Beyond anorexia and bulimia nervosa: what’s “new” in eating disorders?

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Summary
Despite the fact that awareness of eating disorders (EDs) has grown during the past decades, the conceptualisation, psychopathological characterisation and clinical diagnosis of EDs has proven to be problematic for both researchers and clinicians. Presently, diagnostic criteria employed for anorexia nervosa (AN) and bulimia nervosa (BN) are unable to account for an exceedingly high number of individuals with clinically significant eating symptoms or to properly address new clinical prototypes of ED. The aim of this paper is to describe the developments and current limitations of EDs diagnoses, and to recapitulate the recent literature on emerging phenotypes. Descriptions of the symptoms and behaviours of ED patients with diabulimia, orthorexia, muscle dysmorphia, drunkorexia and nocturnal eating disorders are featured with special focus on psychopathological classification and diagnostic ambiguity issues. An overview of non-specific eating and feeding disorders (EDNOS) in the newly released DSM-5 eating and feeding disorders section is also provided. Given the frequent transition between different phenotypes in patients with EDs and the common occurrence of individuals with clinically significant eating symptoms who evade diagnostic criteria, a better understanding and categorization of emerging EDs is required to guide psychiatric research and improve clinical outcomes.

Key-words
Compulsive behavior • Diabulimia • Drunkorexia • Eating disorders • Feeding disorders • Night eating syndrome • Orthorexia • Psychopathology • Vigorexia

Introduction
The first descriptions of self-starving for religious purposes dates to the Hellenistic era of the Roman Empire, and many anecdotal reports concerning disordered eating behaviours have continuously appeared throughout subsequent centuries ¹. However, the first medical description of anorexia nervosa (AN) is usually attributed to the British physician Richard Morton in 1689. A more in-depth psychiatric approach to abnormal eating behaviours is attributable to the French neurologist Ernest C. Laségue and to the English physician Sir William W. Gull, who introduced the term “anorexia nervosa” ². In 1873, both authors, almost simultaneously but yet independently, published seminal papers concerning the causes, clinical picture and course of AN ³. Up to the second half of the 20th century, eating psychopathology paled in the shadows of psychiatric care and it received little scientific interest. Only after the publication by the German-American psychoanalyst Hilde Bruch of the book “The Golden Cage” ⁴, disordered eating behaviours came to the attention of the general, medical and psychiatric audiences. This event was coupled with the other major prototypical eating disorder (ED) (i.e., bulimia nervosa; BN) being first described in 1979 ⁵. Although awareness of EDs has constantly grown during past decades, their conceptualisation, psychopathological characterisation and clinical diagnosis has remained somewhat problematic. According to Uher and Rutter ⁶, the nosological formulations of ED in both ICD-10 and DSM-IV were unsatisfactory for different reasons, including failure to characterise patients at various developmental stages, lack of continuity between childhood and adult feeding disorders and the difficulties in routine practice using those diagnostic criteria in both clinical practice and research settings. One of the main concerns of such clinical criteria is lack of/poor sensitivity and specificity: many patients presenting clinically significant eating-related psychopathology do not fulfill the diagnostic criteria, which in the end account only for a minority of affected individuals.

To settle such problems, both the American Psychiatric Association and the World Health Organization made significant changes in the latest revisions of DSM and ICD, respectively. ICD-11, for example, promises greater attention to cross-cultural validity, a more cogent life-course characterization, a more pronounced prototypical approach with greater modulation of diagnostic thresholds (e.g., a uniform 4-week criterion for the illness duration) and a revision of diagnostic boundaries to avoid the
inflation of “other disorders” categories. Unfortunately, as the ICD revision process has just entered its “beta phase” (2013-2017) and the revision process will be completed by the year 2018, many years will have to elapse before the impact of ICD-11 on ED clinical diagnosis and psychopathological conceptualisation can be determined. The newly produced DSM-5 attempted to correct the flaws of its previous edition, with the explicit aim to better represent the symptoms and behaviours of ED patients across their life-span. The most substantial changes introduced in the DSM-5 section on “Eating and Feeding Disorders” are the revision of the diagnostic criteria for AN (more focused on observable behaviours and with the amenorrhoea no longer needed for the diagnosis), and for BN (reduced frequency of binge eating and compensatory behaviours). In DSM-5, greater attention is given to binge eating disorder (BED) as a stand-alone diagnostic category, whereas three previously listed disorders within the “disorders usually first diagnosed in infancy, childhood or adolescence” are also included. The above changes were expected to minimise the use of catch-all diagnoses (e.g. “other specified”, EDNOS, or “unspecified” eating disorders) and make EDs diagnoses easier for the clinician. Several recently published studies are in line with such expectations: for instance, the use of DSM-5 criteria was associated with significantly less frequent residual eating disorder diagnoses in 150 adolescent and young adult residential female patients, in 117 community outpatients, 309 outpatients and even among adolescents from the community.

