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Investigation of eating and deviant behaviors in bodybuilders according to their competitive engagement

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ABSTRACT

This study investigated eating and deviant behaviors in bodybuilders according to their competitive engagement. Semi-structured interviews were conducted with 16 bodybuilders of different skill levels. Results revealed that dietary strategies and deviations (e.g., disordered eating, doping use, addictive training) developed with competitive commitment. Bodybuilders who intend to engage in competition are in a critical period for the development of deviant behaviors, in relation with increasing drive for muscularity and performance, and coaching pressure. These findings extend the existing literature on deviant behaviors in bodybuilding by providing better insight in the dynamics of development of disordered eating and associated behaviors.

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Introduction

Bodybuilding, which consists of progressive resistance exercise to develop musculature, has become very popular among men in recent decades, especially for aesthetic reasons (e.g., Smith and Hale 2004). This cult of the body affects many male athletes or nonathletes who choose to practice bodybuilding to achieve the thin and muscular body ideal (e.g., Mitchell et al. 2017). Influenced by this male body ideal, men develop certain deviations in their behavior (e.g., Mitchell et al. 2017). These deviations increase with competition; competitors are at greater risk for developing deviations or pathologies than noncompetitors or nonathletes (e.g., Chapman and Woodman 2016). However, the dynamics of development of these deviations still need to be explored. The present research aimed to investigate how eating behaviors and related negative behavioral consequences develop according to bodybuilders' competitive engagement and to identify the main associated psychosocial factors.

Alimentation, supplementation, and doping use in bodybuilders

In bodybuilding, the intense strength training program is often related to a strict nutrition regime that generally involves reducing both sugar ingestion and calorie intake, which facilitates the loss of body fat and increased musculature saliency (Gentil 2015; Helms, Aragon, and Fitschen 2014). Bodybuilders eat large amounts of proteins (Helms, Aragon, and Fitschen 2014; Monteiro, Pimentel, and Sousa 2012) because studies have highlighted the benefits of high-protein diets for weight loss (e.g., Gentil 2015). Bodybuilders use also supplementation, such as powder proteins, containing "important nutrients for building and maintaining all types of body parts including muscles, bones, hair, and nails" (Omar, Othman, and Ismail 2016). Powder proteins are very popular supplements among bodybuilders to aid in muscle development (Bianco et al. 2011; Omar, Othman, and Ismail

2016), and coaches are the main source of information on intake supplementation (Bianco et al. 2011). Alimentation and supplementation vary during the year among sport competitors (e.g., Gentil 2015). Moreover, strict dietary and supplementation practices appear even during the pre-contest season in various sports, notably in bodybuilding (Helms, Aragon, and Fitschen 2014).

In addition, bodybuilders often use doping substances to attain their physical goals (Angoorani and Halabchi 2015; Dakanalis and Riva 2013). For example, in the study of Dakanalis and Riva (2013), 50–100% of men with muscle dysmorphia reported using anabolic steroids. In bodybuilders, anabolic steroid use is viewed as a legitimate way to achieve their desired body shape (Monaghan 2002). Moreover, bodybuilders using steroids distance themselves from other recreational drug users by asserting that steroid use is a means to achieve their objectives rather than an end in itself.

Disordered eating in bodybuilders

Specific diets among athletes can lead to disordered eating (e.g., Chapman and Woodman 2016). Fitness activities and bodybuilding practices may be considered risk factors for the development of disordered eating (Chapman and Woodman 2016; Mosley 2009). The DSM-V (APA, 2013) distinguishes three categories of disordered eating: specified eating disorders, other specified feeding or eating disorders (OSFED), and unspecified feeding or eating disorders (UFED). In addition, muscle dysmorphia is a pathology associated with disordered eating and is considered by some authors to be “reverse anorexia” (Pope, Katz, and Hudson 1993). This preoccupation with leanness was categorized in the eating disorder category in the DSM-IV-TR (APA, 2000) and subsequently as a subtype of body dysmorphic disorder (BDD) in the DSM-V (APA, 2013). Muscle dysmorphia, which occurs when the individual is preoccupied with one or more nonexistent or slight physical appearance defects or flaws (DSM-V, APA, 2013), is characterized by the pursuit of a lean, hypermuscular body (e.g., Mitchell et al. 2017).

Psychological factors related to sport engagement and disordered eating in bodybuilders

Previous studies have identified some psychological factors related to the development of muscle dysmorphia in bodybuilders: body dissatisfaction (e.g., Goldfield 2009); sport dependence (e.g., Griffiths, Foster, and Shorter 2015); and certain personality traits, such as self-esteem, anxiety, perfectionism, and depression (e.g., Mitchell et al. 2017).

Body dissatisfaction, defined as individuals’ body-related negative self-evaluation (Wyssen et al. 2016), seems to be the most important predictor of disordered eating in men (Dakanalis et al. 2015; Wyssen et al. 2016). Several studies have found that high levels of body dissatisfaction influence the desire to become more muscular (e.g., Dakanalis et al. 2015) and to engage in bodybuilding practice (e.g., Goldfield 2009). The high levels of body dissatisfaction and the presence of disordered eating in bodybuilders increase bodychecking (De Sousa Fortes et al. 2017). Muscle dysmorphia (e.g., Mitchell et al. 2017) is strongly correlated with body dissatisfaction and is present among bodybuilders (Griffiths, Foster, and Shorter 2015; Mitchell et al. 2017). Body dissatisfaction is also related to doping behaviors in bodybuilding (Dakanalis and Riva 2013; Griffiths, Foster, and Shorter 2015; Mitchell et al. 2017).

