyzed, sensory sensitivity emerged as the only significant predictor of ARFID traits in this sample, a finding consistent with literature that suggest that oral texture sensitivity, in particular, is the main driver for food selectivity across neurotypical and atypical populations.

By contrast, distress tolerance did not emerge as a significant variable in the maintenance of ARFID traits, demonstrating a possible independence between an individual's ability to tolerate emotional suffering and restrictive eating. This marks a significant difference between ARFID and other eating disorders where emotional regulation difficulties are central maintaining factors.

Our discussion highlighted the need to explore other emotional and cognitive variables that may add additional variance in the development and maintenance of ARFID. These constructs may represent a promising direction for future empirical investigations.

Ultimately, this study highlights the urgent need to expand ARFID research globally. Greater awareness is essential for the early identification of individuals at risk. Hopefully this work can be a important contribution to the understanding of ARFID, as means to support the necessary refinement of the diagnostic criteria, increasingly recommended by various authors, in other to improve clinical precision and treatment outcomes (Kambanis and Thomas, 2025; Zickgraf et al., 2025).

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Supplementary Material

Table A

Percentile distribution values of the instruments

		CATI_TOTAL	DTS_TOTAL	NIAS_TOTAL	NIAS_PE	NIAS_AP	NIAS_FE
Percentiles	25	99.50	2.00	3.00	1.00	0.00	0.00
	50	119.00	3.00	9.00	3.00	2.00	.50
	75	137.00	4.00	15.00	7.00	5.00	3.00

Key: CATI_TOTAL (Total score of Comprehensive Autistic Trait Inventory), DTS_TOTAL (Total score of Distress Tolerance Scale), NIAS_TOTAL (Total score of Nine-Item ARFID Scale), NIAS_PE (Picky Eating), NIAS_AP (Low Appetite), NIAS_FE (Fear)

Table B

Correlation matrix between CATI, DTS and NIAS

	1	2	3	4	5	6	7	8	9	10	11	12
1. NIAS_TOTAL	- -											
2. NIAS_PE	*.786***	- -										
3. NIAS_AP	*.795***	*.407***	- -									
4. NIAS_FE	*.733***	*.329***	*.450***	- -								
5. CATI_TOTAL	*.308***	*.290***	*.177***	*.240***	- -							
6. CATI_SOC	*.152***	*.173***	*.090*	*.070*	*.661***	- -						
7. CATI_COM	*.201***	*.166**	*.126**	*.174***	*.595***	*.360***	- -					
8. CATI_CAM	*.214***	*.187***	*.112**	*.196***	*.821***	*.557***	*.385***	- -				
9. CATI_RIG	*.227***	*.233***	*.115**	*.170***	*.695***	*.219***	*.230***	*.488***	- -			
10. CATI_REP	*.254***	*.256***	*.159***	*.163***	*.805***	*.376***	*.375***	*.592***	*.531***	- -		
11. CATI_SEN	*.303***	*.250***	*.175***	*.280***	*.794***	*.377**	*.425***	*.538***	*.552***	*.574***	- -	
12. DTS_TOTAL	*-.296***	*-.202***	*-.166***	*-.203***	*-.576***	*-.305***	*-.302***	*-.498***	*-.432***	*-.454***	*-.524***	- -

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Key: CATI_TOTAL (Total score of Comprehensive Autistic Trait Inventory), CATI_SOC (Social Interaction), CATI_COM (Communication), CATI_CAM (Camouflage), CATI_RIG (Cognitive Rigidity), CATI_REP (Repetitive Behavior), CATI_SEN (Sensory Sensitivity), DTS (Total score of Distress Tolerance Scale), NIAS_TOTAL (Total score of Nine-Item ARFID Scale), NIAS_PE (Picky Eating), NIAS_AP (Low Appetite), NIAS_FE (Fear)