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A Hierarchical Model of Health Service Quality

Scale Development and Investigation of an Integrated Model

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This research developed and empirically validated a multidimensional hierarchical scale for measuring health service quality and investigated the scale's ability to predict important service outcomes, namely, service satisfaction and behavioral intentions. Data were collected from a qualitative study and three different field studies of health care patients in two different health care contexts: oncology clinics and a general medical practice. Service quality was found to conform to the structure of the hierarchical model in all three samples. The research identified nine subdimensions driving four primary dimensions, which in turn were found to drive service quality perceptions. The primary dimensions were interpersonal quality, technical quality, environment quality, and administrative quality. The subdimensions were interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support. The findings also support the hypothesis that service quality has a significant impact on service satisfaction and behavioral intentions and that service quality mediates the relationship between the dimensions and intentions.

Keywords: scale development; service quality; health care; satisfaction; intentions

Health care is one of the fastest growing sectors in the service economy (Andaleeb 2001). This growth is due in part to an aging population, mounting competitive pressures (Abramowitz, Coté, and Berry 1987), increasing consumerism, and emerging treatments and technologies (Ludwig-Beymer et al. 1993; O'Connor, Trinh, and Shewchuk 2000). Quality in health care is currently at the forefront of professional, political, and managerial attention, primarily because it is being seen as a means for achieving increased patronage, competitive advantage, and long-term profitability (Brown and Swartz 1989; Headley and Miller 1993) and ultimately as an approach to achieving better health outcomes for consumers (Dagger and Sweeney 2006; Marshall, Hays, and Mazel 1996; O'Connor, Shewchuk, and Carney 1994). Against this background, service quality has become an important corporate strategy for health care organizations.

The quality of medical care has traditionally been measured using objective criteria such as mortality and morbidity. Although these indicators are essential to assessing clinical quality, softer, more subjective assessments are often overlooked. In reality, the health care sector has been slow to move beyond a supply-side approach to quality assessment. However, as the industry structure changes, the role patients play in defining what quality means has become a critical competitive consideration (Donabedian 1992; Jun, Peterson, and Zsidisin 1998; O'Connor, Trinh, and Shewchuk 2000). As a consequence, service providers are struggling to implement meaningful customer-oriented quality assessment measures (Clemens, Ozanne, and Laurensen 2001; Murfin, Schlegelmilch, and Diamantopoulos 1995). Because few reliable and valid instruments are available, many service providers are implementing measures that are not aligned to the complexities of the health care setting (Draper and Hill 1996).

The purpose of this article is to describe the development and refinement of a multidimensional, hierachal scale for measuring health service quality that is appropriate to our research contexts, as well as to describe an integrated model that includes health consumer outcomes. Specifically, our key objectives were (a) to provide a conceptualization of the health care service quality construct that captures the domain of the construct, (b) to systematically develop a scale to measure health service quality from the customers' perspective, (c) to assess the psychometric properties of the scale, and (d) to examine the effects of this conceptualization of health service quality on satisfaction and behavioral intentions.

PERCEIVED SERVICE QUALITY

Although a considerable amount of research has been published in the area of service quality perceptions, much of this research has focused on the development of generic service quality models (e.g., Brady and Cronin 2001; Parasuraman, Zeithaml, and Berry 1985). Relatively few studies, in comparison, have focused on the development of context-specific service quality models, despite indications that service quality evaluations are likely to be context dependent (Babakus and Boller 1992; Carman 1990; Dabholkar, Thorpe, and Rentz 1996). Specifically, research has not directly examined how customers assess health service quality. We discuss in the following sections key issues relevant to the development of our health service quality scale.

Measuring Service Quality Perceptions

Service quality perceptions are generally defined as a consumer's judgment of, or impression about, an entity's

overall excellence or superiority (Bitner and Hubbert 1994; Boulding et al. 1993; Cronin and Taylor 1992; Parasuraman, Zeithaml, and Berry 1985, 1988). This judgment is often described in terms of the discrepancy between consumers' expectations of service and actual service performance. Grönroos (1984), for example, emphasized the use of expectations as a standard of reference against which performance can be judged, and Parasuraman, Zeithaml, and Berry (1985) put forward service quality as the gap between expected and perceived service. Although commonly applied, this approach has been the subject of substantial criticism and debate. Babakus and Boller (1992), for example, suggested that the measurement of expectations adds limited information beyond what is gained from measuring service perceptions alone. Similarly, Dabholkar, Shepherd, and Thorpe (2000) found that perceptions performed better than difference measures when comparing these approaches, and both Cronin and Taylor (1992) and Brady and Cronin (2001) focused on performance-only measures (i.e., perceptions rather than expectations) when modeling service quality perceptions.

Although the conceptual definition of service quality is often specified at an abstract level, most commonly as a second-order factor (Grönroos 1984; Parasuraman, Zeithaml, and Berry 1988; Rust and Oliver 1994), service quality has recently been described as a third-order factor (Brady and Cronin 2001; Dabholkar, Thorpe, and Rentz 1996). This structure suggests that service quality comprises several primary dimensions, which in turn share a common theme represented by the higher order global perceived service quality construct. Moreover, these dimensions have subdimensions that combine related attributes into subgroups. Perceptions of overall service quality are therefore represented as a third-order factor to the subdimensions. Modeling service quality in this way recognizes that the evaluation of service quality may be more complex than previously conceptualized.

The complexity of service quality evaluations is also evident in the many failed attempts to replicate the dimensional structure of service quality perceptions. The widely applied SERVQUAL scale (Parasuraman, Zeithaml, and Berry 1985, 1988), for example, has been criticized insofar as its five dimensions, namely, reliability, empathy, tangibles, responsiveness, and assurance, are difficult to replicate across diverse service contexts (Buttle 1996). Researchers applying the SERVQUAL scale have, for example, identified a range of factors, including 3 factors in an automotive servicing context (Bouman and van der Wiele 1992), 4 factors in the retail clothing sector (Gagliano and Hathcote 1994), and 3 factors in the context of MBA students' service quality perceptions (McDougall and Levesque 1994). Furthermore, Brown, Churchill, and Peter (1993) found service quality to be unidimensional when applying the five-dimension SERVQUAL scale. The application of

the SERVQUAL scale in the context of health care services has also produced mixed results, with Wisniewski and Wisniewski (2005) and Rohini and Mahadevappa (2006) supporting the original 5-factor structure, Headley and Miller (1993) identifying 6 dimensions in a primary care clinic, Lytle and Mokwa (1992) finding 7 dimensions among patients of a health care fertility clinic, and Reidenbach and Sandifer-Smallwood (1990) extracting a 7-factor solution in an emergency room setting. Furthermore, Carman (1990) recognized 9 dimensions in a multiencounter hospital setting, and Licata, Mowen, and Chakraborty (1995) identified 12 factors in a health care setting when using the original SERVQUAL scale.

Although researchers disagree about the manner in which service quality perceptions should be measured, it is generally agreed that service quality is a multidimensional, higher order construct (e.g., Grönroos 1984; Parasuraman, Zeithaml, and Berry 1988). Moreover, it has been suggested that service quality may comprise several overarching or primary quality domains that reflect elements of technical quality, functional quality, and environment quality. Grönroos (1984), for example, suggested that service quality comprises two distinct components, the technical aspect, or what is provided, and the functional aspect, or how the service is provided. Similarly, McDougall and Levesque (1994) put forward a model of service quality comprising the three underlying dimensions of outcome, process, and environment and a fourth dimension, enabling, which reflects factors that make the service experience easier for the customer. Rust and Oliver (1994) suggested that customers' evaluations of service quality are based on the process of service delivery, the service environment, and the outcome or technical quality of the service. Finally, Brady and Cronin (2001) suggested that service quality comprises the dimensions of interpersonal quality, outcome quality, and environment quality. Semantic differences aside, these models suggest that service quality perceptions comprise four overarching dimensions, namely, interpersonal quality, technical quality, environment quality, and administrative quality. As well as providing a foundation for the development of our health service quality scale, the merging of these dimensions with SERVQUAL has most recently seen the SERVQUAL dimensions positioned as descriptors of these overarching dimensions (see Brady and Cronin 2001 for a detailed discussion).