Sport motivation has been identified as another important psychological factor related to the development of unhealthy behaviors in sport, such as disordered eating (Girelli et al. 2016; Hagger and Chatzisarantis 2009) or doping use (Chan et al. 2015). The motivation of athletes preparing for competition evolves (Harwood et al. 2015), and risks of disordered eating among athletes increase with their competitive engagement and competition (e.g., Chapman and Woodman 2016). For example, studies have shown that competitive bodybuilders are at greater risk of disordered eating than non-competitive bodybuilders (e.g., Goldfield 2009; Hale et al. 2013; Mitchell et al. 2017). Previous studies on women practicing fitness sports have shown that disordered eating develops in relation to extrinsic motivation (i.e., a desire to change their appearance) (e.g., Allain, Lentillon-Kaestner, and Ohl 2016). Other studies have underlined that participants suffering from muscle dysmorphia have an extrinsic

objective, with aesthetic motivation resulting from body dissatisfaction and the use of dangerous muscle-building techniques (e.g., Griffiths, Foster, and Shorter 2015). This body dissatisfaction and the use of these dangerous techniques can be amplified by external pressure from coaches (Sansone and Sawyer 2005) and associated with complicated social relationships in bodybuilders and poor quality of life (e.g., Bjørnstad, Kandal, and Anderssen 2014)

Significant associations between perfectionism, anxiety, and the development of muscle dysmorphia (Dakanalis et al. 2015; Mitchell et al. 2017) and between anxiety and body dissatisfaction have been underlined (Dakanalis et al. 2015). According to Smith and Hale (2004), bodybuilding practice, perfectionist tendencies, and dependency were related, and symptoms of bodybuilding dependence were more prevalent in competitive bodybuilders than in noncompetitive bodybuilders.

The existing literature provides insight into the role of sport engagement and of certain psychological factors (e.g., body dissatisfaction, sport motivation, and personality traits) in eating behaviors and deviant associated behaviors (e.g., disordered eating, doping use, addictive training conditions, and deteriorating social networks) in bodybuilding. Nevertheless, prior studies, which were typically quantitative, compared only two categories of bodybuilders (i.e., competitors and noncompetitors) (e.g., Goldfield 2009; Hale et al. 2013). The characteristics of eating behaviors among future competitive bodybuilders (i.e., who do not compete but intend to) and related factors have not yet been explored.

This study was designed to gain better insight into the dynamics of disordered eating and deviant behaviors in bodybuilders according to their competitive engagement. Specifically, eating behaviors, their negative behavioral consequences, and associated psychosocial factors were explored in bodybuilders of various levels of skill and competitive engagement. The study findings are expected to inform the development of disordered eating prevention programs for bodybuilders.

Method

This study was mainly theoretically driven, and we were interested in participants' experiences, realities, and meanings. Specifically, the existing literature on disordered eating and associated psychological factors influenced our research questions, the development of the interview guide, and our analyses.

Participants

The study sample consisted of 16 French bodybuilder volunteers aged 21–41 years ($M_{\text{age}} = 26.4$ years; $SD_{\text{age}} = 5.80$). All participants self-identified as Caucasian. They were selected according to the following criteria: (a) to be major, (b) to have at least 3 years of bodybuilding practice in a gym, and (c) to train more than four hours per week. Based on data analysis, three subcategories emerged based on their competitive engagement: competitive bodybuilders ($n = 5$), future competitive bodybuilders ($n = 5$), and noncompetitive bodybuilders ($n = 6$).

Data collection

Data were collected through semi-structured interviews. The authors worked together to formulate an interview guide based on the existing literature on disordered eating and muscle dysmorphia in male athletes (e.g., Chapman and Woodman 2016; Hale et al. 2013; Mitchell et al. 2017; Mosley 2009). The guide was composed of three sections: sport practice, eating behaviors, and psychosocial characteristics. The first section focused on establishing relationships with the participants and characterizing their sport practice through questions about the duration of bodybuilding practice, frequency, intensity, competition, coaching, and associated behaviors (e.g., bathroom scale use, bodychecking). The second section on eating behaviors contained questions about alimentation, supplementation, and associated behaviors (e.g., eating disordered, doping use, monthly budget). Through the third section, we explored

psychosocial characteristics using questions about psychological factors (e.g., body dissatisfaction, sport motivation), personality traits (e.g., self-esteem, anxiety, perfectionism, depression), and social relationships.

Procedure

The volunteers for this study were recruited in gyms during training. Interviews were conducted on a one-to-one basis by a female researcher, the first author of this article, trained to conduct interviews as a result of (a) her reading of books on qualitative interviewing techniques (e.g., Taylor, Bogdan, and DeVault 2015), (b) her experience with previous interviews (i.e., interviews on mental preparation), and (c) the implementation of three pilot interviews for this study. Given this training, the interviews for this study were conducted by following principles of understanding, kindness, and neutrality (Patton 2005).

Individual interviews ($n = 16$) lasted 2 hours on average and occurred in an office. The study objectives were presented, and personal information on participants was collected at the beginning of each interview. In addition, bodybuilders had to sign a consent form, which indicated their rights (e.g., they were not obliged to participate in this study or to answer questions they found too invasive; they could stop the interview or their participation in this study whenever they wanted to). Participants were informed that the responses would be treated anonymously and confidentially, and all names of interviewed bodybuilders were changed to protect their anonymity.

