

Original

## Job strain and binge eating among Brazilian workers participating in the ELSA-Brasil study: does BMI matter?

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**Abstract: Objective:** To assess the association between job strain and binge eating as well as the effect-modifying influence of body mass index (BMI) on this association. **Methods:** A total of 11,951 active civil servants from the multicenter Brazilian Longitudinal Study of Adult Health (ELSA-Brasil) was included in this cross-sectional analysis. Job strain was assessed using the Demand-Control-Support Questionnaire. Binge eating was defined as eating a large amount of food with a sense of lack of control over what and how much is eaten in less than 2 hours at least twice a week. Multiple logistic regression was used to determine the association between binge eating and job strain as well as its interaction with BMI. **Results:** After adjustment, and using low-strain job as the reference category, binge eating was associated with high-strain job (high demand/low control: odds ratio [OR]=1.58, 95% confidence interval [CI] 1.26-1.98), active job (high demand/high control: OR=1.35, 95% CI 1.07-1.70), and passive job (low demand/low control: OR=1.24, 95% CI 1.01-1.53). Psychological job demands were positively associated with binge eating (OR=1.04, 95% CI 1.01-1.07), while greater job control and social support at work were each inversely associated with binge eating (OR=0.95, 95% CI 0.92-0.97 and OR=0.96, 95% CI 0.94-0.98, respectively). BMI modified the association between job strain and binge

eating: Heavier psychological job demands were associated with higher odds of binge eating among obese participants, while a stronger inverse association between job control and binge eating was seen among slimmer participants. **Conclusions:** Job strain increases the odds of binge eating and this association is modified by BMI.

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**Key words:** Feeding and eating disorders, Obesity, Psychological stress, Work

### Introduction

Obesity is an important cause of lifestyle-related diseases, such as diabetes and cardiovascular diseases<sup>1,2</sup>. Although the multifactorial etiology of weight gain is complex, it is often related to individual behavior, such as diet and physical activity<sup>3</sup>. More recent studies have underlined which factors foster an obesogenic environment, and thus influence individual behavior<sup>1</sup>. Work environment and working conditions can directly contribute to weight gain through physiopathological alterations<sup>4</sup> and indirectly through changes in behavioral risk factors<sup>5-7</sup>.

The Demand-Control Model is often used to measure the effect of psychosocial environment on health in the workplace<sup>8</sup>. The model suggests that job strain is generated by an imbalance between perceived psychosocial stressors, including high demand for productivity, and lack of job control. Social support from colleagues and

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immediate supervisors is considered as an effect-modifier in the model<sup>9</sup>. Job strain has been associated with unhealthy behaviors that favor weight gain, such as physical inactivity<sup>10</sup> and unhealthy eating<sup>11</sup>.

However, findings on the association between job strain and weight gain remain inconclusive. Some studies have demonstrated a positive association<sup>5,12</sup>, while others have not demonstrated it<sup>7</sup>. Some authors have proposed that the association between job strain and weight gain may not be uniform in relation to the distribution of body mass index (BMI), which may explain part of the observed inconsistencies. Some longitudinal studies have corroborated this hypothesis, showing that obese individuals are more vulnerable to weight gain when exposed to job strain<sup>13,14</sup>. Although these studies did not have the necessary information to determine the presence of an eating disorder, their authors suggested that chronic stress does not have a homogeneous effect on individuals; it may make some people more prone to eating and some less prone to eating. It has been demonstrated that intake of high-calorie foods rich in fats and carbohydrates may produce a feeling of comfort, thus influencing the biological stress system and reducing its unpleasant sensations<sup>15</sup>. The tendency to consume more of such foods may contribute to weight gain and increase visceral fat deposits. Meanwhile, other individuals may lose weight as stress can suppress the appetite and stimulate physical activity<sup>16</sup>. In addition, the availability of food in a workplace, in combination with its nutritional quality, may influence which foods are consumed in stressful situations that occur during working hours<sup>17</sup>.

Binge eating has been defined as eating a large amount of food within a limited time with a sense of lack of control over what and how much is eaten<sup>18</sup>. The occurrence of such episodes forms part of the definitions of bulimia nervosa (BN) and binge-eating disorder (BED). The latter was proposed as a new diagnostic category and is described in Appendix B of the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV)<sup>18</sup>.

