

Disrupted embodiment: empirically assessing phenomenological accounts of anorexia nervosa

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Abstract

Background Recent philosophical reflection on eating disorders has taken a phenomenological turn. These approaches have focused on the experiences of those with eating disorders, many taking as their focus bodily experience. In this paper, after a brief overview of Lucy Osler's phenomenological account of disrupted embodiment, we describe two studies that provide empirical support for phenomenological approaches to AN broadly, and Osler's account more specifically.

Method Participants included 220 undergraduate women as well as 138 women who self-identified as currently experiencing AN. Participants completed cross-sectional online questionnaires related to their disrupted embodiment, body dissatisfaction, drive for thinness, bulimic behaviors, eating disorder symptomatology, dieting behaviors, and impairment due to eating disorders.

Results Results of hierarchical multiple regression analyses indicated that, with one exception, the Disrupted Embodiment Scale (DES) total score and its three subscales explained variance in eating disorder symptomatology, bulimia behaviors, and eating disorder-related impairment above and beyond body dissatisfaction and drive for thinness. Furthermore, results of four ANCOVAs indicated women who self-identify as experiencing AN reported higher levels of feeling this type of disrupted embodiment, their bodies as a hardship, as a threat, and as separate from their "selves" compared to undergraduate women, controlling for age and BMI. Finally, bifactor analyses in addition to the consistency of the subscale-specific results indicate that the DES may be best conceptualized as a unidimensional scale.

Discussion Overall, results provide empirical support for phenomenological approaches to understanding anorexia, including Osler's specific account.

Plain English Summary

The current paper presents a study aimed at empirically testing Lucy Osler's philosophical ideas about the character of disrupted embodiment in Anorexia Nervosa using the Disrupted Embodiment Scale (DES). The DES measures people's degree of disrupted embodiment and has three subscales: (1) Body as Hardship, (2) Body as Threat, and (3) Body as Separate from Self. Results indicated that women with Anorexia Nervosa have higher levels of disrupted experiences of embodiment, specifically that they view their bodies as more of a hardship, more of a threat, and as more separate from their "selves" than women who do not have Anorexia Nervosa.

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Additionally, results indicate that the DES is significantly related to eating disorder symptoms and impairment. Finally, results indicate that the DES may be best conceptualized as a unidimensional scale.

Keywords Anorexia nervosa · Eating disorders · Phenomenology · Embodiment · Disrupted embodiment scale

Anorexia nervosa (AN) is a complex disorder characterised by the American Psychiatric Association as involving self-starvation leading to dramatic weight loss. The diagnostic criteria for AN, as set out in The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text-Revision (DSM-5-TR) [1], are: (i) a persistent restriction of energy intake leading to significantly low body weight ; (ii) either an intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain; and (iii) a disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Given this characterization, it is reasonable to frame AN as a disorder both of and about the body. It is a disorder *of* the body in that it directly involves bodily behaviors (e.g., food restriction and weight loss) and has severe physical consequences. It is a disorder *about* the body in that it centrally involves how individuals experience, relate to, and make sense of their own embodied existence. Yet despite this fundamentally embodied character, much philosophical and clinical work has focused primarily on cognitive, behavioral, genetic, and cultural dimensions of the disorder, with less attention paid to the lived, first-person experience of being embodied in AN.

Within psychology, the disturbance named in the third diagnostic criterion has typically been studied under the concept of distorted body image (DBI)—where an individual perceives or judges their body to be larger than it in fact is (see Dakanalis, 2016; [2])—and through the attitudinal constructs of body dissatisfaction and drive for thinness [3]. These have become common predictors of eating disorder symptomatology. Although the empirical support for the role of DBI is mixed, there is at least reason to think that some sort of perceptual and/or proprioceptive distortion characterizes the experience of many experiencing AN.¹

Since at least the 1980s, distinctively philosophical work on eating disorders has tended to focus either on their underlying “logic”, or on their etiological connections to persistent cultural messaging about feminine beauty ideals, or both. For example, Susan Bordo [6] famously regards anorexia as a form of “unconscious feminist protest” against prevailing norms of femininity—this is its underlying logic—undertaken partly in response to persistent messaging about the need for women to be (very) thin in order to be beautiful. Writing twenty years later, Simona Giordano (2005) maintains that the logic that underlies eating disorders is a “moral logic”, arguing that eating disorders are symptomatic of a common moral view that treats *thinness* not just as a beauty ideal but as an ethical ideal. On her view, eating pathology results when this aspect of ordinary morality is taken unusually seriously. (Giordano, 2005)

More recently, however, philosophical reflection on eating disorders has taken a phenomenological turn (e.g., [7–21]). These approaches focus on the lived experiences of those with eating disorders, with many taking bodily experience as their focus. Drawing on phenomenological understanding of the subject as fundamentally embodied—as not only having a body but being a body—the idea that AN involves disrupted embodiment draws attention to ways in which the subject can come to experience breakdowns in the smooth integration of both being a body and having a body. Thus, what phenomenological accounts aim to contribute to the broader idea that AN involves disrupted embodiment, is to characterise *how* this disruption is experienced from a first-person perspective.

Notably, phenomenological accounts typically do not home in solely on how an individual with AN experiences their body weight or shape. Rather, they are often more concerned with how individuals experience

¹ For an overview, see [4]; b. One difficulty in assessing the role of perceptual distortion in AN arises out of the fact that perceptual influence and attitudinal influence on a person's experience of their body are intertwined, and difficult to separate experimentally. For a particularly sophisticated attempt to separate those influences, see Cornelissen et al., [5].

themselves as embodied beings in the world.² These accounts do, though, differ (in varying degrees) about the character of the embodied disruption.

In this paper, we empirically examine the phenomenological claim that disrupted embodiment is a central feature of AN. In particular, we test whether one such phenomenological characterization—Osler’s [16] account of the body experienced as noisy, demanding, and threatening to the subject’s agency—is borne out empirically; whether women experiencing AN endorse these descriptions and whether they carry clinical information that standard predictors of eating disorder symptomology do not. In doing so, we aim not only to bolster evidence that AN involves disrupted embodiment but to better understand the character of this disruption at the level of subjective experience.

Disrupted embodiment

Phenomenological accounts do not deny that distorted body image and body dissatisfaction can play a role in AN. They argue, however, that focusing too narrowly on body image, weight, and shape may overlook other disrupted dimensions of bodily experience, as well as potentially giving rise to the conception of AN as a form of dieting taken to the extreme [15, 16]—where the rationale behind self-starvation is primarily exercised to achieve (extreme) weight-loss.

Rather than viewing AN simply as ‘dieting gone too far’, these accounts suggest that AN involves a qualitatively different relationship to one’s body, one characterized by severe disrupted embodiment involving a disturbance in the typical pre-reflective experience of inhabiting one’s body, where the body becomes experienced as alien, threatening, burdensome, or separate from one’s sense of self. In AN, the body is not merely disliked or perceived as needing improvement, nor controlled as a form of affect regulation (though these might all be the case); rather, bodily experience itself is fractured and threatening. The behaviors characteristic of AN facilitate, or hold out the promise of facilitating, a different mode of bodily experience, and so constitute a way of trying to neutralize this threat.

Central to Osler’s [16] account is a phenomenological description of three different modes of bodily experience—body-as-object, body-as-subject, and visceral body—inspired by the work of Drew Leder [22]. In the first mode, one experiences one’s body as a *mere* physical object, an object in the world like others, that can be touched, measured, weighed, poked, and prodded. In the second mode, one’s body is experienced as a locus and medium of experience—think, perhaps, of your own awareness of yourself as a sensing subject, looking through your own eyes, mindfully attending to the tactile sensations in your fingertips, etc., through which you experience the world around you. Finally, in the third mode, one experiences the body as an *organic* object with needs and sensations—as, for example, in the experience of hunger, or overwhelming fatigue, or in the uncontrollable physical throes of intense grief. In this mode, the body is a living object that makes *demands* of the body-as-subject—the body demands to be fed, or to stop walking, or to withdraw from company until the waves of sorrow have passed. A key idea in this phenomenological framework of embodiment, is that the body-as-object and the visceral body typically recede into the background, allowing subjects to live through their bodies directed to the

² Note that phenomenological accounts of eating disorders, including Osler’s, are not in tension with feminist analyses. Rather, they complement feminist approaches by focusing on the lived, embodied experience of those with eating disorders—experiences that are shaped by the patriarchal landscape that feminist scholars have illuminated (e.g., [7, 16, 21]). Although feminist analyses examine how sociocultural forces (such as beauty ideals and gendered expectations) contribute to eating disorders, phenomenological approaches investigate how those forces are actually experienced in and through the body. The two approaches thus operate at different but compatible levels of analysis: feminist work explains the sociocultural context that shapes embodied experience, while phenomenological work describes the structure and content of that experience itself. Understanding both the cultural forces that shape embodied experience and the phenomenological character of that experience is crucial for developing comprehensive approaches to understanding and treating eating disorders. One interesting point of contrast between these phenomenological analyses of AN and analyses of the sort provided by Bordo [6] and Giordano (2005) is the amenability of the former to empirical testing.

world around them [22]. Thus one's awareness of one's body as an object or its viscosity are not the primary way in which we experience our bodies.

Adopting this framework, we might say that the phenomenal experience which those experiencing AN are trying to cope with is the experience of the visceral body being thrown into the foreground, noisily bringing itself and its demands to the subject's attention. In doing so, the visceral body encroaches on the realm of the body as-subject by demanding action by and attention from the subject.³ This experience, in turn, is threatening, even fear-inducing.⁴

As Osler characterizes it, AN is a project of *objectification*—that is, of trying to reduce or silence the demands of the visceral body, rendering the body more object-like, more pliable and controllable. In exercising what she sees as extreme self-control over her body and displaying radical restraint as she shuts out its demands, a person experiencing AN is not straightforwardly trying to get rid of her body, nor merely cut it down to size, but asserting her agency over the visceral demands of the body, aiming to make the body into something that can quietly disappear into the background as she goes about her daily business (2021a).⁵ This is not, of course, to say that the strategy is effective. As Osler goes on to point out, the irony of AN is that, whereas it fundamentally involves a project aimed at silencing the demands of the visceral body, in fact those demands, exacerbated by self-starvation, ultimately become louder and all-consuming.