Data analysis

The data were analyzed in several steps that involved four researchers. Audio-recordings were first transcribed verbatim. The researchers used thematic analysis, which involves recognizing, organizing, and depicting themes from a data set and has been identified as an appropriate qualitative research methodology for psychology research (Braun and Clarke 2006). Thematic analysis started deductively based on the three main themes of our interview guide (i.e., sport practice, eating behaviors, and psychosocial characteristics). Each author familiarized herself with data by actively reading the transcripts. Each *verbatim* transcript was read and categorized by the four researchers separately based on the meaningful information relevant to the research questions and a process of abstraction. In each of the main categories, the categories emergent from athletes' *verbatim* transcripts were retained (inductive analyze); the analysis was not limited to the subcategories in the interview guide. Trends emerged according to eating behaviors, associated psychosocial factors, and related negative behavioral consequences, allowing the researchers to establish three categories of bodybuilders: "non-competitive bodybuilders," "future competitive bodybuilders," and "competitive bodybuilders" (see the Participants section). The four researchers, who were familiar with sport psychology and qualitative methods, checked and interpreted the categories and examined their own raw data themes using a comparing and contrasting process to reach agreement (Denzin and Lincoln 2000). The results are presented in Tables 1 and 2.

Trustworthiness

Several methods were used to increase the trustworthiness of the data (Rolfe 2006). First, we ensured that our sample was appropriate for our research question and used relevant interview practices. The pilot interviews were not included in the final sample, but they helped in establishing an adapted interview guide; the interview length was adapted to the research questions and to each participant. Second, the coding process followed some criteria to ensure trustworthiness (Lincoln and Guba 1985; Patton 2005; Smith and McGannon 2017). For example, the four researchers operated in isolation to independently code the data without negotiation. Subsequently, the four researchers met to compare codes and reach consensus. Consequently, the coding of our study may be deemed

Table 1. Eating behaviors and related negative behavioral consequences among bodybuilders.

Eating behaviours	Alimentation	Meal frequency
Disordered eating	Supplementation	Energy intake Nutritional quality Diversity
	Food control	Frequency Diversity
	Food restriction	Food scale use Alarm reminders Food program
	Objective binge eating	No eating pleasure Diurnal Nocturne
Doping use	Subcutaneous injection Oral doping substances Intention to use doping	

Table 2. Psychosocial factors related to eating behaviors among bodybuilders.

Body dissatisfaction		
Sport motivation	Drive for muscularity	Bathroom scale use Mirror checking
	Achievement motivation	Mastery goals Performance goals
	Passion	Obsessive Harmonious
Personality traits	Perfectionism	
	Anxiety	Trait State
Training conditions	Training load Training forms	Autonomous Supervised
Social network	Personal relationships Social isolation	

reliable and replicable. Third, to ensure “respondent or participant validation,” the transcribed interviews were sent to participants to enable them to examine and comment on the transcript content. The interviewees suggested no changes; thus, they confirmed the data, and the results can be considered credible and the research valid (Smith and McGannon 2017).

Results

The results have been organized into three parts. The first part describes participants’ characteristics according to their competitive engagement, the second part identifies the eating behaviors and related negative behavioral consequences among bodybuilders (Table 1), and the third part presents psychosocial factors related to eating behaviors among bodybuilders (Table 2).

Participants’ characteristics according to their competitive engagement

Three categories of athletes were identified from the sample according to the characteristics of their competition involvement: six “non-competitive bodybuilders,” five “future competitive bodybuilders,” and five “competitive bodybuilders” participating regularly in national and international bodybuilding competitions. Athletes who have trained in bodybuilding regularly for many years ($M_{\text{years of bodybuilding practice}} = 11.8$ years; $SD_{\text{years of bodybuilding practice}} = 6.30$) but who do not wish to participate in bodybuilding competition were considered noncompetitive bodybuilders ($M_{\text{age}} = 27.2$ years; $SD_{\text{age}} = 4.05$). Future competitive bodybuilders were defined as athletes who are in a transition period and who intend to engage in bodybuilding competitions in the near future.

These bodybuilders have been training for a shorter time ($M_{\text{years of bodybuilding practice}} = 4.4$ years; $SD_{\text{years of bodybuilding practice}} = 2.06$) and are younger than the noncompetitive bodybuilders ($M_{\text{age}} = 23.4$ years; $SD_{\text{age}} = 3.14$). The third category of our sample was composed of competitive bodybuilders who had been practicing bodybuilding for many years ($M_{\text{years of bodybuilding practice}} = 9.5$ years; $SD_{\text{years of bodybuilding practice}} = 6.02$) and who are regularly on stage, and they are the oldest bodybuilders ($M_{\text{age}} = 28.8$ years; $SD_{\text{age}} = 6.10$).

Eating behaviors and related negative behavioral consequences among bodybuilders

The eating behaviors of bodybuilders and related negative behavioral consequences are presented in Table 1.

Eating behaviors

In this study, eating behaviors were examined through bodybuilders' alimentation and supplementation frequencies. The amount of daily dietary intake, including alimentation and supplementation, increased according to their competitive engagement, from 5.87 in noncompetitors to an average of 9 in competitors (Table 1).

Alimentation

Bodybuilders' alimentation was analyzed on the basis of two quantitative indicators (i.e., meal frequency and energy intakes) and two qualitative indicators (i.e., nutritional quality and diversity). An evolution of these indicators was observed according to the bodybuilders' competitive engagement. The frequency of their meals seemed to increase particularly in future competitors and competitors. More specifically, competitors ate "between 8 and 10 times a day during pre-competition" (Theo, competitor). Moreover, the intention to compete appeared to be associated with increased energy intake during meals, as underlined by Benjamin, future competitor:

At 16 h before training, I eat 300 g of rice and 200 g of chicken [...]. I know that after a while, when eating, we are not hungry. Nevertheless, I want to eat large quantities, so I eat "like a machine" to eat as much as possible.

Unlike future competitors, competitors tended to consume "small meals every 2–3 hours" (Theo, competitor), and noncompetitors seemed to "emphasize quality rather than quantity" (Yago, noncompetitor).

