CrossMark

How fat will it make me? Estimation of weight gain in anorexia nervosa

Gabriella Milos, MD [a, *], Volker Baur, PhD [a], Sonja Schumacher, PhD [a],
Cornelia Kuenzli, MD [a], Ulrich Schnyder, MD [a], Christoph Mueller-Pfeiffer, MD [a],
Chantal Martin-Soelch, PhD [b]

[a] Department of Psychiatry and Psychotherapy, University Hospital Zurich, University of Zurich, Switzerland
[b] Unit of Clinical and Health Psychology, Department of Psychology, University of Fribourg, Switzerland

ABSTRACT

This study investigates the subjective estimation of weight gain in patients with anorexia nervosa (AN) when being confronted with food cues both in a general (self-unrelated) and in an intent-to-eat (self-related) condition. Looking at the presentation of different snack pictures with different nutrition values (high-low calories), AN patients (N = 24) and age-matched healthy women (N = 27) estimated the weight gain when they imagined eating the presented portions of snack pictures once a day *in addition* to the normal daily nutrition in the following two conditions: 1) a general condition without specific additional instruction, 2) an intent-to-eat condition, in which they were instructed to imagine that they would eat the snack themselves.

Compared to healthy women, patients with AN estimated a higher weight gain only in the intent-to-eat condition, i.e. when they imagined eating the snacks themselves, but not in the general, not self-related condition. In the patient group, mean estimations of weight gain were associated with the "drive for thinness". This study suggests cognitive abnormalities related to the effects of food intake on the weight gain in AN, and that these cognitive anomalies could be related to the fear of gaining weight, one central symptom of AN. It appears that the self-reflective disturbed cognition, rather than the general cognition, could be the main driver underlying anorexia and that the overestimation of the energetic content of food is related to the drive for thinness.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The restriction of energy intake, the intense fear of gaining weight, and the distorted body image are crucial symptoms of anorexia nervosa (American Psychiatric Association, 2013). The persistence of these symptoms often leads to relapse or to a chronic course of the disease (i.e. (Claudino et al., 2006; Foerde, Steinglass, Shohamy, & Walsh, 2015; Mayer, Schebendach, Bodell, Shingleton, & Walsh, 2012; Schmidt & Treasure, 2006; Stice, 2002). The attitude toward nutrition is manifestly altered in anorexia nervosa (AN) patients, and restrictive calories intake has been objectively assessed (Biezonski, Cha, Steinglass, & Posner, 2016; Heaner & Walsh, 2013). One of the main symptoms of AN is an intense fear of weight gain even when the own body weight is very low. Patients often mention fear, and hold catastrophic reasoning when it comes to food intake, i.e. believing that they will gain an inappropriate amount of weight after eating food.

AN patients often have special food habits and eating rituals, such as eating very slowly, delaying food intake or cutting the food into very small pieces (i.e. (Claudino et al., 2006; Gianini et al., 2015; Halmi, 2007; Sunday & Halmi, 1996).). These behaviors suggest that the beliefs preceding food ingestion could represent an important aspect of the eating restriction in AN. Studies using pictorial food stimuli suggest disturbed processing food cues in AN patients (Giel, Teufel, et al., 2011), but the pathological choice of low-calorie food remains - although stereotyped − largely unclear (Steinglass & Walsh, 2016). Plausibly, the pathological eating habits in AN could in some way be related to the fear of gaining weight (Foerde et al., 2015). A recent study (Kissileff et al., 2016 #5311) investigated the

expected anxiety related to the maximum tolerated portion size in AN-patients and control subjects, and reported that the expected anxiety response was greater for patients compared to healthy control, but in this study the anxiety was not explicitly related to the putative weight gain.

To investigate the relationship between food ingestion and the postulated weight gain could help to better understand the mental process of the illness. Thus, testing the expectations about one's own weight gain while being faced with calories intake seems a suitable way for investigating the pathological beliefs leading to the dysfunctional eating behavior in AN. This pilot study examines the estimation of weight gain after the imagined intake of different snacks once a day in addition to individual normal daily meals in female AN patients, and in an age-matched control group of healthy women, under a general - not self-related - condition and an "intent-to-eat" − self related - condition, in which the participants were instructed to estimate the increase in weight gain while imagining that they themselves would eat the pictured snack. We hypothesized that, 1) a higher weight gain would be estimated for every kind and size of snack in AN compared to the control group, 2) AN patients would estimate a higher weight gain than the control group in the intent-to-eat condition. 3) This effect would be stronger for high caloric and larger snacks. Finally, as the intense mental preoccupation with food and the overestimation of weight gain are psychopathological signals of illness severity, we expected a positive correlation between the estimated weight gain, and some parameters of the severity of the illness.