Binge eating is often associated with other mental disorders, such as anxiety disorders and bipolar disorder<sup>19,20</sup>, as well as with obesity<sup>21</sup>. Stressful situations have been reported as one of the triggers for binge eating<sup>22</sup>, and through this they can contribute to obesity and chronic diseases<sup>13,14</sup>. A few studies have explored the effects of job strain on food-related behavior, mostly in Japanese workers, and found associations between job strain and overeating in overweight subjects<sup>11,23-25</sup>. To our knowledge, only one study has described the relation between job strain and the eating disorders BED and BN; the results showed a higher prevalence of these disorders among workers in highly demanding jobs<sup>26</sup>.

This study assesses the association between job strain and binge eating among Brazilian workers, as well as the effect-modifying influence of BMI on this association.

## Subjects and Methods

### *Design and study population*

This is a cross-sectional study of baseline data (2008-2010) from ELSA-Brasil, a multicenter study following 15,105 civil servants aged from 35 to 74 years from public teaching and research institutions in six of Brazil's state capitals (Belo Horizonte, Porto Alegre, Rio de Janeiro, Salvador, São Paulo, and Vitória). The aim of ELSA-Brasil is to investigate the incidence and progression of diabetes mellitus and cardiovascular diseases, as well as to examine the biological, behavioral, environmental, occupational, psychological, and social factors associated with these diseases and their complications, in an effort to construct a causal model contemplating their interrelations in a Brazilian context. The study design, sampling procedures, construction of the questionnaire, and quality assurance and control measures have been described in detail previously<sup>27,28</sup>. All study procedures were conducted in accordance with the ethical standards of the National Research Committee (*Comissão Nacional de Ética em Pesquisa*, CONEP; No. 976/2006) and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all participants included in the study. All those who participated in ELSA-Brasil at baseline were considered eligible for the present analysis, except retirees (n=3009), who were excluded, so that the study population comprised 12,096 participants.

### *Outcome: Binge eating*

All ELSA-Brasil participants were administered a questionnaire by trained study personnel. Binge eating episodes were assessed by the following question: “*Some people, at certain times, eat a large amount of food at once, in a short time (up to 2 hours). They feel they have lost control over eating, that is, they cannot avoid starting to eat, and after starting, cannot stop. During the past 6 months, how often did you eat this way?*”. The response categories were *never; less than once a week; once a week; and twice a week or more*. This question was proposed by Freitas et al.<sup>29</sup> and was based on the Structured Clinical Interview for DSM-IV - SCID-I/P for diagnosing BN and BED<sup>30,31</sup> and on related questions used in other population-based studies<sup>32,33</sup>. Binge eating was considered to be prevalent when participants reported this behavior twice a week or more, as per previous studies<sup>21,29</sup>.

### *Exposure: Job strain*

The Brazilian version of the Swedish Demand-Control-Support Questionnaire (DCSQ) was used in this study to determine job strain. The DCSQ covers three dimensions: Psychological job demands (five items), job control, which is divided into two sub-scales—skill discretion

(four items) and decision authority (two items)—, and social support at work (six items). Each dimension was scored as the sum of all corresponding items and then categorized as high or low using the median of the study population as a cut-off (14 points for psychological job demands and 18 points for job control). High and low psychological job demands and low and high job control were then broken down into Karasek quadrants: Low-strain job (low demand/high control, reference category), passive job (low demand/low control), active job (high demand/high control), and high-strain job (high demand/low control). The dimensions psychological job demands, job control, and social support at work were also assessed in a continuous form.

The Brazilian version of the DCSQ demonstrated internal consistency with intraclass correlation coefficients of 0.88, 0.87, and 0.86 and Cronbach's alpha of 0.72, 0.63, and 0.86 for the dimensions psychological job demands, job control, and social support at work, respectively<sup>34</sup>. The dimensional structure of this instrument has been assessed by studies conducted with different occupational groups<sup>35-37</sup>.