Concerning qualitative indicators, the quality of nutritional intake evolved along with competitive engagement: bodybuilders adopted increasingly high-protein diets, from 2.25 servings of proteins per day in noncompetitors to 4.62 in competitors and future competitors:

At 7 o'clock, eight egg whites and one egg yolk [...]. Before my training, I take my supplementation, and after training as well. At noon, 200 g of chicken [...]. At 17 h, 180 g of tuna with a salad [...]. In the evening, I will eat 200 g of white fish.

In addition, the type of proteins ingested evolved. Competitors during competitive period consumed only proteins: "In the morning, 25 egg whites. Two hours later, 300 g of coalfish [...]. Two hours later, 300 g of chicken, and I alternate between coalfish and chicken the whole day" (Theo, competitor). Nevertheless, it was the intention to engage in competition that seemed to be associated with the diversification of protein intake, ranging from animal to vegetable proteins (Table 1). For example, this is illustrated in the following interview comment from Alex, future competitor:

At 8 o'clock, cake of egg yolk, vitamins and coffee [...]. At 11 h, 250 g of chicken, 10 almonds [...]. At 13 h, 200 g steak 15%, 10 almonds [...]. Before training, 200 g of chicken, 10 almonds [...]. And after training, I eat 300 g of coalfish with vegetables.

The competitive engagement of bodybuilders was accompanied by an increase in the monthly alimentation budget. Indeed, all the noncompetitors interviewed spent less than 300 euros per month for alimentation. This budget was higher in half of the future competitors, ranging from 300–600 euros. For competitors, during noncompetitive periods, their monthly alimentation budget was comparable to that of future competitors. However, during competitive periods, this monthly alimentation budget increased (i.e., more than 600 euros): “I spend about 600–700 euros per month. During competition period, I spend more, about approximately 900 euros per month solely for alimentation” (Martin, competitor).

Supplementation

There was a growing frequency of supplementation intake with competitive engagement: supplementation was consumed more by competitors in noncompetitive periods (i.e., six times per day on average). During competitive periods, supplementation decreased (i.e., 3.75 times per day on average), and powder protein intake disappeared because “we are never really sure of what’s in it” (Enzo, competitor). However, future competitors diversified their supplementation use greatly, as with their protein intake: “Before my training session, I take a booster in a shaker [caffeine], creatine, glutamine and amino acids [...]. After training, a shaker of BCAA and X [protein supplement] [...]. And at 11pm, I take powder casein” (Alex, future competitor).

As with the alimentation budget, the monthly budget for supplementation seemed to increase with competitive engagement. Most noncompetitors interviewed had a budget of less than 100 euros per month, while most competitors had a monthly budget between 100 and 200 euros per month. For future competitors, some had a budget of less than 100 euros per month, while others had a budget between 100 and 200 euros per month.

Disordered eating

The bodybuilders interviewed reported some disordered eating, such as (a) food control, (b) food restriction, and (c) objective binge eating (Table 1).

Food control

Food control seemed to be associated with the intention to engage in bodybuilding competitions and manifested in the excessive use of food scales, for example: “I use the food scale according to my weight, since the coach told me the quantities” (Alex, future competitor); “I began to weigh everything when I decided to get involved in competition” (Theo, competitor). Competitors “weigh food only during competitive periods but not in the off-season [...]. When I’m off, I do it randomly; I know approximately the quantities I need now” (Enzo, competitor). In addition, future competitors used self-regulation strategies, particularly with alarms reminding them to eat: “I eat every 2 hours, obligated [...]. I always have my Tupperware with me. No matter where I am, when my alarm sounds, I eat” (Ricardo, future competitor).

Food restriction

Food restriction seemed to increase with competitive engagement through the adoption of strict diets. Indeed, future competitors and competitors followed specific food programs established by themselves or their coach: “I’ve been eating like that for one year, since Leo has coached me” (Kevin, future competitor). They adopted severe food restrictions, as illustrated in the following excerpt: “I hold myself back because I know that I do not have to eat that [...]. Sometimes it’s a bit complicated, but I can resist in general” (Kevin, future competitor). The consumption of “pleasure” foods decreased along with competitive engagement. Indeed, noncompetitors ate food that they enjoyed daily (e.g., sweets, fast food, soft drinks): “I have X [fast food] just down, so I often go there” (Jean, noncompetitor). In contrast, competitors completely banished the notion of pleasure from their daily alimentation: “I do things because I have to do them. I am not here to make things easy, so even if I

do not like it, I eat it” (Florian, competitor); “I do not eat for pleasure, in fact; I eat because I have to. So I do not care if it is good or not. I swallow, and it is settled” (Theo, competitor).

Objective binge eating

The diet programs followed by future competitors and competitors generated daily frustration, which could lead to major binge eating. Future competitors who followed a strict diet allowed themselves to deviate from their food programs once a week, commonly known as “cheat meals” in bodybuilding: “I went to the self-service buffet and ate four entrance dishes, five main courses and three dessert dishes. I took in four kilos during one meal!” (Antoine, future competitor). These food deviations turned into binge eating episodes that athletes were able to manage: “I suffer too much from this strict diet, so each food deviation is a big fiasco because I cannot help myself [...]. But the next day, I have a major stomach ache” (Ricardo, future competitor). Finally, the competitors had become “robotic with alimentation” (Florian, competitor), in the sense that their food intake seemed automated in order to achieve their objectives. Thus, the competitors had completely banished pleasure during meals; they had confidence in their diet and no longer felt the need to deviate from their diets because it would have negative consequences for their appearance, as this excerpt illustrates:

I was allowed one meal only. So I wanted to eat as much as I could during one meal, until I got sick. But that’s the worst thing we can do because we get our stomach fat. Whereas now I’ve found a balance. (Theo, competitor)

Most competitors had binge eating episodes but only after competition: “We have been so deprived that after we let go, we eat junk without stopping” (Enzo, competitor). However, others did not change their diets after competition and preferred to “eat rice, green beans and chicken as usual” (Martin, competitor).

