Injustice Impairs Self-Regulation and Affects Food Choice

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Abstract

Overweight and obesity are risk factors for a range of chronic diseases, many of them caused by excessive consumption of unhealthy foods and insufficient consumption of healthy foods. The present study aims to experimentally test the effect of being exposed to injustice on the intention to consume healthy and unhealthy foods, through self-regulation. We predicted that injustice decreases self-regulation which in turn increases the intention to consume unhealthy foods and decreases the intention to consume healthy foods. Undergraduate students ($N = 175$; 89% women; $M_{age} = 24.28$, $SD = 7.36$) were randomly exposed to a scenario describing an unjust or a just academic situation. In a subsequent allegedly unrelated task, participants were asked to indicate their intention to consume each of 26 food items (half depicting unhealthy foods and half healthy foods, random order) during the subsequent week. As expected, injustice decreased self-regulation which in turn increased the intention to consume unhealthy foods and decreased the intention to consume healthy foods. These results highlight the central importance of justice perceptions in the study of consumption and contribute to frame it in the study of the consequences of economic inequalities for nutrition.

1. Introduction

Combating all forms of malnutrition is one of the greatest current global health challenges. Malnutrition can assume the form of undernutrition, micronutrient-related malnutrition, overweight, obesity, and diet-related non-communicable diseases. A healthy diet can protect against malnutrition and diseases such as diabetes, cancer, or stroke, whereas an unhealthy diet is one of the risk factors for health (World Health Organization [WHO], 2020). The WHO estimated that in 2016, the prevalence of overweight and obesity in the world adult population was approximately 39% and 13%, respectively (WHO, 2020). For this reason, it is essential to understand the factors that influence the preference for an unhealthy diet so that it is possible to reduce the consumption of unhealthy foods and promote the consumption of healthy foods.

In the current work, we argue that injustice may be a key factor for food preferences, enhancing the likelihood of unhealthier choices and decreasing the likelihood of healthier ones. Specifically, we examined the effect of exposure to injustice on the increased preference for unhealthy food (and decreased preference for healthy food) through reduced self-regulation. Indeed, a causal link between injustice and self-regulation has already been theorized (e.g., Laurin et al., 2011), as well as a causal link between self-regulation and food preferences (e.g., Gerritz et al., 2010). However, as far as we know, no previous study has previously tested the complete path. Next, we will review the theoretical and empirical evidence that supports the causal relation between injustice and self-regulation and, subsequently, we will present the evidence supporting the causal relation between self-regulation and food choice.

The evidence that relates injustice impairing self-regulation departs from the assumption that justice is a fundamental need (Lerner, 1980) and, therefore, perceived injustice motivates processes to restore the perception of justice (e.g., Adams, 1965).

These processes of justice restoration can objectively modify the situation so that it becomes fair, for example, through helping (Correia et al., 2016), protest (Runciman, 1966), or retaliation (e.g., Adams, 1965). However, if the former is not possible, people can resort to processes that distort the interpretation of the situation so that it turns to be perceived as fair, for example, by derogating the victim (Lerner, 1980).

Self-regulation refers to one's ability to change our usual impulses, desires, emotions, and behaviors (Baumeister & Heatherton, 1996). Research has identified two reasons why injustice impairs self-regulation. Specifically, perceived injustice: 1) is associated with a lower investment in long term goals, and consequently with self-regulation (Laurin et al., 2011); and 2) motivates the protection of the fundamental perception of justice - a process that consumes cognitive resources, and therefore reduces the capacity to subsequently exert self-regulation (Loseman & Van den Bos, 2013).

However, research has yet to directly demonstrate that facing injustice decreases self-regulation. As far as the evidence that supports the causal relation between self-regulation and food choice is concerned, self-regulation has been found to be associated with a reduction in the consumption of healthy food such as fruit and vegetables, and an increase in the consumption of unhealthy food (e.g., Gerrits et al., 2010, for a review, see Teixeira et al., 2015). Therefore, these results suggest that injustice may affect food choice through the impairment of self-regulation.