For Osler, then, self-starvation is itself an objectifying act, not merely a response to objectification. This understanding of objectification within AN, although related, differs from the ways in which objectification is typically discussed within the eating disorders literature, which are more heavily influenced by Fredrickson and Roberts's [27] Objectification Theory as well as McKinley and Hyde's [28] ideas related to objectified body consciousness and self-surveillance. Within both of these models, self-objectification occurs in response to the cultural practices of sexually objectifying women's bodies and treating women as bodies that exist to be looked at and used for the pleasure of others.⁶ Self-objectification, then, follows as women internalize this reductive narrative about themselves and subsequently adopt an outside observer's perspective of their bodies [27, 28]. What comes out on Osler's account is that someone experiencing AN “does not experience her body simply as an overly large, inert, heavy *object* but as a noisy, disruptive subject that threatens her own agency” (2021a, p. 42) and action is taken to reclaim the body-as-object so that it might again recede into the background.

The experiences that Osler describes as experiences of one's body as noisy, demanding, threatening, and so on, are central among those that we refer to as experiences of “disrupted embodiment” and that the Disrupted

³ For phenomenological accounts that offer a slightly different analysis of people with AN experiencing their bodies as overly object-like or objectified, see, for example: [7, 13, 21]. Furthermore, as we note in the “Discussion” section of this paper, Osler's and relevantly similar descriptions of the phenomenology of AN map naturally onto the neuroscientific construct of interoception, currently understood as “the conscious sensation and interpretation of bodily signals” ([23, 24]: 163). We are grateful to a referee for this journal for helping us to identify this connection, which, as we explain below, we think is suggestive of fruitful avenues for future research.

⁴ In a rather different context, Ann Cahill [25] notes that the analyses of feminine bodily comportment offered by Iris Marion Young and Sandra Bartky indicate that feminine bodily comportment is shaped in part by fear—not just fears of harm (e.g., via sexual assault) but also fears of one's own bodily desires, and the ways in which they can undermine important goals (e.g., by making them fat) [25]. These latter fears are presumably a natural concomitant of experiencing one's visceral body as “noisy and demanding” in the way that those experiencing AN do.

⁵ In a similar vein, Foster and Lundh [26] argue that self-starvation may in some cases at least temporarily lead to experiences of felt embodiment and aliveness. This is postulated as a form of “embodiment motivation” for self-starvation in response to disharmonious bodily experiences.

⁶ Fredrickson and Roberts follow Sandra Bartky [29] in their characterization of objectification; but one might prefer to theorize objectification differently. In both philosophy and psychology, Nussbaum, [30] is a more common source for a characterization of objectification. Dorothee Legrand [13] argues that Fredrickson and Roberts's characterization of objectification leads them astray, and suggests that they would have done better to follow Nussbaum, whose characterization (in Legrand's view) more readily allows us to see that objectification is “damaging not because it brings physical dimensions into bodily self-consciousness, since these dimensions are part of the normal picture...[but rather] if it is disruptive of subjective dimensions, thereby being disruptive of the integrity of bodily self-consciousness.” (730).

Embodiment Scale (DES; [31]) aims to measure. If Osler's account is correct, then one would expect experiences of disrupted embodiment to characterize not only the lead-up to and early stages of AN, but pretty much the entire course of the disease.

Osler's, however, is one phenomenological account among others. Hannah Bowden [7] suggests that AN is characterised by feeling one's body is objectified; Thomas Fuchs [9] argues that, due to the unbearable experience of (what we would describe as) disrupted embodiment, those experiencing AN attempt to render themselves disembodied subjects; Fredrik Svenaeus [21] describes the body in AN as 'uncanny'. These accounts largely agree that a key part of the character of disrupted embodiment in AN is that the body is experienced as threatening, burdensome, even alien. Where they disagree is over the structure of the disturbance and over what the subject is trying to *do*. For example, on Osler's account, the subject seeks to take over the visceral body's demands as their own, so as to achieve a smoother and integrated embodiment; on Fuchs' account, the subject seeks to escape embodiment altogether. Lundh and Foster, [32] propose that these accounts are best understood not as competing theories but as complementary models that may apply to different individuals.⁷ The proposal is attractive but remains untested. The present study does not attempt to adjudicate between these disagreements (though we think it lays the groundwork for embarking on this path). Rather, it tests the descriptive claims these phenomenological accounts share. We work with Osler's account because it offers a detailed phenomenological description of disrupted embodiment in AN and because the Disrupted Embodiment Scale was designed, in part, with her account in view.

Just as philosophical accounts of AN have recently taken a phenomenological turn, psychological literature has also begun to explore more deeply the idea of embodiment within eating disorders. Piran's Developmental Theory of Embodiment, which was developed through over 150 qualitative interviews with women and girls across different ages and cohorts coded using a constructivist grounded theory approach [33]. Five dimensions of embodiment emerged, including (1) body connection and comfort, (2) agency and functionality, (3) experience and expression of desire, (4) attuned self-care, and (5) resisting objectification. Later quantitative factor analyses conducted by Piran et al., [34] largely supported this five-dimension conceptualization of embodiment, with the addition of the sixth factor of "body unencumbered adjustment" [34]. Although a significant proportion of this psychological literature examining embodiment's role in eating disorders is either theoretical or qualitative (e.g., Cook-Cottone, [35], Mancini, [36], some previous quantitative studies have connected experiences of embodiment with ED-related variables. For example, experiences of embodiment were found to be significantly associated with body esteem, body responsiveness, physical self worth, self-surveillance, body connection, alexythymia, and disordered eating symptomatology [34, 37]. Similarly, embodiment difficulties significantly predicted an eating disorder diagnosis over and above traditional ED screening measures [37]. Another quantitative study conducted by Voica et al., [38] found that the "positive body connection and comfort" significantly predicted lower rates of disordered eating symptomatology in both men and women even after controlling for identity coherence and self-esteem. A third quantitative study conducted by Foster et al., [39] found that a 12-item scale (ES-12) measuring "aspects of harmonious versus non-harmonious ways of relating to one's body, and aspects of identification versus dis-identification with one's body" predicted eating disorder symptomatology in adolescents 13 to 15. Perhaps most salient, an intervention study investigating the efficacy of enhanced cognitive-behavioral therapy indicated that improvements in embodiment mediated the relationship between time and both body uneasiness and eating disorder symptomatology in a sample of patients with either anorexia nervosa or bulimia nervosa [40]. All of this previous work indicates that embodiment, or rather a potential disruption in embodiment, is a salient factor in the phenomenology, maintenance, and treatment of eating disorders and necessitates further quantitative study.

Psychological instruments, however, primarily index the presence or absence of *positive* embodiment, e.g., connection, comfort, agency. Disrupted embodiment, as Osler and other phenomenologists describe it, is not the mere absence of these goods. A body experienced as hardship, threat, or separate from one's self is not simply a

⁷ Thank you to the anonymous reviewer who emphasised this approach in Lundh and Foster [32].

body with which one has lost connection; it is a body that is *present* in experience in a distressing way. Existing measures, therefore, evidence a disrupted bodily relationship. What phenomenological accounts add to this, is *how* the body is experienced in AN.

An important implication of accounts like Osler's is that AN is different from "radical dieting". Our claim is not that this is a novel insight, but that it is a virtue of Osler's and other phenomenological accounts that they yield this result. As early as 1978, Hilde Bruch argued that "anorexia nervosa is an extremely complex illness, much more than dieting gone wild" (1978, p. 94); and feminist analyses of anorexia and other eating disorders have, for the most part, reliably differentiated their causes from those of both ordinary and radical dieting projects.

People embark on diets, both ordinary and extreme, for a variety of reasons—weight management, social pressure, moral and religious values, health and fitness concerns, emotion management, and so on [41]. Dieting projects will be quite heterogeneous in their phenomenology, then. For example, there is no reason to think that an experience of disrupted embodiment would play a role in the restrained eating practices of someone fasting during Ramadan, or embarking on a radical Lenten fast; and there is no reason to think that there is phenomenological overlap in the motivation for or experience of religious fasts and, say, the restrained eating of an elite runner, or boxer, or wrestler trying to get themselves below a specific threshold weight for an upcoming competition. Certainly these and other radical dieting projects can *transform* into eating disorders. Nevertheless, the phenomenological claim is that embodied experience in AN is qualitatively different from that of a person engaging in dieting, shaping both their experiences of their bodies and the behavioral aims; and we would predict that in cases where extreme dieting does transform into AN, this would generally be accompanied by an increase in the phenomenology characteristic of disrupted embodiment in addition to (or perhaps in place of) the phenomenology that typically accompanies dieting projects motivated by religious observance, athletic goals, desires for emotional regulation or body modification, and so on.

