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Theoretical Analyses

Evolutionary Aspects of a New Eating Disorder: Orthorexia Nervosa in the 21st Century

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Abstract

In this theoretical study, certain characteristics of orthorexia nervosa (ON) are assessed. As a type of disordered eating, ON is characterized as pathological healthy eating obsession. By reviewing previous literature, four orthorexic traits are investigated whether they meet the conditions of becoming adaptive drivers of human behavior. First, learned neophobia to avoid “improper” foods is considered as an advantageous strategy, secondly, ON being a cohesive force based on common beliefs and its religious, virtuous characteristics is adaptive as well. The third orthorexic trait in the form of physiological consequences (refeeding syndrome, malnutrition) suggests that ON is rather a nonadaptive health behavior, along with the fourth characteristic, namely, the psychological disturbances that health anxiety may induce. To conclude, ON can be viewed as an inherently useful tool to protect one’s health by diet, but also as a phenomenon which has extreme forms causing health problems. The exact etiologies are unexplored, therefore, the psychological, social and cultural drivers of extreme healthy eating are important to understand for future improvements. In order to establish the criteria and therapeutic guidelines, it would be beneficial to collect narrative data and experiences from individuals with orthorexic tendencies.

Keywords: theoretical study, eating disorder, orthorexia nervosa, health behavior, diet

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Although diagnostic boundaries and clear definitions are not yet set, academic attention has risen to contribute to the current scientific literature on the phenomenon called “orthorexia nervosa” (ON) in the past few decades. The term was first mentioned in a non-scientific journal, in context of the increased interest towards proper food and developing devotion to certain healthy dieting habits (Bratman, 1997). Later, Gleaves, Graham, & Ambwani (2013) characterize ON the following way:

1. spending large amounts of time (more than three hours per day) thinking about, shopping for, and preparing healthy food,
2. feeling superior to those with differing eating habits,
3. following a particular health-food diet rigidly and engaging in compensatory restriction to make up for any dietary indiscretions,

4. tying self-esteem to adherence to the diet (feeling guilt and self-loathing when straying and self-satisfaction when complying), and
5. turning eating 'properly' into the central focus of life, at the expense of other personal values, relationships, previously enjoyed activities, and sometimes, ironically, physical health. (Gleaves, Graham, & Ambwani, 2013, p. 2)

Twenty years after coining the term ON, and after experiencing an emerging interest from medicine and psychology, Bratman added that being a “health-junkie” will only become pathological if further progression takes place: obsessive thinking, compulsive behavior, self-punishment and escalating restriction may become central drivers of life, while hindering other important areas (Bratman, 2017). A review study conceptualized ON as “health food addiction”, labeling it as a behavioral addiction (Dudás & Túry, 2008). Loss of self-control and impairment in social functioning, as part of addiction’s definitions (American Psychiatric Association, 2013) were also proven to be present in the individuals’ lives suffering from compulsive “orthorexic” preoccupation (Catalina Zamora, Bote Bonaechea, García Sánchez, & Ríos Rial, 2005; Rangel, Dukeshire, & MacDonald, 2012). Thus, besides the obsessive-compulsive traits and the risky dietary restrictions, addictive behavior can also be a valid criterion for labeling ON as a medical issue. However, since “orthorexic” symptoms and diagnostic criteria are not concretely defined, it has not yet become a psychiatric disorder as a part of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013).

Anorexia nervosa (AN) is characterized by refusal of nutrients and severe body image disturbances (American Psychiatric Association, 2013). The evolutionary advantages of AN have been tackled by past studies. For example, Gatward (2007) states that in its symbolic sense, it has been considered as a reaction to feeling threatened and it is a form of resignation from power. Thus, holding on to weight loss is signifying the lack of status and fighting capabilities by avoiding competition and combat, and this protects themselves of potential failure as well. Jánosi and Túry (2012) indicate that fashion and dieting industry benefit from the ability and enthusiasm of women’s control over their bodies. This increased aspiration to lose weight is originated from the female fitness marker of a hip/waist ratio, signaling reproductive potential. Therefore, its extreme anorexic form is a competitive strategy among women (Abed, 1998).

ON is becoming an increasingly well studied topic by several scientific branches, yet it has received no attention from an evolutionary perspective. The aim of this study is to assess certain characteristics of ON. By reviewing previous literature, four traits are investigated whether they meet the conditions of becoming adaptive drivers of human behavior.

