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# Low prices and high regret: how pricing influences regret at all-you-can-eat buffets

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## Abstract

**Background:** In this study we shed light on an unknown area of research: whether the price paid for a meal influenced consumers' perceptions of fullness, and feelings of guilt and regret about how much they ate. This has implications for consumers, restaurants and public health.

**Methods:** A field experiment was conducted in which diners at an AYCE restaurant were either charged \$4 or \$8 for an Italian lunch buffet. Following lunch, participants rated dimensions such as physical discomfort, the degree they felt they overate, and guilt.

**Results:** 139 total individuals who came to the restaurant alone ( $n = 8$ ), in groups of two ( $n = 52$ ) and in groups of three or four ( $n = 43$ ) and five and over ( $n = 30$ ) are participated to the study. Out of participants who ate at least one piece of pizza and were included to our analysis ( $n = 95$ ), 49 of them were male and 46 of them were female, the mean age was 44.11, the mean height was 67.58 in., and the mean weight was 181.61 lb. The results were analyzed using a 2x3 between groups ANOVA. Diners who paid \$4 for their buffet rated themselves as physically more uncomfortable and had eaten more than they should have compared to the diners who paid \$8 for the buffet ( $p < 0.05$ ). However, diners who paid \$4 for their buffet gave higher ratings to overeating, feelings of guilt and physical discomfort than the diners who paid \$8 for the buffet, even if they ate the exact same number of pieces.

**Conclusion:** Paying less for an AYCE experience has a number of surprising consequences; lower paying diners feel themselves as more physically uncomfortable and guiltier compared to the higher paying diners, even when they ate the same amount.

**Keywords:** All-you-can-eat buffets, Pricing, Overeating, Physical discomfort, Regret, Field experiment

## Background

Satiety and the feeling of fullness have been the focus of much research. Previous studies investigate the effects of different foods and drinks [1], sensory properties [2, 3] familiarity [4] and perceived density [5] on satiety and the feeling of fullness. The effects of a variety of other issues on satiety and fullness including nutritional information and labeling [6, 7] actual and perceived portion size [8] external cues such as serving container and tableware used [9] and vertical-horizontal illusions [10] have also been examined.

Several studies have emphasized volume and physical dimensions as key factors that impact the fullness

experienced at the end of a meal [11–13]. It has also been shown that the more you eat, the less you will like it [14]. However, the effects of the price paid for a meal on perceived fullness and feelings of regret or guilt on the part of consumers remain unexplored. In this study, we investigated whether the price paid for a meal effects customer perceptions of fullness, guilt or regret.

In this paper, we report the results of a field experiment, which explored the relationship between price and subsequent feelings of fullness followed by experienced guilt in an All-You-Can-Eat (AYCE) setting. Pricing as an external cue is known to be an important influencer of consumer quality perceptions [15–17] however, the lack of studies focusing on the effects of pricing on consumers' experienced feelings, such as guilt and satiety, makes this study a significant one. The results of this study are important

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and could be used by both the academicians focused on pricing and satiety issues, and by practitioners, such as restaurant owners, marketers, dietitians and governments responsible for pricing strategy and for health and eating issues. Moreover, unlike the past studies which were conducted with recruited subjects in artificial lab situations where generally only one food was offered without any charge [18, 19], this study was conducted in a field setting, which led consumers to behave naturally. Customers were randomly assigned to one of two price conditions (low vs. high price) in an AYCE pizza buffet restaurant. We found that although they ate the same amount of pizza, those assigned to the low-price condition felt fuller, and experienced more guilt at the end of the meal than those assigned to the higher-price condition. One possible explanation of this result is that customers can be motivated to get their money’s worth, which means the more pizza they consume, the lower the average cost per slice will be. [14] Thus, those in the lower-price condition may set a lower expectation for the amount of pizza they should consume to get their money’s worth than those in the higher-price condition. It follows that the magnitude of the gap between expectations of the amount of pizza they should consume and the actual amount consumed can be bigger for the high-price group when both groups consume the same amount of pizza. This may lead the high-price group to feel not as full as the low price group and as a result to feel not as guilty as the low-price group.

**Methods**

To make accurate comparisons across different price conditions, it was necessary to find an AYCE restaurant where diners could be served and observed in an unobtrusive, natural manner that addressed and corrected the shortcomings of past studies. To accomplish this, we obtained the cooperation of Aeillo’s Italian Restaurant, an AYCE restaurant mid-way between Syracuse and Binghamton, New York. The restaurant had an AYCE Italian luncheon buffet on weekdays and they served the foods usually offered at such buffets: pizza, salad, breadsticks, pasta, and soup. The study was conducted during lunch buffet hours for a two-week time period in the spring. A between-subjects randomized block design was used where one group was given a flier that promoted the \$8 buffet and offered a free beverage, and the second group was given the same flier and the free beverage, but was informed the buffet cost \$4. The groups did not know that another group of customers were given a different price. That helped us ensure that the \$4 price group did not perceive the price they get as a 50 % discount. This study was approved by the Cornell University Institutional Review Board. Participants provided written, informed consent to participate in the study.