The present study aims to test experimentally the effect of being exposed to injustice on the intention to consume healthy and unhealthy foods, through self-regulation. We expect that: injustice decreases self-regulation which in turn increases the intention to consume unhealthy food (H1); injustice decreases self-regulation which in turn decreases the intention to consume healthy food (H2).

2. Method

2.1. Design and Participants

The sample included 175 undergraduate students (89% women), aged between 18 and 63 years old ($M = 24.28$, $SD = 7.36$), who were randomly assigned to one of two conditions ($n = 88$ just condition; $n = 87$ unjust condition). From the initial sample of 209 participants, 34 (16%) participants were excluded thus reaching the final sample of 175 valid and complete responses to the survey. The 34 participants were excluded due to failing an attention manipulation check. Specifically, we presented five pairs of statements and asked participants to choose the statement that allegedly happened in the case they initially read (e.g., "The teacher accepted the exam consultation" vs. "The teacher refused the exam consultation"). Participants who missed two or more statements, or participants who missed the last statement, were excluded.

2.2 Measures and Procedure

The participants were invited, through social media platforms, to complete an online survey about food consumption habits (hosted at Qualtrics XM). After providing informed consent with eligibility criteria (being undergraduate students with a minimum of 18 years old) and ethical considerations (e.g., voluntary participation, anonymity), participants were presented with the manipulation of (in)justice and the main measures. In the end, the participants were thanked and debriefed.

2.2.1 Manipulation of (In)justice

Participants were instructed to carefully read a text and to imagine that they were the students in that situation. The text described a scenario in the university context (i.e., completion of a final exam) that could be just or unjust (for the complete materials, see Appendix A). Both conditions also included information about what happened to another student, so that social comparison would reinforce the previous justice or injustice manipulation. Indeed, previous studies showed that an inconsistent treatment

between the self and another person when the authority is unjust against the self, but at the same time, fair to another person is perceived as more unfair compared to when the same unjust treatment is equally received to both self and someone else (van Prooijen et al., 2006, Study 2). Therefore, in the unfair condition, the teacher was distributively (Adams, 1965), procedurally (Leventhal, 1980), and interactionally (Bies & Moag, 1986) unfair to the student to which we asked the participant to identify with, but fair to the other student. In the just condition the teacher was distributively, procedurally, and interactionally fair to both students.

2.2.2 Intention to consume more and less healthy foods

Upon the completion of the alleged first study, participants were asked to collaborate in another study about food assessment (cover story). Participants were presented with a set of 26 food images and asked to indicate the intention to consume each food during the next week using a 7-point scale (1 = *Probably, I will not consume this food* to 7 = *Probably, I will consume this food*).

The pictures were selected from the Food-pics database (Blechert et al., 2014; Prada et al., 2017), half depicting foods rated as high healthfulness (e.g., "bananas", "salad plate") and the remaining as low healthfulness (e.g., "pizza"; "ice-cream"). As a way of obtaining the healthy and unhealthy food items, we selected the pictures based on the normative ratings regarding this dimension (high healthfulness: $7.97 \geq M \geq 9.10$ versus low healthfulness: $1.35 \geq M \geq 4.33$). We also controlled for other dimensions and selected items with the following criteria: arousal ($M \geq 5.17$), liking ($M \geq 6.90$), familiarity ($M \geq 6.67$), frequency of consumption ($M \geq 4.74$), desire to eat ($M \geq 6.52$), and palatability ($M \geq 7.00$). Based on these criteria, we selected 18 items perceived as healthy and 16 items as unhealthy. As a way of obtaining the same number of items, images that had the same food (i.e., images 22, 131, 168, 264, 371, 391, 406, 409) were eliminated. The final set included 13 pictures depicting healthy foods (i.e., 224, 393, 263, 413, 307, 427, 323, 478, 358, 526, 361, 543, 379) and 13

depicting unhealthy foods (i.e., 46, 304, 56, 351, 108, 373, 113, 465, 143, 489, 167, 533, 287).

In each trial, a single picture was presented (centered) with the response scale below.

The order of presentation was randomized. Healthy and unhealthy items showed to be

internally consistent regarding healthiness (Cronbach's alpha of .79 and .91,

respectively).

