At the Movies: How External Cues and Perceived Taste Impact Consumption Volume*

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Abstract

External cues such as packaging and container size can powerfully and unknowingly increase how much food a person consumes. Do they still, however, stimulate consumption as the perceived favorability of a food declines? This was examined with popcorn in a theatre setting. Moviegoers who had rated the popcorn as tasting relatively unfavorable ate 61% more popcorn if randomly given a large container than a smaller one. Moviegoers who had rated the popcorn as relatively favorable ate 49% more when the container size was increased (and were likely to eat greater amounts if accompanied with a person of the opposite sex). One reason for this increase was that consumers had more difficulty monitoring how much they ate from large containers. Implications for raising the consumption levels of healthy, but unfavorable foods are investigated.

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At the Movies:
How External Cues and Perceived Taste Impact Consumption Volume

Past research has shown that food consumption increases as the taste of the food improves. Despite this, relatively little effort has been directed towards examining the relationship between taste and consumption when exogenous factors, such as variations in container size, are present. Recent findings, however, suggest that exogenous factors, such as mood (Gould 1997), the presence of others (Berry et al. 1985), and container size (Wansink 1996), might explain a large percentage of the variation in food consumption volume. Can external cues so powerfully influence consumption that they continue to do so even as perceived food quality diminishes?

Better understanding the impact of taste and container size on consumption has implications for food development and distribution, and also for reducing potential confounds in the methodologies that researchers use to examine taste and consumption. For developers and practitioners, these findings show how an exclusive focus on taste does not provide the entire answer for increasing consumption. Because external factors such as package size can have a sizable impact on how much of a product a person consumes, it would be useful to know if they can moderate or magnify the impact that food favorability has on consumption volume. By knowing this, we could modify a package°Øs size to downwardly adjust portion size and consumption, or we could modify it to increase consumption among populations (children and the elderly) where healthy °© yet possibly less palatable foods °© are important for continued health.

Larger container sizes encourage people to consume greater volume per usage occasion than smaller container sizes, (Wertenbroch 1998; Folkes et al. 1993), partially because foods or beverages in larger containers are perceived to be less expensive per unit (Wansink 1996). While no study has investigated the impact perceived food taste has as a potential moderator of this robust "container size effect," other types of external cues such as salience and availability even stimulate usage when one does not particularly like the product (Wansink 1994).

In line with this, the relationship between perceived taste and consumption volume is an arena of research that has been of interest to both academics and practitioners. Food intake has been shown to be directly related to the perceived taste or palatability of the foods and inversely related to the animal's body weight, both in normal and in hypothalamic hyperphagic animals (Corbit & Stellar 1964). It has been generally accepted that the availability and one's liking for a food increases chewing and swallowing rates (Bellisle & Le Magnen 1980) and is generally at the root of excessive consumption (Kissileff & Thornton 1982; Bobroff & Kissileff 1986).

Yet, more careful consideration reveals a number of problems with this simple linear relationship between perceived taste and food consumption. Assuming individuals differ in their taste perception of foods, it may be desirable to examine whether or not differences in perceived (vs. manipulated) palatability can lead to differences in food consumption. For example, only a small percentage of people are overweight or obese although the prevalence of tasty, highly palatable foods is high. This suggests that the availability of these tasty, highly palatable foods is neither a necessary or a sufficient cause for over-consumption (Mela & Rogers 1993). Other factors influence the over-consumption of foods. Given the complex relationship between perceived taste and consumption, it is also necessary to examine how container sizes interact with palatability and – in turn -- impact food consumption quantity.

Method

The subjects in this study were moviegoers who had independently elected to see the 1:30 and 2:15 screenings of °∞Payback°± (starring Mel Gibson) on its opening weekend at a large theatre near Chicago in April 1998. Upon purchasing their ticket, each of the 161 moviegoers were given a coupon that entitled them to a °∞free popcorn and a soft drink°± to purportedly celebrate the theatre's one year anniversary. When they arrived in the theatre they were given a soft drink and were randomly given either a medium (120 grams) or a large (240 grams) container of free popcorn.

Following each of two 123 minute movie sessions, the containers were collected. The weight of the remaining popcorn was subtracted from the average weight of full containers to assess how much had been eaten. As each container was collected, each moviegoer was given a one-page questionnaire that asked questions relating to their perception of the popcorn as well as demographic information (see Appendix). Perceived taste was measured by asking them to indicate on a 9-point scale whether they agreed or disagreed with the statement "This popcorn tasted better than most movie popcorn I've had." Of the 161 people who participated in the study, 151 people (male 56%, female 44%) between the ages of 11 to 89 completed the questionnaire.