This distinction between AN and dieting finds support in feminist analyses, which have long argued that eating disorders arise as a way of managing various pains and stresses that distinctively, even if not exclusively, afflict those who are oppressed under patriarchy. Bordo, [6], as we have already seen, thinks of anorexia as a form of feminist protest against the imposition of patriarchal values. More broadly, Su Holmes [42] comments that early feminist work on eating disorders tended to identify cultural norms of femininity as contributing to a variety of different eating problems in women. Likewise, Cahill, [25] thinks of eating disorders as arising in response to the persistent distress of various threats arising out of the embodied experience of women in a patriarchal society suffused by the "male gaze". Becky Wangsgaard Thompson [43] identifies traumas associated with racism, classism, heterosexism, poverty, and sexual abuse as causes of a variety of disordered eating patterns (anorexia, bulimia, bingeing, and extensive dieting); and a common theme running through the interviews that underwrite her conclusions is the idea that her subjects' eating problems developed as a way of managing the psychological distress produced by these traumas (also see [44]). Moreover, the idea most commonly conveyed by Thompson's interviews is that the way in which eating problems are "about" poverty, abuse, and the like is that these circumstances can cultivate, particularly in those who inhabit marginalized social identities, experiences one might describe as being *alienated* from one's own body or *endangered* or *threatened* by one's own body, largely because of the way in which their body tends to call attention to itself.⁸

Feminist analyses of disordered eating generally differ in their precise details from the phenomenological accounts we have so far been discussing; but, at the same time, it is natural to see them as latching onto some of the same key ideas. Specifically, the phenomenological accounts are, broadly speaking, in accord with the feminist analyses on precisely these points: anorexia is a different phenomenon from radical dieting; and what differentiates the two is primarily the fact that anorexia, perhaps along with certain other clinical eating disorders, like bulimia, involves the attempt to manage unpleasant experiences of one's own body as (to use Osler's term) "noisy" in various ways. The main further contribution to these points of agreement that the feminist analyses add

⁸ See especially the descriptions of Antonia, Elsa, Ruthie, Martha, and Joselyn (pp. 551–557) and Thompson's discussion of "body-consciousness" (p. 556).

is just the claim that *being embodied in a patriarchal society as someone other than a cis-gendered, heterosexual, well-off white male* makes one particularly vulnerable to such experiences.⁹

Whatever their intuitive appeal might be, however, a persistent (or, at any rate, persistently alleged) weakness of both the feminist approach and the phenomenological approach is their lack of anchoring in quantitative empirical research. Feminist and phenomenological accounts, including that of Osler's, often rely on first person reports of AN found in memoirs or in others' qualitative studies—a methodology common in much philosophical work done on various psychopathologies. Nevertheless, these accounts remain largely theoretical and, to a certain extent, speculative when it comes to establishing empirical claims about patterns across populations. We think anchoring in quantitative empirical research is important; and so we take the present study not only to be of first-order significance in lending empirical credence to Osler's phenomenological account, but also of higher-order methodological significance insofar as it lends credence to the idea that distinctively philosophical approaches to eating disorders might, in some cases at least, be more amenable to empirical investigation than has previously been assumed.¹⁰

The current study

Previous work has detailed the development and begun the validation process of the new Disrupted Embodiment Scale (DES; [31]), which was designed based on phenomenological accounts of AN and other eating disorders, including Osler's [16] account. The DES has been preliminarily found to yield valid and reliable scores with stringent enough measurement invariance to allow for group comparisons [31]. Similarly, Hocking and Gondoli, [31] has indicated that the DES total scores explain variance in eating disorder symptomatology and impairment over and above the traditional predictors of body dissatisfaction and drive for thinness. There are two primary aims of the current paper: (1) to empirically examine whether there might be empirical support for Osler's understanding of the phenomenology of AN, and (2) to delve deeper into the subscales of the DES (Body as Hardship, Body as Threat, Body as Separate from Self) and examine the relative contribution of these three subscales to explaining variance in eating disorder symptomatology and impairment in undergraduate women as well as women who self-identify as experiencing AN, providing some additional evidence to the validity of the new DES. If her account is correct, we would predict the following results and make the following hypotheses:

1. Undergraduate women would report lower levels of feeling disrupted embodiment, their bodies as a hardship, as a threat, and as separate from their "selves" compared to women who self-identify as experiencing anorexia.
2. The total score of the Disrupted Embodiment Scale (DES) and each subscale of the DES (Body as Hardship, Body as Threat, and Body as Separate from Self) will predict variance in eating disorder symptomatology and impairment over and above more traditional predictors of eating disorder symptomatology, including body dissatisfaction and drive for thinness.

Additional exploratory analyses were conducted in which no a priori hypotheses were made. First, we investigated whether age moderated the relationship between the DES total score and the four outcome variables. Second, we conducted exploratory bi-factor modeling in order to investigate whether the DES may be better conceptualized as a unidimensional scale.

⁹ Cf. Holmes, [42]: 373–375 and references therein.

¹⁰ For discussions about how to bridge phenomenological philosophy and empirical work, see, for example: [45, 46, 47, 48].

Method

Participants and procedure

Participants included two samples: 220 undergraduate college women as well as a sample of 138 women who self-identified as currently experiencing Anorexia Nervosa. The undergraduate sample consisted of 220 cisgender college women ($M_{\text{age}} = 19.88$ years, $SD_{\text{age}} = 0.78$ years). Regarding racial identity, 171 participants reported being white (77.73%), 10 (4.55%) identified as Black or African American, 17 (7.73%) reported being Asian, 1 (0.45%) reported being Hawaiian or Pacific Islander, 15 (6.82%) identified as multiracial, and 6 participants (2.73%) reported being a different race or ethnicity. Thirty-two participants (14.55%) reported being Hispanic or Latinx.

Participants were drawn from students currently enrolled in a private university in a medium-sized Midwestern city. Students who identified as women who attended the university were eligible for participation in the study. Study information was posted on the university's SONA website as well as on flyers posted around campus. In order to be eligible for the study at Time 1, participants had to be at least 18 years old, identify as a woman, of freshman or sophomore standing, and speak English fluently. Freshman and sophomore students were initially recruited due to the longitudinal nature of the larger study to allow for all three timepoints of data to fall within their four years at the university. Participants indicated interest in Time 1 of the study by signing up on the university's SONA website and completing the informed consent or by emailing the email address on the recruitment flyers posted around campus. Once consent had been documented, participants were emailed a link to the study as well as a unique Study ID. Although the greater study included three timepoints of data, only data from Time 2 are used in the current study. Only Time 2 is used in the current study due to the DES not being included in Time 1's questionnaire packet and the sample size for Time 3 being significantly smaller than Time 2, limiting the statistical power of analyses. Questionnaires for Time 2 took approximately 60 to 75 min to complete. Participants were compensated with either \$25 or extra course credit, whatever they preferred. See Table 1 for complete participant demographics.

Table 1 Participant demographics

	<i>n</i> (%)	<i>n</i> (%)
	Self-Identified AN Sample	Undergraduate Sample
Biological sex		
Female	135 (97.8)	219 (99.5)
Male	1 (0.7)	0 (0.0)
Intersex	1 (0.7)	0 (0.0)
Declined to answer	1 (0.7)	1 (0.5)
Gender Identity		
Woman	138 (100.0)	220 (100.0)
Race/Ethnicity		
White	116 (84.1)	171 (77.7)
Black or African American	3 (2.2)	10 (4.5)
American Indian or Alaska Native	1 (0.7)	0 (0.0)
Asian	8 (5.8)	17 (7.7)
Hawaiian or Pacific Islander	0 (0.0)	1 (0.5)
Multiracial/Multiethnic	7 (5.1)	15 (6.8)
Other	2 (1.4)	6 (2.7)
Hispanic		
Yes	15 (10.9)	32 (14.5)
No	121 (87.7)	188 (85.5)
Declined to answer	2 (1.4)	0 (0.0)
Officially Diagnosed		
Yes	98 (71.0)	
No	33 (23.9)	
Not Sure	7 (5.1)	

Participants within the self-identified AN sample were recruited via Prolific, an online survey platform that connects researchers to participants. Participants who sign up on Prolific complete a detailed questionnaire regarding various inclusion and exclusion criteria common to research studies, which researchers can then specify when creating a study. First, a two-minute screening survey was offered to all Prolific participants who (1) identified as women, (2) were fluent in English, and (3) reported an ongoing mental health illness/condition. Within this screening survey, participants reported whether they were currently experiencing an ongoing mental health illness/condition. If participants responded “yes,” then they were asked to indicate the category/categories of their ongoing mental health illness/condition, with “Eating Disorders” constituting one of the options. If participants reported experiencing an eating disorder, they were then also asked what type of eating disorder/s they were experiencing, as well as whether or not they had officially been diagnosed. Finally, participants of the screening survey completed the Eating Disorders Examination Questionnaire - Short Form (EDEQ-S; [49]). Participants who reported currently experiencing an eating disorder were eligible for the primary survey. Following recruitment, 2391 participants completed the two-minute screening survey, with 529 qualifying for the primary survey (i.e., reported currently experiencing an eating disorder). The primary survey took approximately 30 minutes to complete and included questionnaires related to body image, disordered eating behaviors, anxiety, depression, alexithymia, and other related variables. Of the 529 participants sent the primary survey, 403 went on to complete it, and 138 of the 403 (34.2%) reported experiencing Anorexia Nervosa. Although the larger study also involved women who self-identified as experiencing Bulimia Nervosa (BN), Binge Eating Disorder (BED), and other eating disorders, only women who reported experiencing AN were included in the current study. All participants who completed the screening survey were compensated \$0.35, and those who completed the primary survey were compensated an additional \$10. It is important to note that the full sample of 403 women was used in the initial validation article of the DES [31], including the 138 women who report currently experiencing AN. Therefore, it is prudent to think of the current study in some ways as a continuation of the initial validation article, providing some new analyses from the same dataset as well as analyses from a new, unique dataset not used in Hocking and Gondoli’s [31] initial validation paper. The current study was approved by the Human Subjects Institutional Review Board at the University of Notre Dame.

Of the 138 participants ($M_{\text{age}} = 28.13$ years, $SD_{\text{age}} = 8.12$ years), 135 (97.8%) reported a female biological sex assignment at birth, 1 (0.7%) reported a male biological sex assignment at birth, 1 (0.7%) reported being intersex, and 1 (0.7%) declined to answer. Participants were asked about their racial and ethnic identity. Similarly, participants were asked to endorse what type of eating disorder they self-identified as having. See Table 1 for complete participant demographics.