#### Covariables

Covariables were selected according to previous studies<sup>21,25,38</sup>: Gender (male and female); age (continuous, in years); race/skin color, self-declared using Brazil's population census classification (Black, Brown, White, Yellow, and Indigenous); education level (elementary school or less, secondary school, university level, and postgraduate); per capita income (continuous, in United States dollars [USD]); marital status (married/cohabitating, divorced/separated, single, and widowed); BMI, calculated using height and weight measured by trained personnel (continuous, in kg/m<sup>2</sup>); and number of hours worked per week (continuous, in hours).

#### Statistical analysis

Associations between job strain and binge eating were estimated by binary logistic regression. Exposure was analyzed by quadrants (low-strain job, passive job, active job, and high-strain job) and continuously by individual dimensions (psychological job demands, job control, and social support at work). All covariables were included as potential confounders in the hierarchical logistic models, sequentially from proximal to distal variables, following the underlying theoretical model. Covariables whose inclusion improved the model fit ( $p < 0.05$ ), that is—gender, age, per capita income, BMI, and number of hours worked per week—were retained. Crude and adjusted odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were calculated. For the models with quadrants, the “low-strain job” quadrant was used as the reference category.

Multiplicative interaction of job strain (quadrants and

dimensions) with BMI (job strain\*BMI) and gender (job strain\*gender), as well as a three-way interaction (job strain\*BMI\*gender) were assessed. When the interaction term was significant, that is,  $p < 0.05$  for the deviance comparison test between the models with and without the interaction term evaluated, the OR and corresponding 95% CIs were estimated again considering the effect of the interaction<sup>39</sup>.

Descriptive analyses were conducted with maximum data, which resulted in some variation in the number of participants between variables. Logistic regression analyses, in turn, involved only participants with no data missing for any of the variables included in the models ( $N = 11,951$ ). All analyses were conducted using R 3.1.3<sup>40</sup>.

## Results

More than half of the participants were females and over three-quarters were aged from 35 to 54 years. About half of the study population reported their race/skin color as white, followed by 29.3% as brown, and 16.4% as black. Just over half of the population had a university degree and about two-thirds had a per capita income of up to 933 United States dollars (USD, exchange rate: 2 Brazilian reais=1 USD), that is, less than five minimum wages (USD 208 at the time of the study). Nearly 70% of the participants declared themselves to be married or cohabitating. Furthermore, 62.2% of the participants were overweight or obese (BMI  $\geq 25$  kg/m<sup>2</sup>) and approximately one-third declared to be working more than 40 hours a week (Table 1).

The prevalence of binge eating in the overall study sample was 6.9%. Prevalences were higher among females, younger participants, and unmarried participants. The prevalence of binge eating increased with a decreasing education level and a decreasing per capita income. Furthermore, lower prevalences were observed among participants of white race/skin color than among those of indigenous, black, or brown race/skin color. The prevalence of binge eating among obese participants (BMI  $\geq 30$  kg/m<sup>2</sup>) was 5.3 times greater than among normal-weight participants (Table 1).

With regard to job strain, the highest prevalence of binge eating was observed among those with high-strain jobs and the lowest prevalence among those with low-strain jobs. Binge eating was more prevalent among participants with high psychological job demands, less job control, and less social support at work (Table 1).

In the unadjusted model, significantly higher odds of binge eating were observed in participants with high-strain jobs (OR 1.98), followed by those with active jobs (OR 1.42) and passive jobs (OR 1.40). After adjustment for selected covariables, this association persisted in these three quadrants. As compared with participants with low-strain jobs, those with high-strain, active, and passive jobs

**Table 1.** Distribution of participants and prevalence of binge eating by study variables—ELSA-Brasil, 2008-2010 (n=12,096) —.

