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Converging paths: Autistic raits, body image concerns, and disordered eating symptoms in women

Nora M. Laskowski ,[*], Vanessa C. Jürgensen , Martin S. Lehe ,[b], Georg Halbeisen , Georgios P slakis

University inic for Psychosomatic Medicine and Psychotherapy, Medical Faculty, ampus East-Westphalia, Ruhr-University Bochum, Virchowstraße 65, 32312, Luebbecke, Germany
[b] Department of inical Psychology and Psychotherapy, Otto-Friedrich-University of Bamberg, Markusplatz 3, 96047, Bamberg, Germany

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A B S T R A C T

Autistic traits, such as sensory sensitivities and rigid routines, have been linked to body dissatisfaction (BD) nd eating disorders (EDs). However, e interplay between utistic raits, f - nd muscularity-related BD, nd disordered eating remains underexplored.

This cross-sectional study examined he relationships between utistic raits, BD, and disordered eating in 298 women. Correlations nd mediation nalyses, longside bootstrap ing echniques, were used o evaluate relationships between variables.

Autistic raits were ositively ssociated with " raditional" disordered e ing symptoms including food voidance nd selective e ing as well s earance-related s pects of muscle dysmorphia. Autistic traits were ositively ssociated with avoidant-restrictive food intake disorder (ARFID) symptoms. BD was elevated with increasing utistic raits, only in relation to body fat, not muscularity. Only body fat-related BD (BD-F), but not muscularity-related BD (BD-M) mediated the effect of utistic raits on disordered eating symptoms, redicting increases in both ED nd body dysmorphic symptoms, s well as reductions in ARFID symptoms.

Our findings suggest women with utistic raits may be more susceptible o internalizing socially perpetuated body ideals or to social feedback owards eir earance, s only s ereotypically "female-typed" BD-F, but not "male-typed" dissatisfaction with muscularity (BD-M) mediated the link between utistic raits nd disordered eating. Implications are discussed.

1. Introduction

Eating disorders (EDs) involve significant concerns bout body image, bnormal eating, nd weight control behaviors. The most common EDs include anorexia nervosa (AN), bulimia nervosa, binge-e ing disorder, voidant-restrictive food intake disorder (ARFID), and other specified feeding or eating disorders (APA, 2013; Galmiche et l., 2019). Body dissatisfaction (BD), described s negative evaluation of one's body (Talbot e l., 2019), depicts n established risk factor for e development of EDs in women (McLean nd P xton, 2019). BD can originate from erceiving discrepancies when comparing one's own body with -often unrealistic-body ideals, e.g., ideals of thinness or muscularity (Grossbard et l., 2011; Strahan et l., 2006). Related o e drive for muscularity in its more extreme manifestations, muscle dysmorphia (MD) describes n obsessive preoccupation with muscularity nd leanness, ccompanied by igh levels of BD, excessive exercise routines, nd rigid dietary regimens, including e intake of nabolic steroids (APA, 2013; Zaiser e al., 2024).

In recent years, sociocultural and neurobiological factors involved in e development nd m intenance of EDs ve received increasing ention, including ossible links between EDs nd utism (Carpita et l., 2022). In 1985, Gillberg suggested link between autism s ectrum disorders (ASDs) and EDs, noting some utistic raits in boys re lso resent in girl siblings with AN (Gillberg, 1985). While e global lifetime prevalence of ASDs is 1% (Roy nd Strate, 2023; Taylor et l., 2020), estimates suggest 5%–23% of ients with EDs receive an ASD diagnosis (Huke et l., 2013; Nickel e al., 2019). On e other side, u to 70% of children with ASDs s ow ypical nd disturbed eating behaviors, ranging from feeding problems, such s icky eating and food voidance, to severe EDs (Baraskewich et l., 2021; Brzóska

* Corresponding uthor.
E-mail address: nora.laskowski@rub.de (N.M. Laskowski).

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et l., 2021; Mayes and Zickgraf, 2019).