Researchers have further suggested that service quality may be most appropriately conceptualized as a formative construct (Rossiter 2002; Dabholkar, Shepherd, and Thorpe 2000; Parasuraman, Zeithaml, and Malhotra 2005). According to the formative approach, the dimensions of the construct give rise to or cause the overall construct, whereas in the reflective approach, the dimensions are

seen as reflective indicators of their higher order construct (Jarvis, MacKenzie, and Podsakoff 2003). In support of this approach, we argue, for example, that it does not make sense to suggest that high levels of technical service quality are the result of high overall service quality perceptions, as implied by the traditional, reflective approach to modeling service quality and its dimensions, but rather that as technical service quality increases, overall service quality perceptions increase.

Health Service Quality Research

Turning attention to the health care literature, several conceptual frameworks for evaluating the quality of care are offered. Donabedian (1966, 1980, 1992) differentiated between two primary domains of managing health care quality, namely, technical and interpersonal processes. According to this framework, technical care refers to the application of medical science and technology to health care, while interpersonal care represents the management of the interaction that occurs between the service provider and consumer. Within this conceptualization, a third element, the amenities of care, also contributes to health care quality. The amenities of care describe the intimate features of the environment in which care is provided. Brook and Williams (1975) put forward a conceptualization similar to that proposed by Donabedian (1966, 1980, 1992), in which technical care reflects how well diagnostic and therapeutic processes are applied and interactive care concerns the interactive behavior between the service provider and patient. Ware, Davies-Avery, and Stewart (1978) and Ware et al. (1983) also identified the interaction between a service provider and a patient, the technical quality of care, and the environment as important dimensions of patient satisfaction. These authors also provided support for the inclusion of a fourth dimension reflecting the administrative aspects of service provision. This dimension is similar to the enabling dimension proposed by McDougall and Levesque (1994). Finally, Wiggers et al. (1990) noted the importance of technical competence and interpersonal skills when assessing health care services. More recently, Zineldin (2006) expanded these conceptualizations and found support for five quality dimensions: object or technical quality, quality processes or functional quality, quality infrastructure, quality interaction, and quality atmosphere. Similarly, Choi et al. (2005) forward a four-factor structure, including physician concern, staff concern, convenience of care process, and tangibles, which reflect aspects of technical, functional, environment, and administrative quality. Finally, Doran and Smith (2004) examined a model in which outcome is seen as a pivotal service quality dimension; empathy, assurance, responsiveness, and reliability as core aspects of quality; and

tangibles or the physical aspects of the service as peripheral aspects. A comparison of the health care dimensions identified with those evident in the marketing literature indicates considerable overlap. That is, both literatures identify the importance of the technical, functional, environment, and administrative dimensions of the service experience.

SCALE DEVELOPMENT

Because a primary goal of our research was to develop a scale to measure health service quality, we began by investigating commonly cited primary dimensions of service quality in the marketing literature, as outlined in the previous section. Through this process, we identified four primary dimensions that reflect service quality perceptions. The first of these dimensions, interpersonal quality, reflects the relationship developed and the dyadic interplay that occurs between a service provider and a user (Brady and Cronin 2001; Donabedian 1992; Grönroos 1984; Rust and Oliver 1994; Ware, Davies-Avery, and Stewart 1978). As services are produced, distributed, and consumed in the interaction between a service provider and a customer, the interpersonal process is crucial to the customer's ultimate perception of the service provider's performance. The second, technical quality, describes the outcome of the service process, or what a customer receives as a result of interacting with a service firm (Brady and Cronin 2001; Donabedian 1992; Grönroos 1984; Rust and Oliver 1994; Ware, Davies-Avery, and Stewart 1978). Technical quality reflects the expertise, professionalism, and competency of a service provider in delivering a service (Aharony and Strasser 1993; Zifko-Baliga and Krampf 1997). The third dimension is environment quality, which comprises a complex mix of environmental features (Baker 1986; Bitner 1992; Brady and Cronin 2001; Donabedian 1992). The final primary dimension we identified is administrative quality. Administrative service elements facilitate the production of the core service while adding value to a customer's use of a service (Grönroos 1990; Lovelock, Patterson, and Walker 2001; Ware, Davies-Avery, and Stewart 1978).

Consistent with our proposition that service quality is perceived at multiple levels of abstraction (e.g., Brady and Cronin 2001; Dabholkar, Thorpe, and Rentz 1996), we suspected that several specific subdimensions would underpin these primary domains. Thus, we undertook an exploratory qualitative study to explore this issue in particular and to confirm the contextual appropriateness of the primary dimensions identified in the literature. We describe this study next.

STAGE 1: THE QUALITATIVE STUDY

Qualitative data were obtained from four focus group interviews conducted with health care customers. A total of 28 participants, 7 per focus group, were involved in the focus group sessions. These sessions were conducted by the researchers and lasted for approximately 2 hours. Participants were purposively recruited from five clinics located at five major metropolitan private hospitals. A purposive sample was deemed appropriate because such samples tend to generate productive discussions and provide the richest data (Morgan 1997). Potential participants were selected on the basis of the criteria established by the researchers (e.g., over 18 years of age) and on the clinic managers' perceptions of the contribution each participant would make to the discussion (Kinnear et al. 1993).

Respondents were screened prior to being included in the focus group sessions. The primary screening criteria required patients to be over 18 years of age, have private medical insurance, and have a histologically proven diagnoses of cancer. Respondents ranged in age from 18 to 72 years. Both genders were equally represented. All patients had private medical insurance. The procedures used to form the focus groups involved four steps. First, potential participants were mailed an information package about the research. This package contained an information letter from the relevant clinic introducing the researchers and endorsing the research project. Second, the researchers contacted potential participants, via telephone, within 1 week of participants' receiving the information package. Dates and times for the sessions were decided in consultation with participants. Third, a confirmation letter was sent to participants detailing the date, time, and location of the focus group sessions. Finally, participants were contacted via telephone the evening before the session as a reminder that the session was taking place the following day.

To identify service quality perceptions the following types of questions were asked: "In your opinion what makes a great clinic?" "What are the clinic's major strengths (weaknesses)?" and "Can you tell me about any really positive or negative experiences you have had at the clinic?" The sessions were audiotaped and transcribed by the researchers. Data were then analyzed using a manual content analysis system and QSR NUD*IST 4 (Qualitative Solutions and Research 1995). Several stages were involved. First, key responses on the transcripts were highlighted. Key responses relating to the dimensionality of service quality and the relationship between quality, satisfaction, and behavioral intentions were identified. Second, the data were categorized into responses reflecting the dimensions of service quality and the relationship between constructs. Additional categories were developed and existing

categories revised as necessary. Third, recurring themes were identified within the response categories, and patterns in the data were noted and agreed on between two academic judges who were not involved in the development of the conceptual model. The interjudge reliability was .89 (Perreault and Leigh 1989). When there was disagreement, the issues were discussed until agreement was reached. Finally, themes were substantiated and refined by rechecking the raw data and confirming interpretation.

Qualitative Findings

A recurring theme throughout the qualitative study was that evaluations of service quality are complex, occurring at multiple levels of abstraction. Customers frequently made comments about service-level attributes (e.g., "The staff is helpful"), about primary service aspects (e.g., "The entire interaction you have with staff is excellent at this clinic"), and about overall perceptions of quality (e.g., "The quality of the service at this clinic is excellent"). Furthermore, we found support for the four primary dimensions of interpersonal quality, technical quality, environment quality, and administrative quality and identified that the structure of each of these primary dimensions was complex, comprising at least two subdimensions. While the development of the subdimensions was based on the themes identified in the qualitative study, the literature was consulted to support our findings (e.g., Brady and Cronin 2001; Parasuraman, Zeithaml, and Berry 1985). Thus, we discuss, in the following paragraphs, the subdimensions we identified and the supporting literature we found. The subdimensions are grouped according to the primary domain they reflect to facilitate this discussion.

Interpersonal quality. Interpersonal quality reflects the relationship developed and the dyadic interplay between a service provider and a user (Brady and Cronin 2001; Grönroos 1984). Three core themes were found to constitute customers' perceptions of interpersonal quality; these were termed manner, communication, and relationship. The first, manner, describes the attitude and behavior of a service provider in the service setting (Bitner, Booms, and Tetreault 1990; Brady and Cronin, 2001). The manner in which a service provider interacted with a customer was a common point of discussion during the focus group interviews, as exemplified by the following comments: "The staff are supportive" and "They are caring and they're empathetic." The second theme, communication, reflects the interactive nature of the interpersonal process (Wiggers et al. 1990; Zifko-Baliga and Krampf 1997). Communication includes the transfer of information between a provider and a customer, the degree of interaction,

and the level of two-way communication. Focus group participants frequently referred to communication as an important indicator of interpersonal quality, as suggested by the following comments: "They have good communication skills" and "They listen to what you have to say." The final theme, relationship, refers to the closeness and strength of the relationship developed between a provider and a customer (Beatty et al. 1996). Relationship encompasses a high degree of mutuality (Wiggers et al. 1990) and ongoing, interpersonally close interactions in which trust or mutual liking exist (Koerner 2000). Focus group participants indicated that they had formed close bonds, friendships, and mutual relationships with service workers, as indicated by the comment "You become part of the furniture and they [the providers] become like family."