Moreover, night eating syndrome was present in bodybuilders and seemed to increase along with competitive engagement. Indeed, most competitors reported night eating syndrome, as in this report by Theo: “In the evening, I take a shaker of X [protein supplement]. And at night, I have an alarm clock that rings at 2–3 h of the morning, and I again take a shaker of X [protein supplement].” A minority of the competitors interviewed, the most experienced, did not wake up at night but consumed a final protein shaker or ate protein before going to bed. Future competitors did not wake up at night, yet they ate protein before sleeping “to prevent the body from fasting” (Kevin, future competitor).

Doping use

Three subcategories were identified to characterize doping use in bodybuilders: (a) subcutaneous injections, (b) oral doping substances, and (c) intention to use doping (Table 1).

Subcutaneous injections

Injections of anabolic steroids seemed to be the most frequently used by bodybuilders, along with injections of growth hormones or peptides. The use of doping substances increases with competitive engagement. Although half of the noncompetitors were totally opposed to doping use and the use of doping substances in this category of practice is not recommended, a noncompetitor admitted to doping use in the past: “I doped once in my life, and I will not do it again” (Fabien, noncompetitor). Among competitors, doping use was more common. All the interviewed competitors regularly used doping substances because “it is part of the sport” (Florian, competitor).

Oral doping substances

Doping use through subcutaneous injections was more frequent than oral use because it “damages the organs least” (Theo, competitor). Nevertheless, some athletes stated that they had already tested

the oral administration of doping substances: “I just took clenbuterol for eight weeks in pill form” (Fabien, noncompetitor). Competitors regularly used doping, knowing their side effects: “We spend our time telling ourselves that we’re going to die, that it is dangerous, but we continue anyway” (Florian, competitor).

Intention to use doping

The intention to dope was present in most future competitors: “I think I am moving towards it [doping use]” (Alex, future competitor). Only one future competitor had already scheduled his doping use in the near future: “I already have everything at home” (Kevin, future competitor), but he appeared to be an exception in this category. Indeed, Kevin was the only future competitor to have a budget devoted to doping substances: “I spend 1000 euros for doping substances and everything [alimentation + supplementation + doping]” (Kevin, future competitor). All competitors used doping regularly, which is why their monthly doping budget was higher than that of noncompetitors and future competitors: “During the period of preparation for competition, I spend 1000–1500 euros [alimentation + supplementation + doping]” (Enzo, competitor); “3000 euros for four months [doping]; 90% of my total budget is for that. I spend a little more than the French statutory minimum wage in bodybuilding, 1200–1300 euros per month [alimentation + supplementation + doping + subscription + travel]” (Martin, competitor).

Psychosocial factors related to eating behaviors among bodybuilders

Five subcategories of psychosocial factors related to eating behaviors among bodybuilders were identified: (a) body dissatisfaction, (b) sport motivation, (c) personality traits, (d) social network, and (e) training conditions (Table 2).

Body dissatisfaction

Body dissatisfaction seemed to be present in all bodybuilders interviewed: “There is always something wrong: I am eternally dissatisfied” (Fabien, noncompetitor); “I always want more because it never goes well” (Antoine, future competitor); “We perceive ourselves as never good enough; that’s why we are always looking to gain more muscle” (Martin, competitor). This body dissatisfaction increased along with competitive engagement, and some competitors had developed double and contradictory body dissatisfaction. They felt too large in their daily life but not muscular enough in the sport context: “Sometimes, I perceive myself as thin [...]. Sometimes I’m too fat. In stores, it’s unbearable, so I stay outside. You do not know where to go; I do not fit between shelves or through some doors” (Theo, competitor).

Sport motivation

Three forms of motivation have been identified: (a) drive for muscularity (i.e., motivation associated with appearance), (b) achievement motivation (i.e., pursuit of mastery and performance goals), and (c) passion (i.e., obsessive and/or harmonious) (see Table 2).

Drive for muscularity

The motivation associated with appearance was related to the drive for muscularity in bodybuilders. This motivation seemed to be present in bodybuilders who intended to engage in bodybuilding competitions: “I do not care; I just want to increase my muscle bulk [...]. We all want to be more muscular” (Ricardo, future competitor). Some noncompetitors and competitors also sought to develop their muscle mass: “I still want to develop my muscles” (Jean, noncompetitor); “What I want physically is to become as bulky as possible, to be out of the ordinary” (Martin, competitor). However, some of them were simply afraid of losing their muscle mass and aimed only to maintain

themselves physically: “I do not want to fall into the extreme, so I’ve been stagnating for two years” (Fabien, noncompetitor);

I spent seven years of my life reaching a goal that I can lose in 3 months if I do not go to the gym. So, I am forced to go because I do not want to become like I was before. (Raphael, competitor)

Moreover, this form of motivation was associated with the adoption of certain behaviors, such as the excessive use of bathroom scales and mirrors, which seemed to vary based on competitive engagement. The intention to engage in competition seemed strongly related to bathroom scale use. Indeed, all of the future competitors interviewed weighed in at least once per week: “I am so obsessed with gaining weight since I started preparing for the competition that I weigh myself all the time to confirm that my weight is on track [...]. Now, it has become a habit” (Ricardo, future competitor). By contrast, noncompetitors and competitors seemed to have less need for control, with these athletes weighing only occasionally: “If I weigh once every two months, it is good” (Fabien, noncompetitor); “I do not even have a scale at home, so I do it in the gym when I think about it” (Martin, competitor). In addition, competitive bodybuilders exclusively used the mirror, as Enzo (competitor) noted: “I look at my body each morning at a minimum to detect defects, such as muscular asymmetry.” The same applied to most future competitors: “We always try to see our weak points” (Antoine, future competitor).