First, the psychological mechanism and the roots of selective eating are identified and studied whether orthorexic tendencies have common roots with taste aversion and neophobia. Secondly, it is theorized that the trait of group cohesion, as an adaptive psychological mechanism is also present in individuals that have orthorexic tendencies. However, there are also disadvantages which confirm the unlikelihood that orthorexia is a beneficial behavior in evolutionary terms. As the third typical orthorexic phenomenon, nutritional health threats are reviewed. Finally, orthorexic behavior also may have the downside of developing psychological disturbances such as depression and anxiety which will be discussed. There are both ‘pro’ and ‘con’ arguments to the evolutionary explanations of ON, which are important to be synthesized.

Method

This theoretical study follows the structure of dialectic reasoning; starting with a thesis (ON evolving as an adaptive mechanism) and developing a contradictory antithesis (ON is rather non-adaptive), both grounded by evidence from previous literature. Synthesis is achieved by reconciling both possibilities and proposing further realms of research questions in the unexplored field of ON.

Results

Orthorexia May Be Adaptive due to Selective Eating

One type of selective eating is neophobia: an adaptive, reflexive reaction to certain food types, common in the animal kingdom (Addessi, Galloway, Visalberghi, & Birch, 2005). Taste aversion is oftentimes an unconditional reaction; it does not require any consciousness. Even the molluscs are able to learn to sense what contains toxins, and to differentiate between odors and flavors, which was inevitable for surviving without food poisoning (Ratcliffe, Fenton, & Galef, 2003), thus, there is no need to experience all food sources whether they are edible or poisonous.

However, neophobia can also be a learned behavior. Social species are able to learn food preference, as Jouventin, Pasteur, and Cambefort (1977) also demonstrated while studying baboons. The experiment's results showed that they could observe each other's food preference. Five baby baboons witnessed an adult baboon eating red-colored unflavored bananas while avoiding blue-painted bananas flavored with quinine. Fifteen days after the experiment, four of the five children had eaten the red bananas, but reluctantly and unpleasantly tasted the blue ones, although they were the same unflavored ones.

Selective eating and neophobia developed by orthorexic individuals are also based on similar principles: either reflexive aversion (Thompson, Cummins, Brown, & Kyle, 2015), or social learning (Nicolosi, 2007). Neophobia as an orthorexic strategy is particularly present regarding foods that are believed to be impure or improper. Nicolosi's (2007) theorizing suggests that neophobic food anxiety about "bad" (p. 52) food is oftentimes based on the fear of the "artificial" (p. 44), expressing hostility towards biotechnologies, as opposed to "natural" connected to "the myth of Eden" (p. 53). It has been shown that model-following social learning about food is not exclusively human-specific phenomenon, thus, its evolutionary roots are more apparent (Jouventin, Pasteur, & Cambefort, 1977).

Orthorexia May Be Adaptive due to Its Social Characteristics

Baumeister and Leary (1995) studied the necessity of belonging to a group and found that contacting fellow human beings is one of the most important drives of life. Joining the group provides security, knowledge, satisfaction, a drive to reach certain goals, and it also encourages information exchange.

Well-organized ideas and common beliefs helped the survival and reproduction of members of the group. Magical-religious beliefs are held by all humans (Csányi, 2006). As Mircea Eliade (2014, p. 11) put it, we are all descendants of "homo religiosus", so the modern man has brought many private religions, while drifting away from traditional religions as a "desacralized" individual. Beyond institutionalized religion or even spirituality, sa-

cred ideologies can also hold pseudo-control and mythological elements. While profane space for humans is unorganized, sacred spaces provide a "solid point" for the believer to hold on to, which stands out in the chaos. For orthorexic individuals, this cohesive force is finding the perfect diet and maintaining health. Pure food and clean eating have provided stability and control for people with disordered eating (Rangel, Dukeshire, & MacDonald, 2012), and it has also been shown that social media groups and hashtags have the ability to provide a space to connect, understanding and provide support for like-minded people (Juarascio, Shoaib, & Timko, 2010; Turner & Lefevre, 2017).

Another theory-oriented study suggests that orthorexic behaviors are relevant evolutionary strategies because they can enable earning recognition and honors from others (Musolino, Warin, Wade, & Gilchrist, 2015). When humans were in the process of organizing into societies, each group member had a need to develop a position in the community, which also proved to be useful: competition for organizational positions and leading roles was an important organizing force. Status is gained by earning recognition and honors from others and competitive situations (McAdams, Hoffman, Mansfield, & Day, 1996). Personal accounts from the qualitative study conducted by Musolino, Warin, Wade, and Gilchrist (2015), demonstrate how health consciousness reflects the person's moral quality. For the individuals quoted, weight is tied to purity as a moral and spiritual quality. *"Kelly, for example, took great pride in holding this superior position and sharing her knowledge with friends and acquaintances"; "(…) women would regularly praise Gemma for her rapidly shrinking physique, and ask how she has achieved such quick weight loss - clearly positioning her as a success."* (Musolino, Warin, Wade, & Gilchrist, 2015, p. 23). The theme of taking care of oneself placed them higher in their social networks, which reinforced their practices and beliefs that progressed further their disordered eating.

