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The Combined Effects of the Physical Environment and Employee Behavior on Customer Perception of Restaurant Service Quality

by EILEEN A. WALL and LEONARD L. BERRY

Dining in a table-service restaurant is a multilayered experience that involves at least three types of clues. Although food quality is basic, the ambience and service performance greatly influence a customer's evaluation of a particular establishment. Diners use the

following types of clues to judge a restaurant experience: functional—the technical quality of the food and service; mechanic—the ambience and other design and technical elements; and humanic—the performance, behavior, and appearance of the

employees. While customers' perceptions of mechanic clues are positively related to their expectations of the service, humanic clues dominate the influence of mechanic clues. Ideally, managers should orchestrate both humanic and mechanic clues to deliver a consistent service message.

Keywords: restaurant service; customer satisfaction; service clues

Beyond food quality, a key question in managing a restaurant is, "What is more important to customers—the behavior of employees or the environment where they perform the service?" While extensive research examines the separate effects of these two important influences on customers' perception of service quality, few studies address their combined effects (among those who have examined the combined effects are Baker, Grewal, and Voss 2002). This would seem to be an important area of inquiry, given that restaurant customers commonly experience both employees and the facility simultaneously.

Consequently, our objective in this article is to examine the combined effects of the physical environment and the behavior of employees on customers' perceptions of restaurant service quality. After discussing the theoretical basis for the research, we describe a study designed to test those effects. We discuss the study's conclusions, managerial implications, and suggest future research in the final section.

The Clues of Service

In choosing and using restaurant services, customers frequently behave like detectives as they search for information and organize their perceptions into a set of feelings about the service (Berry, Wall, and Carbone 2006). For example, everything on a restaurant table potentially communicates to customers, including the table covering used, if

any, the use of paper or cloth napkins and their texture, and the cleanliness of the table. That assessment is then combined with reactions to the presentation of the meal and the food itself.

Berry, Carbone, and Haeckel (2002) discussed three categories of clues present in the service experience: functional clues, mechanic clues, and humanic clues. Functional clues concern the technical quality of the service, particularly relating to whether the service is performed competently. In a restaurant, this category refers to the food itself and the accuracy or efficiency of the service. For example, the taste and freshness of a restaurant's shrimp scampi is a functional clue, as is the appropriate pacing of the meal. Mechanic clues are nonhuman elements in the service environment consisting of design and ambient factors, including equipment, facility layout, lighting, and color. For example, tile-top tables, copper pot lamps, and photos of chili cook-off events serve as mechanic clues in Chili's restaurants. Humanic clues consist of the behavior of service employees, including body language, tone of voice, and level of enthusiasm. For example, the warm, friendly smile and sincere greeting of a restaurant hostess illustrate humanic clues.

Functional clues are the basis of a restaurant's success. Few managers would disagree that tasteful, wholesome food served at an appropriate temperature is an essential to a positive dining experience. While functional clues are the foundation of the dining experience, however, functionality constitutes only part of that experience. For example, a rude, bored, or aloof server can effectively ruin a customer's restaurant experience even if the meal was prepared properly. This is consistent with the findings of Parsa et al. (2005), who found that while food quality was critical to restaurant success, excellent food alone did not guarantee success. Because differentiating the service

typically relies on mechanic and humanic clues, our study focuses on the combined effects of those clues on customers. (We prefer the term “clues” over the similar term “cues” to better convey the service customer’s active processing of stimuli that can help inform their choices and influence their feelings about the experience.)

The Effect of Mechanic Clues

During the dining experience, customers are affected by a variety of mechanic clues, as indicated by research in environmental psychology and marketing. Research in environmental psychology draws from the stimulus-organism-response (SOR) paradigm in psychology (Mehrabian and Russell 1974; Spangenberg, Crowley, and Henderson 1996) and generally finds that the physical environment can powerfully influence people’s cognition, emotions, and behavior.¹ People rely on the environment for meaning about their world and for behavioral guidance (Genereaux, Ward, and Russell 1983; Ittelson et al. 1974; Kaplan 1987; Rapoport 1982; Russell, Ward, and Pratt 1981; Russell and Pratt 1980; Russell and Ward 1982). In addition, an environment can influence feelings, which may among other reactions encourage people to remain in the environment or to leave it (Mehrabian and Russell 1974).