Technical quality. Technical quality involves the outcomes achieved (Grönroos 1984; McDougall and Levesque 1994) and the technical competence of a service provider (Ware, Davies-Avery, and Stewart 1978). Two core themes underpinned customers' perceptions of technical quality: expertise and outcome. We believe that these themes are salient indicators of technical quality in the context of our study, in which service provision was both complex and ongoing. That is, customers evaluated technical quality on the basis of service provider expertise and the outcomes achieved over multiple service encounters. The first theme, expertise, reflects a provider's competence, knowledge, qualifications, or skill (Aharony and Strasser 1993). Expertise reflects the ability of a service provider to adhere to high standards of service provision (Zifko-Baliga and Krampf 1997). Focus group participants referred to factors such as competence and knowledge as indicators of expertise. Consider these comments about service providers: The staff members are "obviously competent," and "Their knowledge and skill is evident." The second theme of service outcome refers to the outcome of the service process, or what a consumer receives as a result of his or her interactions with a service firm (Aharony and Strasser 1993; Grönroos 1984). Comments such as "A measure of outcome is if the treatment is working as planned" and "You just feel better as a result of coming to the clinic, you're more positive" are evidence of the importance of outcome as an aspect of technical service quality. We note, however, that outcome does not refer to an ultimate result (e.g., cure) but rather to the outcomes experienced over a series of service encounters.

Environment quality. The environment defines the complex mix of environmental features that shape consumer service perceptions (Gotlieb, Grewal, and Brown 1994). Atmosphere and tangibles were the key themes underlying customers' perceptions of environment quality.

The first theme of atmosphere refers to the intangible, background characteristics of the service environment (Baker 1986; Bitner 1992). These elements generally exist below consumers' level of awareness, thus affecting the pleasantness of the surroundings (Kotler 1974). During the exploratory study, participants readily discussed the atmosphere at the clinic, as indicated by the comments "The atmosphere is pleasant and comfortable" and the clinic "doesn't have that hospital smell." The second of these themes, tangibles, refers to the physical elements of the service environment that exist at the forefront of awareness (Baker 1986). Within this study, tangibles comprise the design, function, or layout of the environment and the signs, symbols, and artifacts found in the environment (Bitner 1992). Comments such as "I think the whole layout is very well thought out" and "The colors don't make it look sterile, but it still looks clean" highlight the importance of tangible elements in the environment.

Administrative quality. Administrative service elements facilitate the production of a core service while adding value to a customer's use of the service (Grönroos 1990; McDougall and Levesque 1994). Facilitating services are essential to the delivery and consumption of a core service, while supporting elements augment the service but are not necessary to core service delivery (Grönroos 1990; Lovelock, Patterson, and Walker 2001). Three themes comprised customers' perceptions of administrative quality: timeliness, operation, and support. The first, timeliness, refers to the factors involved in arranging to receive medical services, such as appointment waiting lists, waiting time, the ease of changing appointments, and hours of operation (Thomas, Glynne-Jones, and Chaiti 1997). Focus group participants frequently mentioned service timeliness, as exemplified by the comments "I must have waited for two and a half hours" and "You can get an appointment when you need an appointment." The second theme of operation similarly facilitated core service production through the general administration of the clinic (Meterko, Nelson, and Rubin 1990) and the coordination, organization, and integration of medical care (Wensing, Grol, and Smits 1994). Focus group participants frequently referred to operational service aspects, as indicated by these comments: "The admin side of things could be better organized" and "The coordination of the different medical services by the clinic is really impressive." The final dimension, support, represents an augmented service element that adds value to the core service (Grönroos 1990; Lovelock, Patterson, and Walker 2001). The exploratory study identified support as an important aspect of service, as reflected in the comment "They offer valuable support activities that are open to all patients."

STAGE 2: THE SCALE DEVELOPMENT STUDY

The health care industry was the context for this research. Data were specifically collected from the customers of private outpatient oncology and general practitioner clinics. The outpatient environment was chosen as the study context because health care is increasingly being delivered via this modality. Our specific research contexts included private outpatient oncology clinics and general practice clinics. In total, three samples were used from different cities in Australia.

The first sample was an exploratory sample from which the measurement and structural parameters were estimated. This sample comprised two oncology clinics located at two major metropolitan private hospitals in the same city. This sample is referred to as the exploratory sample in subsequent analyses. The second sample acted in a confirmatory sense and was used to validate the model established in the first data set. This sample, referred to as confirmatory sample 1, comprised three oncology clinics located at three major metropolitan private hospitals in another city. Both of these samples (the exploratory sample and confirmatory sample 1) were derived from a census of each clinic's customer database at a given point in time. The third sample was taken from a different health care context, that of general or family practice, to improve the generalizability of our findings. This sample is referred to as confirmatory sample 2. The survey used to collect the data in all cases was pretested on a randomly selected sample of patients from across the clinics and hospitals participating in the research. In the oncology contexts, surveys were mailed with a cover letter and postage-paid return envelope to all customers in the sample. In total, 2,370 questionnaires were mailed in the exploratory study and 505 in the confirmatory study. This represented a census of customers attending the clinics during the previous 12 months. Of these questionnaires, 778 and 340 usable surveys were returned for the exploratory sample and confirmatory sample 1, respectively (i.e., response rates of 32.8% and 67.3%, respectively). In the general or family practice context, surveys were distributed to patients attending a general practice clinic over a 2-week period. In total, 400 surveys were distributed. Of these surveys, 215 usable surveys were returned, for a response rate of 53.8%. The data were tested for response bias by comparing early respondents with late respondents (late respondents are considered to provide a good measure of the characteristics of nonrespondents), as recommended by Armstrong and Overton (1977). This analysis provided evidence that nonresponse was not a concern in this study.

TABLE 1
Sample Profile

Characteristic	Exploratory Sample (%)	Confirmatory Sample 1 (%)	Confirmatory Sample 2 (%)
Age (years)			
18 to 35	5.4	3.3	2.8
36 to 45	11.3	10.4	10.4
46 to 55	22.9	24.0	26.4
56 to 65	30.6	32.1	25.0
66 to 75	21.0	23.7	27.8
≥76	8.8	6.5	7.5
Sex			
Male	41.8	39.8	40.8
Female	58.2	60.2	59.2
Employment status			
Working full-time	21.3	19.6	20.9
Working part-time	14.0	18.1	19.9
Unemployed	1.7	1.5	1.4
Not in the labor force	46.1	50.9	48.3
Unable to work: illness	16.9	9.9	9.5
Annual household income			
<\$29,999	52.2	64.0	60.6
\$30,000 to \$49,999	23.7	21.3	23.8
\$50,000 to \$69,999	13.2	8.5	9.4
\$70,000 to \$89,999	5.2	2.7	2.1
≥\$90,000	5.7	3.6	4.1
Primary cancer diagnosis			
Breast	20.5	38.6	N/A
Colorectal	11.7	22.6	N/A
Lung	2.9	5.4	N/A
Prostate	1.4	1.5	N/A
Lymphoma	16.2	13.0	N/A
Leukemia	11.5	1.2	N/A
Other	35.9	17.8	N/A

NOTE: Percentage breakdowns may not add precisely to 100%. N/A = not available.

Comparison of the demographic characteristics of the exploratory and confirmatory samples indicated that they were similar, as can be seen in Table 1. A χ^2 test revealed that the samples did not differ in terms of the key demographic variables of age and gender. Moreover, the oncology cohort profiles were highly comparable with the national oncology population; for example, in both cohorts, 83.3% of respondents in the first study and 86.3% in the second study were aged 45 years and older, which is comparable with national statistics indicating that 89% of all cancers occur in those over 45 years of age (Australian Institute of Health and Welfare 2001). The demographic characteristics for the third sample derived from general practice are also shown in Table 1.