Nevertheless, current diagnostic criteria for AN and BN still do not account for the majority of individuals with clinically significant eating symptoms and new clinical prototypes for EDs have been described. The aim of the present paper is to provide an overview of the recent literature covering some of the emerging alleged EDs.

**Diabulimia**

Type 1 diabetes mellitus is an inflammatory autoimmune disease that leads to the destruction of insulin-producing pancreatic cells resulting in a lack of insulin. Besides having to take into account food intake and energy expenditure, in order to avoid hypo- and hyperglycaemia, multiple daily doses of insulin must be administered to diabetic patients. As the majority of patients with type I diabetes are children or adolescents, they may represent a high-risk population for ED. Recent reports highlight that adolescents with type I diabetes are twice as likely to experience an ED as non-diabetic ones by exhibiting difficulties in maintaining optimal weight with increased risk of concerns about weight and body shape. Having abnormal eating behaviour in patients with diabetes can be especially challenging in order to keep glycaemia under control since insulin encourages fat storage. Consequently, many people with type I diabetes attempt to reduce their insulin injections in order to induce/provoke weight loss. The word ‘diabulimia’ refers to the deliberate omission or reduction of insulin use in individuals with type 1 diabetes with the specific purpose of weight control. The association of intentional hypoglycaemia in patients with type 1 diabetes and BN/EDNOS has been recently reported. Diabulimia does not represent a fully recognised medical condition yet, but it is receiving growing attention. The American Diabetes Association has acknowledged the existence of this condition for quite some time and it has been estimated that between 30 and 40% of adolescents and young women with diabetes skip insulin after meals. The lack of proper insulin treatment may lead to many harmful conditions spanning from the short term risk of dehydration, breakdown of muscle tissue and fatigue, and kidney failure, retinopathy and cardiovascular and neuropathic complications over the long term; thus, diabulimia represents a potentially life-threatening disorder requiring immediate medical attention. Furthermore, recent reports on the coexistence of type 1 diabetes and AN highlight the possible increased incidence of known diabetic complications (such as retinopathy and nephropathy) and peculiar difficulties in glucose control especially during “refeeding” phases. These patients also present lower motivation to change their eating behaviours and a generally poorer prognosis.

Specific screening questionnaires and biological methods have recently been proposed to diagnose diabulimia. Glycosylated haemoglobin (HbA1c) is usually higher in diabetic patients with and without EDs, and the HbA1c pattern allows for the detection of intentional insulin omission for weight loss (usually with a pattern of initially stable HbA1c levels followed by both high HbA1c levels and wide fluctuations between visits). At present, neither specific diagnostic nor treatment guidelines are available; when diabetes and EDs co-occur, the clinician is left to make generic recommendations on the adherence to insulin treatment and correct diabetes self-management, in order to prevent complications in susceptible patients with only a generic focus on psychopathology and eating patterns.