Research in marketing draws from theories in environmental psychology to examine the effects of the environment on customers’ affect, attitudes, service evaluation, and behavior—and, ultimately, sales. In the context of retailing, Kotler (1973) defined atmospherics as the conscious design of space to create certain effects in buyers to enhance purchase likelihood. According to Kotler, atmosphere can affect purchase behavior in three ways. As an attention-creating medium, atmosphere can make a store or restaurant

distinctive through design, color, motion, or sound. In the Hard Rock Cafe, for example, customers are surrounded by authentic rock and roll memorabilia, such as a guitar signed by John Lennon or a leather jacket worn by Elvis Presley, hung on the walls. These mechanic clues help to establish the Hard Rock brand. As a message-creating medium, the atmosphere provides discriminative stimuli to buyers that enable them to recognize a restaurant’s differences as a basis for choosing that restaurant. For example, the soft lighting, snowy white linen tablecloths, and crystal chandeliers of an upscale restaurant communicate to customers the type of food and level of service that make up a fine-dining experience. Finally, as an affect-creating medium, atmospheric elements such as color, smell, sound, and texture evoke visceral reactions that influence purchase probability. At Walt Disney World in Orlando, for example, the smell of chocolate chip cookies baking is piped from the underground to the park’s Main Street inside the front gate to greet guests, create warm feelings, and whet their appetite for a treat.

Much of the empirical research in atmospherics has focused on the effects on customers of specific ambient factors, which are background conditions such as lighting or music that affect the senses, often subconsciously (Baker and Cameron 1996). Music has been one of the most commonly studied ambient elements. For example, Smith and Curnow (1966) found that shoppers spent less time in a store when music was played loudly, but they found no effect on sales per customer. Milliman (1986, 1982) found that music volume and tempo influenced the amount of time and money consumers spent in retail and restaurant establishments.

Research in services marketing has shown that in inseparable services where both the customer and service provider

1. The term “environment” has multiple meanings. In this article, our use of the term refers to the physical facility in which the service is performed.

must be present, such as those found in restaurants and hotels, the physical environment where the service is performed influences customers' perception of service quality (Baker, Grewal, and Parasuraman 1994; Bitner 1990). For example, Bitner (1990) found that travel agency customers were less likely to attribute service failures to the companies when employees had clean, organized desks.

Mechanic clues are especially important in services marketing because the intangibility of the offering leads customers to rely on tangibles to evaluate the experience. The mechanic clues in the service environment assist customers in understanding and interpreting the service (Carbone and Haeckel 1994). This principle is inherent in the interior of a fast-food restaurant, where the customer queues communicate the quick-serve nature of the experience.

In a study of the influence of environment on quality inferences and store image, Baker, Grewal, and Parasuraman (1994) found that ambient elements of the store environment provide information that consumers use to infer quality. Studies of the relative importance of intrinsic and extrinsic factors have shown that extrinsic factors become more important to consumers in judging quality when intrinsic factors are not available or when evaluation of intrinsic factors is difficult (Hartline and Jones 1996; Zeithaml 1988). Mechanic clues influence customers' service perceptions because these clues are part of the experience. Uncomfortable seats in a movie theater, offensive signs in a retail store (e.g., "break it and you've bought it"), and tables too close together in a restaurant directly detract from customers' experiences. We believe mechanic clues are especially influential in affecting quality perceptions for services in which customers experience the facilities for an extended time, such as

hotels and airplanes. The more time customers spend in a service facility, the greater the opportunity they have to be influenced by mechanic clues. Such tangibles are salient to value creation. In addition to their impact on customers during the dining experience, mechanic clues also have the ability to influence customers before they experience either functional or humanic clues. The next section examines how this influence works.

Mechanic Clues and Expectations

Customers' perceptions of service quality are subjective evaluations of a service experience, and customers' expectations are the standards against which such service experiences are judged (Zeithaml, Berry, and Parasuraman 1993). Bitner (1990) proposed that the "servicescape" can influence customers through its effects not only on perceived performance but also on expectations. Thus, an important function of mechanic clues is their influence on customer expectations. Along with price, tangibles or mechanic clues have been found to function as implicit service promises that lead to inferences about what the service should be like (Zeithaml, Berry, and Parasuraman 1993). Research indicates that customers often use price and tangibles as surrogates for quality (Zeithaml, Berry, and Parasuraman 1993). For example, a customer would expect a higher level of personal service at a luxurious, expensive hotel than at a budget hotel with basic facilities. This is consistent with Sharma and Stafford (2000), who suggested that environment-based perceptions of a retail store can influence customers' beliefs about the people who work there, and that nicer environments are generally associated with more credible service providers. As a result, it is expected that customers' perceptions of

mechanic clues will be positively related to their expectations of the service.