The three samples used in this study were not only of sufficient size to achieve a high level of statistical power (McQuitty 2004),¹ they also resulted in response rates (32.8%, 53.75%, and 67.3%) higher than those reported in similar consumer studies (e.g., Meuter et al. 2000; Parasuraman, Zeithaml, and Berry 1994).

Measures

Scales from prior research were used as the source of measures for the overall service quality scale, satisfaction, behavioral intentions, and primary dimension scales. The overall perceived service quality measure comprised four items operationalizing service quality as a consumer's judgment of, or impression about, a clinic's overall excellence or superiority (Brady and Cronin 2001; Parasuraman, Zeithaml, and Berry 1988). Behavioral intentions were measured using seven items derived from the scales of Zeithaml, Berry, and Parasuraman (1996); Headley and Miller (1993); and Taylor and Baker (1994). Satisfaction was measured using five items derived from Oliver's (1997) satisfaction scale, as well as Greenfield and Attkisson (1989) and Hubbert (1995). The primary dimensions were operationalized to reflect service excellence and superiority using three items adapted from the literature (Brady and Cronin 2001; McDougall and Levesque 1994; Rust and Oliver 1994). All measures are shown in Appendix A and used 7-point, Likert-type scales (Babakus and Boller 1992; Brady and Cronin 2001).

Churchill's (1979) recommended scale development procedure was used to develop the subdimension scales. This process began with an initial item pool generated from the qualitative study. To reduce the size of the item pool, two expert judges who were familiar in the scale development process and with health care marketing reviewed the items for relevance, ambiguity, and similarity (DeVellis 2003). Several items were removed from the item pool on this basis, and a refined pool of 112 items was retained. To maximize the content and face validity of these items, an expert panel of 12 marketing and 4 health care academics reviewed the items. Specifically, panel members rated each item with respect to its relevance to a particular subdimension. These ratings were then examined using paired-sample *t* tests to identify whether an item was significantly less relevant than other items representing the same subdimension. In such a case, the substantive meaning of the item was considered, and if appropriate, the item was deleted. At the conclusion of this process, 50 items reflected the 10 subdimension scales (manner, communication, relationship, expertise, outcome, atmosphere, tangibles, timeliness, support, and operation).

Assessment of Measures

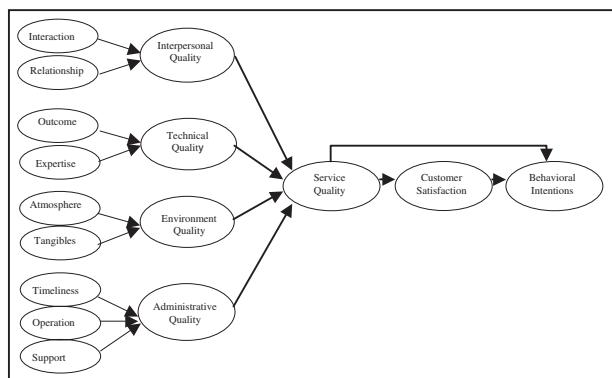
An initial exploratory factor analysis of the primary dimension measures was undertaken on the exploratory sample to determine the dimensionality of these constructs.² This analysis, using principal-components factoring with oblimin rotation, supported the distinction of the four primary dimensions, as shown in Table 2. Analysis of

TABLE 2
Measurement, Reliability, and Validity of the Health Service Quality Scale

Measurement Model	EFA				CFA							
	EFA Loadings		Cronbach's α		CFA Loadings			Construct Reliability		Average Variance Extracted		
	Exploratory	Exploratory	Exploratory	Confirmatory 1	Confirmatory 2	Exploratory	Confirmatory 1	Confirmatory 2	Exploratory	Confirmatory 1	Confirmatory 2	
Service quality	.93 to .94	.95	.93 to .94	.96 to .97	.96 to .97	.93	.96	.91	.87	.93	.84	
Satisfaction	.95 to .96	.96	.94 to .94	.89 to .96	.91 to .97	.96	.95	.96	.88	.87	.89	
Behavioral intentions	.80 to .93	.95	.92 to .96	.94 to .98	.98 to .98	.95	.97	.97	.87	.92	.92	
Primary dimensions												
Interpersonal quality	.88 to .95	.92	.90 to .91	.89 to .92	.89 to .91	.90	.90	.90	.82	.82	.82	
Technical quality	.91 to .98	.95	.94 to .95	.96 to .96	.96 to .97	.94	.96	.96	.89	.92	.93	
Environment quality	.88 to .95	.92	.83 to .97	.86 to .98	.87 to .98	.90	.92	.92	.81	.85	.86	
Administration quality	.89 to .97	.94	.90 to .95	.90 to .99	.95 to .98	.92	.95	.97	.86	.90	.93	
Subdimensions												
Interaction	.55 to .81	.94	.92 to .96	.96 to .97	.96 to .97	.95	.98	.98	.88	.93	.93	
Relationship	.59 to .88	.96	.83 to .87	.88 to .92	.90 to .92	.84	.90	.91	.72	.81	.83	
Outcome	.44 to .82	.82	.94 to .96	.90 to .99	.89 to .99	.95	.94	.94	.90	.90	.87	
Expertise	.63 to .94	.89	.93 to .97	.96 to .98	.95 to .98	.95	.97	.97	.90	.94	.93	
Atmosphere	.68 to .94	.95	.79 to .92	.92 to .98	.93 to .99	.85	.95	.96	.74	.90	.92	
Tangibles	.54 to .74	.93	.90 to .92	.92 to .95	.92 to .95	.94	.96	.96	.84	.88	.88	
Timeliness	.50 to .71	.94	.93 to .95	.89 to .90	.89 to .92	.94	.89	.90	.88	.80	.82	
Operation	.88 to .91	.93	.90 to .94	.90 to .91	.92 to .93	.92	.90	.92	.85	.82	.86	
Support	.41 to .65	.92	.79 to .92	.85 to .87	.84 to .88	.94	.85	.85	.89	.74	.74	
Goodness-of-fit indices	χ^2	<i>df</i>	CFI	IFI	NFI	TLI	RMSEA					
Exploratory sample	1,941.88	474	.96	.96	.95	.95	.06					
Confirmatory sample 1	1,141.31	474	.96	.96	.94	.95	.06					
Confirmatory sample 2	9,16.62	474	.96	.96	.92	.95	.07					

NOTE: The exploratory factor analyses (EFAs) were conducted on the exploratory sample ($n = 778$). The rotation method was oblimin with Kaiser normalization. The total variance explained by the four primary dimension factors was 79.8%, and the total variance explained by the nine subdimension factors was 72.94%. The subdimension items were first examined in their primary dimension groups (e.g., interaction and relationship as subdimensions of interpersonal quality were factor analyzed together without placing any restriction on the analysis). This analysis supported the nine subdimension factors. A final analysis was then conducted in which all nine factors were simultaneously factor analyzed and the factor structure was restricted to nine factors. The results of this simultaneous analysis are shown in this table. All nine factors remained distinct. CFA = confirmatory factor analysis; CFI = comparative fit index; IFI = incremental fit index; NFI = normed fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation.

FIGURE 1
Full Conceptual Model



Cronbach's α coefficients indicated that these scales could be used with confidence, with reliabilities ranging from .92 for the environment quality and interpersonal quality scales to .95 for the technical quality scale, as can be seen in Table 2.

The dimensionality of the subdimension scales was also examined using exploratory factor analysis. Analysis of the subdimension scales began with an initial pool of 50 items reflecting the 10 subdimension scales, namely, manner, communication, relationship, tangibles, atmosphere, expertise, outcome, operation, timeliness, and support. Items that cross-loaded, produced sharp drops in item-to-total correlations, or loaded on unexpected factors were removed from the analysis. Analysis suggested that we combine the manner and communication subdimensions into a single scale termed interaction and that several items needed to be removed from the analysis because of cross-loading or low interitem correlations. The manner and communication subdimensions were combined because they were found to form a single factor during exploratory factor analysis. Close examination of the items reflecting these subdimensions indicated some inherent overlap insofar as manner is often reflected in communication. The combined subdimension thus reflected the interaction (manner and communication) that takes place during a service encounter. After several iterations, a final group of 45 items measuring nine distinct subdimensions remained. The subdimensions were interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support, as shown in Figure 1. Again, α reliability coefficients were high, ranging from .96 for the relationship scale to .82 for the outcome scale, as shown in Table 2.