Orthorexia Is not Adaptive due to Possible Health Complications

In current literature, four specific case studies are standing out, that demonstrate secondary symptomatology, that is, physiological consequences occurring due to restrictive healthy eating. Mathieu (2005) quotes Bratman referring to a case when he met a woman whose starvation-induced heart failure and subsequent death was due to a strict healthy food-based diet. Park et al. (2011, p. 33) report the following about a patient: "He had eaten only 3-4 spoons of brown rice and fresh vegetable without salt for three months to treat his tic disorder. He developed hyponatremia, metabolic acidosis, subcutaneous emphysema, mediastinal emphysema, pneumothorax, and pancytopenia." Moroze, Dunn, Holland, Yager, and Weintraub (2015) reported their patient to have 3-year history of poor nutrition resulting in weight loss with significant malnutrition. Followed by curing this patient, the first formal proposal for diagnostic criteria has appeared, adding more importance to the fact that orthorexic behavior might be harmful to one's health. Reported by Nauta, Toxopeus, and Eekhoff (2016), another case study mentions a 71-year-old male who did not meet the criteria for a DSM-registered eating disorder, but his obsession with his diet that contained exclusively vegetables, oil and water led him to heart failure, cachexia and biochemical disturbances, gastrointestinal complications. Malnutrition can cause deficit in cognitive functions as well due to the possible nutrient imbalance of special diets (Bayless et al., 2002), which has been the leading argument for considering orthorexia as a serious issue (Dunn & Bratman, 2016).

As a result of severe malnutrition, refeeding syndrome may occur in restrictive eating disorders, as after drastic food withdrawal, poorly reintroduced meals could lead to fatal complications (Matthews, Capra, & Palmer, 2018). Due to such difficulties, two deaths have been reported by the organizers of two juice cleanse fasting retreats in Hungary (Bóna, Forgács, & Túry, 2018). Reaching relief from fasting is not a new concept: withdraw-

ing food for a longer period is a regular ritual for the major religions (Lukács & Kézdy, 2008). More recently, fasting practices are introduced as a "detoxification" endeavor in Western culture, as an opportunity to stay away from work stress and family, while experiencing a real de-loading. Despite their aim of staying healthy and “clean their bodies”, the two mentioned participants were not following the strict suggestions of avoiding binge eating (Bóna et al., 2018, p. 1144). The rare deaths that may occur after these retreats are especially tragic as they have been attending to improve their health.

Orthorexia Is not Adaptive due to Psychological Disturbances

A recent case study showed connection between major depressive disorder and ON (Lopes, Melo, & Pereira, 2018). It presents a set of orthorexic traits that the patient has had over twelve months, followed by symptoms of depression. Mirtazapine medication ended both their depressed state and preoccupation with healthy eating, which led to raise their BMI from 16.2 to a normal state of 19.3. In another case description, it has been shown that olanzapine (antipsychotic medication) is also effective in curing magical thinking and obsession that were originating from the beliefs in the health qualities of the diet (Moroze et al., 2015).

Clean and natural eating or limiting the amount of food is representing self-care and responsibility for health. The notion of healthism was termed to describe this individual obligation by Crawford in 1980. Going beyond the arguments about the obvious benefits of healthy eating habits, “healthist” standards may lead to cognitive distortions. Achieving and maintaining the perfection of the elaborate athletic body becomes a moral issue in the code of “healthism”, over-emphasizing the willpower and responsible behavior required (Crawford, 1980). Eating - just like the body - must be perfect as well. Thus, the lean body struggling with the perfect diet is an important part of the value system of healthism, which draws a visible line between them and those who are not as attentive and responsible. A person who eats healthy, controls impulsivity, has energy and goals for which he/she works with discipline that is a “twisted version of the Protestant work ethic” (Musolino, Warin, Wade, & Gilchrist, 2015, pp. 23-24). However, these standards are equivalent to perfectionism which is a significant correlate with orthorexic tendencies, as well as fearful and dismissing attachment styles (Barnes & Caltabiano, 2017; Oberle, Samaghabadi, & Hughes, 2017). Cognitive distortions and obsessive-compulsive disorder have also been suggested to have a strong association with orthorexic tendencies (Belloch, Roncero, & Perpiña, 2016; Brytek-Matera, Fonte, Poggiogalle, Donini, & Cena, 2017; Gramaglia, Brytek-Matera, Rogoza, & Zeppegno, 2017; Hadjistavropoulos & Lawrence, 2007; Koven & Abry, 2015).