The Effect of Humanic Clues

In addition to mechanic clues, employees' behavior during a service also provide powerful clues that contribute to customers' perceptions of service quality (Berry and Bendapudi 2003; Bitner 1990; Bitner, Booms, and Mohr 1994; Bitner, Booms, and Tetreault 1990; Bowen and Schneider 1985; Zeithaml, Berry, and Parasuraman 1993; Zeithaml, Parasuraman, and Berry 1985). Customers' assessment of employees' effort and service performance has been found to have a strong effect on satisfaction and customers' switching behavior (Keaveney 1995; Mohr and Bitner 1995). Berry and Lampo (2004) argued that labor-intensive service brands can be only as strong as the customers' satisfaction with the people performing the service, because customers' actual service experiences are most influential in establishing brand meaning. A server's pacing in serving a meal and attention to customers' readiness for the next course should influence perceptions of service quality. Thus, while mechanic clues can set the stage by influencing customers' expectations, humanic clues typically play a prominent role in delivering on the promise through the service provider's performance.

Companies seek to deliver service that meets or, even better, exceeds customer service expectations (Zeithaml, Berry, and Parasuraman 1985). Since mechanic clues influence customers' expectations of service performance and humanic clues directly reflect service performance, it would seem critical that these two types of clues be viewed as consistent for the customer to determine that the firm delivers excellent service. A comfortable, beautifully decorated restaurant that delivers excellent service by courteous, well-dressed employees is likely to receive higher service quality

ratings from customers than a restaurant that is strong in one but not both of these clue categories. Important though the role of mechanic clues can play in influencing customers' expectations and perceptions of service, however, humanic clues typically have even stronger effects. In a study of the sources of services' brand strength, Berry and Lampo (2004) found that employee behavior was, by far, the most influential factor in shaping customers' perceptions of their high- and low-preference brands. Thus, we expect that humanic clues moderate the effect of mechanic clues. In other words, the effect of humanic clues on perceived service quality will be stronger when mechanic clues are positive than when mechanic clues are negative.

Study Methods and Procedures

We tested the combined effect of mechanic clues and humanic clues on customers' perception of service quality with a 2×2 experiment in a casual-dining restaurant. This setting was chosen as being representative of a labor-intensive, interactive service context.

Subjects

Similarly, the sample was chosen to be representative of the dining public in a college town. As such, it was drawn from student and community groups representing a wide range of ages and backgrounds. Students, representing 26 percent of the sample, were drawn from undergraduate business classes, and the community groups were from local church and charitable organizations. Seventy-one percent of the respondents reported dining out once a week or more. Because a final sample of 45 subjects per cell was considered to be optimal (Cohen 1988), we set a goal of 50 subjects per cell, or 200 total subjects, to allow for nonresponse. Final completed responses

totaled 181, with approximately 45 responses per cell. Community groups were offered an honorarium and students were offered extra class credit for participating in the study. Exhibit 1 summarizes the composition of the sample.

Stimuli

One challenge in environment-behavior research is achieving experiential realism—the use of realistic stimuli within subjects' experience that maintain fidelity to the variables and settings with which the research is concerned (Bateson and Hui 1992). Pictures have been used as stimuli in such environmental studies (Bitner 1990). We also used video as a stimulus because of its ability to capture not only the visual and auditory elements of the restaurant's physical environment but also the behavior of employees, thus enhancing experiential realism. The use of video in such studies has been determined to be representative of the environment, and video has been used in environment-behavior studies in marketing (Bateson and Hui 1992; and Carpman, Grant, and Simmons 1985).

The stimuli used in the experiment were photographs and videotape of the restaurant. Four brief videos were developed with the cooperation of a seafood restaurant chain. The videos were filmed in two of the chain's restaurants; one location was a new prototype (positive environment condition), and the other was the oldest format in the chain (negative environment condition). The locations were chosen on the basis of company data indicating positive customer response to the prototype and negative response to the old location. Pretests using photographs of each location confirmed these customer responses. The old restaurant had rough-hewn wood panels and dark, heavy wood furnishings. Décor consisted of authentic fishnets and oars hanging on the walls, with an old rowboat hanging from the ceiling in the main dining room. Windows were few

Exhibit 1:

Subject Profile

Sample	
Community group	134
Students	47
Total	181
Gender	
Female	102
Male	79
Total	181
Age	
18-24	60
25-34	26
35-49	48
50-65	29
Older than 65	18
Total	181
Marital status	
Single	63
Married	88
Divorced	5
No response	25
Total	181
Education	
High school or less	8
High school grad	30
Some college	86
College grad	42
Graduate school	15
Total	181
Income	
Below 20K	68
20-40K	38
41-60K	39
61-100K	51
More than 100K	16
No response	5
Total	181
Frequency of dining out	
Once a week or more	129
Less than once a week, but more than once a month	35
Once a month or less	17
Total	181

and small and lighting was low, resulting in a dark restaurant interior. Conversely, the prototype was bright, with ivory stucco

walls and waist-to-ceiling windows on three of the exterior walls. The lobby included a skylight and contemporary furnishings, with light-colored wood and upholstered chairs. Décor consisted of a large metal fish sculpture over a centrally located bar. In addition, modern-style vertical live fish tanks were situated throughout the restaurant.