Structural equation modeling was used to further examine the research measures and their reliability and validity for all three samples. Table 2 provides the results

of the measurement model analysis (confirmatory factor analysis [CFA]) for the exploratory and two confirmatory studies. Analysis of the measurement model was based on a partial disaggregation approach in which scale items were combined into composites to reduce random error, while retaining the multiple indicator approach of structural equation modeling (Bagozzi and Foxall 1996; Bagozzi and Heatherton 1994). This approach has been used in several widely cited scale development studies (e.g., Sweeney and Soutar 2001). When possible, at least three composite indicators were created per latent construct, as is the recommended approach in the literature (e.g., Hau and Marsh 2004).³

Model fit was evaluated using the comparative fit index (CFI), the Tucker-Lewis index (TLI), the normed fit index (NFI), the incremental fit index (IFI), and the root mean square error of approximation (RMSEA) on the basis of the fit criteria established in prior service quality research (e.g., Parasuraman, Zeithaml, and Malhotra 2005). The psychometric properties of our scales were evaluated through a comprehensive CFA. All items were tested in the same model and were restricted to load on their respective factors. Scale statistics are shown in Table 2⁴ and construct intercorrelations in Appendix B. As can be seen, the measurement model resulted in good fit to the data. Moreover, all indicators were found to serve as strong measures of their respective construct in both the exploratory and confirmatory studies.⁵

The results indicated high levels of construct reliability and average variance extracted for all latent variables (see Table 2). Because all t values were significant ($p = .05$) and the average variances extracted were greater than 0.50, convergent validity was established. All construct pairs in our model were tested for discriminant validity using Fornell and Larcker's (1981) stringent criteria. Almost all construct pairs met these criteria in all three samples. In the case of an exception, the χ^2 test for discriminant validity was successfully applied (Anderson and Gerbing 1988; Garver and Mentzer 1999).⁶

After establishing the strength and psychometric properties of the scales underpinning our model, we examined the structure of our service quality model. As can be seen in Figure 1, we modeled service quality as a formative construct insofar as the dimensions in our model drove service quality perceptions (Jarvis, MacKenzie, and Podsakoff 2003; Parasuraman, Zeithaml, and Malhotra 2005; Rossiter 2002). We adopted this perspective on the basis of the decision criteria of Jarvis, MacKenzie, and Podsakoff (2003)⁷ and suggestions in the literature that service quality may be more appropriately modeled as a formative construct (Dabholkar, Shepherd, and Thorpe 2000; Parasuraman, Zeithaml, and Malhotra 2005; Rossiter 2002). We note, however, that our scale items

TABLE 3
Structural Model Estimates of the Health Service Quality Scale

	<i>Exploratory Sample</i>		<i>Confirmatory Sample 1</i>		<i>Confirmatory Sample 2</i>		
	<i>Path Estimate^a</i>	<i>t^b</i>	<i>Path Estimate</i>	<i>t</i>	<i>Path Estimate</i>	<i>t</i>	
Service quality → service satisfaction	.85	32.07	.50	10.00	.52	8.39	
Service quality → behavioral intentions	.70	17.24	.37	10.35	.42	8.87	
Service satisfaction → behavioral intentions	.25	6.40	.62	16.49	.56	11.53	
Interpersonal quality → service quality	.18	6.76	.30	6.83	.29	5.37	
Technical quality → service quality	.53	20.50	.25	7.35	.23	5.37	
Environment quality → service quality	.09	3.99	.12	3.17	.16	3.22	
Administrative quality → service quality	.29	11.79	.39	8.97	.40	7.44	
Interaction → interpersonal quality	.72	20.84	.84	20.60	.83	16.18	
Relationship → interpersonal quality	.28	8.06	.19	4.91	.19	3.94	
Outcome → technical quality	.02	0.58	.27	3.76	.39	4.66	
Expertise → technical quality	.84	22.56	.43	5.81	.30	3.57	
Atmosphere → environment quality	.25	8.25	.36	8.97	.38	8.20	
Tangibles → environment quality	.76	24.24	.63	15.12	.61	12.75	
Timeliness → administrative quality	.22	7.51	.24	5.40	.35	6.74	
Operation → administrative quality	.67	21.97	.63	12.36	.50	8.90	
Support → administrative quality	.10	3.07	.14	3.46	.21	4.20	
Goodness-of-fit indices	χ^2	<i>df</i>	CFI	IFI	NFI	TLI	RMSEA
Exploratory sample	3,820.91	542	.91	.91	.90	.90	.09
Confirmatory sample 1	1,839.30	542	.93	.93	.90	.91	.08
Confirmatory sample 2	1,370.43	542	.92	.93	.88	.92	.08

NOTE: CFI = comparative fit index; IFI = incremental fit index; NFI = normed fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error approximation.

a. These are standardized loading estimates.

b. On the basis of one-tailed tests, *t* values greater than 1.65 were significant at $p < .05$; *t* values greater than 2.33 were significant at $p < .01$.

were specified as reflective and that this specification was also based on Jarvis, Mackenzie, and Podsakoff's decision criteria.

As can be seen in Table 3, our model fitted the data well (exploratory sample: $\chi^2 = 3,820.91$, *df* = 542, CFI = .91, TLI = .90, RMSEA = .09; confirmatory sample 1: $\chi^2 = 1,839.30$, *df* = 542, CFI = .93, TLI = .91, RMSEA = .08; confirmatory sample 2: $\chi^2 = 1,370.43$, *df* = 542, CFI = .92, TLI = .92, RMSEA = .08). Examination of the structural parameters indicated that interpersonal quality, technical quality, environment quality, and administration quality each had a significant and positive impact on service quality perceptions in both the exploratory and confirmatory studies. In fact, technical quality (exploratory sample $\beta = .53$, confirmatory sample 1 $\beta = .25$, confirmatory sample 2 $\beta = .23$) and administrative quality (exploratory sample $\beta = .29$, confirmatory sample 1 $\beta = .39$, confirmatory sample 2 $\beta = .40$) seemed to have the greatest effect on service quality perceptions. Interpersonal quality (exploratory sample $\beta = .18$, confirmatory sample 1 $\beta = .30$, confirmatory sample 2 $\beta = .29$) also had an important effect, as did environment quality (exploratory sample $\beta = .09$, confirmatory sample 1 $\beta = .12$, confirmatory sample 2 $\beta = .16$),⁸ although to a lesser extent.

At the subdimension level, interaction had a significant, positive and large effect (exploratory sample $\beta = .72$, confirmatory sample 1 $\beta = .84$, confirmatory sample 2 $\beta = .83$)

on perceptions of interpersonal quality, while relationship had a significant, positive, and medium association (exploratory sample $\beta = .28$, confirmatory sample 1 $\beta = .19$, confirmatory sample 2 $\beta = .19$) with this construct. Analysis further indicated that expertise had a significant, positive, medium to large effect on perceptions of technical quality (exploratory sample $\beta = .84$, confirmatory sample 1 $\beta = .43$, confirmatory sample 2 $\beta = .30$). Outcome, however, did not have a significant association with this construct in the exploratory sample. In contrast, outcome was found to have a significant, positive, and medium effect on perceptions of technical quality for confirmatory sample 1 ($\beta = .27$) and confirmatory sample 2 ($\beta = .39$). Atmosphere and tangibles both had significant and positive effects on customers' perceptions of the environment, with atmosphere having a moderate effect (exploratory sample $\beta = .25$, confirmatory sample 1 $\beta = .36$, confirmatory sample 2 $\beta = .38$) on perceptions of environment quality and tangibles having a large impact (exploratory sample $\beta = .76$, confirmatory sample 1 $\beta = .63$, confirmatory sample 2 $\beta = .61$) on this construct. Finally, the operation, timeliness, and support dimensions all had significant impacts on perceptions of administrative quality in each sample. Operation had the greatest impact on perceptions of supplementary service quality (exploratory sample $\beta = .67$, confirmatory sample 1 $\beta = .63$, confirmatory sample 2 $\beta = .50$), while timeliness

had a medium effect (exploratory sample $\beta = .22$, confirmatory sample 1 $\beta = .24$, confirmatory sample 2 $\beta = .35$), and support had a significant but relatively weak impact (exploratory sample $\beta = .10$, confirmatory sample 1 $\beta = .14$, confirmatory sample 2 $\beta = .21$).