Achievement motivation

Two dimensions characterized bodybuilders’ achievement motivation: mastery (individual comparison) and/or performance goals (social comparison).

All bodybuilders followed mastery goals because they still wanted to progress physically: “The goal is to ‘shake up the body’ to constantly progress” (Dan, noncompetitor); “You are very happy when you see physical changes, so you continue to still progress” (Antoine, future competitor); “I’m still progressing like that, and so as long as I’m progressing, it’s good” (Martin competitor). Mastery goals are present independently of competitive engagement.

The emergence of performance goals was associated with the intention to engage in bodybuilding competitions. Indeed, half of future competitors and all competitors pursued social comparison goals: “I started bodybuilding so I could be the best on stage” (Florian, competitor); “I want to compare with the best ones on the stage, see who is the best” (Alex, future competitor). This type of motivational goal was not present in noncompetitors: “I don’t want to be better than another person” (Yago, noncompetitor).

Passion

By practicing bodybuilding intensively to overcome their body dissatisfaction, the athletes interviewed seemed to develop an obsessive passion in relation to bodybuilding: “It is a real drug” (Jean, noncompetitor); “I think that all bodybuilders are addicted” (Benjamin, future competitor); “I think only about this. I even sold my car or my laptop, only to receive 200 euros and be able to buy supplementation and doping substances” (Theo, competitor). The intention to compete seemed to be associated with the development of an obsessive passion, as underlined by Ricardo, future competitor: “Six meals a day, seven days a week training, and all my free time is devoted to that. I think it’s obsessive anyway.” In contrast, most noncompetitors and competitors were passionate harmoniously about bodybuilding: “It started in an obsessive way, but with time, it’s more and more harmonious because I manage better” (Florian, competitor).

Personality traits

The personality trait analysis was important to understand some of the deviant behaviors of bodybuilding practitioners; perfectionism and anxiety emerged as highly prevalent in the future competitors interviewed.

Perfectionism

The intention to engage in bodybuilding competition seemed to relate to perfectionism. Indeed, all future competitors appeared to be perfectionists with themselves and others surrounding them, whereas this was the case for only half of the noncompetitors and competitors: “Everything I do, I try to do it as best I can” (Jean, noncompetitor); “Perfectionist, outright! Especially with myself, but sometimes with others too” (Theo, competitor).

Anxiety

Anxiety in future competitors seemed to correspond to “trait anxiety.” Indeed, the anxiety felt by these athletes seemed constant and appeared to result frequently from specific external stimuli: “Yes, very [...]. I often have a bit of a knot in my stomach and trembling in my arms” (Alex, future competitor). Most competitors considered their feeling of anxiety to be essentially related to their state before competition (anxiety state): “It depends ... For example, before going on stage, yes” (Martin, competitor). For noncompetitors, most of these athletes did not consider themselves anxious: “I am not very anxious” (Dan, noncompetitor).

Training conditions

Training load

Future competitors appeared to have the highest training load. These athletes tended to train 6 or 7 days per week:

I actually train seven times a week [...]. That is how I am instructed to train. But in fact, I would like to have two days off, so that the muscle can rest and consequently swell. It is true actually that I have no rest, but I have an adequate diet, so it goes well anyway. (Alex, future competitor)

In addition, future competitors allowed themselves vacations only if they did not negatively affect their training pace: “I first look for a fitness center and then a hotel around or a hotel with a well-equipped fitness room [...]. I get up at 6 o'clock in the morning to avoid bothering anyone” (Kevin, future competitor).

Training forms

Training forms evolved according to competitive engagement. Noncompetitors and competitors seemed to prefer to train independently, whereas future competitors preferred to be supervised while training for competition: “I have been supervised for six months” (Antoine, future competitor). Noncompetitors did not aspire to a high physical level; they trained alone and did not feel the need for coaching. Competitors trained independently; their experience in bodybuilding allowed them to manage their own training. They usually planned simple and flexible training programs. Some competitors did not even have programs and adapted their training according to their daily desires. Coaching causes training changes since they work with specific training cycles, which require more rigor and attendance from athletes. This factor could explain why the intention to engage in bodybuilding competitions was associated with both internal and external pressure: “I cannot miss sessions because my coach has established a training cycle that I have to follow” (Alex, future competitor); “If I come to do something wrong on the diet level or elsewhere, I'll get banged up” (Kevin, future competitor).

Social network

Personal relationships

The athletes' training load seemed to have major negative consequences for the athletes' personal relationships. Specifically, the intention to compete appeared to be associated with the deterioration of social relationships: (a) family: “Since I missed the Christmas meal to train, my parents

want me to stop bodybuilding” (Alex, future competitor), (b) intimate: “It’s hard to find a girl who accepts my way of life!” (Benjamin, future competitor), and (c) friendly: “I must admit that I see my old friends less, I am more with people who are like me because they understand my lifestyle” (Kevin, future competitor). Most competitors had experienced a period with difficult social relationships: “I even put my relatives after bodybuilding, my marriage wasn’t a priority, but today I would not make the same errors again” (Theo, competitor). Nevertheless, they seemed to confront less relational difficulty related to their sport practice because they had developed a new social context:

My girlfriend practices bodybuilding and my friends too, because you get a little closer, so my loved ones are from bodybuilding now. At least they do not think about stereotypes; they know me and understand me, so I do not seem like an alien to them (Enzo, competitor).