Measures

Disrupted embodiment

Participants reported on their disrupted embodiment by completing the Disrupted Embodiment Scale (DES; [31]). The DES is a 17-item measure with three subscales: (1) Body as Hardship, (2) Body as Threat, and (3) Body as Separate from Self. Sample items include “My body makes annoying demands of me”, “I see my body as dangerous to me,” and “I feel like my true self does not have a body” from the Body as Hardship, Body as Threat, and Body as Separate from Self subscales, respectively. Higher scores indicate higher levels of disrupted embodiment. The DES, although a new measure, has demonstrated adequate test-retest reliability, concurrent validity, and internal consistency [31]. For the current study, Cronbach’s alphas for the self-identified AN sample were .95, .91, .86, and .82 for the total score, Body as Hardship subscale, Body as Threat subscale, and Body as Separate from Self subscale, respectively. For the undergraduate sample, Cronbach’s alphas were .95, .91, .90, and .77 for the total score, Body as Hardship subscale, Body as Threat subscale, and Body as Separate from Self subscale, respectively.

Body dissatisfaction

Participants completed three subscales of the Eating Disorders Inventory: body dissatisfaction, and drive for thinness, and bulimia behaviors (EDI-3; [3]). The EDI-3 is a 91 question scale commonly used to measure eating disorder symptomatology and factors associated with eating disorders. The EDI-3 has demonstrated strong internal consistency, discriminant validity, as well as sensitivity and specificity [50]. The Body Dissatisfaction subscale addresses unhappiness with specific parts of one's body and includes ten items, including "I think my hips are too big" and "I think my thighs are just the right size", the second of which is reverse-scored. Items are rated on a scale from 0 (*never*) to 5 (*always*), with higher scores indicating higher levels of body dissatisfaction. Scores from this scale can potentially range from 0 to 50, with observed scores in the current sample ranging from 4 to 45. Cronbach's alpha was equal to 0.86 for the self-identified AN sample and 0.80 for the undergraduate sample.

Drive for thinness

Participants also completed the 7-item Drive for Thinness subscale of the EDI-3 [3]. Items from this subscale address the cognitive and affective components of struggling with body image. Sample items include "I am pre-occupied with the desire to be thinner" and "I am terrified of gaining weight". Items are rated on a scale from 0 (*never*) to 5 (*always*), with total scores from this scale potentially ranging from 0 to 35. Higher scores indicating a greater drive for thinness. For this sample, scores ranged from 1 to 35. Cronbach's alpha was equal to 0.90 for the self-identified AN sample and 0.89 for the undergraduate sample.

Bulimia behaviors

Participants also completed the eight-item bulimia subscale of the EDI-3 [3]. This subscale addresses both bingeing and purging behaviors associated with bulimia. Because seven of the eight items address bingeing, it may be more accurate to classify this subscale as primarily addressing bingeing thoughts, attitudes, and behaviors. Sample items include "I eat moderately in front of others and stuff myself when they are gone" and "I have the thought of trying to vomit in order to lose weight." Items are rated on a scale from 0 (*never*) to 5 (*always*), with total scores from this scale potentially ranging from 0 to 40. For this sample, scores ranged from 0 to 34. Cronbach's alpha was equal to 0.90 for the self-identified AN sample and 0.92 for the undergraduate sample. Although it may seem counterintuitive to measure bulimia behaviors in a sample of women experiencing AN, there is significant overlap in symptomatology between AN and BN, and one of the subtypes of AN is the binge-eating/purging subtype [1]. Thus, it is prudent to measure bulimia behaviors even in a sample of women experiencing AN.

Eating disorder symptomatology

Participants also completed the Eating Attitudes Test-26 (EAT-26; [51]). This commonly-used scale was originally developed as a tool for diagnosing Anorexia Nervosa [51]. Consistent with previous research (e.g., Tylka et al., [52]), it was scored continuously from 1 (*never*) to 6 (*always*) in the current study to avoid skewed data. Sample items include "I am aware of the calorie content of foods that I eat" and "I cut my food into small pieces.", with higher scores indicating more disordered eating symptomatology. Scores can potentially range from 26 to 156, with observed scores ranging from 33 to 138. The EAT-26 has been shown to accurately (> 90%) discriminate between participants with and without eating disorders (Mintz & O'Halloran, 2000). Cronbach's alpha was equal to 0.91 for the self-identified AN sample and 0.94 for the undergraduate sample.

Dieting

Participants reported on their dieting using the Dutch Restrained Eating Scale (DRES; [53]). This ten-item scale measures dieting and restrained eating, including items such as “How often did you deliberately eat less in order to not become heavier?” and “How often did you watch exactly what you ate?” [53]. Items are rated on a scale from 1 (*never*) to 5 (*always*), with potential scores ranging from 10 to 50. Higher scores indicate greater levels of dieting. The DRES has demonstrated satisfactory predictive validity, significantly predicting restrictive food intake more broadly as well as intake of fat and sugar in participants [53]. For this sample, scores ranged from 10 to 50. Cronbach’s alpha was equal to 0.94 for the self-identified AN sample and 0.95 for the undergraduate sample.

Disordered eating impairment

Finally, participants completed the 16-item Clinical Impairment Assessment (CIA; [54]), which measures the degree to which their disordered eating impairs their daily life and social activities. Items are rated on a scale from 0 (*not at all*) to 3 (*a lot*), with potential scores ranging from 0 to 48. Higher scores indicate greater impairment. Prompted with “Over the past month, to what extent have your eating habits, exercising, or feelings about your eating, shape, or weight...”, sample items include “...interfered with meals with family or friends?” and “...made you feel guilty?” The CIA has demonstrated strong reliability and validity [54, 55]. Furthermore, the CIA has consistently been associated with greater levels of disordered eating [54, 55]. For the current study, participant scores ranged from 0 to 48. Cronbach’s alpha was equal to 0.95 for the self-identified AN sample and 0.96 for the undergraduate sample.

Data analysis plan

All analyses were conducted in SPSS 31. Degree of missingness and descriptive properties on all measures were examined. Means, standard deviations, and correlations of all variables (both separated by sample and all together) were reported and evaluated.

A series of four ANCOVAs were conducted in order to determine whether women who identify as experiencing anorexia report higher levels of disrupted embodiment (as measured by the DES total score), as well as feeling their bodies as a hardship, their bodies as threats, and their bodies as separate from themselves compared to the undergraduate women (each DES subscale tested separately), testing Hypothesis 1. Age and BMI were entered as covariates because the self-identified AN sample reported being significantly older and having significantly higher BMIs than the undergraduate sample.

Hierarchical multiple regression was utilized in order to test Hypothesis 2, whether disrupted embodiment explains variation in disordered eating behaviors and disordered eating-related impairment above and beyond the more traditional predictors (e.g., body dissatisfaction, drive for thinness). To avoid circularity, only the undergraduate women were included in these regression analyses, given the use of the self-identified AN sample in the original Hocking and Gondoli [31] validation article. For each disordered eating outcome variable (eating disorder symptomatology, bulimia, dieting, and impairment), a two-step regression was utilized. On Step 1, the traditional predictors were entered, specifically body dissatisfaction and drive for thinness. Additionally, age and BMI were also entered on Step (1). On Step 2, the DES subscale was entered. In order to determine whether the DES subscale predicts additional variation above and beyond the Step 1 predictors, the change in *F*-value between Step 1 and Step 2 was empirically tested, testing Hypothesis (2). All predictors were standardized prior to analyses to a mean of 0 and a standard deviation of 1.

In addition to our two hypotheses, two sets of exploratory analyses were conducted, for which no hypotheses were specified. First, four post-hoc regression analyses were conducted examining whether age moderated the relationship between disrupted embodiment and the four outcome variables (bulimia, eating disorder

symptomatology, dieting, and impairment). The full sample of 355 was included to give variability in age, as the undergraduate sample was primarily between 18 and 22. Including the self-identified AN sample broadened the age range of the sample. In Step 1, the DES total score and age were both entered, and both had been standardized to have a mean of 0 and a standard deviation of 1. On Step 2, the interaction term was entered. To evaluate significance, the f -change between Step 1 and Step 2 was evaluated. This possibility was explored as the age diversity of the sample may include women in different developmental stages of embodiment [33] and/or at different stages in the progression of the lived experience of AN according to Osler's theory [16]. Finally, given the high correlations between the DES subscales and the similarity of the results in Table 4, we conducted exploratory, post-hoc bifactor modeling to investigate whether the DES might be better thought of as a unidimensional construct. For all analyses, alpha was set at 0.05.

Results

Preliminary analyses

Prior to any analyses, the data were inspected for missingness. The data were found to be largely complete. Within the undergraduate sample, three participants skipped the Disrupted Embodiment Scale, one participant skipped the Dutch Restrained Eating Scale and the Drive for Thinness subscale of the EDI, six participants skipped the Eating Attitudes Test-26, and seven participants skipped the Clinical Impairment Assessment. Two scales (The Body Dissatisfaction and Bulimia subscales of the EDI) had no missing data. Overall, the missing data within the undergraduate sample accounted for 1.2% of the data, Pairwise deletion was used to account for missing data. Within the self-identified AN sample, one participant skipped a single item on the Dutch Restrained Eating Scale, and a different participant skipped a single item on the Clinical Impairment Assessment. The rest of the scales had no missing data. Overall, the missing data within this sample accounted for 0.05% of the data.

Power analyses indicated that our sample size of 358 participants would provide 80% power or greater for Cohen's f^2 effect sizes of 0.03 or greater within hierarchical multiple regression analyses). Additionally, the sample size of 220 (the undergraduate sample only) would provide 80% power or greater for Cohen's f^2 effect sizes of 0.04 or greater within hierarchical multiple regression analyses [56].

Prior to testing our hypotheses, the two samples were compared. A series of ANCOVAs compared the two samples on all key study variables. For all analyses, age and BMI were controlled for as the sample self-identifying as having AN reported having significantly higher BMIs and being significantly older than the undergraduate women. Furthermore, both BMI and age were significantly related to multiple study variables, including the DES total score and all three subscales as well as all three subscales of the EDI (see Supplemental Material). Sample was dummy coded as Self-identified AN Sample = 1, Undergraduate Sample = 0). The sample who identified as currently experiencing AN reported significantly higher body dissatisfaction, drive for thinness, disordered eating symptomatology, bulimia behaviors, dieting, and impairment (all $ps < 0.05$).

Correlations between all study variables separated by sample are presented in Table 2. Correlations between all study variables with the two samples combined may be found in the supplementary materials. Most study variables were significantly correlated in the expected direction ($ps < 0.001$).