Next o c llenges in social interaction, ASDs lso resent wit restrictive, rigid, and repetitive behaviors and sensory sensitivities (Lord et l., 2020). In fact, e unique sensory erceptions of ients with ASDs m y potentially impact eating behaviors and body image (Krumm et l., 2017). Misperceiving one's body size may increase social comparisons with beauty ideals (Healy e al., 2021), nd interoceptive difficulties may lead o increased preoccupation with internal s es such s unger nd satiation (Trevisan et l., 2021), which could, in turn, be accompanied by behaviors iming avoiding or controlling body s e and sensations (Longhurst, 2023), thus leading to BD. A recent scoping review by Longhurst (2023) identified four s udies found quanti- ive links between utistic raits nd BD; owever, only wo of e identified studies investigated BD nd disordered eating simultaneously (Galvin et l., 2022; Mansour et l., 2016). M nsour e l. found ositive relationship between BD nd utistic raits (Mansour et l., 2016). S ecifically, utistic raits were found o redict disordered eating behaviors rough body fat-related body dissatisfaction (BD-F), s measured by the Body Shape Questionnaire (BSQ; Evans& Dolan, 1993), which mostly ddresses concerns related o body s e nd feelings of being overweight. Galvin et l. (2022) focused on nother ntecedent of BD, e drive for muscularity, which is lso ssociated with MD. The authors found rallel associations between utistic raits and symptoms of MD and EDs, suggesting muscularity-related BD (BD-M) may lso serve s link between elevated utistic raits and disordered e ing. BD-M s often been overlooked in e field of EDs, nd given e existing importance of rigid routines in both MD nd utistic raits, exploring potential links is crucial. To he best of our knowledge, e simultaneous influence of BD-F nd BD-M on disordered e ing via utistic raits remains unexplored.

Despite the clinical overlap between ASDs and EDs, more researc is needed o fully understand their interconnection. Autistic trai s are not limited o ose with formal diagnosis nd can lso manifest subclinically (Constantino nd Todd, 2003). Interconnections between utistic raits nd disordered e ing re increasingly investig ed in non-clinical opulations (Christensen et l., 2019). This could elp o identify rait atterns related o EDs, nd potentially improve our understanding of ED development nd ssesment. Even ough disordered eating ffects diverse opulations (Halbeisen e l., 2022), ere, we chose women s e rget opulation given eir increased risk for developing EDs nd the overrepresentation of women with autistic raits mong those with the most severe forms of EDs (i.e., mong those in reatment for AN) (Brede et l., 2020). Other s udies ve lso shown utistic raits nd disordered e ing correlate more strongly in women compared to men (Barnett et l., 2021). At the same ime, sexual orientation, key spect of diversity, has shown strong ssoci ations with disordered e ing, e.g., in s udies mong sexual minority opul ions (Parker nd Harriger, 2020). Autistic individuals re also more likely o identify s non-heteronormative, nd this may shape their risk for EDs rough distinct social pressures and body image concerns (George nd Stokes, 2018; Pecora e l., 2020). We erefore considered sexual orientation across our analyses.

The resent s udy imed o extend our knowledge of he links be- ween utistic raits, BD, nd disordered e ing. S ecifically, our ri- mary objective w s o explore e ssociations of utistic rai s nd various disordered eating symptoms, MD, nd different spects of BD (body fat- nd muscularity-related). We expected utistic raits o be associated with ronounced BD as well as with ronounced ED nd MD symptoms, nd utistic raits and BD jointly increase ED nd MD symptoms. Our secondary objective w s o explore whether different aspects of BD could be linked o different ED nd MD symptoms, ough we did not formulate n a riori ypothesis.

. Material and methods

2.1. Participants and procedure

The present study used data from a cross-sectional online survey on disordered eating in dult women (≥18 years). The recruitment rocess involved wo methods o ensure diverse sample. On May 31st, 2024, we recruited two-thirds of our s mple rough Prolific (s://www.prolific.com/), n online rticipant recruitment latform known for its diverse and reliable rticipant pool. The remaining third of he sample was recruited rough dvertisements osted on our website, university mailing lists, nd rough ersonal networks (May 8 o June 27 , 2024). T e study rticipants were recruited from e German adult general opulation.

Based on previous power calculations in similar study endeavors by our research group (Eschrich e al., 2024), he study targeted 300 r- icipants. T e study protocol received e ics approval on March 15 , 2024 (AZ, 2022-910_1) nd was re-registered on e Open Science Framework (OSF, s://osf.io/efn4v). T e study was conducted following the ethical principles outlined in he Declaration of Helsinki, nd informed consent was obtained from ll rticipants before eir involvement.

The online s udy was conducted using jsPsych (de Leeuw et l., 2023). P rticipants ccessed e study's website, reviewed e study information nd consent forms, nd were informed e study focused on disordered eating in women. Participants recruited via Prolific were compensated £4.50 for eir articipation. Participants from e convenience s mple did not receive ny monetary compensation; however, eligible university students received compensation in form of research rticipation credits. All data nd m erials related o is research re available from he corresponding author upon reasonable request.

2.2. Measures

The questionnaire did not assess whether diagnosis of ASD and/or nother mental disorder was resent. Nonetheless, in ddition o e sociodemographic variables, several instruments were used o assess symptoms of mental disorders, which are described below.