Social isolation

All the bodybuilders interviewed, regardless of their competitive engagement, agreed that bodybuilding practice tended to favor social isolation: “Bodybuilding is still constraining. For example, I do not go out on Saturdays so as not to be tired the next day and to be able to train” (Jean, noncompetitor); “You’re in your world in preparation for competition, you get confused with everyone, you feel like no one understands you, when you’re just the flustered dumbass” (Theo, competitor).

When I am at my fitness center, I do not pay attention to others because I stay in my bubble. I do not mind what is around [...]. We see it in the fitness, there are those who are here just for the beach, and the real athletes, those who train the whole year, and we do not necessarily understand each other (Ricardo, future competitor).

Discussion

This study was designed to gain better insight into the dynamics of disordered eating and deviant behaviors in bodybuilders according to their competitive engagement. More precisely, eating behaviors, their negative behavioral consequences, and associated psychosocial factors were explored in bodybuilders of various levels of skill and competitive engagement. The findings of this study are expected to inform the development of disordered eating prevention programs for bodybuilders.

First, our results confirmed that bodybuilding is a sport in which participants are at risk for developing disordered eating and associated psychosocial factors. The deviations observed in our study have been highlighted in previous studies: hyperprotein diets and food overconsumption (e.g., Chauliac 2015; Helms, Aragon, and Fitschen 2014; Monteiro, Pimentel, and Sousa 2012), significant budgetary expenditures for bodybuilding practice (e.g., Mosley 2009), associated psychosocial factors such as body dissatisfaction with excessive use of mirrors (e.g., De Sousa Fortes et al. 2017; Goldfield 2009), and social isolation of bodybuilders (e.g., Bjørnstad, Kandal, and Anderssen 2014). However, our qualitative study suggested that body dissatisfaction increased and became more complex in competitors. Half of the competitors interviewed had double and contradictory body dissatisfaction related to social contexts: they did not feel muscular enough in a sport context, but they felt too large in everyday life.

Previous research has often compared competitors to noncompetitors (e.g., Goldfield 2009; Hale et al. 2013) and presented competitors as the most at-risk category (e.g., Goldfield 2009). Indeed, our results confirmed that competitors were a category at risk. However, the major contribution of our study is the identification of an intermediate category, important in the development of deviations: future competitive bodybuilders. Our study emphasized that (a) some deviations seemed to emerge when bodybuilders intended to compete, and they persisted in competitors, and (b) other deviations seemed to be specific to future competitors.

Deviant behaviors emerging with the intention to compete and persisting in competitive bodybuilders

Some deviant behavior appeared when bodybuilders intended to compete: increased frequency of food intake, increased food restriction, intention to dope, and pursuit of performance goals. These deviations seemed to persist and even increase in competitors.

The intention to engage in competition appeared to be associated with the adoption of strict diets. The frequency of food intake (alimentation and supplementation) in future competitors was higher than that in noncompetitors, comparable to that of competitors in noncompetitive periods, and lower than that of competitors in competitive periods. The food intake of future competitors was frequent and very high in protein. The protein intake of the athletes interviewed seemed to increase with their competitive commitment; in fact, protein intake increased and became the only food intake of bodybuilders during competitive periods. Our study confirmed that bodybuilders generally eat more than the recommended intake (Chauliac 2015) and adopt high-protein diets (e.g., Helms, Aragon, and Fitschen 2014; Monteiro, Pimentel, and Sousa 2012; Omar, Othman, and Ismail 2016) and that such tendencies increase along with competitive commitment. Moreover, the increased frequency of food intake seemed to have negative consequences, such as night eating syndrome. This disordered eating emerged in future competitors, as their dietary programs including a final intake of food before sleeping. Night eating syndrome was more prevalent in competitors, who ate before sleeping and woke in the middle of the night to eat protein, as a previous study already reported (e.g., Monteiro, Pimentel, and Sousa 2012).

Food restriction appeared with the intention to compete; future competitive bodybuilders rigorously followed their dietary programs, in which only one pleasure meal was allowed per week. This “cheat meal” allowed athletes to decompress from daily frustrations, but this gap usually turned in objective binge eating episodes. Competitive commitment seemed to be related to increased food restriction and reduced food pleasure; the competitors interviewed banished food pleasure and increasingly automated their food intake to reach their physical objective. The only food gaps that the majority of competitors allowed themselves were after competitions to decompress from the pre-competitive dietary rigor. While Goldfield (2009) highlighted the presence of objective bingeing episodes in competitors, our study emphasized that such episodes were typically present in future competitors as well.

Our research also confirmed the link among bodybuilding, the development of disordered eating, and doping use (e.g., Mosley 2009). In our sample, one noncompetitor had already been tested for doping substances, although this was not the norm in this category. Our study showed that the intention to dope emerged in future competitors; all future competitors were thinking about doping use, and one of them had already bought doping substances for use in the near future. Doping use appeared to increase along with competitive commitment, and our study emphasized the regular use in competitive bodybuilders only.

Concerning sport motivation, performance goals in relation to physical appearance appeared in future competitors and seemed to increase in competitors. Indeed, competitors aim to be in the best shape during bodybuilding competition by displaying the most impressive physiques. The presence of extrinsic motivation and performance goals seemed to influence the adoption of deviant behaviors in our sample, as in previous studies (e.g., Chan et al. 2015). In their study, Chan and colleagues showed that self-motivation in sport was positively associated with the types of motivation allowing an individual to avoid doping, in contrast to controlled motivation, which would be a positive predictor of doping intention.