Primary analyses

Hypothesis 1

To address Hypothesis 1, a series of four ANCOVAs were conducted comparing the two samples on their reported rates of Disrupted Embodiment using the DES total score, as well as their separate scores on the Body as Hardship, Body as Threat, and Body as Separate from Self subscales. The ANCOVAs were run separately due to

Table 2 Means, standard deviations, and correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. DES - Total Score	--	0.95**	0.94**	0.85**	0.58**	0.60**	0.46**	0.62**	0.50**	0.75**	-0.06	0.09
2. DES - Body as Hardship	0.95**	--	0.83**	0.69**	0.58**	0.64**	0.47**	0.60**	0.51**	0.73**	-0.07	0.16
3. DES - Body as Threat	0.92**	0.79**	--	0.74**	0.49**	0.50**	0.42**	0.57**	0.43**	0.70**	-0.03	0.02
4. DES - Body as Separate from Self	0.85**	0.71**	0.73**	--	0.49**	0.47**	0.36**	0.51**	0.41**	0.61**	-0.05	0.02
5. Body Dissatisfaction	0.59**	0.59**	0.53**	0.44**	--	0.65**	0.41**	0.59**	0.52**	0.57**	0.16	0.18*
6. Drive for Thinness	0.64**	0.63**	0.63**	0.43**	0.68**	--	0.41**	0.81**	0.78**	0.67**	0.09	0.18*
7. Bulimia	0.53**	0.52**	0.57**	0.31**	0.53**	0.64**	--	0.50**	0.32**	0.44**	-0.09	0.16
8. Eating Pathology (EAT-26)	0.66**	0.64**	0.67**	0.45**	0.64**	0.83**	0.63**	--	0.82**	0.77**	0.10	-0.12
9. Dieting	0.56**	0.57**	0.53**	0.36**	0.65**	0.82**	0.53**	0.82**	--	0.61**	0.07	0.07
10. Impairment	0.69**	0.68**	0.67**	0.48**	0.59**	0.69**	0.60**	0.76**	0.62**	--	-0.08	-0.01
11. Age	-0.02	-0.01	-0.01	-0.03	0.02	0.01	0.00	-0.02	0.00	0.02	--	-0.04
12. BMI	0.28**	0.36**	0.15*	0.20**	0.36**	0.28**	0.23**	0.19**	0.24**	0.22**	-0.02	--

Note: * $p < .05$. ** $p < .001$. Correlations for the self-identified AN sample appear above the diagonal, and correlations for the undergraduate sample appear below the diagonal

Table 3 Estimated marginal means, standard errors, and effect sizes

	Self-Identified AN Sample		Undergraduate Sample		η^2
	EMM	SE	EMM	SE	
DES Total Score	59.44	1.40	41.36	1.06	0.21
Body as Hardship	30.39	0.70	21.19	0.53	0.21
Body as Threat	16.39	0.47	11.11	0.35	0.16
Body as Separate from Self	12.67	0.36	9.06	0.27	0.14

Table 4 Slope estimates for the DES and its subscales across the four outcomes variables

		b	SE	R^2	ΔR^2	p
DES Total Score						
	Bulimia	1.43	0.57	0.44	0.02	0.01
	EAT-26	4.38	1.07	0.74	0.02	<0.001
	Dieting	0.16	0.50	0.68	0.00	0.75
	Impairment	4.70	0.72	0.59	0.09	<0.001
Body as Hardship						
	Bulimia	1.24	0.58	0.44	0.01	0.03
	EAT-26	4.16	1.08	0.73	0.02	<0.001
	Dieting	0.46	0.51	0.69	0.00	0.37
	Impairment	4.66	0.73	0.59	0.08	<0.001
Body as Threat						
	Bulimia	2.12	0.54	0.46	0.04	<0.001
	EAT-26	4.49	1.03	0.74	0.03	<0.001
	Dieting	-0.01	0.49	0.68	0.00	0.99
	Impairment	4.22	0.71	0.58	0.07	<0.001
Body as Separate from Self						
	Bulimia	0.14	0.48	0.42	0.00	0.77
	EAT-26	1.91	0.92	0.72	0.01	0.04
	Dieting	-0.24	0.42	0.69	0.00	0.58
	Impairment	2.36	0.65	0.53	0.03	<0.001

concerns of multicollinearity between the DES total scores and subscale totals. As previously mentioned, age and BMI were controlled for as the self-identified AN sample reported having significantly higher BMIs and being significantly older than the undergraduate sample, and both age and BMI were significantly correlated with most study variables when looking at correlations within the whole sample (see supplemental material). Results indicated that, after controlling for age and BMI, there was a significant main effect of sample ($F(1, 336)=86.42, p < .001, \eta^2 = 0.21$), with the self-identified AN sample reported significantly higher total scores on the DES than the undergraduate sample. The same pattern was observed for the Body as Hardship subscale ($F(1, 336)=89.22, p < .001, \eta^2 = 0.21$), Body as Threat subscale ($F(1, 336)=66.00, p < .001, \eta^2 = 0.16$), and Body as Separate from Self subscale ($F(1, 336)=53.17, p < .001, \eta^2 = 0.14$). Therefore, hypothesis one was supported. See Table 3 for estimated marginal means, standard errors, and effect sizes.

Hypothesis 2

In order to test Hypothesis 2, a series of 16 two-step hierarchical multiple regressions were conducted, as described above. To test whether the DES subscale predicts additional variation above and beyond the Step 1 predictors, the change in F -value between Step 1 and Step 2 was empirically tested. If this change was statistically significant, the beta coefficients were evaluated and interpreted. As seen in Table 4, the DES total score significantly predicted additional variance in bulimia behaviors, eating disorder symptomatology as measured by the EAT-26, and impairment. The DES did not, however, explain additional variance in dieting after controlling for Step 1 predictors. Additionally, in order to test the relative contribution of each subscale to explaining variance in disordered

eating symptomatology and impairment, additional hierarchical regression analyses were conducted. Each subscale was evaluated separately due to concerns about multicollinearity, as the three subscales were highly correlated with each other. As seen in Table 4, all three subscales of the DES followed the same pattern as the DES total score (with one exception), explaining additional variance in bulimia, eating disorder symptomatology, and impairment, but not dieting. The singular exception was that the Body as Separate from Self subscale did not significantly predict bulimia. Therefore, Hypothesis 2 was partially supported.

Exploratory analyses

Four exploratory, post-hoc regression analyses were conducted using the full sample of 355 examining whether age moderated the relationship between disrupted embodiment and the four outcome variables: bulimia, ED symptomatology, dieting, and impairment. Results indicated that age did not significantly moderate the relationship between disrupted embodiment and any of the four outcome variables.

Finally, given the high correlations between the DES subscales and the similarity of the results in Table 4, we conducted exploratory bifactor modeling to investigate whether the DES might be better thought of as a unidimensional construct. To avoid circularity, this was conducted just on the 220 undergraduate women, given that the 138 women who self-identify as experiencing AN were present in the sample that the original factor structure is based on [31]. A bifactor model was fit in which: (1) all of the items load onto a general factor, (2) all the items additionally load onto their subscale, and (3) the subscales are orthogonal to each other. Results indicated acceptable model fit ($\chi^2(102) = 187.95$, $p < .001$, $CFI = 0.95$, $TLI = 0.95$, $RMSEA$ 90% $CI = 0.062$ [0.049; 0.071], $SRMR = 0.04$). Additionally, ECV was equal to 0.82, PUC was equal to 0.68, and ω_h was equal to 0.91. Examining factor loadings, all of the factor loadings for the general factor were significant (all $ps < 0.001$) and ranged from 0.34 to 0.99. For the Body as Hardship Subscale, only four of the eight items had significant factor loadings, and none of the items had a factor loading greater than 0.47. For the Body as Threat subscale, all items but one had significant factor loadings, although again they were largely smaller in magnitude than the general factor, with only one item (“I feel threatened by my body.”) having a factor loading greater than 0.31. Finally for the Body as Separate from Self subscale, all four items had significant factor loadings, although they were smaller in magnitude and ranged from 0.18 to 0.56. The bifactor models were rerun on the self-identified AN sample, and the pattern of results was the same. All of this evidence points to a strong general factor, indicating that the subscales of the DES may not independently provide novel information beyond the DES total score.

Discussion

The current study had an overarching goal of empirically investigating phenomenological approaches to disrupted embodiment in anorexia nervosa (AN) broadly and the specific character that Osler [16] ascribes to disrupted embodiment in anorexia nervosa (AN), namely the body experienced as threatening, noisy, overly demanding, and beyond one’s own control. The aim was to investigate whether Osler’s characterization of disrupted embodiment in AN is endorsed by women living with AN, distinguishes their experiences from women not living with AN, and explains additional variance in ED symptomatology and impairment above and beyond the traditional predictors of body dissatisfaction and drive for thinness.

We took a three-fold approach to investigating this potential for empirical evidence. First, we sought to investigate whether women who self-identify as experiencing anorexia nervosa (AN) reported greater feelings of disrupted embodiment, and of their bodies as a hardship, as a threat, and as separate from the “self” compared to college women. Second, the current study sought to investigate the subscales of the Disrupted Embodiment Scale (DES; [31]) and examine their relative contribution to explaining variance in eating disorder symptomatology and impairment over and above body dissatisfaction and drive for thinness. We also explored whether age

moderated the relationship between the DES and the outcome variables. Finally, we explored whether the DES may be best conceptualized as a unidimensional scale through bifactor modeling.

The results of both studies overall lend initial empirical evidence to Osler's [16] characterization of disrupted embodiment in AN. Examining mean-level differences between women who identify as experiencing anorexia and the undergraduate women, women who identify as experiencing AN reported significantly greater feelings of their bodies as a hardship, their bodies as a threat, and their bodies as being or feeling separate from their true selves. This indicates that these experiences of bodily disruption may be greater in magnitude within those experiencing AN, adding empirical credence to Osler's [16] claims.