2.3. Sociodemographic variables

Participants were sked o self-report various demographic nd ealth-related information s rt of e survey. This included eir gender (man, woman, diverse/intersex; no nswer), ge, weight, eight, nd sexual orientation (coded non-heterosexual vs. heterosexual). Additionally, rticipants reported whether ey d migration background (yes/no) with the question "Were you or least one of your parents born broad?" referring o he revised definition of he German Federal Statistical Office (Statistisches Bundesamt, 2017), nd lso re- orted heir years of education (<12/>12 years). Marital status was lso recorded (single, married, divorced, or widowed), s well s eir living circumstances (living alone or sharing household with others). Addi- ionally, rticipants rovided open-ended responses regarding ny history of EDs nd whether hey were receiving ongoing reatmen for n ED. Finally, participants were asked if they d reviously r icipated in e resent study (yes/no). We further included n ttention c eck question random osition in e survey ("Please m rk e word giraffe" from series of options) (Oppenheimer e l., 2009). T ese questions were crucial for identifying nd excluding datasets from repeated participation in is s udy nd/or inattentive rtici nts o ensure he integrity of e data.

2.3.1. Disordered eating symptoms

We used e German version (Hilbert et l., 2007) of e Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn nd Beglin,

2008). T e EDE-Q ssesses cognitive nd behavioral ED symptoms within e last 28 days, using 22 itudinal i ems r ed on 7-point scale (0 = never o 6 = every day). Six dditional items ssess over-eating episodes, binge episodes, binge d ys, nd purging behaviors, such as vomiting, laxative use, and driven exercise. Previous investigations did not support e proposed factor structure of he EDE-Q (Laskowski et l., 2023a, 2023b); herefore, we did not consider subscales nd only report he global score (Cronbach's α = .957).

The Eating Disorders in Youth-Questionnaire (EDY-Q; van Dyck nd Hilbert, 2016), dapted for dults, was used o ssess ARFID symptoms, with 14 questions covering food avoidance (FA), selective eating (SE), functional dysphagia (FD), and problems with underweight. Additional questions ssessing ica, rumination, nd weight/shape concerns (ARFID exclusion criteria) are not routinely used for scale construction. All items were rated on 7-point scale (0 = never to 6 = always). We report he EDY-Q subscales nd otal mean score. T e total score showed moderate internal consistency with Cronbach's α = .608, due o low internal consistency for e FA subscale (Cronbach's α = .356). T e subscales SE (Cronbach's α = .728) nd FD (Cronbach's α = .771) demonstrated cceptable o good internal consistency in our sam le.

We also included the validated German version of he Muscle Dysmorphic Disorder Inventory (MDDI; Zeeck et l., 2018). This instrument comprises 13 items on muscularity-related body image disturbances nd behaviors rated on 5-point scale (1 = never to 5 = always). The MDDI s three subscales: drive for size (DS), ppearance intolerance (AI), nd functional impairment (FI). T e subscales displayed igh internal consistency (DS: Cronbach's α = .803; AI: Cronbach's α = .836; FI: Cronbach's α = .845). We report e subscales nd MDDI otal mean score (good internal consistency with Cronbach's α = .776).

2.3.2. Body dissatisfaction

We used e Female Body Scale (FBS) nd Female Fit Body Scale (FFITBS) o ssess wo spects of BD in women (Ralph-Nearman nd Filik, 2020). The FBS depicts series of nine female bodies ranging from emaciated o obese, nd e FFITBS series of nine female bodies ranging from emaciated o very muscular. For each series of bodies, women were sked o indicate which body figure best represented eir current body shape nd en o indicate eir ideal body shape. Responses were coded from 0 (most emaciated body) to 8 (most obese or muscular, respectively). BD-F nd BD-M re inferred from he discrepancies between ctual nd ideal body images, with positive scores representing increased BD (Talbot et al., 2019).

2.3.3. Autistic traits

We lied he short version of he Autism Spectrum Quotient (AQ-10; Allison et l., 2012), which comprises 10 items designed for rapid autism spectrum screening. Participants responded using 4-point Likert scale (1 = strongly gree o 4 = strongly disagree). The AQ-10 demonstrated low o moderate internal consistency (Cronbach's α = .597) in e resent sample. A cut-off of 6 indicates risk; in ddition o this cut-off, we calculated the sum score.

2.3.4. Additional questions

Further measures ssessed elp-seeking motivation regarding ED treatment, stereotypical erceptions of EDs in men nd individuals with EDs in general, erceived socio-economic s us, menstruation s us, self-ascribed gender roles, orthorexic eating behavior, nd ED risk (Jürgensen e l., Lehe et l., manuscripts in reparation). Given e specific interest in e association between ASD nd EDs, these further constructs ave not been included in the resent nalyses.