When approaching the restaurant door, participants were asked by one of three to five experimenters if they would be willing to take a short survey related to the restaurant. After agreeing and providing informed consent, they were asked two open-ended restaurant-selection questions which were intended to distract them from the true purpose of the study: [20] (1) “What other places did you consider for lunch?” and (2) “Why did you choose this restaurant?” They were then thanked and given the flier and asked if they would answer a short series of questions when they finished their meal.

People who arrived in groups were all assigned to the same coupon condition. Groups were assigned to conditions in alternating order. That is, the first group was offered the discounted coupon and drink, while the next group was offered only the drink. The data were collected from 11:00 to 1:30, with the weather being overcast and chilly or rainy throughout the days of the study.

Of the 72 groups of people who arrived at the restaurant during these times, 139 total individuals participated in the study. Although some diners came as individuals ( $n = 8$ ), most people came in groups of two ( $n = 52$ ), three or four ( $n = 43$ ), or five and over ( $n = 30$ ). Diners served themselves pizza, salad, pasta, breadsticks, and soup and could return to the buffet as often as they wanted. The modal number of pieces of pizza taken was three.

Diners were intercepted after they paid at the cash register and each was given a short questionnaire, which asked for demographic information along with a variety of questions about their feelings of guilt about how much they ate, physical discomfort, and feelings of overeating. Age, height, weight and gender of the respondents were asked to understand the demographic characteristics of the sample. Other than questions involving numerical estimates, most questions asked their agreement with a number of statements on 9-point Likert scales (1 = “strongly disagree”; 9 = “strongly agree”). One-way ANOVA was used to reveal the results. Demographics of the two conditions are provided in Table 1.

**Results**

Out of 95 respondents who ate at least one piece of pizza and were included in the analysis, 49 of them were male (24 of them in \$4 group and 25 of them in \$8 group) and 46 of them were female (19 of them

**Table 1** Descriptive statistics

Demographics	\$4 ( $n = 43$ )	\$8 ( $n = 52$ )	<i>t</i>
Age (years)	43.67 (18.50)	44.55 (14.30)	0.25
Height (inches)	68.65 (3.67)	66.51 (9.44)	1.38
Weight (pounds)	184.83 (63.70)	178.38 (45.71)	0.52

in \$4 group and 27 of them in \$8 group). The mean age was 44.11, the mean height was 67.58 in., and the mean weight was 181.61 lb. There were no significant differences in age, height and weight among respondents who were in the \$4 or \$8 price group (see Table 1).

As expected, there was a significant main effect for number of pieces consumed on overeating ratings. As the number of pieces of pizza consumed increased, the consumers' ratings for overeating items also increased significantly. The ratings of consumers who ate one, two or three pieces of pizza are as follows; "I ate more pizza than I should have" [2.20, 4.17, and 5.20,  $F(2,84) = 10.57$ ,  $p = 0.00$ ], "I overate" [1.98, 2.75, and 3.61,  $F(2,84) = 3.85$ ,  $p = 0.03$ ], and "I ate more than I should have" [2.29, 3.23, 4.29,  $F(2,84) = 4.89$ ,  $p = 0.01$ ]. Although the results were not significant for "I feel guilty about how much I ate" and "I am physically uncomfortable" items, they were also showing an increase as the number of pieces of pizza consumption increased.

Interestingly, there was no significant difference between high and low paying groups in terms of their height and the weight ( $p > 0.05$ ). However, there was a significant main effect for price paid for the buffet. When controlling for how many pieces of pizza they consumed, the \$4 group rated the discomfort, overeating and guilt items higher than the \$8 group; "I am physically uncomfortable" [2.56 vs. 1.70,  $F(1,84) = 5.36$ ,  $p = 0.02$ ], "I ate more pizza than I should have" [4.48 vs. 3.22,  $F(1,84) = 5.35$ ,  $p = 0.02$ ], "I overate" [3.30 vs. 2.25,  $F(1,84) = 5.26$ ,  $p = 0.02$ ], "I ate more than I should have" [3.87 vs. 2.66,  $F(1,84) = 5.86$ ,  $p = 0.02$ ], and "I feel guilty about how much I ate" [3.25 vs. 2.25,  $F(1,84) = 4.95$ ,  $p = 0.03$ ]. There was no significant interaction effect between price paid for the buffet and pieces eaten on any of the items ( $p > 0.05$ ) (Table 2).