The design of the study is 2□2 between-subjects design in which container size was randomly manipulated (medium or large) and perceived food quality was measured. Taste differences in the popcorn were measured (median split) instead of manipulated (1) to help avoid demand effects, (2) to help keep subjects blind to the conditions of the study, and (3) to enable us to conduct the experiment in a naturalistic setting. Because of the general familiarity and expectation levels moviegoers have with popcorn, manipulating the taste of the popcorn would have violated their prior expectations and would have caused demand effects for the study. Furthermore, doing so may have hurt the image of the theatre and precluded the ability to examine this in a naturalistic setting.

Based on their individual ratings of the taste of the popcorn, subjects were categorized into two perceived taste groups, relatively unfavorable taste (n = 67) and relatively favorable taste (n = 54). This median split on the taste variable enabled us to compare high and low perceived taste groups without raising unnecessary demand effects. In analyzing the consumption data, the number of hours since each subject°Øs prior meal was used as a covariate in an ANOVA to avoid any uncontrollable effects from hunger. SPSS°Øs General Linear Factorial Model was used to conduct the ANCOVA model on the effects of perceived taste and container sizes on the amount of popcorn eaten.

Results and Discussion

Our results in Table 1 indicate that consumers with relatively favorable taste perceptions are likely to be in better moods ($t = -2.320$; $p < .05$), be more excited ($t = -2.970$; $p < .01$), and perceive the popcorn as more healthy ($t = -5.357$; $p < .001$). The average volume eaten, however, is not significantly different between the two perceived taste groups (72.9 vs. 80.0). The results suggest that increases in perceived taste are related to a more pleasant eating experience but are not always related to significant increases in consumption volume. It is interesting that the more favorably one rated the popcorn, the more healthy they perceived it to be. This is in contrast with a misleading yet common consumer view that "most healthy foods taste bad and most unhealthy foods taste good" (Wansink 1994).

Table 1 also indicates that consumers ate an average of 53% more popcorn from a large container than from a small container ($t = -5.336$; $p < .001$), and that consumers tend to perceive popcorn in a small containers as healthier than that in a large container ($t = 2.185$; $p < .05$). Container sizes, however, did not have any significant influences on perceived taste. It is interesting to note that popcorn from the larger container is perceived as being less healthy than that from the small container. In addition, the results also suggest that larger containers make it more difficult for consumers to monitor their consumption g ($t = 2.042$; $p < .05$) and leave them with more self-regret ($t = -2.087$; $p < .05$).

Table 1.
The Impact of Perceived Taste and Container Sizes on Consumption Volume
(Standard Deviations in Parentheses)

Dependent Variable	Perceived Taste[a]		t-Stats	Container Sizes		t-Stats
	Unfavorable Taste	Favorable Taste		Small (120 grams)	Large (240 grams)	
Volume eaten	72.9 (40.5)	80.0 (40.5)	-.962	61.1 (23.6)	93.5 (50.6)	-5.336**
Attention paid	5.3 (3.0)	6.0 (2.6)	-1.343	5.8 (2.4)	5.2 (2.5)	2.042*
Average moods	6.6 (2.0)	7.4 (1.5)	-2.320*	7.0 (1.9)	6.9 (1.6)	.632
Excitement	6.0 (2.5)	7.1 (2.0)	-2.970**	6.5 (2.1)	6.5 (2.4)	.386
Ate too much	4.5 (2.8)	5.3 (2.7)	-1.645	4.8 (2.8)	4.8 (2.8)	.225
Wish I ate less	4.4 (2.9)	4.8 (2.8)	-.807	4.4 (2.9)	5.0 (2.6)	-2.087
Perceived taste	2.5 (1.1)	7.5 (1.2)	-23.372**	4.7 (2.6)	4.9 (2.4)	-.824
Perceived healthiness	4.4 (2.1)	6.6 (2.1)	-5.357**	5.7 (2.1)	5.0 (2.4)	2.185**

Note. Means was measured on a 9-point scale and Volume Eaten in grams.
a. A median split method is used to categorize two groups, where the median is 5 on a 9-point scale.
** $p < .01$. * $p < .05$..