2.4. Data analysis

Data nalysis w s erformed using Python version 3.12.4 (Python Software Foundation, 2001) within upyter Notebook version 7.2.1 environment (Jupyter Team, 2015). The Python packages used included NumPy version 2.0.0 (Harris et l., 2020), Pandas version 2.2.2 (ndas development eam, 2024), s smodels version 0.14.2 (Seabold nd Perktold, 2010), SciPy version 1.14.0 (Virtanen e al., 2020), m lotlib (Hunter, 2007), nd networkX (Hagberg et l., 2008).

To ssess e reliability of e measures used in is s udy, we calculated Cronbach's Alpha (α) for multi-item scales nd Kuder-Richardson's (KR-20) coefficient for binary (yes/no) items. Generally, Cronbach's α values above .70 are considered acceptable, with values above .80 preferred for research instruments requiring igh degree of internal consistency (Taber, 2018). To assess the relationships between various ssessments, non-parametric Kendall's Tau correlation coefficients were calculated. Kendall's Tau accounts for ies nd rovides more robust measure in the presence of non-normal distributions.

Mediation analyses were used to examine the mediating roles of BD-M and BD-F in the relationship between utistic raits nd wo outcomes, with sexual orientation included s control variable (covaria e): 1) disordered eating behavior nd 2) MD. Ordinary Least Squares (OLS) regressions were employed to model both direct and indirect effects. T e analysis was conducted rough three distinct regression models, each controlling for sexual orientation: 1) The initial model assessed e direct relationship between utistic raits nd BD-M, 2) e second model evaluated the relationship between utistic raits nd BD-F, nd 3) e third model examined he effects of both BD-M nd BD-F on e outcomes of disordered e ing behavior nd MD. Direct effects were estimated from e respective regression models. For e mediation nalysis, indirect effects were computed by examining ow utis ic traits influenced he mediators (BD-F nd BD-M), nd ow hese medi- ors, in urn, ffected e outcomes. S ecifically, e indirec effects were derived by multiplying the path coefficients from utistic raits o each mediator by e coefficients from each mediator o e respective outcomes. For is nalysis, sexual orientation was dichotomized (heterosexual vs. non-heterosexual).

To ensure the robustness of he estimates nd o ddress potential sampling variability, bootstrapping rocedure w s employed. We generated 5000 bootstrap s mples from e dataset, refitted e regression models for e ch s mple, nd computed the indirect effects for each bootstrap sample. The 95% confidence intervals for these indirect effects were obtained by determining the 2.5 and 97.5 percentiles of e bootstrap distributions. Regression model summaries, including coefficients, nd -values, were examined o ssess statistical significance (at α = .05 level) and interpret the magnitude of both direct and indirect effects.

3. Results

3.1. Sample description

A total of 304 women ook rt in he survey. After excluding self-reported duplicate rticipations, 298 were included in e na lysis. The sample d mean ge of 28 years nd mean body mass index (BMI) of 23 kg/m^2. Most rticipants (67.2%) identified s sexually oriented owards the opposite gender, while 30.2% reported having migration background. A majority d more n 12 years of school endance (84.2%). In erms of family situation, most were single (77.5%). Household size varied, with e majority living with o ers (73.4%). As shown in Table 1, some ssessments, including the AQ-10, indicated higher risk levels for specific conditions. A small bu notable ercentage of rticipants were risk for relevant utistic s ectrum disorder traits (15.1%). Detailed sample characteristics re provided in Table 1.

3.2. Correlation matrix

The Kendall's-Tau correlation matrix involving the AQ-10 sum score showed several significant correlations. The AQ-10 sum score correlated weakly but significantly with the MDDI subscale AI, indicating slight

Table 1
Sample characteristics.