STAGE 3: CONCEPTUAL FRAMEWORK

The findings presented thus far offer a new conceptualization of health care service quality and a reliable and valid scale to measure service quality perceptions from the customer's perspective. In the following sections, we examine the salience of our health service quality scale in predicting important health service outcomes, namely, customer satisfaction and behavioral intentions. We chose these outcomes on the basis of the weight of research suggesting their importance as outcomes of service quality (e.g., Bitner and Hubbert 1994; Brady and Robertson 2001; Cronin, Brady, and Hult 2000; Cronin and Taylor 1992; Gotlieb, Grewal, and Brown 1994; Mohr and Bitner 1995). Furthermore, we examined whether overall health service quality perceptions mediated the relationship between the primary dimensions of our model and behavioral intentions. We discuss these relationships next.

Customer Satisfaction and Behavioral Intentions

A review of the literature suggests two alternative perspectives regarding the relationship between service quality and satisfaction. The first is the transaction perspective (Bitner and Hubbert 1994; Mohr and Bitner 1995), whereby satisfaction is considered antecedent to a global evaluation of perceived service quality on the basis that an accumulation of transaction-specific satisfaction judgments will result in a broader, global evaluation of service quality. The second perspective posits that service quality, as a cognitive evaluation, precedes the more emotive satisfaction construct (e.g., Brady and Robertson 2001; Cronin and Taylor 1992; Gotlieb, Grewal, and Brown 1994). Findings relative to the impact of these constructs on behavioral intentions have been mixed. Studies have found, for example, an indirect relationship between service quality and intentions through satisfaction (Cronin and Taylor 1992; Dabholkar, Shepherd, and Thorpe 2000; Gotlieb, Grewal, and Brown 1994) as well as a direct relationship between these constructs (Cronin, Brady, and Hult 2000). Given that health care is of critical concern to consumers, we expected service quality to have both a direct effect on intentions as well as an indirect effect through customer satisfaction. Thus, we developed the following hypotheses:

Hypothesis 1: Overall health service quality has a significant positive impact on health service satisfaction.

Hypothesis 2: Overall health service quality has a significant positive impact on behavioral intentions.

Hypothesis 3: Health service satisfaction has a significant positive impact on behavioral intentions.

On the basis of prior research, we also adopted the position that overall service quality perceptions would be likely to mediate the relationship between our primary dimensions and behavioral intentions. This follows the early work of Woodside, Frey, and Daly (1989), who proposed that overall service quality and satisfaction result from the evaluation of certain components, such as admissions, nursing, and housekeeping, in a health care context. Similarly, Dabholkar, Shepherd, and Thorpe (2000), using a competing model approach, found the mediated model superior to a direct model of service quality dimensions on behavioral outcomes. Finally, researchers such as Hightower, Brady, and Baker (2002) have developed models including specific aspects of service quality such as the environment and perceived waiting time, which are posited as affecting overall service quality and ultimately behavioral outcomes, thus supporting the mediating approach to service quality. The establishment of a mediation effect underscores the importance of measuring overall quality perceptions and gives credence to the hierarchical (third-order) service quality measure developed in this study. We therefore posited the following research hypothesis:

Hypothesis 4: Perceived health service quality is a true mediator of the relationship between the health service quality dimensions and behavioral intentions.

Results of Hypothesis Testing

Model fit and structural parameters for the service quality, satisfaction, and intentions paths can be seen in Table 3. The squared multiple correlations for the behavioral intentions construct were .84 for the exploratory sample, .75 in confirmatory sample 1, and .74 in confirmatory sample 2, indicating that well over three quarters of the variance in behavioral intentions was explained by its service quality and service satisfaction antecedents in all three studies. A closer examination of these results indicates that service quality perceptions had a large influence on service satisfaction in the exploratory and confirmatory samples (exploratory sample $\beta = .85$, confirmatory sample 1 $\beta = .50$, confirmatory sample 2 $\beta = .52$),

TABLE 4
Regression Equation Tests for Service Quality Mediation (in the primary dimensions and behavioral intentions relationship)

Independent Variable	Equation 1: Mediator ^a : $SQ = f$ (Independent ^b)	Equation 2: Dependent ^c : $BI = f$ (Independent)	Equation 3: Dependent: $BI = f$ (Independent and Mediator)	
	Coefficient for the Independent Variables	Coefficient for the Independent Variables	Coefficient for the Independent Variables on BI	Coefficient for the Independent Variables on SQ
Exploratory study				
1. Interpersonal quality	.18 (6.21)	.19 (5.08)	.05 (1.41)	.18 (5.81)
2. Technical quality	.49 (18.38)	.53 (16.60)	.18 (4.60)	.46 (16.97)
3. Environment quality	.10 (3.71)	.06 (1.77)	-.02 (-.70)	.11 (3.82)
4. Administrative quality	.31 (1.63)	.20 (5.79)	-.04 (-1.12)	.32 (1.77)
SQ → intentions			.76 (12.59)	
SMC service quality	.85	N/A	N/A	.84
SMC intentions	N/A	.73	.82	N/A
Confirmatory study 1				
1. Interpersonal quality	.20 (4.31)	.23 (3.68)	.05 (.92)	.20 (4.14)
2. Technical quality	.49 (11.71)	.45 (8.71)	.07 (1.23)	.48 (11.37)
3. Environment quality	.11 (2.73)	.13 (2.42)	.04 (.79)	.11 (2.61)
4. Administrative quality	.24 (5.67)	.15 (2.94)	-.06 (-1.20)	.25 (5.81)
SQ → intentions			.83 (1.42)	
SMC service quality	.86	N/A	N/A	.85
SMC intentions		.73	.83	
Confirmatory study 2				
1. Interpersonal quality	.34 (5.352)	.10 (1.277)	.00 (.043)	.34 (5.316)
2. Technical quality	.20 (4.657)	.53 (9.252)	.48 (8.094)	.20 (4.589)
3. Environment quality	.17 (2.974)	.20 (2.363)	-.03 (-.345)	.17 (2.990)
4. Administrative quality	.33 (4.925)	.25 (2.899)	.16 (1.745)	.33 (4.982)
SQ → intentions			.29 (2.689)	
SMC service quality	.80	N/A	N/A	.80
SMC intentions		.62	.64	

NOTE: Figures in parentheses are critical ratio values. Note that the critical ratio for a directional test at the 95% level of confidence is ± 1.645 . Cell entries are read as follows: For equation 1, the coefficient for the effect of interpersonal quality (independent variable) on perceived SQ (mediating variable) is .18. For equation 2, the coefficient for interpersonal quality (independent variable) on BI (dependent variable) is .19. For equation 3, the coefficients for interpersonal quality (independent variable) on perceived SQ (mediating variable) and BI (dependent variable) are .05 and .18, respectively. SQ = service quality; BI = behavioral intentions; SMC = squared multiple correlation for structural equations.

a. The mediator is perceived service quality.

b. The independent variable for each row is the primary dimension specified in the left-hand column.

c. The dependent variable is behavioral intentions.

supporting Hypothesis 1. Service quality also had a significant and large impact on behavioral intentions (exploratory sample $\beta = .70$, confirmatory sample 1 $\beta = .37$, confirmatory sample 2 $\beta = .42$). Thus, Hypothesis 2 was also supported. Similarly, service satisfaction was found to significantly influence the behavioral intentions of customers in all studies (exploratory sample $\beta = .25$, confirmatory sample 1 $\beta = .62$, confirmatory sample 2 $\beta = .56$), supporting Hypothesis 3. When considering the direct and indirect effects in the model, service quality was found to have a greater total effect on behavioral intentions than satisfaction (total effects of .91, .68, and .71 for the exploratory sample, confirmatory sample 1, and confirmatory sample 2, respectively).

The results also indicated that service quality perceptions mediated the relationship between the primary dimensions and behavioral intentions in the exploratory sample and confirmatory sample 1, supporting Hypothesis 4. Specifically, each of the primary dimensions (independent variables) was found to significantly affect perceived service quality (mediator, equation 1), as well as behavioral intentions (dependent variable, equation 2) as shown in Table 4. Service quality (mediator) was found to significantly affect behavioral intentions (dependent variable) when both service quality and the primary dimensions were included as predictors of behavioral intentions (equation 3), as shown in Table 4. The effect of the primary dimensions on behavioral intentions was less in equation 3 (behavioral

intentions regressed on perceived service quality and each primary dimension) than in equation 2 (behavioral intentions regressed on each primary dimension). Specifically, the effect of the interpersonal quality, environment quality, and administrative quality dimensions on behavioral intentions was reduced to insignificance when perceived service quality was included in the equation for the exploratory sample (exploratory sample equation 3, column 1, rows 1, 3, and 4 in Table 4). In the first confirmatory sample, the effect of all four primary dimensions on behavioral intentions was reduced to insignificance when perceived service quality was included in the equation (confirmatory sample equation 3, column 1, rows 1, 2, 3, and 4 in Table 4). These findings strongly support the mediating role of service quality in the primary dimension and behavioral intention relationship. This mediation mechanism implies that overall service quality perceptions are critical in determining behavioral intentions. In the second confirmatory sample, the effect was not as clear, with some of the paths between the dimensions and behavioral intentions remaining significant even in equation 3. Thus, in the general practice sample, it would appear that service quality was not a full mediator of the relationship between the dimensions and behavioral intentions.