Variables	Total population (n=12,096)	Binge eating prevalence (n=830)		Variables	Total population (n=12,096)	Binge eating prevalence (n=830)	
	n (%)	n	%		n (%)	n	%
Gender				Body mass index <sup>a, b</sup>			
Male	5780 (47.8)	289	5.0	Underweight (<18.5 kg/m <sup>2</sup> )	117 (1.0)	1	0.9
Female	6316 (52.2)	541	8.6	Normal (18.5-24.9 kg/m <sup>2</sup> )	4454 (36.8)	120	2.7
Age (years) <sup>a</sup>				Overweight (25-29.9 kg/m <sup>2</sup> )	4816 (39.8)	323	6.7
35-44	3337 (27.6)	245	7.4	Obese (>=30 kg/m <sup>2</sup> )	2704 (22.4)	386	14.3
45-54	5761 (47.6)	408	7.1	Number of hours worked per week <sup>a</sup>			
55-64	2737 (22.6)	166	6.1	<40 hrs	2147 (17.8)	157	7.3
≥65	261 (2.2)	11	4.2	40 hrs	5965 (49.4)	388	6.5
Race/skin color				>40 hrs	3966 (32.8)	284	7.2
Black	1955 (16.4)	160	8.2	Karasek quadrants of job strain			
Brown	3500 (29.3)	259	7.4	Low-strain job	3219 (26.7)	163	5.1
White	6085 (50.9)	365	6.0	Passive job	4387 (36.4)	304	6.9
Yellow	2911 (2.4)	18	6.2	Active job	2279 (18.9)	159	7.0
Indigenous	124 (1.0)	16	12.9	High-strain job	2162 (17.9)	203	9.4
Education level				Psychological job demands <sup>a, c</sup>			
Elementary school or less	1333 (11.0)	102	7.7	Low	3100 (25.7)	193	6.2
Secondary school	4388 (36.3)	341	7.8	Medium	4512 (37.4)	274	6.1
University level	1937 (16.0)	132	6.8	High	4443 (36.9)	362	8.2
Postgraduate	4438 (36.7)	255	5.8	Job control <sup>a, c</sup>			
Per capita income <sup>a</sup>				Low	3595 (29.8)	305	8.5
Low (up to USD 466)	4226 (35.1)	350	8.3	Medium	2961 (24.6)	203	6.9
Medium (USD 467-933)	3945 (32.7)	266	6.7	High	5502 (45.6)	322	5.9
High (USD 934-3942)	3875 (32.2)	209	5.4	Social support at work <sup>a, c</sup>			
Marital status				Low	3878 (32.2)	316	8.2
Married/cohabitating	8160 (67.5)	510	6.3	Medium	4028 (33.5)	271	6.7
Divorced/separated	2366 (19.6)	198	8.4	High	4124 (34.3)	239	5.8
Single	1216 (10.1)	95	7.8				
Widowed	353 (2.9)	27	7.6				

USD: United States dollars.

<sup>a</sup>Variables categorized only for descriptive analysis.<sup>b</sup>BMI categories according to <sup>49</sup>.<sup>c</sup>Categorized by lower, middle, and upper distribution tertiles.

were 58%, 35%, and 24% more likely to display binge eating, respectively (Table 2).

Looking at individual dimensions also revealed significant associations with binge eating (Table 3). The inclusion of covariables in the models had little effect. In the complete models, 4% greater odds were observed for each one-point increase in the score for psychological job demands, and 5% and 4% lower odds for each one-point increase in the score for job control and social support at work, respectively.

A more detailed investigation revealed that BMI was not only a covariable but also an effect-modifier in the association between job strain and binge eating, whether job strain was represented as quadrants ( $p=0.008$ ) or as the dimensions psychological job demands ( $p=0.041$ ) and job control ( $p=0.045$ ). However, no interaction was observed

with the dimension of social support at work ( $p=0.56$ ).

When low-strain job was used as the reference category, having an active job showed higher odds of binge eating at higher BMIs, while having a passive job significantly contributed to binge eating among those with BMI lower than 30 kg/m<sup>2</sup> (Fig. 1A). A similar trend was observed for high-strain jobs; associations were stronger among individuals with lower BMIs.

At each BMI value, we calculated the OR of binge eating for a 1-point increase in scores for the dimensions job control and psychological job demands and observed that greater job control was associated with lower odds of binge eating, although this effect diminished at higher BMI values. On the other hand, high psychological job demands were significantly associated with binge eating among participants with a BMI greater than 30 kg/m<sup>2</sup>, and

**Table 2.** Odds ratios (ORs) and respective 95% confidence intervals (CIs) of the association between job strain quadrants and binge eating—ELSA-Brasil, 2008-2010 (n=11,951) —.