Variable	N (%)/Mean (SD, Range)
Mean age (SD, Range)	28.43 (9.50, 18–64)
Mean body mass index (SD, Range)	23.47 (5.20, 16.00–47.84)
Sexual Orientation	*N* (%)
To opposite gender	193 (67.2)
To men nd women	68 (23.7)
To s me gender	24 (8.4)
To o er gender	2 (0.7)
Migration background	*N* (%)
No	208 (69.8)
Yes	90 (30.2)
School years	*N* (%)
>12	251 (84.2)
<12	47 (15.8)
Marital status	*N* (%)
Single	231 (77.5)
Married/With rtner	58 (19.5)
divorced	9 (3.0)
Household size	*N* (%)
>1 ersons	218 (73.4)
1 erson	79 (26.6)
Diagnosis of Eating Disorder	*N* (%)
No	264 (88.6)
Yes	34 (11.4)
Anorexia nervosa	21 (56.8)
Bulimia Nervosa	3 (8.1)
Binge E ing Disorder	6 (16.2)
Other	7 (18.9)
If yes, treatment for eating disorder	
Yes	20 (58.8)
No	14 (41.2)
Eating Disorder Examination-Questionnaire (EDE-Q; Hilbert et l., 2007) mean global score (SD, Range)	1.77 (1.34, 0–5.57)
Eating Disorders in Youth-Questionnaire (EDY-Q; van Dyck and Hilbert, 2016)	Mean (SD, Range)
Mean score	1.28 (0.73, 0–4.50)
Mean score subscale Food Avoidance	1.48 (1.00, 0–5.00)
Mean score subscale Selective Eating	1.90 (1.50, 0–6.00)
Mean score subscale Functional Dysphagia	0.39 (0.87, 0–5.00)
Muscle Dysmorphic Disorder Inventory (MDDI; Zeeck et l., 2018)	Mean (SD, Range)
Mean score	1.00 (0.55, 0–3.00)
Mean score subscale Drive for Size	0.81 (0.76, 0–3.60)
Mean score subscale Appearance Intolerance	1.57 (1.0, 0–4.00)
Mean score subscale Functional Impairment	0.70 (0.79, 0–3.50)
Body Fat-Related Body Dissatisfaction, Mean (SD, Range)	1.08 (1.10, −1.00 – 5.00)
Muscularity-Related Body Dissatisfaction, Mean (SD, Range)	−0.33 (1.24, −4.00 – 3.00)
Autism Spectrum Quotient (AQ-10; Allison et l., 2012)	
Mean sum score (SD, Range)	3.24 (1.90, 0–10)
High risk (sum ≥6), *n* (%)	45 (15.1)

Notes. The body mass index was calculated from e weight nd height d .

association between autistic traits and concerns about appearance. The AQ-10 also correlated with the EDY-Q mean score nd ll the subscales, suggesting link between utistic raits and food avoidance, selective eating, nd food s icking. Additionally, e AQ-10 sum score showed significant correlations with the EDE-Q global score. There was lso small but significant correlation with BD-F. Notably, e AQ-10 sum score did not s ow significant correlation with the MDDI (including its subscales, except AI) nd BD-M. Detailed correlations between he used measures nd subscales re displayed in Table 2.

3.3. Mediation analyses

The nalyses revealed sexual orientation significantly affects BD-F nd he EDY-Q mean score, indicating sexual orientation lays role in DEB rough BD-F, which is why we controlled for this variable in our nalyses. However, sexual orientation did not significantly impact BD-M or MDDI mean score.

Mediation nalyses, as shown in Fig. 1, revealed significant ositive relationship between AQ-10 sum scores nd BD-F. BD-F, in urn, d significant positive effect on the EDE-Q global score. The boots rapped analysis confirmed e indirect effect was significant (see Table 3), and here was no direct effect of he AQ-10 on the EDE-Q global score fter rtializing this indirect effect. However, lthough BD-M s owed significant negative effect on e EDE-Q global score, AQ-10 did not redict BD-M, nd there was no indirect effect of he AQ-10 on EDE-Q scores rough changes in BD-M. Thus, in summary, AQ-10 sum scores demonstrated an indirect effect on the EDE-Q global score only rough BD-F.

The AQ-10 sum scores did not ve significant direct effect on e MDDI mean score. Additionally, BD-M ad no effect on the MDDI mean score, nd here was no indirect effect of AQ-10 rough BD-M. However, BD-F d significant ositive effect on e MDDI mean score, lthough he indirect effect of AQ-10 on the MDDI rough changes in BD-F was not significant (see Table 3). In summary, AQ-10 sum scores did not demonstrate significant indirect effect on the MDDI mean score rough BD-F (see Fig. 1).

There was significant positive direct effect of he AQ-10 sum score on e EDY-Q mean score. However, because BD-F d significant negative effect on the EDY-Q mean score, there was lso negative indirect (i.e., mediated) effect of he AQ-10 on the EDY-Q (see Table 3). BD-M ad no significant effect on the EDY-Q mean score. In summary, e AQ-10 sum scores directly influenced e EDY-Q mean score nd demonstrated negative indirect effect on the EDY-Q rough BD-F (see Fig. 1).

The analyses with reverted variable order showed no indirect effects.