Second, the DES total score explained additional variance in eating disorder symptomatology, bulimia behaviors, and disordered eating-related impairment. Delving further into the subscales, the Body as Hardship, Body as Threat subscale, and the Body as Separate from Self subscale of the DES explained additional variance in bulimia behaviors, disordered eating symptomatology, and impairment related to disordered eating. The only exception is that the Body as Separate from Self subscale did not significantly predict bulimia behaviors. One particularly interesting finding relates to the variance explained by the DES in impairment related to eating disorders. For the Body as Hardship and Body as Threat subscales, the amount of additional variance explained over and above body dissatisfaction and drive for thinness was 7–8% percent. This suggests that, not only might various facets of disrupted embodiment (specifically, feeling the body to be a hardship and/or a threat) be highly relevant in eating disorder symptomatology, it might also be particularly salient in determining the level of *impairment* one experiences related to their eating disorder. Given the tangible, daily difficulties impairment can bring (e.g., work performance issues, avoiding social situations due to appearance anxiety, difficulty in intimate relationships), this finding is of particular note and speaks to the potential importance of incorporating disrupted embodiment into eating disorder conceptualization, diagnosis, and treatment.

Conversely, the subscales of the DES did not significantly predict increased dieting. This finding is noteworthy: if disrupted embodiment were simply a more extreme version of the motivations underlying restrictive dieting, we would expect the DES to predict variance in dieting behaviors. That it does not suggests that disrupted embodiment and dieting represent overlapping but distinct phenomena. Although both may involve food restriction, they appear to be motivated by different underlying experiences and concerns. To put it another way, this finding suggests a real qualitative difference in the essence of eating disorders that is deeper and more complex than extreme dieting. As noted earlier, Bruch [57] claimed as much; it is *prima facie* plausible in light of the variety of different goals and concerns that are known to motivate extreme dieting projects in people not experiencing AN; and it has also been a point of broad agreement among those taking both feminist and phenomenological approaches to the understanding of eating disorders.

It is interesting to further consider why the total score of the DES or its subscales did not significantly predict increased dieting (as measured by the Dutch Restrained Eating Scale) given that all of these predicted higher scores on the EAT-26. Both scales largely capture restrictive/restrained eating. Examining the items of both these measures, some salient differences emerge. Items on the EAT-26 cover the cognitive and affective dimensions of restricted eating (e.g., “I feel uncomfortable after eating sweets” and “I find myself preoccupied with food.”) more so than the DRES, which tends to focus more on the observable behaviors (e.g., “Did you deliberately eat less in order to not become heavier?”). Additionally, when the EAT-26 does ask questions pertaining to behavior, a broader range of behaviors are included, including some that are more closely associated with AN and other clinical eating disorders and less associated with normative dieting (e.g., “I cut my food into small pieces”; “I vomit after I have eaten.”). From a phenomenological perspective, this distinction is significant: the EAT-26 items capture aspects of what it is like to experience eating and one's body in a disordered way—the affective and experiential dimensions—whereas the DRES focuses primarily on deliberate behavioral choices. That disrupted embodiment predicts the former but not the latter suggests that what distinguishes AN from dieting is not merely the intensity or extremity of restrictive behavior, but the underlying experiential disturbance that motivates and accompanies it.

It is important to note that, although the subscales of the DES consistently predicted bulimia, eating disorder symptomatology, and impairment above and beyond both body dissatisfaction and drive for thinness, the increase in variance-explained was often rather small. This suggests that, although these experiences related to bodily-experiences are important, body dissatisfaction and drive for thinness cannot be ignored as salient factors in ED symptomatology and impairment. This finding, however, remains perfectly consistent with the view, defended by Osler and others, that disrupted embodiment is a key feature of AN lived experience. Indeed, Osler readily acknowledges that factors other than disrupted embodiment enter into people's experience of AN, and notes that many others (e.g. Krueger and Osler, [10], Legrand, [13], Rodemeyer, [18] take a similarly pluralistic approach. Instead, findings of the current set of studies indicate that these disruptive bodily experiences need to be accounted for alongside other relevant factors of AN, as opposed to neglected as they often have been traditionally.

Moving beyond how results of the current study coincide with Osler's [16] philosophical claims, these findings also suggest that bodily experiences themselves, and not only attitudes and beliefs about the body or ideals around thinness, are important in predicting ED symptomatology and impairment—a finding continuous with those in Foster et al., [39]. Disrupted embodiment is, therefore, not reducible to severe body dissatisfaction but a distinct dimension of AN experience. These results indicate that it is essential to additionally account for experiences of the body (e.g., as burdensome, threatening, separate from self) and include bodily/affective dimensions of EDs in our understanding and diagnosis. How specifically to integrate these ideas into treatment for eating disorders, however, would be a worthwhile path for future research.

Findings from the current study not only provide support for Osler's philosophical claims, but they also integrate well with neuroscientific research on AN. As we noted earlier (fn. 3), one point of contact is the construct of interoception. Recent work on the role of reduced interoceptive ability in AN and other eating disorders suggests that diminished interoceptive abilities may contribute to body image disturbance (BID). As Khalsa and Choquette [23] observe, recent studies have identified inverse relationships between BID and somatosensory coactivation, body satisfaction scores and insula activity, and self-objectification scores and interoception, all of which suggests that “individuals with AN and BN may have difficulty adaptively integrating external and internal signals, which could lead to an inaccurate mental representation of one's own body and ultimately body dissatisfaction” ([23], p. 173). Future research could explore the relationship between reduced interoceptive ability and DES scores, perhaps lending support to the hypothesis that diminished interoception contributes to the sort of phenomenology that Osler associates with AN.

A second point of contact with neuroscientific research concerns the Allocentric Lock Hypothesis (Riva, 2012; Riva & Gaudio, 2012). Put briefly, this framework posits that individuals with AN are stuck or “locked” viewing their bodies from an allocentric/observer point of view, unable to update their view of their bodies using the frequently-updated egocentric view (see Riva & Gaudio, 2012, for a review). Neurocognitive research has provided support for this hypothesis, finding differences in the parietal lobe, gray matter, and hippocampal volume between people experiencing AN and controls, pointing to potential differences in spatial processing [58, 59]. This complements both Osler's theory and the empirical findings of the DES. Specifically, Osler, [16] delineates what may initially drive those with AN to adopt the allocentric/observer view of the body. As mentioned, Osler, [16] argues that those with AN adopt this view in order to silence the demands of the visceral body. This may precipitate getting locked into the allostatic point of view. Similarly, items of the DES may provide insight into the lived experiences of those experiencing this allostatic lock. Future research could further merge and bridge these complementary findings related to the inner workings of AN.

Finally, the current study provides some additional validity evidence for the DES. The sample of undergraduate women in the current study is unique to the current study and adds additional credence to the DES' internal consistency, construct validity, and concurrent validity. As previously stated, the sample of women who identify as currently experiencing AN is a subset of the participants included in the first study discussed in Hocking and Gondoli's [31] initial validation article. The analyses in the current study, however, are novel in that they delve deeper into the subscales of the DES. In this way, however, the current study may be best conceptualized as a continuation of this initial validation article. Perhaps more importantly, results of the current study indicate that

the DES may be best considered as a unidimensional scale. Bifactor analysis indicated a unidimensional structure, and the largely uniform pattern of regression results of Hypothesis 2 discussed above both indicate that the subscale scores by themselves may not provide novel information left out by the total score. Before any strong recommendations are made, however, additional validation research on the DES is needed. Although this was not an explicit hypothesis of the study, this unidimensional structure has theoretical significance. Phenomenological accounts of AN typically describe disrupted embodiment as a gestalt experience. The DES subscales were designed to pick out facets of this gestalt experience; that they form a strong general factor rather than separating into distinct dimensions is broadly consistent with this gestalt-theoretic picture. The dimensions we distinguish in each subscale, then, can be understood as interdependent features of a unified disturbance in embodied experience. The therapeutic implication of this is that interventions should target this integrated experience of disrupted embodied, rather than attempting to target individual dimensions in isolation from one another. For example, attempting to address someone's experience of their body as not part of themselves should not be treated as separable from their experience that the body is experienced as burdensome and threatening their sense of self and autonomy.

Limitations

We recognize several potential limitations of our studies. First, in arriving at our results about AN, we have relied on a sample that includes individuals who self-identify as experiencing AN, but our sample does not include individuals with a confirmed AN diagnosis. Accordingly, one might argue that our findings pertain not so much to the experience of AN (since we have not confirmed that those who say they are experiencing AN are in fact experiencing AN) but rather to the experience “as of” AN, where those having the relevant experience may include both people who are in fact experiencing AN, as well as people who simply think that they are based on their own perhaps misleading self-diagnosis. Accordingly, one might argue that, strictly speaking, claims we have made about what our results suggest about the experience of AN (e.g., that our findings indicate certain experiences of bodily disruption may be unique to those experiencing AN) really only suggest something about the experience of being someone who self-identifies as having AN.

How significant is this limitation? The question depends on what might be discovered if one were to filter out from the study responses from individuals who both self-identify as experiencing AN but lack a confirmed diagnosis. Since one can self-identify as AN without experiencing AN, and vice versa, one might discover one of three things: (a) the correlations we have identified between disrupted embodiment and “the experience of AN” in fact pertain only to the experience of AN and not to merely self-identifying as experiencing AN; (b) the correlations pertain both to the experience of AN and to merely self-identifying AN; or (c) the correlations pertain only to the experience of self-identifying as having AN, but not to the experience of AN itself. Of these possibilities, (c) seems least likely, and is the only one that would require substantial reframing of our conclusions. Nevertheless, we acknowledge that future research on the relationship between disrupted embodiment and the experience of AN should seek clarity on this matter.