**Orthorexia**

Orthorexia is a term used to describe a pathological obsession for “healthy” or “pure” food (e.g., free of herbicides or pesticides), with rigid avoidance of food believed to be unhealthy or polluted. The term “orthorexia” is derived from the combination of the Greek words “orthos” (which means accurate, right, correct, valid) and
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common traits of perfectionism, anxiety, need to exert control and valuing diet adherence as a proof of self-control (and deviation from the diet as a failure of self-control) with AN. Therefore, there is still an open debate regarding whether orthorexia is a unique disorder or just a subtype of anorexia or obsessive-compulsive disorder. The empiric investigation of motivations and body perception (e.g., pursuit of an ideal body shape vs. keeping an healthy body), of ideation toward eating and food (e.g., worries about quantity vs. quality of food), of the level of illness insight/awareness (subjects with AN try to hide their habits whereas orthorexic individuals allegedly show off their behaviour) and of socio-demographic characteristics (e.g., sex distribution, level of education, access to food-related information) in clinical populations will probably shed further light on the true psychopathology of this syndrome. At present, orthorexia would most appropriately be categorised, within DSM-5 options, as “avoidant/restrictive food intake disorder” (ARFID), although it has been suggested that it may represent a distinct subtype.

Muscle dysmorphia

Muscle dysmorphia (MD), also known as “vigorexia” or “bigorexia”, is a body image-related psychological con-
dition in which normal or even unusually muscular; affected persons demonstrate an excessive focus on body appearance associated with the fear of being “small” or “puny”. Such fear leads to unwarranted physical exercise and increased body size. Usually, pathological preoccupation with one’s degree of masculinity causes severe subjective distress, impaired social and occupational functioning (due to the feelings of shame over their perceived appearance flaws and to their excessively time-consuming exercise schedule), and frequent abuse of anabolic steroids or other similar substances in an attempt to gain size. Due to lifestyle modifications and substance abuse, MD can lead to serious health complications such as damage to muscles, joints and tendons, fatigue, acne, testicular atrophy, decreased sperm count, high blood pressure, high cholesterol, abnormal liver function, constipation, retention of water and intestinal gas.

Although male body builders are thought to be at higher risk for MD, the few available studies tend to report that the number of affected females is increasing in relation to body size. Due to lifestyle modifications and substance abuse, MD can lead to serious health complications such as damage to muscles, joints and tendons, fatigue, acne, testicular atrophy, decreased sperm count, high blood pressure, high cholesterol, abnormal liver function, constipation, retention of water and intestinal gas.

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Despite continued investigation on the topic, contention surrounds MD nosology as it has been classified in different categories, with little consensus among researchers and clinicians. Over the years, MD has been linked to at least four different psychopathological realms: EDs, obsessive-compulsive disorder, body dysmorphic disorder and, more recently, behavioural addictions (in this case, addiction for a perfect muscular body). To reveal the psychopathological conundrum behind the diagnosis of MD, one could reflect on the fact that, although being historically conceptualised as a “reverse” or “opposite” form of AN mainly because of the antithetical symptomatology in relation to body size. Indeed, individuals with MD tend to see their body size as excessively “small” and/or “weak” and, even though they may look normal or highly muscular, they wish to be larger and more muscular. Specific diagnostic criteria have been proposed for DM (Table I).

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Drunkorexia

Drunkorexia is used to describe a disorder characterised by restricting food assumption, before alcohol is consumed or planned to be consumed, in order to avoid calorie intake. Literature on the topic is very scarce, with only 6 related articles available in PubMed at the present moment. The available evidence tend to support the idea that drunkorexia is a relatively common activity among US college students with a reported 46% of prevalence within this population. Young age, female sex, physical exercise, abnormal eating and heavy-drinking behaviours have been associated with a higher risk of develop-
ing drunkorexia. As this disorder combines the worse of drinking and the worse of dieting, the consequences involve not only drinking excessively on an empty stomach, but also dangerously altering nutrition. Although a questionnaire providing a multidimensional measure of specific motivations and behaviors of drunkorexia has recently been proposed, it has not been validated yet.

Even though some authors recently proposed that drunkorexia might be specifically related to weight concerns in line with the higher incidence among female heavy-drinkers with respect to males, the psychopathological characterisation of the syndrome is still very rudimentary. Further studies are needed to design focused interventions, which might aid in safely reconciling pressure to be thin and participate in binge drinking.