4. Discussion

4.1. Main findings

This study investigated e link between utistic raits, BD, nd disordered eating symptoms in dult women from the general population. Consistent with previous findings, utistic raits showed ositive associations with cognitive nd behavioral ED symptoms s ssessed by the EDE-Q (Barnett et l., 2021) and some earance-related aspects of MD (Galvin et l., 2022). Expectedly, utistic raits were lso ositively associated with ARFID symptomatology (Sanchez-Cerezo et l., 2023). BD w s further ositively ssociated with utistic raits, but only in relation to body f (BD-F) and not muscularity (BD-M).

To understand e bivariate ssociations between utistic traits, body dissatisfaction, nd disordered eating, we conducted sever l mediation nalyses, controlling for influences of sexual orienta ion. Here, we found only BD-F (and not BD-M) mediated he effec of utistic raits, predicting increased ED nd decreased ARFID symptoms. This ern could suggest BD-F might ct s moderator for utistic raits o either lead o increased disordered eating symptoms related to s e nd weight concerns (in case of higher levels of BD-F) or to increased avoidant-restrictive forms of disordered eating unrelated o body image concerns (in case of lower levels of BD-F). We must note, owever, utistic raits were ositively ssociated with ARFID even fter controlling for BD-F (i.e., e direct effect was signific nt). This suggests effects on disordered e ing re not solely driven by whether utistic raits change BD-F, but ossibly by o er medi ing rocesses not currently ssessed. For example, ere may be rans-diagnostic overlaps, such s sensory sensitivity, which is commonly observed in both utism nd ARFID nd could contribute o selec ive eating behaviors (Keski-Rahkonen and Ruusunen, 2023).

It is further important o cknowledge e EDE-Q, which we used o ssess disordered e ing symptoms, is self-report measure ossibly more “female-centric” in erms of e ursuit of in body ideal (Byrne et l., 2024). Indeed, the BD-M scores (dissatisfaction with muscle size) nd he EDE-Q correlated negatively. The EDE-Q’s otential

Table
Kendall's Tau correlation nalysis.

	MDDI	MDDI DS	MDDI AI	MDDI FI	EDY-Q	EDY-Q FA	EDY-Q SE	EDY-Q FD	EDE-Q	BD-F	Muscularity-related BD (BD-M)
Autism Spectrum Quotient (AQ-10)	.07	.04	.10*	.02	.14**	.08	.13**	.10*	.10*	.11*	−.02
Muscle Dysmorphic Disorder Inventory (MDDI)	–	.45**	.50**	.51**	.19**	.12**	.09*	.27**	.42**	.21**	−.03
MDDI Drive for Size (DS)	–	–	−.02	.23**	.18**	−.04	.06	.25**	−.03	−.23**	.24**
MDDI Appearance Intolerance (AI)	–	–	–	.11**	.10*	.20**	.11*	.13**	.62**	.53**	−.23**
MDDI Functional Impairment (FI)	–	–	–	–	.10*	.03	.04	.18**	.21**	−.01	−.01
Eating Disorders in Youth-Questionnaire (EDY-Q)	–	–	–	–	–	.38**	.61**	.34**	.07	−.07	−.01
EDY-Q Food Avoidance (FA)	–	–	–	–	–	–	.09*	.10*	.19**	.14**	−.16**
EDY-Q Selective Eating (SE)	–	–	–	–	–	–	–	.18**	.07	.03	−.04
EDY-Q Functional Dysphagia (FD)	–	–	–	–	–	–	–	–	.10*	.03	−.06
Eating Disorder Examination-Questionnaire (EDE-Q)	–	–	–	–	–	–	–	–	–	.52**	−.28**
Body-fat related dissatisfaction (BD-F)	–	–	–	–	–	–	–	–	–	–	−.36**

Notes. Two-sided; *correlation is significant at the .05 level; **correlation is significant at the .01 level.