2.2.3 Self-regulation

Self-regulation was measured using the Self-Regulation of Eating Behavior

Questionnaire for adults (Kliemann et al., 2016) which includes five items (e.g., *I give

up too easily on my eating intentions*" – recoded; Cronbach's alpha = .72). Participants

were asked to select the options they most identified with using a 5-point scale (1 =

Never to 5 = *Always*).

2.2.4 Sociodemographic, diet-related and state variables

We controlled for several variables that may affect the proposed relationships

but that were not of direct theoretical interest. Besides age and gender, we also

measured perceived socioeconomic status by asking participants to think about a 10-

step ladder where people can be placed (step 10 includes people who are better off in

life - the richest, with better education and better jobs - and step 1 includes people who

are worse off in life). Participants were asked to identify on which step of this ladder

they are located, using a 10-point scale (0 = *People who are worse off in life* to 10 =

People who are better off in life, Adler et al., 2000).

Regarding diet-related variables, we asked participants to indicate their height

and weight so we could calculate their Body Mass Index (BMI - body weight in

kilograms divided by the square of the respondent's height in meters). Moreover, we

also assessed perceived BMI by asking participants to compare their weight in relation

to people of the same height, age, and gender using a 7-point scale (1 = *Much below average* to 7 = *Much above average*).

Lastly, we included two measures to assess participants' current state, namely physiological state (5 items - e.g., "*I feel energetic*" – answered using 7-point rating scales 1 = *Strongly disagree* to 7 = *Strongly agree*, Cronbach's alpha =.72, adapted from Prada et al., 2017), and mood (5 semantic differentials - e.g., Good / Bad – answered using 7-point bipolar scales, Cronbach's alpha =.83, Garcia-Marques, 2004). Higher values correspond to a more positive physiological state and a more positive mood respectively.

2.3 Manipulation checks

To control for the justice manipulation, participants were asked to indicate the degree of fairness of the situation they read through a 7-point scale (1 = *Unfair situation* to 7 = *Fair situation*).

3. Results

3.1 Manipulation check

As expected, participants perceived the justice condition as more just ($M = 6.39$, $SD = 1.09$), than the injustice condition ($M = 1.34$, $SD = 0.76$), $t(173) = 35.52$, $p < .001$, 95% IC = [4.76, 5.32].

3.2 Descriptive Results

The descriptive statistics and correlations for all variables are presented in Table 1. As shown in Table 1, intention to consume unhealthy food was negatively associated with self-regulation and physiological state, such that participants with higher intentions to eat unhealthy food also reported lower levels of self-regulation and more negative physiological states. In contrast, intention to consume healthy foods significantly correlated with higher age, more self-regulation, and a more positive physiological state.

We also explored for gender differences in the intention to consume both types of food: women ($M = 4.80$, $SD = 1.16$) expressed more intention to consume healthy foods than men ($M = 4.09$, $SD = 1.09$), $t(173) = 2.45$, $p = .015$, $d = 1.16$. Congruently, women ($M = 3.24$, $SD = 1.43$) expressed less intention to consume unhealthy foods than men ($M = 4.21$, $SD = 1.56$), $t(173) = -2.71$, $p = .007$, $d = 1.44$.

Overall, participants exposed to the unjust scenario ($M = 3.66$, $SD = 1.46$) expressed more intention to consume unhealthy foods than those in the just condition ($M = 3.02$, $SD = 1.42$), $t(173) = 2.92$, $p = .004$, $d = 1.44$. In contrast, for healthy foods, no significant differences were detected between the unjust ($M = 4.80$, $SD = 1.11$) and just conditions ($M = 4.66$, $SD = 1.23$), $t(173) = -0.79$, $p = .431$, $d = 1.17$.

3.3 Impact of (in)justice in intention to consume (un)healthy food: Self-regulation as a mediator

We used Macro Process Model 4 (Hayes, 2013) to test if self-regulation mediated the impact of (in)justice on the intention to consume unhealthy and healthy foods (5000 bootstrapping resamples and a 95% confidence interval) and we included all the control variables as covariates in the model (see Figures 1 and 2, respectively).