Nocturnal eating disorders

Nighttime eating might occur in a variety of psychiatric syndromes, ranging from atypical forms of depression to binge eating. Moreover, two major psychiatric clinical entities characterised by abnormal meal timing have been described: “nocturnal eating syndrome” (NES) and sleep-related eating disorder (SRED).

NES was defined almost half a century ago by Stunkard et al. as abnormal meal timing with nocturnal hyperphagia and morning anorexia, insomnia and awakening, in the absence of daytime EDs it typically occurred during periods of stress and was associated with poor outcomes of efforts to reduce weight. Throughout the years, NES has been conceptualised as a proper sleep disorder (and classified within the First International Classification of Sleep Disorders) or as a circadian rhythm disorder (with food intake being shifted towards the end of the day, interfering with sleep and decreasing satiety). Besides sleep reduction and fragmentation, the high scores obtained on several psychometric scales for eating symptomatology suggest that NES is psychopathologically related to EDs, although the amount of food consumed in the evening/night is not necessarily large and its disordered eating pattern is not better explained by BED, nor is any loss of control over food intake required. Due to its high comorbidity with obesity and other psychiatric conditions, NES represents a specific focus of attention for clinical care. Recent reports tend to confirm that NES is prevalent among psychiatric outpatients and associated with depression, impulse control disorder and nicotine dependency, especially when high degrees of body dissatisfaction are present.

Nonetheless, and in spite of the availability of several specific psychometric tools, NES is often neglected by both health professionals and patients and is practically ignored by major diagnostic systems (DSM-5 relegated it to the EDNOS category). However, the latest revision of its diagnostic criteria (Table II) might increase the validity of the NES diagnosis and favour its inclusion in future updates of psychiatric diagnostic systems.

Another condition that poses a link between disordered eating and sleep dysfunction is SRED, which is characterised by recurrent episodes of eating at the transition from night-time sleep to arousal, with preference for high-caloric foods. The level of consciousness during SRED may vary widely (from partial consciousness to complete unawareness) and this might create some diagnostic ambiguity between SRED parasomnias and somnambulistic episodes. Furthermore, SRED is frequently associated with the use of psychotropic medications (particularly sedative-hypnotics) and other sleep disorders. Although it seems to share some pathophysologic features with NES, several other aspects tend to clearly differentiate SRED from the latter and make it a candidate psychiatric disorder.

**Table II.**

Proposed research criteria for NES.

<table>
<thead>
<tr>
<th>A. The daily pattern of eating demonstrates a significantly increased intake in the evening and/or nighttime, as manifested by one or both of the following:</th>
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<tr>
<td>1. at least 25% of food intake is consumed after the evening meal</td>
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<td>2. at least two episodes of nocturnal eating per week</td>
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| B. Awareness and recall of evening and nocturnal eating episodes are present |

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<th>C. The clinical picture is characterized by at least three of the following features:</th>
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<tr>
<td>1. lack of desire to eat in the morning and/or breakfast is omitted on four or more mornings per week</td>
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<td>2. presence of a strong urge to eat between dinner and sleep onset and/or during the night</td>
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<tr>
<td>3. sleep onset and/or sleep maintenance insomnia are present four or more nights per week</td>
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<td>4. presence of a belief that one must eat in order to initiate or return to sleep</td>
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<tr>
<td>5. mood is frequently depressed and/or mood worsens in the evening</td>
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| D. The disorder is associated with significant distress and/or impairment in functioning |

| E. The disordered pattern of eating has been maintained for at least 3 months |

| F. The disorder is not secondary to substance abuse or dependence, medical disorder, medication, or another psychiatric disorder |
Other eating disorders

Some other clinical syndromes related to abnormal eating behaviour have been reported during the past decades. For the majority of them, many nosological controversies, mainly due to their relative clinical rarity and the consequent scarcity of empirically grounded data, still persist; given the concerns about their real prevalence in the general population and their long-term course, only some of these have been included in DSM-5 and will be probably included in the upcoming ICD-11. A brief account of the disorders most frequently reported in the literature is provided in Table III.