Deviations specific to future competitive bodybuilders

While some noncompetitors and competitors sought to maintain their physical appearance, future competitors pursued increases in muscular mass. This omnipresent drive for muscularity in future

competitors may be related to specific deviant eating behaviors and psychosocial factors: food control with increasing self-regulation behaviors, obsessive passion, anxiety, perfectionism, addictive training, coaching, and deteriorating social networks. Beyond the intention to compete, the key parameter that evolved in future competitors was the adherence to coaching, which led to the emergence of deviations.

While the frequency of food intake increased along with competitive commitment, the quantity and diversity of food intake were higher in future competitors. In addition, future competitors in our sample developed self-regulation behaviors related to alimentation, weight, and appearance: use of food scales and alarms for each food intake as well as excessive use of bathroom scales and mirrors. Our results were in line with the study of de Sousa Fortes and colleagues (2017), who underlined the link between bodybuilding and bodychecking.

The drive for muscularity, omnipresent in future competitors, could also be related to the development of obsessive passion. Most of the future competitors interviewed were unable to take a rest day and had to train each day even if they went on holiday with their loved ones. Their obsessive passion was positively related to sport dependence (Paradis et al. 2013), and previous studies highlighted increasing sport dependence with competitive commitment (e.g., Goldfield 2009; Hale et al. 2013; Smith and Hale 2004). Nevertheless, our study showed that obsessive passion appeared essentially in future competitors, a category not considered in previous studies. Moreover, obsessive passion could be related to some personality traits that caused vulnerability in future competitors, particularly perfectionism and anxiety. All future competitors interviewed seemed to be perfectionists with themselves and with their peers, whereas only half of noncompetitors and competitors fit this description. All future competitors seemed to show trait anxiety, while competitors reported state anxiety only in relation to competition. Trait anxiety was positively related to symptoms of depression (Castillo et al. 2016) but not to state anxiety. Our study's results are in line with previous results showing that perfectionism favors the development of sport dependence (D. Smith and Hale 2004) and disordered eating if associated with anxiety (Dakanalis et al. 2015).

In addition to individual psychological factors, specific social behaviors were observed in future competitors. Our study showed that personal complications appeared in future competitors, particularly at the affective, friend, and family levels. All the bodybuilders interviewed seemed to avoid people who did not engage in bodybuilding, but future competitors seemed to be at greater risk of social isolation. Our results are in line with previous studies that established the link between the practice of bodybuilding and deteriorating social relationships (e.g., Bjørnstad, Kandal, and Anderssen 2014).

In addition, the emergence of deviant eating behaviors, which was associated with some psychosocial factors, could be related to coaching. Indeed, future competitors were the most at risk for the development of deviations, and all of them were supervised. Coaching causes training changes since such individuals work with specific training cycles that are more complex and that require more rigor and attendance from athletes. These training cycles must be completed as quickly as possible to move on to the next training cycle and allow the athlete to progress. The pressure of sport coaching has been studied previously (Sansone and Sawyer 2005), but the influence of coaching in bodybuilding has been shown mainly in relation to supplementation (e.g., Bianco et al. 2011). Bianco and colleagues (2011) denounced the idea that coaches were the first to inform and advise athletes about supplementation, although they were not necessarily trained in nutrition. Our study showed that coached bodybuilders seemed to be under pressure both externally and internally, leading to negative psychological, behavioral, and social consequences. On the one hand, coaches provided highly structured training programs to follow, and all the future competitors were unable to miss a training session. On the other hand, coaches planned strict diet programs that generated specific behaviors in future competitive bodybuilders, such as increased quantity and diversity of protein intake, increased frequency of diet intake, excessive food restriction and food control, which led to the development of episodic objective binge eating and night eating syndrome. Finally, athletes needed to monitor their

weight progress to provide a weekly assessment to their coach, which caused deviant behaviors such as the excessive use of scales or mirrors.

The study findings must be considered in light of the research limitations. First, our sample size has notable limitations. This qualitative study was based on 16 bodybuilders with a small number of athletes in each category. A qualitative study of a larger sample would confirm the relations between the different variables highlighted in this study. Moreover, it may be interesting to confirm the results in a female population to determine whether the results observed in men are generalizable. Another remarkable limit in our study is the average age of participants in our categories; the competitors in our sample were older than the athletes in the other two categories, which may have skewed some data. Moreover, the date of competition engagement was not recorded in future competitors, whereas this time variable could have a considerable effect on the development of some deviations. Second, limitations on qualitative approach can be cited. For example, the gap between discourse about practices and actual practices can sometimes be important. The establishment of a logbook for each bodybuilder could have allowed a longitudinal follow-up to show the development of their behaviors. Moreover, a quantitative or experimental study could have been useful for verifying and extending some results.

In conclusion, our study showed some deviations emerging in bodybuilders with the intention to compete in the future, with such deviations continuing in competitive bodybuilders. Other deviations were specific to future competitors and declined in competitive bodybuilders. It would be interesting to analyze whether this transition period is a critical period in the development of deviations only in bodybuilders or if the intention to compete is a critical period in participants in all sports at risk for the development of disordered eating (e.g., endurance sport, sport weight category).

Perspectives

While previous studies showed that competitive bodybuilders were at risk (e.g., Goldfield 2009), our study showed that future competitive bodybuilders, by their behaviors and psychological characteristics, were also at risk (or even more at risk) for the development of deviant behaviors. Prevention thus seems important for bodybuilders who seek to compete. This prevention may attempt to influence protective factors, such as healthy alimentation, avoidance of doping use, physical and psychological well-being, intrinsic motivation, self-confidence, training for pleasure, lifestyle, and variety of social relationships (not only in the gym). Finally, coaching seems to be a factor strongly related to the vulnerability of these athletes; prevention programs with both bodybuilders and coaches therefore seem necessary.

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