A second limitation arises out of the fact that our data are cross-sectional rather than longitudinal. We have spoken throughout not only about what we might “predict” on the basis of phenomenological accounts of AN like Osler's, but also about what is or is not predicted by the DES and its various subscales. One might argue however that talk of “prediction” here is out of place, given that our data are cross-sectional. We acknowledge that in one sense of “predict” this is true: our study does not determine causation or causal ordering; and so it does not allow us to say that, in response to changes in any particular factor we have examined (e.g., a person's experience of disrupted embodiment) any specific outcome (e.g., a change in eating disorder pathology) is likely to follow. Importantly, our study also does not rule out the possibility of reverse or bidirectional causality between experiences of disrupted embodiment and the behaviors characteristic of AN. So, for example, our study does not rule out the possibility that neurological changes brought on by persistent manifestation of eating disorder pathology might bring about or intensify experiences of disrupted embodiment. Of course, “predict” can be and

is often used in other senses; but the substantive limitation to which this worry points is that the nature of the relationship between disrupted embodiment and AN that our studies can claim to establish is, at best, a relatively thin one: not causation or even some sort of common-causal connection, but mere correlation, albeit a correlation of substantial interest in its own right.

Other limitations of the current study involve the overlap in samples between the current study and the original validation article of the DES. As previously mentioned, given this overlap, it is best to consider the current study as a continuing and building on the initial validation article, as the DES remains a new measure. Additionally, Hypothesis 2 was tested with a set of sixteen regression analyses, which puts the results at risk of Type I errors. Finally, both samples were relatively homogenous in terms of SES and nationality, therefore results may not be generalizable beyond white American women.

Future research

Although the current set of studies provides promising initial evidence lending empirical credence to Osler's [16] view of AN, further research could provide additional empirical evidence for her claim. First, her argument (as well as the current study) focuses exclusively on AN. Future research could expand this to investigate whether her claims related to disrupted embodiment extend to other eating disorder diagnoses. For example, do those diagnosed with bulimia nervosa (BN) or binge eating disorder experience similar feelings of their bodies as threatening, noisy, overly demanding, and beyond one's own control? Additionally, do they experience these feelings of disrupted embodiment to the same degree as those diagnosed with AN?

An additional line of research that would provide additional empirical support to Osler's [16] claims would be a longitudinal investigation of disrupted embodiment among those diagnosed with AN. Osler, [16] argues that those experiencing AN go through four stages of disrupted embodiment/disrupted bodily experience (although she makes space for the idea that this progression might not be linear and will greatly vary across those experiencing AN): (1) an individual experiencing an uncomfortable (even unbearable) tension between their body-as-subject and the visceral demands of the body, (2) the individual embarking on a project of objectification through self-starvation as a means of denying the visceral needs of the body-as-object and taking control of what the body feels, (3) through constant self-monitoring and starvation, the individual increasingly feeling alienated from her body and the world, (4) the starved body reasserts its own control, reducing the individual to obsessive thoughts of food and the body, rendering her out of control. A longitudinal study, likely involving both qualitative and quantitative methods, could shed additional light on how these feelings of disrupted embodiment change and fluctuate over the course of AN, providing additional empirical information with which to assess Osler's [16] arguments.

Finally, future research could seek to further unpack how those experiencing AN would specifically characterize their feelings of their bodies as separate from themselves. The items of this subscale of the DES hold some clue, including items such as "My body and my mind are completely separate," "I feel like my true self does not have a body," and "I wish I did not have a body." A deeper understanding of the phenomenological experience, however, is prudent and could serve to further support Osler's [16] claims or contradict what she has argued. Specifically, does the individual experience the body as separate from self and therefore want to 'get rid of the body' or become a 'disembodied mind' in some way? Or is the body experienced as separate from the bodily subject, because it is threatening or undermining that individual's sense of agency and autonomy in the world? If the latter, this would be consistent with Osler's [16] analysis – as it could be consistent with AN as a project to reintegrate these bodily dimensions and become a transcendent bodily-subject unimpeded by the visceral demands of the organic body. If the former, however, it would be much more akin to the notion that those with AN are seeking to destroy their bodies, a notion that Osler [16] directly argues against. Further research, likely those utilizing mixed-methods approaches, could help further understand what "body as separate from self" means in the context of those experiencing AN. Note though, that while evidence in support of the former might contradict Osler's phenomenological account, it might be consistent with other phenomenological work on disrupted

embodiment in AN (e.g., Fuchs, [9], and may still lend support for bringing phenomenological considerations to the fore in our attempts to better understand and treat AN. A further possibility is that, following Lundh and Foster's (2024) suggestion that phenomenological accounts may apply to different individuals rather than to AN uniformly, mixed-methods research could investigate not only which phenomenological characterisations predominate, but whether different phenomenological accounts can be used to differentiate between different subgroups of bodily experience as lived in AN.

Conclusion

The current study provides initial empirical evidence for Osler's [16] claims about the phenomenology of AN specifically, and phenomenological approaches to disrupted embodiment in AN more broadly. It also provides additional validity evidence for the Disrupted Embodiment Scale. Should further research continue to provide empirical support, Osler's ideas about AN have tremendous implications for the etiology and treatment of AN that warrant serious consideration.

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Data availability All deidentified data and code for the current study are available for free in the Open Science Framework repository at [https://osf.io/ye6ut/?view_only=9ae723a624654b408665fc57194c9192]. This study was not pre-registered.

Declarations

Ethics approval and consent to participate The current study was approved by the Human Subjects Institutional Review Board of the University of Notre Dame. Written consent (collected electronically) was obtained from all participants prior to participating in the study.

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References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed., text rev.; DSM-5-TR). American Psychiatric Publishing; 2022. <https://doi.org/10.1176/appi.books.9780890425787>.
2. Moccia L, Conte E, Ambrosicchia M, Janiri D, Di Pietro S, De Martin V, Janiri L. Anomalous self-experience, body image disturbance, and eating disorder symptomatology in first-onset anorexia nervosa. *Eat Weight Disorders-Studies Anorexia Bulimia Obes.* 2022;27(1):101–8.
3. Garner DM, Olmstead MP, Polivy J. Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *Int J Eat Disord.* 1983;2(2):15–34. [https://doi.org/10.1002/1098-108X\(198321\)2:2%3C15::AID-EAT2260020203%3E3.0.CO;2-6](https://doi.org/10.1002/1098-108X(198321)2:2%3C15::AID-EAT2260020203%3E3.0.CO;2-6).
4. Gadsby S. Distorted body representations in anorexia nervosa. *Conscious Cogn.* 2017a;51:17–33. <https://doi.org/10.1016/j.concog.2017.02.015>.
5. Cornelissen KK, Widdington H, McCarty K, Pollet TV, Tovee MJ, Cornelissen PL. Are attitudinal and perceptual body image the same or different? Evidence from high-level adaptation. *Body Image.* 2019;31:35–47.
6. Bordo S. The body and the reproduction of femininity. In *Gender/Body/Knowledge: Feminist Reconstructions of Being and Knowing*, edited by Alison Jaggar and Susan Bordo. Rutgers University Press, 1989;13–33.
7. Bowden H. A phenomenological study of anorexia nervosa. *Philos Psychiatry Psychol.* 2012;19(3):227–41.
8. Evans A. Anorexia nervosa: Illusion in the sense of agency. *Mind Lang.* 2023;38(2):480–94. <https://doi.org/10.1111/mila.12385>.
9. Fuchs T. The disappearing body: anorexia as a conflict of embodiment. *Eating and Weight Disorders-Studies on Anorexia. Bulimia Obes.* 2022;27(1):109–17. <https://doi.org/10.1007/s40519-021-01122-7>.
10. Krueger J, Osler L. Commentary on Levels of embodiment: A Husserlian analysis of gender and the development of eating disorders. *Time Body: Phenomenological Psychopathological Approaches*, 2020;256–62.
11. Leder D. Anorexia: a disease of doubling. *Philos Psychiatry Psychol.* 2013;20(1):93–6. <https://doi.org/10.1353/ppp.2013.0004>.
12. Leder D. Anorexia: That body I am-with. *Philosophy. Psychiatry Psychol.* 2021;28(1):59–61. <https://doi.org/10.1353/ppp.2021.0009>.
13. Legrand D. Subjective and physical dimensions of bodily self-consciousness, and their dis-integration in anorexia nervosa. *Neuropsychologia.* 2010;48(3):726–37.
14. Maiese M. Anorexia nervosa, the visceral body, and the sense of ownership. *Philos Psychiatry Psychol.* 2021;28(1):63–5. <https://doi.org/10.1016/j.neuropsychologia.2009.08.026>.
15. Maiese M. Anorexia nervosa, bodily alienation, and authenticity. *Rev Philos Psychol.* 2023;15(3):1–21. <https://doi.org/10.1007/s13164-023-00717-6>.
16. Osler L. Controlling the noise: a phenomenological account of Anorexia Nervosa and the threatening body. *Philos Psychiatry Psychol.* 2021a;28(1):41–58. <https://doi.org/10.1353/ppp.2021.0008>.
17. Osler L. (Un)wanted feelings in anorexia nervosa: making the visceral body mine again. *Philos Psychiatry Psychol.* 2021b;28(1):67–9. <https://doi.org/10.1353/ppp.2021.0011>.
18. Rodemeyer LM. Levels of embodiment. *Time Body: Phenomenological Psychopathological Approaches.* 2020;234–55. <https://doi.org/10.1017/9781108776660>.
19. Schiff M. Anorexia and Identity: a Philosophical Analysis. Georgetown University; 2022.
20. Stanghellini G, Mancini M, Castellini G, Ricca V. Eating disorders as disorders of embodiment and identity: Theoretical and empirical perspectives. *Embodiment and Eating Disorders*. Routledge; 2018. pp. 127–41.
21. Svenaeus F. Anorexia nervosa and the body uncanny: A phenomenological approach. *Philos Psychiatry Psychol.* 2013;20(1):81–91. <https://doi.org/10.1353/ppp.2013.0012>.
22. Leder D. *The Absent Body*. The University of Chicago Press; 1990.
23. Choquette EM, Khalsa SS. Interoception in eating disorders. In *The Handbook of the Neurobiology of Eating Disorders*, edited by Christina E. Wierenga and Joanna E. Steinglass. Oxford University Press, 2025;162–188. <https://doi.org/10.1093/9780197675212.003.0009>.
24. Khalsa SS, Adolphs R, Cameron OG, Critchley HD, Davenport PW, Feinstein JS, Feusner JD, Garfinkel SN, Lane RD, Mehling WE, Meuret AE, Nemeroff CB, Oppenheimer S, Petzschner FH, Pollatos O, Rhudy JL, Schramm LP, Simmons WK, Stein MB, Stephan KE, Van den Bergh O, Van Diest I, von Leupoldt A, Paulus MP. Interoception and mental health: A roadmap. *Biol Psychiatry: Cogn Neurosci Nueroimaging.* 2018;3(6):501–13. <https://doi.org/10.1016/j.bpsc.2017.12.004>.
25. Cahill A. *Rethinking Rape*. Cornell University Press; 2001.
26. Foster L, Lundh LG. Readiness for the leap: Hunter mode in anorexia nervosa. *Philos Psychiatry Psychol.* 2025;32(3):329–42.
27. Fredrickson, Roberts TA. Objectification theory: toward understanding women’s lived experiences and mental health risks. *Psychol Women Q.* 1997;21(2):173–206. <https://doi.org/10.1111/j.1471-6402.1997.tb00108.x>.