Of perhaps the greatest interest is the fact that effect persists across the number of slices eaten. For 1, 2 and 3 slices eaten, \$4 group gives higher ratings for all of the guilt and overeating dimensions than the \$8 group, and this effect is even stronger for the people who ate 2 slices (See Table 3) (Fig. 1).

## Discussion and conclusion

Although satiety and feeling of fullness have been well studied, the effects of pricing on consumers' perceptions of satiety and fullness have been less explored. In this research, we present results that show pricing influences consumers' fullness and satiety perceptions. We offered an All-You-Can-Eat buffet to consumers either for \$4 or \$8. Consumers were assigned to \$4 or \$8 price groups randomly. Since framing –differences in people's reactions depending on how it is presented [21]– could affect the results, none of the participants knew that another consumer group was given a different price. Additionally, the prices were not framed as a price discount or a price increase. Our findings suggest that, regardless of how many pieces of pizza consumed, consumers who pay a lower price more strongly agree with questions such as "I ate more pizza than I should have", "I feel guilty about how much I ate", "I am physically uncomfortable", "I overate", "I ate more than I should have." Moreover, while they ate the exact same amount of pizza and without having any significant height/weight difference ( $p > 0.05$ ), the low-price payers' feelings of guilt about how much they ate, physical discomfort, and perceptions about overeating are higher than the perceptions of high-price payers.

One possible explanation for this result is that customers could be motivated to get their money's worth. The more pizza they consume, the lower the average cost per slice will be [14]. Thus, those in the lower-price condition can set a lower expectation about the amount of pizza they should consume to worth their money than those in the high-price condition. The magnitude of the gap between expectations about the amount of pizza they should consume and the actual amount consumed can be bigger for the high-price group when both groups consume the same amount of pizza. This may lead the high-price group not feeling as full as the low-price group and as a result not as guilty as the low-price group.

Our study confirms that how much consumers pay for their food influences their perceptions about satiety, feelings of guilt and overeating. Although the AYCE

**Table 2** How price paid influence overeating

	\$4 (Discounted-price)			\$8 (Full-price)			<i>F-Statistics</i>		
	One piece (n = 18)	Two pieces (n = 18)	Three pieces (n = 7)	One piece (n = 17)	Two pieces (n = 19)	Three pieces (n = 10)	Effect of price	Effect of pieces	Effect of price x pieces
I ate more pizza than I should have	2.63 (2.06)	4.82 (2.55)	6.00 (2.00)	1.76 (1.82)	3.53 (2.39)	4.40 (3.24)	5.37*	10.77**	0.15
I feel guilty about how much I ate	2.39 (1.94)	3.44 (2.47)	3.71 (1.49)	2.26 (1.79)	1.68 (1.42)	2.90 (2.08)	4.28*	1.49	1.67
I am physically uncomfortable	2.17 (1.88)	2.94 (2.12)	2.43 (1.51)	1.97 (1.68)	1.45 (0.94)	2.25 (1.81)	4.19*	0.25	1.15
I overate	2.11 (1.81)	3.89 (2.59)	3.71 (1.79)	1.67 (1.28)	1.67 (1.24)	3.50 (2.74)	5.02*	4.09*	2.27
I ate more than I should have	2.50 (2.20)	4.28 (2.44)	4.57 (2.22)	2.00 (1.45)	2.14 (1.77)	3.92 (2.81)	6.20*	5.00*	1.14

\* $p < .05$ , \*\* $p < .01$

All scaled questions are measured on a Likert scale with 1 = strongly disagree and 9 = strongly agree. Standard deviations are in parentheses

**Table 3** Effect of pieces and price on feeling of overeating

	1 Piece			2 Pieces			3 Pieces		
	\$4 (n = 18)	\$8 (n = 19)	F-Test	\$4 (n = 18)	\$8 (n = 21)	F-Test	\$4 (n = 7)	\$8 (n = 12)	F-Test
I ate more pizza than I should have	2.63 (2.06)	1.76 (1.82)	1.62	4.82 (2.55)	3.53 (2.39)	2.47	6.00 (2.00)	4.40 (3.24)	1.34
I feel guilty about how much I ate	2.39 (1.94)	2.26 (1.79)	0.04	3.44 (2.48)	1.68 (1.42)	7.13*	3.71 (1.50)	2.90 (2.08)	0.78
I am physically uncomfortable	2.17 (1.89)	1.955 (1.68)	0.14	2.94 (2.13)	1.28 (0.46)	8.11**	2.43 (1.51)	2.10 (1.91)	0.14
I overate	2.11 (1.81)	1.67 (1.28)	0.72	3.89 (2.59)	1.53 (1.02)	1.63**	3.71 (1.79)	3.50 (2.95)	0.03
I ate more than I should have	2.50 (2.20)	2.00 (1.45)	0.67	4.28 (2.44)	2.05 (1.72)	10.36**	4.57 (2.23)	4.00 (3.02)	0.18