Two different service scenarios were shot at each location: one portraying positive service behavior and the other portraying negative service behavior. Scripts for these two scenarios were developed based on the company's customer-service standards. The script for the positive service scenario showed employees greeting customers promptly, seating them at clean tables, and frequently checking on customers throughout the dining experience. The negative script showed employees ignoring customers as they enter the restaurant, displaying poor product knowledge, and failing to attend to customers while dining. Prices were not visible to respondents, and the same menus were used in all scenarios. Pictures of both of the restaurants and the scripts were pretested with a small sample of subjects prior to filming the videos to verify that the experimental design would perform as expected. In the pretests, subjects viewed the restaurant pictures and answered questions on a questionnaire concerning their perceptions of mechanic clues. Then they read a script of a service scenario and answered additional questions concerning their perceptions of the humanic clues and the combination of mechanic and humanic clues. Once manipulations were verified, the four videos were filmed for data collection.

Instrument and Procedures

Respondents rated their reaction to the restaurant's environment and the service employees' behavior using 7-point Likert-type scales based on Baker, Berry, and

Parasuraman (1988). Items were adapted to fit the restaurant environment and service. To ensure content validity, care was taken to ensure realism through interviews with restaurant management, service employees (servers and hosts or hostesses), and customers. Refinements were made as a result of the interviews to ensure the items generated reflected the measures' content. Items and administration procedures were further refined in the pretests described previously. The survey instrument consisted of a four-section questionnaire.

Respondents were randomly assigned to one of the four treatments, namely, (1) positive mechanic clues and positive humanic clues, (2) negative mechanic clues and positive humanic clues, (3) positive mechanic clues and negative humanic clues, or (4) negative mechanic clues and negative humanic clues. Respondents viewed pictures of their assigned restaurant and indicated the extent to which they agreed with the statement, "Customers could expect good service in this restaurant." When all respondents were finished evaluating the still photos, they were shown the selected video and completed section two of the survey, which asked for their opinions about the service they had just viewed. After filling out this section, subjects were asked to complete section three of the survey, in which they were instructed to take both still pictures and video into consideration and provide their impressions of overall service quality by indicating the extent to which they agreed with the sentence, "The service quality of this restaurant is good." Finally, in section four, respondents provided demographic data, which can be found in Exhibit 1.

Analysis and Results

Customer expectations of restaurant service were found to be significantly higher when mechanic clues were positive than

Exhibit 2:

Analysis of Variance Results

Source of Variation	Sums of Square	df	Mean Square	F	p	η^2
Corrected model	906.129	3	302.043	601.902	.000	.911
Intercept	2,893.192	1	2,893.192	5,765.461	.000	.970
Mechanic clues	0.103	1	0.103	0.205	.651	.001
Humanic clues	891.548	1	891.548	1,776.649	.000	.909
Mechanic \times Humanic clues	8.793	1	8.793	17.522	.000	.090
Error	88.821	177	0.502			
Adjusted $R^2 = .909$						
$N = 181$						

when they were negative.² As suggested above, mechanic clues seem to set the stage for what customers expect of a service.

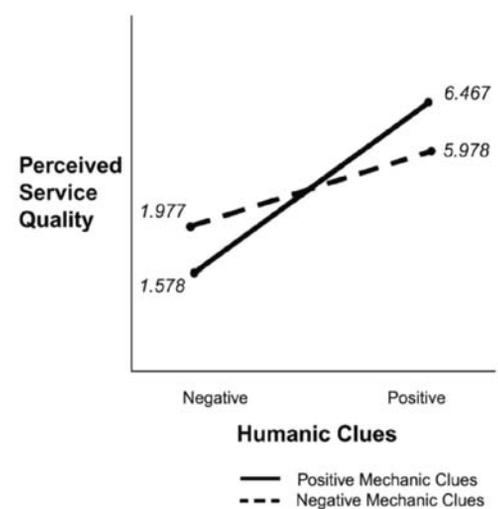
However, humanic clues are more important than mechanic clues in determining the customer's final assessment of the restaurant's service. To assess this relationship we conducted a 2×2 analysis of variance (ANOVA) consisting of the positive and negative mechanic clues and the positive and negative humanic clues, with customers' perception of service quality as the dependent variable. The ANOVA showed a significant main effect of behavior (humanic clues) on perception of service quality with a large effect size and a statistically insignificant main effect of mechanic clues on perception of service quality with a small effect size. In addition, the results indicate a significant interaction effect of mechanic clues and humanic clues with a large effect size. The insignificant effect of mechanic clues on service quality perception suggests the unequal influence of mechanic and humanic clues on service quality when customers experience them both in a restaurant. The ANOVA results are presented in Exhibit 2.