28. McKinley, Hyde JS. The objectified body consciousness scale. *Psychol Women Q.* 1996;20(2):181–215. <https://doi.org/10.1111/j.1471-6402.1996.tb00467.x>.
29. Bartky SL. *Femininity and domination: Studies in the phenomenology of oppression.* New York: Routledge; 1990.
30. Nussbaum M. Objectification. *Philos Public Affairs.* 1995;24(4):249–91.
31. Hocking JE, Gondoli DM. The development and preliminary validation of the Disrupted Embodiment Scale. *J Psychopathol Behav Assess.* 2025;47(3):1–15.
32. Lundh LG, Foster L. Embodiment as a synthesis of having a body and being a body, and its role in self-identity and mental health. *New Ideas Psychol.* 2024;74:101083. <https://doi.org/10.1016/j.newideapsych.2024.101083>.
33. Piran N. Embodied possibilities and disruptions: The emergence of the Experience of Embodiment construct from qualitative studies with girls and women. *Body image.* 2016;18:43–60.
34. Piran N, Teall TL, Counsell A. The experience of embodiment scale: Development and psychometric evaluation. *Body Image.* 2020;34:117–34. <https://doi.org/10.1016/j.bodyim.2020.05.007>.
35. Cook-Cottone C. *Embodiment and the treatment of eating disorders: The body as a resource in recovery.* WW Norton & Company; 2020.
36. Mancini M, Esposito CM. Lived body and the Other's gaze: a phenomenological perspective on feeding and eating disorders. *Eat Weight Disorders-Studies Anorexia Bulimia Obes.* 2021;26(8):2523–9. <https://doi.org/10.1007/s40519-020-01103-2>.
37. Stanghellini G, Castellini G, Brogna P, Faravelli C, Ricca V. Identity and eating disorders (IDEA): a questionnaire evaluating identity and embodiment in eating disorder patients. *Psychopathology.* 2012;45(3):147–58. <https://doi.org/10.1159/000330258>.
38. Voica SA, Kling J, Frisen A, Piran N. Disordered eating through the lens of positive psychology: The role of embodiment, self-esteem and identity coherence. *Body Image.* 2021;39:103–13. <https://doi.org/10.1016/j.bodyim.2021.06.006>.
39. Foster L, Lundh LG, Daukantaitė D. Embodiment and Psychological Health in Adolescence: 1. Development and Validation of a Brief 12-item Questionnaire to Measure the Experience of Embodiment. *J Person-Oriented Res.* 2025;11(1):10–24. <https://doi.org/10.17505/jpor.2025.27576>.
40. Rossi E, Castellini G, Cassioli E, Sensi C, Mancini M, Stanghellini G, Ricca V. The role of embodiment in the treatment of patients with anorexia and bulimia nervosa: a 2-year follow-up study proposing an integration between enhanced cognitive behavioural therapy and a phenomenological model of eating disorders. *Eat Weight Disorders - Stud Anorexia Bulimia Obes.* 2021;26(8):2513–22. <https://doi.org/10.1007/s40519-021-01118-3>.
41. Haynos AF, Wang SB, Fruzzetti AE. Restrictive eating is associated with emotion regulation difficulties in a non-clinical sample. *Eat Disord.* 2018;26(1):5–12.
42. Holmes S. Why hadn't I come across this sooner?': Exploring the relationships between 'feminism(s)' and 'eating disorders. *Feminist Stud.* 2020;46(2):371–97.
43. Thompson BW. A Way Outa No Way': Eating problems among African-American, Latina, and white women. *Gend Soc.* 1992;6(4):546–61.
44. Kendall M. *Black girls don't have eating disorders. Hood Feminism: Notes from the Women that a Movement Forgot.* Penguin Books; 2020. pp. 113–26.
45. Fernandez AV. Embodiment and objectification in illness and health care: Taking phenomenology from theory to practice. *J Clin Nurs.* 2020;29(21–22):4403–12. <https://doi.org/10.1111/jocn.15431>.
46. Høffding S, Martiny K. Framing a phenomenological interview: What, why and how. *Phenomenology Cogn Sci.* 2016;15:539–64. <https://doi.org/10.1007/s11097-015-9433-z>.
47. Klinke ME, Fernandez AV. Taking phenomenology beyond the first-person perspective: conceptual grounding in the collection and analysis of observational evidence. *Phenomenology Cogn Sci.* 2023;22(1):171–91. <https://doi.org/10.1007/s11097-021-09796-1>.
48. Petitmengin C. Micro-phenomenology as coming into contact with experience: Subtilisation, surprises, and liberation. *Practicing Embodied Thinking in Research and Learning.* Routledge; 2024. pp. 119–28.
49. Gideon N, Hawkes N, Mond J, Saunders R, Tchanturia K, Serpell L. Development and psychometric validation of the EDE-QS, a 12 item short form of the Eating Disorder Examination Questionnaire (EDE-Q). *PLoS ONE.* 2016;11(5):e0152744–0152744. <https://doi.org/10.1371/journal.pone.0152744>.
50. Clausen L, Rosenvinge JH, Friborg O, Rokkedal K. Validating the Eating Disorder Inventory-3 (EDI-3): A comparison between 561 female eating disorders patients and 878 females from the general population. *J Psychopathol Behav Assess.* 2011;33(1):101–10. <https://doi.org/10.1007/s10862-010-9207-4>.
51. Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The Eating Attitudes Test: psychometric features and clinical correlates. *Psychol Med.* 1982;12(4):871–8. <https://doi.org/10.1017/S0033291700049163>.
52. Tylka TL, Russell HL, Neal AA. Self-compassion as a moderator of thinness-related pressures' associations with thin-ideal internalization and disordered eating. *Eat Behav.* 2015;17:23–6. <https://doi.org/10.1016/j.eatbeh.2014.12.009>.
53. Van Strien T, Frijters JE, Van Staveren WA, Defares PB, Deurenberg P. The predictive validity of the Dutch Restrained Eating Scale. *Int J Eat Disord.* 1986;5(4):747–55. [https://doi.org/10.1002/1098-108X\(198605\)5:4%3C747::AID-EAT2260050413%3E3.0.CO;2-6](https://doi.org/10.1002/1098-108X(198605)5:4%3C747::AID-EAT2260050413%3E3.0.CO;2-6).

54. Bohn K, Doll HA, Cooper Z, O'Connor M, Palmer RL, Fairburn CG. The measurement of impairment due to eating disorder psychopathology. *Behav Res Ther*. 2008;46(10):1105–10. <https://doi.org/10.1016/j.brat.2008.06.012>.
55. Reas DL, Rø Ø, Kapstad H, Lask B. Psychometric properties of the Clinical Impairment Assessment: Norms for young adult women. *Int J Eat Disord*. 2010;43(1):72–6. <https://doi.org/10.1002/eat.20653>.
56. Soper DS. (2025). A-priori Sample Size Calculator for Hierarchical Multiple Regression [Software]. Available from <https://www.danielsoper.com/statcalc>
57. Bruch H. *The Golden Cage: The Enigma of Anorexia*. Harvard University Press; 1978.
58. Fuglset TS, Endestad T, Hilland E, Bang L, Tamnes CK, Landrø NI, Rø Ø. Brain volumes and regional cortical thickness in young females with anorexia nervosa. *BMC Psychiatry*. 2016;16(1):404. <https://doi.org/10.1186/s12888-016-1126-9>.
59. Titova OE, Hjorth OC, Schiöth HB, Brooks SJ. Anorexia nervosa is linked to reduced brain structure in reward and somatosensory regions: a meta-analysis of VBM studies. *BMC Psychiatry*. 2013;13(1):110. <https://doi.org/10.1186/1471-244X-13-110>.
60. Akinwande MO, Dikko HG, Samson A. Variance inflation factor: as a condition for the inclusion of suppressor variable (s) in regression analysis. *Open J Stat*. 2015;5(07):754.
61. Dakanalis A, Gaudio S, Serino S, Clerici M, Carrà G, Riva G. Body-image distortion in anorexia nervosa. *Nat Reviews Disease Primers*. 2016;2(1):1–2.
62. Gadsby S. Anorexia nervosa and oversized experiences. *Philosophical Psychol*. 2017b;30(5):594–615. <https://doi.org/10.1080/09515089.2017.1315083>.
63. Giordano S. *Understanding Eating Disorders: Conceptual and Ethical Issues in the Treatment of Anorexia and Bulimia Nervosa*, Oxford University Press.
64. Lundh LG, Foster L. The ethics of relating to patients as embodied others. In S. Ferrarello, editor, *Handbook of Phenomenological Bioethics*. Bloomsbury. 2025.
65. Mintz LB, O'Halloran MS. The Eating Attitudes Test: validation with DSM-IV eating disorder criteria. *J Pers Assess*. 2000;74(3):489–503. https://doi.org/10.1207/S15327752JPA7403_11.

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