\* $p < .05$ , \*\* $p < .01$

All scaled questions are measured on a Likert scale with 1 = strongly disagree and 9 = strongly agree. Standard deviations are in parentheses

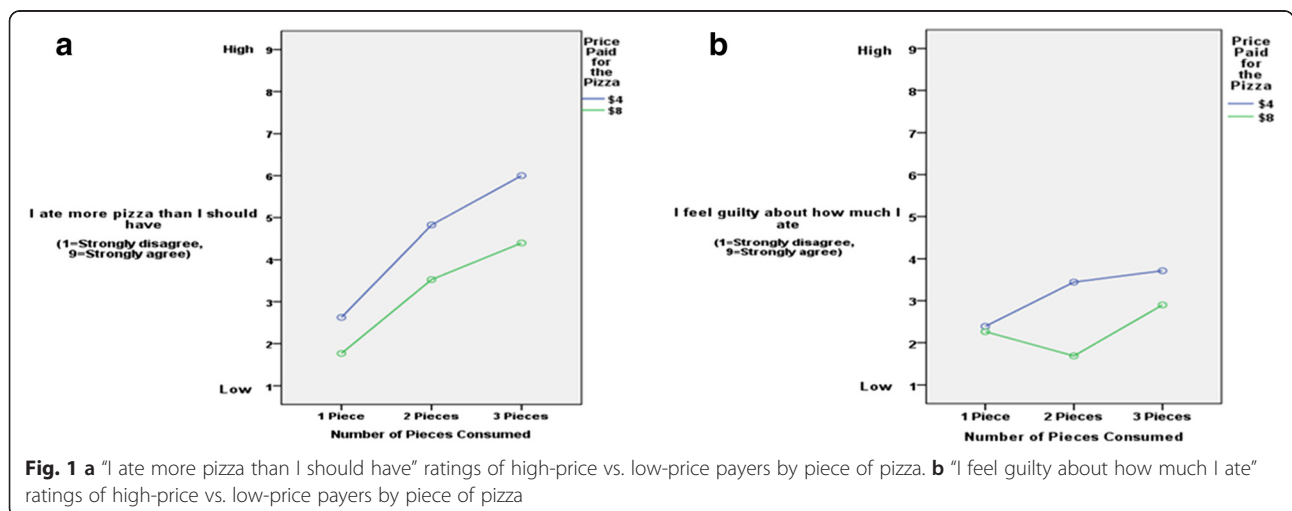
setting gives insightful results, future work could extend this study to pay per slice sales or other more common modes of sale.

Also, the study could be extended for broader price levels. Future studies could also compare the results for the consumers who consume a broader variety and more amounts of food. The study was conducted at a single site and no extensive information about respondents' demographics was available. Different demographic characteristics could lead to differences in the results. Also, income of the respondents is a crucial factor that could have an impact on the results; respondents with higher or lower income can evaluate a \$4 or \$8 buffet differently. As a result, all these could prevent the generalizability of the study findings. Future studies should examine possible gender, group effects and the income effects. Moreover, future studies should control for the effect of the day of the week on eating behavior and guilt of the consumers; whether Fridays and/or weekends influence consumers' guilt perception.

Charging a low price may influence consumers to set a lower expectation level about how much they should

consume to get their money's worth compared to the consumers who are charged a higher price. This lower expectation level may cause low-price payers to feel guiltier and feel fuller at the end of the meal compared to the high-price payers although both of the groups consume the same amount of food. Thus, the low-price payers may experience more negative feelings compared to the ones who ate the same amount but paid a higher price. This shows us the importance of pricing strategy for firms in the food industry. Although pricing too low may attract consumer attention, the negative feelings they will experience at the end of the meal may cause consumers to associate negative thoughts with the specific restaurant/firm, which will turn into a disadvantage for the firm in the long-term.

There is a possibility for customers to eat more but not perceive guilt in higher priced restaurants, and perceiving guilt even in small amounts for the lower priced restaurants. Pricing moderately or offering more variety of healthier options in AYCE restaurants could be a good starting point for restaurants both to lead their customers eat healthier, and/or feel less guilty. In their marketing communications, restaurants could also



mention the importance of eating from healthier food options for less guilt experience.

#### Abbreviations

AYCE: All-You-Can-Eat.

#### Competing interests

The authors declare that they have no competing interests.

#### Authors' contributions

OS collected and analyzed data, and helped draft the manuscript. BW conceived of the study, and participated in its design and coordination and helped draft the manuscript. Both authors read and approved the final manuscript.

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