DISCUSSION

Health Service Quality Scale

Because the development of reliable and valid operationalizations is a fundamental goal of scientific endeavor, the health service quality scale put forward in this study makes an important contribution to theory and practice. The findings suggest that customers base their perceptions of health service quality on four primary dimensions: interpersonal quality, technical quality, environment quality, and administrative quality. Moreover, these primary dimensions are driven by nine underlying subdimensions. The subdimensions include interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support. These findings suggest that customers evaluate service quality at an overall level, a dimensional level, and at subdimensional level and that each level drives perceptions at the level above. This finding improves our understanding of how customers evaluate health service quality.

In particular, the findings suggest that health service managers should be concerned with improving the quality of the services they provide across the four primary domains. This can be achieved via the subdimensions identified in the study. Managers could, for example, improve perceptions of technical service quality by improving

(a) the outcomes of the service process by encouraging customers in their treatment, by informing and empowering customers with knowledge of the treatment process, their treatment options, and their future health prognosis; and (b) improving customers' perceptions of service providers' expertise by offering customers information on staff members' qualifications, training, skill, and professional achievements, including awards, publications, and research projects. This information can be used by managers in deciding how to allocate limited resources to the improvement of quality.

Given the scale's hierarchical structure, practitioners are able to measure service quality at three levels, including at the overall level (with a global measure of service quality), at the primary dimension level (with overall measures of interpersonal quality, technical quality, environment quality, and administrative quality), and at the subdimension level (with measures of interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support). Practitioners can measure service quality at any one or all of these levels depending on their information requirements. A practitioner could, for example, simply measure overall perceptions of service quality to get a broad indication of an organization's service quality performance. Practitioners could measure service quality only at the primary dimension level, or they could measure service quality at the subdimension level for a detailed analysis of service quality perceptions. The scale therefore offers managers several choices regarding the level of detail measured and thus the length of scale to be implemented.

As well as being used as a diagnostic tool for identifying poor and/or excellent service performance the scale can be used to benchmark across multiple functions within a single organization, across multiple locations, or within a particular industry; furthermore, any of these situations can also be compared across time. This information is particularly important given that perceptions of the service dimensions were shown to influence behavioral intentions and that these behaviors ultimately affect market performance and profitability (Rust and Zahorik 1993; Zeithaml 2000). Furthermore, information generated from the scale can be used as a platform for funding and to set priorities and allocate resources.

Service Quality, Satisfaction, and Intentions

The findings of our study suggest that health service quality is an important determinant of health service satisfaction and behavioral intentions, thus underscoring the importance of service quality as a decision-making variable. The strong association between service quality and

behavioral intentions is noteworthy because satisfaction is generally viewed as more closely aligned with behavioral intentions, in that satisfaction is typically modeled as mediating the relationship between service quality and behavioral intentions (e.g., Anderson and Sullivan 1993; Brady and Robertson 2001; Cronin and Taylor 1992; Dabholkar, Shepherd, and Thorpe 2000; Gotlieb, Grewal, and Brown 1994).

The findings of our study also generally supported the mediating role of service quality in the service attributes–behavioral intentions relationship. This mediation mechanism implies that the service attributes are more strongly related to overall service quality than behavioral intentions and that customers' overall perceptions of service quality continue to play an important role in generating consumer outcomes. Although this mediation effect has been identified by prior researchers (e.g., Dabholkar, Shepherd, and Thorpe 2000; Hightower, Brady, and Baker 2002; Woodside, Frey, and Daly 1989), our findings underscore the strength of this effect in a different service context and using different service quality dimensions. We note, however, that we found only partial mediation in the general practice sample.

These findings suggest that health care managers and indeed managers of other nonhealth services (e.g., financial services, education services, retirement services) should consider both service quality and customer satisfaction as important strategic objectives, because these constructs provide a way for managers to ensure positive behavioral intentions in their cohort. These findings are expected to be of particular relevance to high involvement, high contact, ongoing services in which service provision is likely, as in this study, to have a significant impact on long-term behavior. Services such as physiotherapy and counseling as well as nonhealth services such as higher education, financial planning, and retirement services may benefit from these findings.

LIMITATIONS AND RESEARCH DIRECTION

As with any study, this research has several limitations. The cross-sectional design of the research is a limitation because all measures were collected simultaneously. We recognize that there is a need for longitudinal studies to aid in establishing the causal relationships between the constructs of interest in this study. Moreover, the model developed in the study represents a static model of service evaluation. That is, the findings of this study are representative of only a single point in time. Although the sampling method used in this study took a census of customers

from participating oncology clinics, this is a partial representation of the general oncology customer population. Moreover, the mail survey method resulted in some non-responses from customers, although this was relatively low compared with other studies based on mail surveys. This study was also undertaken within a single service industry (health care) and in one country. However, we did use two different health care contexts, that of oncology care and general practice, suggesting a degree of generalizability to other health care contexts. Replications in other health service environments, for example, physiotherapy and counseling, and in nonhealth contexts such as higher education, financial planning, and retirement services would further increase confidence in the research model.

The findings of this study also suggest several important directions for future research. The model developed could be applied to a longitudinal study to investigate how customers' perceptions and evaluations of service quality change over time. Researchers could also investigate the impact of analytical context markers such as the frequency of patronage and the number of service encounters on the research model. Further research is also needed to clarify the relationship between outcome and technical service quality components. Few studies have examined the impact of outcome on perceptions of technical service quality, despite suggestions that outcome is an important driver of service quality perceptions (e.g., Grönroos 1984; Mangold and Babakus 1991; Richard and Allaway 1993). Modeling service quality as a formative construct rather than in the more traditional reflective way underscores the need for further research examining and comparing these approaches.

CONCLUSION

The service quality instrument developed in this study can be used to monitor and improve the quality of service delivered to customers. Although developed in the context of oncology clinics, this instrument may be of interest to a range of service providers offering high-involvement, high-contact, ongoing services. The findings of this study provide managers with valuable insights into the dimensions that reflect customers' health service quality perceptions. This knowledge can be used in quality improvement efforts, which is important because of the subsequent impact of service quality improvements on customer satisfaction and behavioral intentions as well as on broader outcomes such as the quality of life experienced by these customers (Dagger and Sweeney 2006).

APPENDIX A

Measures of Study Constructs

Health service quality: Respondents rated the clinic's performance on each scale item using a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The items below are grouped by dimension for expositional convenience; they appear in random order on the survey.

Perceived service quality (Brady and Cronin 2001; Parasuraman, Zeithaml, and Berry 1988):

- EA The overall quality of the service provided by the clinic is excellent.
- ED The quality of the service provided at the clinic is impressive.
- EM The service provided by the clinic is of a high standard.
- EJ I believe the clinic offers service that is superior in every way.

Service satisfaction (Greenfield and Attkisson 1989; Hubbert 1995; Oliver 1997):

- EC My feelings towards the clinic are very positive.
- EF I feel good about coming to this clinic for my treatment.
- EL Overall I am satisfied with the clinic and the service it provides.
- EO I feel satisfied that the results of my treatment are the best that can be achieved.
- EP The extent to which my treatment has produced the best possible outcome is satisfying.

Behavioral intentions (Headley and Miller 1993; Taylor and Baker 1994; Zeithaml, Berry, and Parasuraman 1996):

- EB If I had to start treatment again I would want to come to this clinic.
- EE I would highly recommend the clinic to other patients.
- EK I have said positive things about the clinic to my family and friends.
- EG I intend to continue having treatment, or any follow-up care I need, at this clinic.
- EN I have no desire to change clinics.
- EI I intend to follow the medical advice given to me at the clinic.
- EH I am glad I have my treatment at this clinic rather than somewhere else.