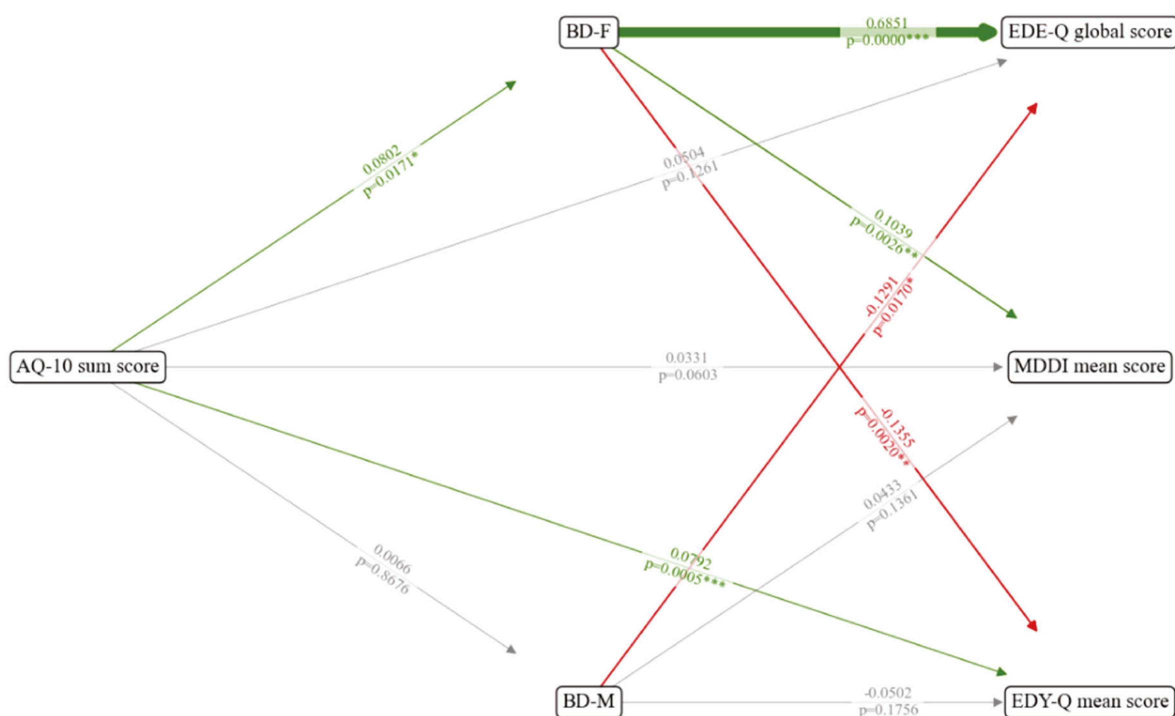

Fig. 1. Path diagram of mediation nalysis.
Notes. Analysis is controlled for sexual orientation (heterosexual vs. non-heterosexual). The nodes in the diagram represent the variables, while the arrows indicate e hypothesized directions of influence. The thickness of e rrows is roportional o he size of the effects, nd the labels of e arrows indicate he weights of e direct effects nd heir significance levels. A significant effec is indicated by weighting with p-value of less than * = .05, ** = .01 or ***<.001, which indicates statistically significant relationship. Green indicates positive effect, red indicates negative effect, and gray indicates non-significant effect. EDE-Q = Eating Disorder Examination-Questionnaire (Fairburn nd Beglin, 2008; Hilbert et l., 2007); EDY-Q = Eating Disorders in Youth-Questionnaire (van Dyck nd Hilbert, 2016), MDDI = Muscle Dysmorphic Disorder Inventory (Zeeck et l., 2018), AQ-10 = Autism Spectrum Quotient (Allison et l., 2012); BD-M = Body dissatisfaction related to muscularity; BD-F = Body dissatisfaction related to body fat.

bias could explain why BD-F fully mediated e association of utistic raits nd disordered eating in our s mple. Furthermore, it is conceiv- ble BD-F might similarly influence EDE-Q scores in women without utistic raits, given he questionnaire's focus on thin body ideals. This observation underscores the need for careful consideration of ow specific measures, like the EDE-Q, may reflect gendered constructs. Thus, utistic raits may redict disordered e ing symptoms beyond influences driven by BD-F when using other forms of disordered e ing ssessment.

Unrelated o utistic raits, we lso observed overall MDDI scores correlated ositively with BD-F nd not with BD-M. This may appear surprising, given he close (and observed) associations between BD-M nd he MDDI's drive for size subscale. However, the strongest correlations emerged between he MDDI's appearance intolerance subscale and BD-F. This difference in subscales largely explains he difference in the MDDI total score correlations with BD-F nd BD-M. I further suggests women in our sample were appearance intolerant due o body f -related rather han muscularity dissatisfaction.

Overall, e observed erns dd o our understanding of ow utistic raits might relate o disordered e ing symptoms. Previous studies suggest interoceptive differences in he context of utism spectrum disorders may lead o aversive reactions to bodily experiences

Table 3
Results of e mediation nalysis.