As shown in Figure 1, the mediation model accounted for 19% of the variation regarding the intention to consume unhealthy foods ($R^2 = .18$), $F(7, 167) = 5.31$, $p < .001$. Exposure to injustice had a negative direct impact in self-regulation ($b = -.21$), $t = -2.34$, $p = .020$, as well as a positive direct impact on the intention to consume unhealthy foods ($b = .45$), $t = 2.29$, $p = .023$. Moreover, the indirect effect was also significant (and positive), ($b = .17$, 95% IC $= [.03, .35]$), which suggests that exposure to injustice also impacts the intentions to consume unhealthy foods through self-regulation. Because this indirect effect is smaller than the total effect ($b = .17$, 95% IC $= [.03, .35]$; $b = .62$, $p = .003$, 95% IC $= [.22, 1.03]$, respectively) the mediation is only partial.

As shown in Figure 2, the mediation model accounted for 13% of the variation regarding the intention to consume healthy foods ($R^2 = .13$), $F(7, 167) = 3.69$, $p = .001$. Again, exposure to injustice had a negative direct impact on self-regulation ($b = -.21$), $t = -2.39$, $p = .020$. Although we did not observe a direct impact of injustice on the intention to consume healthy foods ($b = .29$, $t = 1.72$, $p = .086$), there was a significant indirect effect ($b = -.10$, 95% IC = [-.23, -.02]) of injustice on intentions to consume healthy foods through self-regulation. Note that, as argued by Zhao et al. (2010) and Kim et al., (2018), and contrarily to what Baron and Kenny (1986) assumed, there is no need of a significant relationship between the independent variable and the dependent variable for there to be an indirect effect of the independent variable on the dependent variable through the mediator variable.

4. Discussion

The present study examined the causal impact of injustice on the intention to consume healthy and unhealthy foods through a decrease in self-regulation. As predicted, we found that injustice decreases self-regulation which in turn: increases the intention to consume unhealthy food and decreases the intention to consume healthy food. These effects remained significant after controlling for age, socioeconomic status, BMI, mood, and physiological state.

These findings are relevant for research on the relationship between injustice and self-regulation because, to the best of our knowledge, this was the first study to demonstrate a causal effect between injustice and self-regulation. Laurin et al. (2011) had already found an effect of justice manipulation versus a control condition in self-regulation and only in low-status groups. Still, we manipulated injustice (vs. justice) and, even controlling for perceived social-economic status, we observed a significant

negative impact of injustice on self-regulation. Overall, the evidence of a causal relation between injustice and self-regulation is in line with the theorization that postulates justice as a basic and fundamental need (Lerner, 1980). Drawing on self-regulation theory, these results indicate that injustice is another process that consumes the same resource as, for example, the regulation of emotion, attention, and thought, resisting temptations, assimilating inconsistent information, or even stress (e.g., Thau & Mitchell, 2010).

Furthermore, the indirect effect of injustice on food choice is an important finding both theoretically and for application purposes. At a theoretical level, it contributes to the current limited experimental evidence regarding the relation between injustice and consumption. Our study also contributes to the line of research that has established an association between income inequalities and increased caloric intake (e.g., Wilkinson & Picket, 2009).

Both correlational (Wilkinson & Pickett, 2009) and experimental (e.g., Bratanova et al., 2016) evidence has related income inequalities and food consumption. A particularly striking finding was the positive association found between income inequality and caloric intake in the 23 richest countries (for review, see Wilkinson & Pickett, 2009). In our view, the impact of income inequalities on caloric intake may very well reflect the impact of injustice on food choice, because income inequality has shown to be associated with less perceived fairness (Oishi et al., 2011). Therefore, we propose that the perception of injustice and the consequent reduction of self-regulation may be the underlying mechanism linking income inequality and caloric intake. Specifically, income inequalities would increase confrontation with injustice in everyday life. This perceived injustice threatens the fundamental need for justice and consequently consumes self-regulation resources which, in turn, leads to excessive

calorie intake. Although perceived injustice and self-regulation are not certainly the only underlying mechanisms between economic inequalities and bad nutrition (Bratanova et al., 2016), it seems to be a potentially important one.