Customer mean ratings of service quality were highest when both mechanic clues and humanic clues were positive, followed by negative mechanic clues with

2. $X_{mean pos} = 5.26$; $X_{mean neg} = 4.67$; $p = .001$.

Exhibit 3:

Means of Perceived Service Quality



positive humanic clues. Perceptions of service quality were lowest when mechanic clues were positive but humanic clues were negative, and slightly higher when both mechanic clues and humanic clues were negative. A diagram of the results is presented in Exhibit 3.

Discussion

Customers' expectations of service were significantly higher when mechanic clues were positive than when they were negative. This finding supports the conceptualization of the restaurant environment as an implicit service promise, with the potential to influence customers' expectations of service (Zeithaml, Berry, and Parasuraman 1993). This is consistent with Parsa et al. (2005), who found that successful restaurants had a clear and consistent concept. In effect, customers look for tangible clues to help inform their expectations of a service. Thus, managers may improve perceptions of restaurant service by orchestrating mechanic clues.

Regardless of the information imparted by mechanic clues, however, humanic clues dominate mechanic clues in influencing service quality perceptions for this casual-dining restaurant. This is why restaurants that have excellent food and service but poor ambience can be successful. Ideally, both humanic and mechanic clues should deliver a consistent message to customers, but when inconsistency occurs, it is best to be strong in humanic clues.

Our findings strengthen our conviction that consistent application of mechanic and humanic clues is the ideal. However, we recognize that this does not always occur in labor-intensive, interactive services. Our findings, therefore, suggest the essential importance of positive humanic clues. Negative humanic clues cannot overcome positive mechanic clues, but positive humanic clues can—to a degree—overcome negative mechanic clues. However, mechanic clues were also found to be associated with customer expectations, and they also are important.

Readers should bear in mind several limitations of this research in considering the findings. First, the empirical conclusions are based on the study of one service

industry—restaurants—and one company within that industry. Replication of the research in other restaurants or service sectors is needed to extend the generalizability of the findings. Also, although efforts were made to ensure that the subjects were representative of the market's restaurant patrons, and the subjects were randomly assigned to the treatment conditions, probability sampling was not used. In addition, subjects were not prescreened for having dined at this type of restaurant before, which may also have had an effect on our results. Moreover, we made no effort to identify the relative influence of specific stimuli within mechanic and humanic clues, since that was beyond our study's scope. Functional clues, such as food quality, were likewise beyond the scope of our study.

Even with those limitations, this research goes beyond examining the individual effects of mechanic and humanic clues to investigating their combined effects, and thus the findings are more representative of the customer's actual experience. As such, the study lends empirical support to the services marketing literature on experience engineering, which suggests that functional, mechanic, and humanic clues must be managed in a consistent way to enhance the customer's service experience (Berry and Bendapudi 2003; Carbone and Haeckel 1994; Haeckel, Carbone, and Berry 2003).

Much remains to be learned in this area of inquiry. Replicating our study in other types of restaurants and other service sectors may reveal differing importance levels of the clues, as suggested earlier. For example, we would not be surprised to find humanic clues playing a less dominant role in quick-service restaurants, where customer interaction with service providers is limited to counter service or the drive-through. Moreover, we see orchestrating mechanic clues to manage expectations as an underexplored concept in services

marketing. In particular, examination of the effects of specific types of clues on customers or employees would be beneficial. By the same token, we need further exploration of humanic clues. That is, what specifically about employee behavior is important to customers? For example, is a greeter's smile when a customer enters the restaurant a key determinant of customers' service-quality perceptions? Even more valuable would be a study that goes beyond the effect of mechanic and humanic clues on satisfaction to their effect on customers' commitment to a restaurant. Finally, a future study should include the interaction of functional clues in addition to mechanic and humanic clues for a more complete picture of the service experience.

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