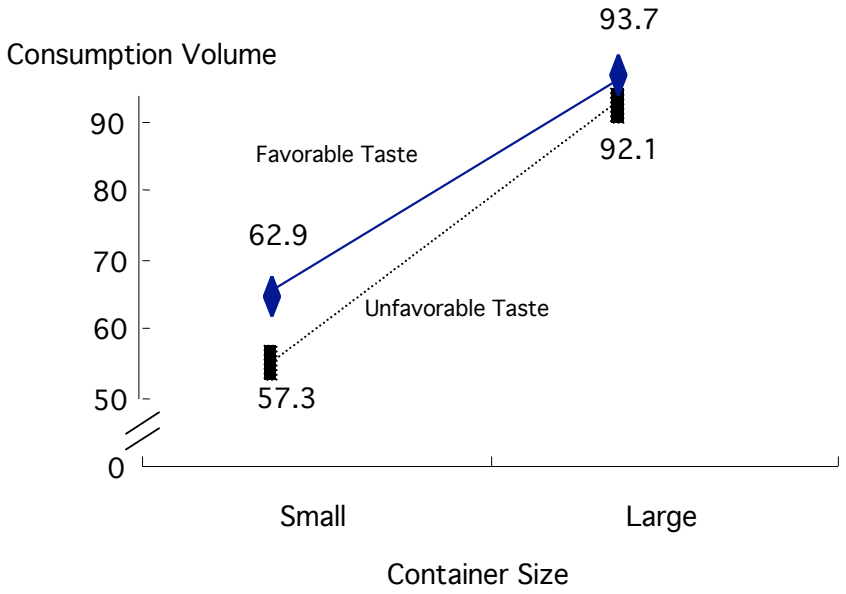
How Do Perceived Taste and Container Size Influence Consumption?

The impact that container size has on consumption is well documented (Wansink 1996). What is not understood, however, is whether container size still increases consumption as the favorability of the food decreases. We might expect that if a person finds the flavor of a product relatively unfavorable, package or container size will not cause them to eat more. To investigate this, we categorized the subjects into two perceived taste groups, unfavorable taste (n = 67) and favorable taste (n = 54), based on the median of a popcorn taste measure. As depicted in Figure 1, our ANCOVA indicates that container sizes have significant effects on consumption volume ($F_{size} = 20.780$; $p < .001$). However, neither a main effect of perceived taste ($F_{taste} = .298$; $p < .587$) nor an interaction between container sizes and perceived taste ($F_{sizextaste} = .049$; $p < .826$) were found.

This shows the robust impact that external cues, such as container size, can have on consumption --even across different levels of perceived taste quality. While we might expect this with relatively favorable foods, we would not expect it with less favorable ones. Yet larger packages stimulated 49% more consumption with relatively favorably rated popcorn (93.7 vs. 62.9 grams), and they stimulated 61% more consumption of relatively unfavorably rated popcorn (92.1 vs. 57.3 grams).

It is important to note that all this popcorn had an adequate or acceptable taste. Within this realistic range of taste acceptability, it is remarkable that package size has a robust impact on consumption, regardless whether one loves the taste or merely finds it adequate.

Figure 1.
The Impact of Perceived Taste and Container Sizes on Consumption Volume



The Influences of Other Factors on Consumption

Table 2 identifies other factors that may influence consumption volume of foods. The beta weights in Table 2 were estimated separately for three different models: (1) All subjects, (2) subjects who perceived the taste of the popcorn as relatively unfavorable, and (3) subjects who perceived the taste of the popcorn as relatively favorable. The 13 variables in each model were included all at once in the three multiple regression models.

Results across all subjects indicate that container size, gender, attention (consumption-monitoring) level, and presence of others can all influence consumption volume. Large containers increase consumption ($p<.05$) as does the presence of others ($p<.05$). Furthermore, men eat more than women ($p<.05$), and people who paid little attention to how much they ate tended to consume more ($p<.05$).

Those who rated the popcorn as relatively favorable, ate more from large containers than small ($p<.05$), and this effect was further magnified if accompanied with a person of the opposite sex ($p<.05$). In the group that rated the taste of the popcorn as relatively unfavorable, the biggest determinate of how much they ate was whether they paid attention to how much they were eating ($p<.01$). This factor washed out the direct impact of container size. When a food is eaten from a large container, it appears easy to lose track of how much one eats. Even if the food were to taste relatively unfavorable, eating it from a large container may cause one to overeat because they lose track of how much they have consumed.