Models	OR (95% CI)		
	Quadrants		
	Active job	Passive job	High-strain job
Model 1: unadjusted	1.42 (1.13-1.78)	1.40 (1.15-1.71)	1.98 (1.60-2.45)
Model 2: model 1+gender	1.36 (1.08-1.71)	1.36 (1.11-1.66)	1.82 (1.47-2.27)
Model 3: model 2+age	1.36 (1.08-1.70)	1.35 (1.11-1.65)	1.80 (1.45-2.73)
Model 4: model 3+per capita income	1.37 (1.09-1.73)	1.25 (1.02-1.53)	1.67 (1.34-2.08)
Model 5: model 4+number of hours worked per week	1.32 (1.04-1.66)	1.27 (1.03-1.56)	1.65 (1.32-2.06)
Model 6: model 5+body mass index	1.35 (1.07-1.70)	1.24 (1.01-1.53)	1.58 (1.26-1.98)

**Table 3.** Crude and adjusted odds ratios (ORs) and respective 95% confidence intervals (CIs) for the association between job strain dimensions and binge eating—ELSA-Brasil, 2008-2010 (n=11,951) —.

Models	OR (95% CI)		
	Dimensions		
	Job control	Psychological job demands	Social support at work
Model 1: unadjusted	0.93 (0.91-0.95)	1.05 (1.03-1.08)	0.94 (0.92-0.96)
Model 2: model 1+gender	0.94 (0.92-0.96)	1.05 (1.02-1.07)	0.94 (0.93-0.96)
Model 3: model 2+age	0.94 (0.92-0.96)	1.04 (1.02-1.07)	0.95 (0.93-0.97)
Model 4: model 3+per capita income	0.95 (0.92-0.97)	1.04 (1.02-1.08)	0.94 (0.92-0.96)
Model 5: model 4+number of hours worked per week	0.94 (0.92-0.97)	1.04 (1.02-1.07)	0.95 (0.93-0.97)
Model 6: model 5+other dimensions	0.94 (0.92-0.97)	1.04 (1.01-1.06)	0.96 (0.94-0.98)
Model 7: model 6+body mass index	0.95 (0.92-0.97)	1.04 (1.01-1.07)	0.96 (0.94-0.98)

this association became stronger with increasing BMI values (Fig. 1B). Models stratified for BMI categories (lower and equal or higher than 25 kg/m<sup>2</sup>) confirmed these results (data not shown).

The two-way interaction between job strain and gender in the association with binge eating did not reach statistical significance (p=0.839 for quadrants, p=0.779 for psychological job demands, p=0.812 for job control, and p=0.980 for social support at work). There was also no evidence for a three-way interaction among job strain, BMI, and gender in the association with binge eating, whether job strain was represented as quadrants (p=0.800) or as the dimensions psychological job demands (p=0.504), job control (p=0.442), and social support at work (p=0.260).