Conclusions

The psychopathological definition of “non-threshold” EDs is still blurred, at least for some syndromic entities. However, given the fast rate by which alleged “new” EDs are described in the scientific literature, the field still requires

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<th>Proposed eating syndrome</th>
<th>DSM-5 inclusion</th>
<th>Clinical features</th>
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<tr>
<td>Adult Pica</td>
<td>Yes</td>
<td>Pica is the persistent eating of non-food substances (including earth, chalk, metals, plastic objects, hair, faces, etc.). Traditionally included in the major diagnostic systems among conditions usually occurring during infancy or childhood, DSM-5 has recognized that adult presentations of pica may persist. Presently pica typically is given attention during adulthood, but the diagnosis is made only if the condition is severe, leads to adverse consequences and happens outside cultural or religious practices (Nicholls &amp; Bryant-Waugh, 2009). Pica is frequently diagnosed during pregnancy and among people with intellectual disabilities and is rare among the general population, but recent reports tend to show that the prevalence of related behaviors might be higher among people with ED (Delaney et al., 2015)</td>
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<tr>
<td>ARFID</td>
<td>Yes</td>
<td>DSM-5 renamed infancy or early childhood feeding disorder as “avoidant/restrictive food intake disorder” (ARFID), adding significantly expanded criteria (Norris &amp; Katzman, 2015). The syndrome, also dubbed “selective eating disorder”, is characterized by the inability to eat certain foods and strong preference for “safe” foods. Individuals may exclude whole food groups (such as fruits or vegetables) or the refusal maybe be based just on color or on specific brands. Patients with ARFID seem to be clinically distinct from those with AN or BN, as they tend to be significantly underweight with a longer duration of illness and a greater likelihood of comorbid medical and/or psychiatric symptoms (Fisher et al., 2014)</td>
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<tr>
<td>Choking phobia</td>
<td>No</td>
<td>Also known as “anginophobia”, “phagophobia” or “swallowing phobia”, this is rare clinical entity that is characterized by the phobic stimulus of swallowing that results in the avoidance of food or drinks, and ultimately to low weight, social withdrawal, anxiety and depression states (Lopez et al., 2014)</td>
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<tr>
<td>Emetophobia</td>
<td>No</td>
<td>Emetophobia is an intense and irrational anxiety pertaining to vomiting and/or nausea, which may lead to food avoidance and weight loss, because of its intense somatization mechanism (Boschen, 2006). The disorder is often hidden because of the associated shame among sufferers. Very little empirical data are available concerning its epidemiology, treatment and outcome. It is classified among specific phobias in ICD-10 and DSM-5 and seems to be comorbid with anxiety and depressive disorders, rather than with eating disorders (Sykes et al., 2015)</td>
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<tr>
<td>Food addiction</td>
<td>No</td>
<td>It has been proposed that some kind of foods may be potentially addictive and thus cause overeating and, in turn, obesity (Meule &amp; Gearhardt, 2014). However, several concerns have been expressed with regard to the shift of focus from “eating addictive” behavior to the substance-based addiction model, especially because of the lack of systematic clinical and translational studies in this field (Hebebrand et al., 2014)</td>
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<tr>
<td>Grazing</td>
<td>No</td>
<td>Grazing is a relatively frequent behavior characterized by a repetitive eating pattern, often following bariatric surgery; since it has also been reported in eating disordered and community samples, and given its negative impact on weight outcomes after bariatric surgery, it is receiving greater attention, though the use of different definitions has prevented accurate measurements and comparison of data across studies (Conceição et al., 2014)</td>
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(continued)
great clinical attention by researchers and clinicians. Despite numerous biological, psychological and physical hallmarks of EDs have already been identified, and the role of environment has been recognised to increase the risk for disordered eating, the comprehension of potential new disease patterns is still superficial. Grasping emerging ED phenotypes in-depth is especially challenging because of symptom overlap and rapid transition between different phenotypes over time. Understanding whether they are new clinical entities or whether they encompass an existing major eating disorder will aid clinicians in managing such patients and policy makers in implementing prevention programs for vulnerable groups.

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