Outcome	Direct Effect AQ-10 Sum Score	Indirect Effect via Muscularity-Related Body Dissatisfaction (BD-M)	Indirect Effect via Body F -Related Body Dissatisfaction (BD-F)	Total Indirect Effect
EDE-Q global score	0.05, p = .1261	<-.01, 95% CI = [-0.01; 0.01]	0.06, 95% CI = [0.01; 0.10]	0.05, 95% CI = [0.01; 0.11]
EDY-Q mean score	**0.08, p<.001**	<-0.01, 95% CI = [-0.01; <0.01]	**−0.01, 95% CI= [-0.02; <-0.01]**	**−0.01 95% CI= [-0.03; <-0.01]**
MDDI mean score	0.03, p = .060	<-0.01, 95% CI = [-0.01; <0.01]	0.01, 95% CI = [<-0.01; 0.02]	0.01 95% CI = [<-0.01; 0.02]

Notes. Analysis is controlled for sexual orientation (heterosexual vs. non-heterosexual); results in bold re statistically significant; EDE-Q = Eating Disorder Examination-Questionnaire (Fairburn nd Beglin, 2008; Hilbert et l., 2007); EDY-Q = Eating Disorders in Youth-Questionnaire (van Dyck nd Hilbert, 2016), MDDI = Muscle Dysmorphic Disorder Inventory (Zeeck et l., 2018), AQ-10 = Autism S ectrum Quotient (Allison et l., 2012); CI = confidence interval.

nd us promote increased levels of BD (Trevisan et l., 2021). I is lso ossible one's body f could be more noticeable in erms of bodily sensations, such s how clothes fit, which could also explain e stronger link o BD-F (compared o BD-M). Autistic raits ve lso been linked o externally-oriented inking nd emotion rocessing deficits (Oakley et l., 2022), which previous studies found o explain increased disordered eating symptoms (Moseley et l., 2023). T e resent findings suggest women with utistic raits may also be more suscep ible o internalizing socially erpetuated body ideals or o social feedback owards eir earance, s only s ereotypically "female-typed" BD-F, but not "male-typed" dissatisfaction with muscularity (BD-M) medi- ed e link between utistic raits nd disordered e ing. In o er words, e ssociation with BD-F could indicate utistic raits in women re more closely linked o concerns bout overall body size rather n specific muscle definition. Although muscularity is becoming more emphasized in female beauty standards (Roberts e l., 2022), our findings indicate societal ressures to be thin may still ve stronger impact on disordered eating behaviors in women with igher utistic raits.

Moreover, our findings m y also be relevant for e reatment of EDs. Although utistic raits were generally redictive of increased disordered eating symptoms, specific symptoms emerged only in combina- ion with BD-F. While igh levels of BD-F were linked o increased disordered eating symptoms, avoidant-restrictive symptoms emerged in combination with low BD-F. Thus, clinicians may be dvised to consider utistic raits in conjunction with body image o derive more recise clinical ypotheses about ient 's ED.

4.2. Limitations and future directions

The interpretation of our findings is subject to limitations. First, e cross-sectional nature of our s udy limits causal inferences about e direction of he observed effects. Whether utistic raits caus lly romote BD nd, s result, disordered eating needs to be investigated in future longitudinal studies. In ddition, here may be biases due o self-reported d nd the lack of ssessment of whether n ASD diagnosis nd/or o er mental disorders were resent. Recent s udies lso expressed concerns regarding e sychometric properties of the used screening instrument for utistic raits (the AQ-10) in non-clinical opulations (Taylor e l., 2020), suggesting need for replication using different ssessments. Our study lso does not ccount for ow lower self-esteem m y impact women with utistic raits, despite e fact low self-esteem may be significant issue in is opulation (Brede et l., 2020). Finally, the extent o which our findings could be generalized to further opulations remains n empirical question. We thus far only included women. Even ough women nd girls comprise majority of eople with EDs, utistic raits and ASDs re more revalent in boys (Piccini e al., 2018). The mediating role of different spects of BD in explaining disordered eating symptoms in men with autistic raits therefore needs to be further explored in future studies. We must lso note eople with clinically relevant, diagnosed ASDs, neuro-developmental disorder (Kerr-Gaffney e al., 2020), often misperceive their body size (Asada et l., 2018) or m y also exhibit lack of concern bout body image, which can ct s rotective f ctor (Brede et l., 2020). Notably, BD-F ears o function s moderating factor, shaping whether utistic raits re more likely to result in common EDs or in ARFID, distinction carries significant implications for clinical ractice. Consequently, future research should rioritize examining ese mechanisms within clinical opulations o refine our understanding of the inferences lay.

5. Conclusion

BD in individuals with utistic raits could be crucial for diverse disordered eating symptoms nd otentially ffect other reas of mental ealth (e.g., nxiety and depression) s well. Our findings igh light e complex relationship between autistic traits, body image concerns, and disordered eating in women, emphasizing the need for nuanced understanding of disordered eating in this opulation.

CRediT a thorship contribution statement

Nora M. Laskowski: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal nalysis, D curation. **Vanessa C. Jürgensen:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Martin S. Lehe:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Georg Halbeisen:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **Georgios Paslakis:** Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Methodology, Conceptualization.

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