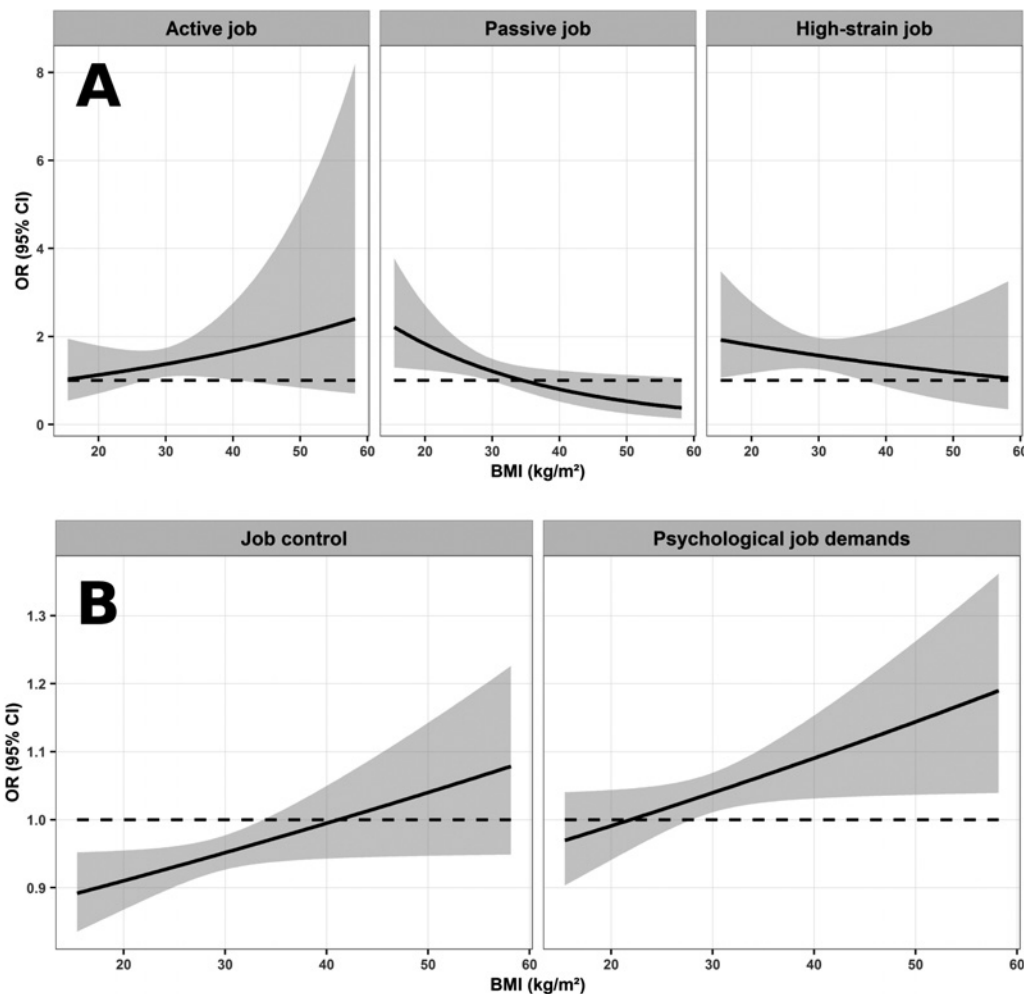
## Discussion

This study investigated the association between job strain and binge eating, considering the influence of BMI on this association. A direct association between job strain and binge eating as well as an effect-modifying influence of BMI were observed. Having a high-strain job showed the strongest association with binge eating, fol-

lowed by active job and passive job. Similar findings were reported by another Brazilian study that explored the association between job strain and the eating disorders BN and BED<sup>26</sup>. However, only the association between a high-strain job and BED attained borderline statistical significance in that study.

Some studies have related psychosocial aspects of work with eating disorders<sup>11,23,26,41,42</sup>, but they did not assess the association between job strain and binge eating. One study found an association between high job strain and various isolated indicators of eating disorders, such as: “*I eat when I am stressed*” and “*I find myself thinking about food and reaching for food when I am stressed*”<sup>39,42</sup>. However, in that study, job strain was measured using an instrument that assessed twelve aspects of nursing work and the sum of scores was stratified into two categories: low and high job strain.

Although the ability to make direct comparisons is limited, the findings of this study are generally in agreement with those of other studies. The study of a Japanese population showed that the “quantitative workload” (volume and intensity required in performing a job) and the “qualitative workload” (level of concentration, difficulty, and



**Fig. 1.** Interaction between job strain and body mass index (BMI) in the association with binge eating in the fully adjusted models—ELSA-Brasil, 2008-2010 (n=11,951) —.

(A) Odds ratios (ORs) and confidence intervals (CIs) for binge eating in the three job strain quadrants at different BMI values using the quadrant low-strain job (horizontal broken line) as a reference. (B) ORs and 95% CIs for binge eating for a 1-point increase in the scores for the dimensions of job control and psychological job demands at different BMI values.

use of skills in performing a job) were significantly and positively correlated with characteristics of overeating behaviors, such as the absence of any feeling of satiety or motivation to eat, among overweight male workers<sup>11</sup>. The same study also found a negative correlation between “job latitude” (a dimension similar to job control) and overeating.

The association between job strain and overeating can be explained by a feedback mechanism. The idea is that, when the organism is exposed to conditions of high demand and low control, a network of stimuli raises adrenalin and cortisol levels<sup>43</sup>. It has been posited that binge eating acts as an escape valve for this stress<sup>44</sup>, whereby one eats (particularly high-sugar and high-calorie foods) in an attempt to lower catecholamine and cortisol levels in the job-strain response network<sup>15,22</sup>.