Regarding possible implications for practice, this research is relevant for marketers and health stakeholders because it indicates justice as another determinant that can influence the consumption of specific products. For example, these results suggest that people should be attentive to the possibility of advertising hedonic products, such as unhealthy foods, by inducing the experience of unfair situations.

Despite its contributions, we acknowledge that the current study is not without limitations. The sample included university students, recruited by convenience sampling and the majority were women. A replication of the study with other samples including other operationalizations of the injustice manipulation and the dependent variables (e.g., actual food consumption) is advisable.

This study has implications for the health and nutrition domains because it helps to understand the reasons why adherence (or maintenance) to diets and nutritional recommendations is often lower than desirable. It is possible that by raising awareness about how injustice can increase the tendency to consume unhealthy foods, consumers may be able to exert more control when faced with such a situation, and implement other strategies (e.g., running). This issue is particularly relevant because combating obesity is currently one of the biggest global challenges for health (WHO, 2020).

Finally, in a world with increasingly unequal societies, it is important to understand if the experience of injustice associated with the inequalities is promoting a poorer diet, reinforcing the impact of the consequences of these inequalities on health, and giving an additional important argument to those mobilized to reduce it.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

All authors conceptualized and designed the study. VC collected the data, VC and IC analyzed the data. All authors have reviewed, edited, and approved the final manuscript.

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Tables

Descriptives (M, SD) and Correlations between Variables.

	M	SD	1	2	3	4	5	6	7	8
	Descriptives									
1. Unhealthy food	3.34	1.47								
2. Healthy food	4.73	1.17	.03							
3. Self-regulation	3.51	0.63	-.41***	.29***						
4. Age	24.28	7.36	-.11	.26***	.02					
5. Socioeconomic status	8.00	1.23	.02	.13	.19*	-.07				
6. Body Mass Index	22.42	3.03	.13	-.05	-.29***	.16*	.03			
7. Perceived BMI	4.32	1.08	.09	-.01	-.26**	.02	.09	.74***		
8. Physiological state	4.31	1.24	-.30***	.16*	.20*	.12	.17*	-.03	-.07	
9. Mood	4.44	1.24	-.03	.13	.14	.10	.26**	.09	.05	.32***

*$p < .050$, **$p < .010$, ***$p < .001$

M = Mean
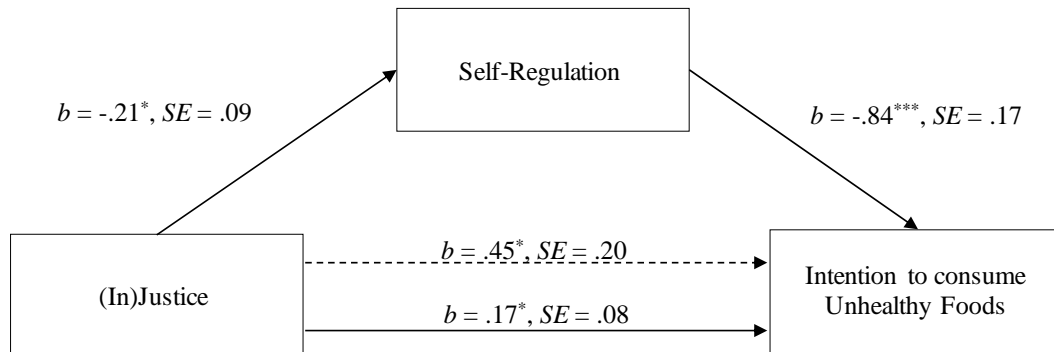*SD = Standard Deviation*

Figure Legends

Figure 1

Mediation Model for the Intention to Consume Unhealthy Foods

Figure 2

Mediation Model for the Intention to Consume Healthy Foods

Figures

Figure 1. *Mediation Model for the Intention to Consume Unhealthy Foods*

$b = -.21^{*}, SE = .09$

Self-Regulation

$b = -.84^{***}, SE = .17$

$b = .45^{*}, SE = .20$

(In)Justice

$b = .17^{*}, SE = .08$

Intention to consume Unhealthy Foods

Dotted lines show coefficient weights for the direct relationship prior do mediation by self-regulation.