2. Material and methods

2.1. Participants

We recruited 24 females with a DSM-IV-TR (American Psychiatric Association, 2000) diagnosis of current AN from the in- and outpatient units at the Center for Eating Disorders of the Department of Psychiatry and Psychotherapy of the University Hospital of Zurich, in Switzerland, and compared them with 27 healthy women (HW) recruited from local universities, colleges and vocational schools using flyers and electronic advertisements. At the moment of the examination all patients were in a stable internal medicine situation (after a comprehensive clinical and laboratory investigation), and were following since at least three

weeks an eating disorders specific therapy with regular balanced meals.

All participants were at least 18 years old, without past or current neurological disorders or professional knowledge about nutrition. The weight and height of each participant were measured the day of the examination by the staff working at our center. Patient and control groups received the same assessment battery. The HW group was without current or lifetime Axis-I diagnoses. A detailed description of the sociodemographic and clinical characteristics of the sample is summarized in Table 1 and in a previous publication (Milos et al., 2013) (see Table 1).

2.2. Psychometric measures

The Structured Clinical Interview for DSM-IV Axis I Disorders (Wittchen, Zaudig, & Fydrich, 1997) was used to assess life-time and current psychiatric disorders, including eating disorders and the Eating Disorder Inventory (Garner, 1991) (Cronbach's α for this study: 0.98) to correlate specific AN symptoms and features with the estimation of gained weight. The Beck Depression Inventory (Hautzinger, Bailer, Worall, & Keller, 1995) (Cronbach's alpha for this study: 0.94) was used to assess depressive symptoms. The trait section of the State-Trait Anxiety Inventory (Laux, Glanzmann, Schaffner, & Spielberger, 1981) (Cronbach's alpha for this study: 0.97) was used to assess trait anxiety, a 10-cm VAS (0 = no hunger, 10 = extreme hunger) to rate hunger and satiety feelings (Farooqi et al., 2007).

2.3. Weight gain estimation task

During a computer-based task the participants had to estimate the weight gain in two conditions and during the sequential display of different types of snacks (melon, banana, bread roll, chocolate, all referred to as "snack type"), which were imagined to be eaten once a day in addition to individual normal daily meals (see Fig. 1). The snacks used in the study were selected according to the typical local use of snacks; custom-created photographs of food (Uher et al., 2004) are important to avoid cultural bias in the studies. Four different sizes of the snacks were prepared from the Division of Endocrinology, Diabetes and Clinical Nutrition of our University hospital and was presented with the following energy values: melon: 19 kcal, 38 kcal, 76 kcal, 152 kcal; banana: 35 kcal, 65 kcal,

Table 1
Sociodemographic and clinical characteristics.

	Women with Anorexia nervosa (n = 24)		Healthy women (n = 27)				
	M	SD	M	SD	t	p	d
Age	22.38	4.10	21.41	2.75	−1.00	0.32	0.28
Current BMI [kg/m²]	15.80	2.01	21.47	2.71	8.40	<0.001	−2.40
Lowest BMI [kg/m²]	13.12	1.79	20.36	2.34	12.12	<0.001	−3.48
Highest BMI [kg/m²]	20.91	2.87	22.43	3.27	1.73	0.09	−0.49
BDI	24.96	10.04	2.96	3.19	−10.28	<0.001	2.95
STAI-trait	58.25	7.63	32.67	7.63	−11.95	<0.001	3.35
EDI total score	187.58	32.66	64.89	27.18	−14.64	<0.001	4.08
EDI „drive for thinness"	26.25	7.90	6.07	4.70	−11.23	<0.001	3.10
EDI „bulimia"	9.46	8.28	3.00	2.66	−3.66	<0.01	1.05
EDI „body dissatisfaction"	33.29	6.56	14.48	9.25	−8.44	<0.001	2.35
EDI „ineffectiveness"	31.17	8.65	8.07	5.28	−11.34	<0.001	3.22
EDI „perfectionism"	18.58	5.33	9.00	4.57	−6.91	<0.001	1.93
EDI „interpersonal distrust"	16.58	6.52	7.56	3.75	−5.96	<0.001	1.70
EDI „interoceptive awareness"	29.83	7.73	7.19	5.13	−12.17	<0.001	3.45
EDI „maturity fears"	22.42	7.55	9.52	3.86	−7.54	<0.001	2.15
Hunger	15.33	20.01	35.37	28.43	2.94	<0.01	−0.82

BMI: body-mass index; BDI: Beck Depression Inventory; EDI: Eating Disorder Inventory; STAI: State-Trait Anxiety Inventory, t: *t*-test value, p: level of significance, d: Cohen's d (effect size).