Table 2
Drivers of Consumption Volume

Independent Variable		Standardized Beta Coefficient		
		All Subjects (R^2 = .401)	Unfavorable Taste Subjects (R^2 = .463)	Favorable Taste Subjects (R^2 = .580)
Container Sizes		1.990**	1.303	3.046*
Gender		-.185*	-.194	.053
Age		.102	.100	.057
Attention		-.215*	-.405**	-.132
Average Moods		-.133	-.165	-.279
Excitement		.058	-.085	.045
Perceived Taste		.159	N/A	N/A
Perceived Healthiness		.115	-.012	.230
With Same Genders[a]		.538	.339	.859
With Opposite Genders[a]		.674	.680	1.311
Interactions	Size x Perceived Taste	-.133	N/A	N/A
	Size x Same Genders	-.972*	-.498	-1.609
	Size x Opposite Genders	-1.271*	-.976	-2.474*
Number of Cases Included		98	49	29

a. Dummies were coded as alone (1-1), same genders (2-1), and opposite genders (1-2).
** $p < .01$. * $p < .05$.

Before tentatively discussing theoretical and practical implications of these findings, the caveats of naturalistic studies must be mentioned. In order to work with a commonly consumed food in a commonly experienced environment, we needed to rely on variations in food quality that were measured through consumer perceptions. While efforts were made to help reduce unnecessary variance in perceptions (such as controlling for the time since the prior meal), food quality perceptions can be influenced by some random variation (such as the influence of mood) and can result in range and variance restriction that could otherwise be avoided through a controlled, but invasive manipulation.

The power of this study is that it shows how a very common behavior °© popcorn consumption in a movie theatre °© can be dramatically influenced by an external cue such as package size. In doing so, it will hopefully stimulate studies that can use laboratory studies to calibrate the consumption trade-off between external cues and taste.

This study demonstrated how perceived taste and container sizes influence the consumption volume of foods. The results from a naturalistic study of moviegoers indicated that larger container sizes encouraged increased consumption more than smaller container sizes, but that perceived differences in taste did not have any significant effects on consumption of foods given two different container sizes. Additionally, we also found that factors such as attention, gender, and the presence of others increased consumption volume.

Clearly, dominant external cues such as container sizes can increase usage volume of foods when overall food quality is standardized. However, considering the multi-faceted aspects of food choice and consumption, the critical presence of other non-food-related factors should not be overlooked. For example, a low consumption-monitoring person is more susceptible to container sizes than a high consumption-monitoring person. Self-monitoring has been shown to influence purchase quantities (Wansink, Kent, and Hoch 1998) and household inventory depletion (Wansink, Brasel, and Amjad 2000) and has critical promise for studying over-consumption, especially in low-involvement or distracted contexts. Such contexts would include situations when a person watches TV or reads while eating or contexts in which there non-family members present.

This research underscores the importance of controlling for variables such as package sizes when one examines the impact of taste on consumption. However, while package sizes stimulated increased con-

sumption by 49% and 60% for relatively favorable and unfavorable foods, these results should be considered suggestive, not conclusive. One reason we might see seemingly greater increases among relatively unfavorably tasting products is because there is a ceiling of how much a person can eat, and it may be that people eating favorable-tasting popcorn reach that ceiling more quickly and with smaller containers. Furthermore, the lack of a direct taste manipulation and other possible confounds between variables such as taste and mood states may limit the generalizability of these results.

For developers and practitioners, these findings show how an exclusive focus on taste and palatability does not explain all of the variation in consumption volume. External and exogenous factors such as container size or household inventory levels (Wansink and Deshpande 1994) can have a sizable impact on how much of a product a person consumes. While container or package size can be used to downwardly adjust portion size and consumption, it can also be used to increase consumption among populations (children and the elderly) where healthy °© yet possibly less palatable foods °© are important for continued health.

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Appendix
Movie Popcorn Study Questionnaire

Thank you for helping us.
We would like to ask you to answer a few questions.

Please circle the number (1 to 9) that corresponds with what you think or feel…

	Strongly Disagree								Strongly Agree
This popcorn tasted better than most movie popcorn I've had.	1	2	3	4	5	6	7	8	9
I paid attention to how much popcorn I was eating.	1	2	3	4	5	6	7	8	9
I was in a better than average mood.	1	2	3	4	5	6	7	8	9
I ate too much popcorn.	1	2	3	4	5	6	7	8	9
I was excited during the movie.	1	2	3	4	5	6	7	8	9
I wish I ate less popcorn.	1	2	3	4	5	6	7	8	9
I was in a good mood during the movie.	1	2	3	4	5	6	7	8	9
This popcorn is healthier than most movie popcorn I had.	1	2	3	4	5	6	7	8	9

How many hours has it been since you ate a meal? _____ hours

Please check one:
_____ I am here by myself.
_____ I am here with a male friend.
_____ I am here with a female friend.

Please check one:
_____ I am Male.
_____ I am Female.

What is your age? _____ years old