Our study found an interaction between job strain (both

as quadrants and as dimensions) and BMI in the association with binge eating. In agreement with other studies<sup>11,25</sup>, our results support the hypothesis that job strain affects binge eating, depending on workers’ BMI. Previous studies have noted that binge eating is more common among the obese<sup>18,21</sup>, and some studies have shown a relation between job strain and overeating behaviors in overweight workers<sup>11,23-25</sup>.

Low job control was associated with greater odds of binge eating. In addition, we showed that the strength and significance of the association were related to BMI (stronger associations were found among individuals with lower BMI). An exhaustive review of the literature identified no similar findings. In a way, our findings differ from those by Kivimäki et al.<sup>14</sup> who found that low levels of job control led to weight loss among lean males and weight gain among obese males. However, it must be em-

phasized that our study measured binge eating and not weight gain.

The dimensions of job strain acted differently in two groups in our study sample: Heavy psychological job demands seemed to be associated with binge eating among obese participants, while lack of job control seemed to contribute to greater odds of such behavior among all except the most obese participants. The analysis by quadrant provided results that pointed in the same direction. The association between high job strain and binge eating was present at all levels of BMI, but it had a tendency to decrease at the highest BMI values and lost significance among the most obese. To a certain degree, this result contrasts with those by Fujishiro et al. who observed that more obese females were more vulnerable to weight gain when continuously exposed to high job strain<sup>13</sup>. Results similar to those by Fujishiro et al. were observed among males by Kivimäki et al.<sup>14</sup> who assessed job strain as a continuous variable produced by subtracting demand and control dimensions. Nonetheless, the association was of borderline significance and ceased to be significant when the exposure was analyzed in quadrants (high job strain as compared with all other quadrants combined).

In quadrant analyses, our study found that a passive job contributed to higher odds of binge eating among non-obese participants, while an active job tended to raise the odds of that outcome among obese participants. This result reflects the interaction observed between the dimensions studied here and BMI: When low-strain job was used as the reference category, passive job was differentiated by low job control, while active job was differentiated by heavy psychological job demands. As already mentioned, at lower BMI values, low control (present in passive work) was associated with binge eating, while no differences were observed for psychological job demands. At high BMI values, heavy demands (present in active work) were associated with binge eating, while no differences were observed for level of job control. One possible explanation for these findings is that, among the non-obese, low levels of job control may be related to low levels of self-control<sup>45,46</sup>. On the other hand, among the obese, heavy psychological job demands may constitute a trigger to engage in compulsive eating behavior<sup>44</sup>, thus contributing to overweight and obesity<sup>45</sup>.

The strength of these findings rests in the data from ELSA-Brasil, a large-scale, multicenter cohort study of 15,105 participants, which applied stringent measures to ensure data quality<sup>27,28</sup>. However, the present study does suffer from some limitations. First, its cross-sectional design precludes establishing any precise time relation between job strain and binge eating, although it is implausible that binge eating leads to job strain. Second, previous studies have pointed to stressful situations as triggers for binge eating<sup>22,47</sup>. Third, it has to be considered that the aim of ELSA-Brasil is to study risk factors for cardiovas-

cular diseases and diabetes; it is not designed specifically to investigate eating disorders. Indeed, we did not have sufficient data to determine clinical diagnoses of BN and BED. Instead, we sought to detect binge eating, which is a behavior that is present in BN and BED, but we could not quantify the prevalences of each disorder.

At last, the DCSQ was used to assess job strain in this study and has certain limitations. Two Brazilian studies have established that the two sub-scales of the job control dimension (“decision authority” and “skill discretion”) do not form a single dimension, but are isolated dimensions<sup>35,36</sup>. Nevertheless, we decided to assess job control as a single dimension to permit a comparison with international studies, especially considering a lack of research on the subject. We conducted complementary analyses in which these two sub-scales were considered separately, and they rendered similar results (data not shown).

In conclusion, our findings show a significant, positive association between job strain and binge eating; in addition, BMI modified the strength of the association. However, the importance of this study is not limited to these findings. The prevalence of binge eating was greater among females and was high when compared with international prevalences, which ranged from 0.54% to 3.2% using similar outcome definitions<sup>19,20,32,48</sup>. We believe that these findings can contribute to the development of interventions in the job environment directed at preventing and treating eating disorders and obesity.

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