Discussion

The present theoretical study, first in the literature, examines ON in the context of evolutionary strategies. While reviewing the existing literature, the authors revealed selective eating and group cohesion as two possible adaptive behavioral mechanisms that may have allowed ON to become a widespread phenomenon (Musolino, Warin, Wade, & Gilchrist, 2015; Rangel, Dukeshire, & MacDonald, 2012; Turner & Lefevre, 2017). Followed by that, biomedical and psychological conditions were listed that contradicted its existence as an adaptive mechanism (Bóna, Forgács, & Túry, 2018; Moroze, Dunn, Holland, Yager, & Weintraub, 2015; Nauta, Toxopeus, & Eekhoff, 2016; Park et al., 2011).

Reconciling the Extremities: ON as a Coping Mechanism With Modern Health Worries

Despite not having its own DSM-5 category, ON is present in modern, western world, as a possible coping mechanism to handle the rapid cultural evolution and changes of human urban environment. According to Nesse's (1999) hypothesis, some adaptive strategies from the past are not anymore beneficial, because what causes danger has changed significantly in the modern environment (Jánosi & Túry, 2012). A great example is demonstrated by the "Savanna principle" (Kanazawa, 2004, p. 28), which claims that humans needed sugar and fat for staying alive and developed a preference for "highly palatable" foods. However, the mutations that helped our ancestors to survive once scarcity, are causing metabolic syndrome today, also referred to as "diabesity" (Koulouridis, 2004, p. 438). This psychological mechanism for preferring fatty and sugary foods and sedentary lifestyle are now real problems that have developed attempts for solutions in the modern world.

The authors of the present study agree that it is possible that the mechanisms of selective healthy eating and strong self-control are adaptive in the future. The counterintuitive mechanisms of restrictive eating could help humans cope with the challenge of the obesogen environment in the 21st century. Cautious, healthy eating and lifestyle interventions are possible solutions transforming the initial aims of orthorexic tendencies into adaptive mechanisms. Understanding this phenomenon may challenge the existing psychiatric claim that ON is a new eating disorder, if its non-extreme forms are causing significant life quality improvements. In future research, this aspect needs to be underpinned with qualitative studies and narrative data, that measure life satisfaction with those who live with this form of selective eating.

Healthist Identities, Orthorexic Societies: Finding the Middle Ground

Current living conditions in the modern western world are not only "forced" into abundance in terms of food, but also information-wise. The most important factor for the dietary extremities turning into eating disorders is the fast spreading of ideas and beliefs. The internet plays a significant role in food perceptions and attitudes that generate a shift in the belief systems about nutrition (Freeland-Graves & Nitzke, 2013). The direct influence of marketing and media, especially social networking sites has been proved to change social values of its young consumers (McHale, Dotterer, & Kim, 2009). The advancement of virtual technology requires new ways of coping: the place of traditional large identity narratives is taken over by micronarratives, which seek boundaries and fixed points in the uncertain world. This can cause allostatic imbalances, difficulties to maintain stability in the process of this rapid change. Such adaptation difficulties require coping mechanisms: ON as an extremism can be considered as one, that turns into harmful health behavior. Even though its primary purposes are benign, the secondary symptomatology is harmful to one's health. The most common form of secondary symptomatology is malnutrition, but also the psychosomatic consequences of anxiety can be severe due to health worries. In future research, conducting more case studies in the clinical practice and collecting information from undernourished patients about their lifestyle choices may improve the current dataset about ON.

Limitations

This study is not without limitations. The study lacks discussion of whether any of the behaviors or underlying traits of ON have demonstrable heritability or have genetic links, which would suggest natural selection. This absence suggests that more exploration and research on ON traits' genetic background is necessary. Another limitation is that the four orthorexic traits examined were picked based on clinical observations that were rein-

forced by the referred studies, and not by using official nosological systems's lists, due to the lack thereof. Further clarification of ON's definition and its diagnostic boundaries needs a high priority.

Conclusion

To conclude, ON can be viewed as an inherently useful tool to protect one's health by diet, but also as a phenomenon which has extreme forms causing health problems. The exact etiologies are unexplored, therefore, the psychological, social and cultural drivers of extreme healthy eating behavior are important to understand for future improvements. In order to establish the criteria and therapeutic guidelines, it would be beneficial to collect narrative data and experiences from individuals with orthorexic tendencies. This study reinforces the importance of interdisciplinary cooperation between social and medical sciences, and public health education, as the evidence shows a clear link between poor diet and health consequences. In order to cure disordered eating, having an unbiased, integrating discussion is important both in academic and non-academic fields.

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