$^{*}p < .050, ^{**}p < .010, ^{***}p < .001, SE = Standard Error, b = Beta$
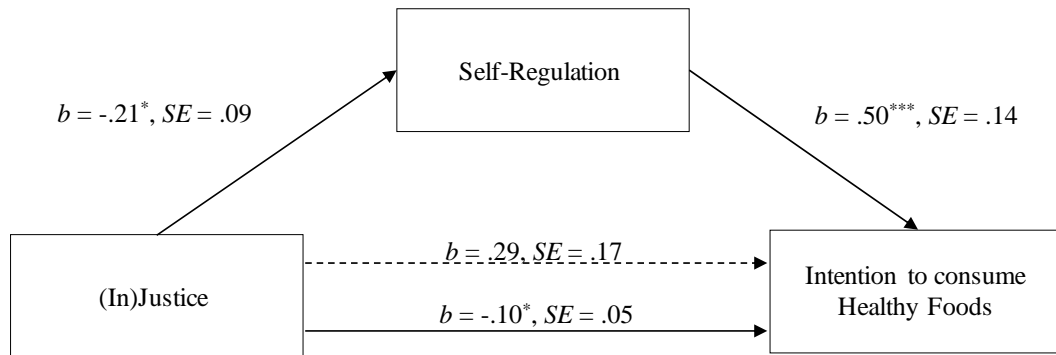
Figure 2. *Mediation Model for the Intention to Consume Healthy Foods*

Dotted lines show coefficient weights for the direct relationship prior do mediation by self-regulation.

*p < .050, **p < .010, ***p < .001, SE = Standard Error, b= Beta

Tables

Table 1

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4. Age	24.28	7.36	-.11	.26***	.02					
5. Socioeconomic status	8.00	1.23	.02	.13	.19*	-.07				
6. Body Mass Index	22.42	3.03	.13	-.05	-.29***	.16*	.03			
7. Perceived BMI	4.32	1.08	.09	-.01	-.26**	.02	.09	.74***		
8. Physiological state	4.31	1.24	-.30***	.16*	.20*	.12	.17*	-.03	-.07	
9. Mood	4.44	1.24	-.03	.13	.14	.10	.26**	.09	.05	.32***

*p < .050, **p < .010, ***p < .001

Appendix – Manipulation of (in)justice

Just scenario	Unjust scenario
"You are in the last year of your degree and just need one last exam to finish. This exam is from a very demanding course and has a high impact in your degree overall grade (…), it's your last chance to do it and finish your degree. The grade of this exam is decisive for the final average, very important regarding access to a master's course that you may be able to do in the future, as well as in terms of employability in your professional career. So, you have been working hard for this exam, not going out with friends or go to parties.	
On the day of the exam, you and another student receive exams with a degree of difficulty adequate to the level of demand of the subject and clear instructions from the teacher, regarding the quotation of questions, which leads you to make advantageous choices as to whether or not answer some of them.	On the day of the exam, you receive an exam with an excessively high degree of difficulty and wrong instructions from the teacher, regarding the quotation of the questions, which leads you to make disadvantageous choices on answering or not to some of them. On the other hand, another student receives an exam with a degree of difficulty adequate to the level of demand of the subject and clear instructions from the teacher, regarding the quotation of the questions, which leads him to make advantageous choices as to whether or not answer some of them.
In addition, the content and format of the exams are in accordance with the information the teacher had given in advance.	In addition, the content and format of your exam are not in accordance with the information that the teacher had given in advance, unlike what happens with the other student, whose exam content and format are in accordance with the instructions previously given.
A few days after taking the exam, the list with the results becomes available and both you and the other student ask the teacher to consult the test. The latter agrees to the request and both students are allowed to review the exam, concluding that the test was well-graded and that both had the deserved grade. You and the other student pass the course."	A few days after taking the exam, the list with the results becomes available and both you and the other student ask the teacher to review the test. The latter agrees to the request of the other student, but refuses yours, stating that "it is, what it is" and that "you also have to be lucky with the exams". In the end, the other student can review the exam and you cannot. You fail the exam, and you will only be able to repeat it next year."