Primary dimensions

Interpersonal quality (Brady and Cronin 2001; Rust and Oliver 1994)

- AD The interaction I have with the staff at the clinic is of a high standard.
- AH The interaction I have with the staff at the clinic is excellent.
- AP I feel good about the interaction I have with the staff at the clinic.

Technical quality (Brady and Cronin 2001; Rust and Oliver 1994)

- DD The quality of the care I receive at the clinic is excellent.
- DI The care provided by the clinic is of a high standard.
- DN I am impressed by the care provided at the clinic.

Environment quality (Brady and Cronin 2001; Rust and Oliver 1994)

- BF I believe the physical environment at the clinic is excellent.
- BO I am impressed with the quality of the clinic's physical environment.
- BK The physical environment at the clinic is of a high standard.

Administrative quality (McDougall and Levesque 1994)

- CD The administration system at the clinic is excellent.
- CO The administration at the clinic is of a high standard.
- CL I have confidence in the clinic's administration system.

Subdimensions (developed for this research)

Interaction

- AJ The staff at the clinic always listen to what I have to say.
- AK The clinic's staff treat me as an individual and not just a number.
- AE I feel the staff at the clinic understand my needs.
- AA The staff at the clinic are concerned about my well-being.
- AI I always get personalised attention from the staff at the clinic.

(continued)

APPENDIX A (continued)

- AN I find it easy to discuss things with the staff at the clinic.
- AC The staff at the clinic explain things in a way that I can understand.
- AG The staff at the clinic are willing to answer my questions.
- AM I believe the staff at the clinic care about me.

Relationship

- AO The staff and I sometimes kid around, laugh, or joke with each other like close friends.
- AL The staff and I talk about the things that are happening in our lives, and not just about my medical condition.
- AB I have built a close relationship with some of the staff at the clinic.

Outcome

- DA I feel hopeful as a result of having treatment at the clinic.
- DJ Coming to the clinic has increased my chances of improving my health.
- DE I believe my future health will improve as a result of attending the clinic.
- DB I believe having treatment at the clinic has been worthwhile.
- DG I leave the clinic feeling encouraged about my treatment.
- DK I believe the results of my treatment will be the best they can be.

Expertise

- DF You can rely on the staff at the clinic to be well trained and qualified.
- DL The staff at the clinic carry out their tasks competently.
- DH I believe the staff at the clinic are highly skilled at their jobs.
- DM I feel good about the quality of the care given to me at the clinic.

Atmosphere

- BA The atmosphere at the clinic is pleasing.
- BG I like the "feel" of the atmosphere at the clinic.
- BM The clinic has an appealing atmosphere.
- BI The temperature at the clinic is pleasant.
- BN The clinic smells pleasant.

Tangibles

- BB The furniture at the clinic is comfortable.
- BC I like the layout of the clinic.
- BE The clinic looks attractive.
- BL I like the interior decoration (e.g., style of furniture) at the clinic.
- BQ The color scheme at the clinic is attractive.
- BP The lighting at the clinic is appropriate for this setting.
- BH The design of the clinic is patient friendly.

Timeliness

- CB The clinic keeps waiting time to a minimum.
- CH Generally, appointments at the clinic run on time.

Operation

- CC The clinic's records and documentation are error free (e.g., billing).
- CE The clinic works well with other service providers (e.g., pathology).
- CF I believe the clinic is well-managed.
- CI The registration procedures at the clinic are efficient.
- CN The discharge procedures at the clinic are efficient.
- CA The clinic's opening hours meet my needs.

Support

- CG The clinic frequently runs support groups and programs for patients.
- CM The clinic provides patients with an excellent range of support services.
- CJ The clinic provides patients with services beyond medical treatment.

APPENDIX B
Correlation Matrix for Exploratory Sample, Confirmatory Sample 1, and Confirmatory Sample 2

	SQUAL	SAT	BI	IQAL	TQAL	EQAL	AQAL	IACT	RSHIP	OUTC	EXPT	ATMO	TANG	TIME	OPER	SUPT
SQUAL	.78	.85	.70	.78	.62	.73	.76	.55	.67	.82	.61	.57	.50	.73	.47	
SAT	.47	.80	.56	.83	.47	.57	.70	.51	.79	.70	.59	.39	.38	.74	.41	
BI	.66	.77	.65	.76	.55	.63	.73	.54	.65	.74	.55	.50	.44	.71	.45	
IQAL	.75	.38	.52		.52	.55	.58	.88	.74	.53	.69	.50	.54	.39	.56	.46
TQAL	.64	.69	.77	.61		.49	.55	.76	.53	.60	.79	.64	.39	.34	.79	.40
EQAL	.69	.30	.47	.63	.45		.60	.56	.42	.47	.59	.76	.89	.51	.55	.49
AQAL	.76	.35	.55	.67	.50	.65		.63	.44	.53	.65	.55	.58	.59	.78	.51
IACT	.77	.40	.55	.93	.60	.64	.69		.70	.58	.75	.61	.54	.43	.71	.49
RSHIP	.58	.28	.37	.77	.45	.44	.52	.73		.45	.54	.49	.40	.29	.49	.40
OUTC	.80	.39	.58	.65	.58	.54	.62	.72	.50		.76	.55	.50	.41	.54	.42
EXPT	.88	.43	.61	.71	.60	.64	.74	.76	.54	.71		.63	.57	.46	.68	.46
ATMO	.68	.36	.46	.64	.52	.79	.65	.66	.55	.42	.54		.72	.49	.67	.46
TANG	.60	.30	.48	.55	.35	.85	.60	.58	.40	.45	.55	.74		.51	.49	.50
TIME	.55	.27	.37	.48	.37	.54	.64	.52	.38	.45	.58	.52	.53		.41	.61
OPER	.78	.38	.52	.63	.64	.66	.82	.69	.57	.64	.69	.74	.53	.50		.50
SUPT	.52	.26	.37	.52	.34	.52	.54	.49	.49	.48	.53	.49	.50	.50	.51	
SQUAL	.49	.69	.74	.64	.70	.78	.75	.59	.77	.86	.68	.59	.50	.75	.54	
SAT		.75	.42	.63	.34	.39	.43	.34	.44	.42	.42	.35	.24	.40	.35	
BI			.57	.71	.50	.61	.60	.43	.64	.63	.50	.54	.36	.54	.43	
IQAL				.52	.59	.71	.92	.76	.60	.73	.62	.54	.44	.59	.50	
TQAL					.46	.52	.62	.50	.60	.56	.56	.35	.32	.67	.34	
PEQAL						.69	.59	.41	.49	.64	.78	.83	.50	.64	.56	
ASQAL							.72	.51	.62	.78	.67	.62	.68	.79	.55	
IACT								.72	.69	.75	.64	.54	.47	.65	.48	
RSHIP									.47	.55	.54	.37	.34	.57	.44	
OUTC										.72	.53	.47	.39	.60	.50	
EXPT											.63	.56	.56	.65	.57	
ATMO												.69	.46	.74	.51	
TANG													.51	.48	.53	
TIME														.57	.38	
OPER															.49	
SUPT																

NOTE: Correlations for the exploratory sample are presented in the upper triangle of the top matrix. Correlations for confirmatory sample 1 are presented in the lower triangle of the top matrix, and correlations for confirmatory sample 2 are presented in the upper triangle of the bottom matrix. SQUAL = service quality; SAT = satisfaction; BI = behavioral intentions; IQAL = interpersonal quality; TQAL = technical quality; EQAL = environment quality; AQAL = administrative quality; IACT = interaction; RSHIP = relationship; OUTC = outcome; EXPT = expertise; ATMO = atmosphere; TANG = tangibles; TIME = timeliness; OPER = operation; SUPT = support.

NOTES

1. It is recommended that for a model with $df = 392$ and power of 0.90, sample sizes should be greater than about 81 to achieve sufficient statistical power (McQuitty 2004).

2. Because the variance explained by the first factor extracted in the factor analyses was not greater than 50%, common-method bias did not appear to be a significant problem in the present study (Podsakoff et al. 2003).

3. To ensure that adopting a partial disaggregation approach did not generate misleading results in terms of model fit and biased estimates of other parameters, the measurement model was also examined in its most disaggregate form. Model fit and parameter estimates were not significantly different from those reported when using the partial disaggregation approach. Furthermore, it should be noted that the analysis of reliability and validity presented in this study was undertaken on the disaggregate scale items rather than the item parcels.

4. The CFA results specified scale items as reflective indicators of their corresponding construct.

5. Because multicollinearity can affect results, we examined the correlation matrix and standardized path coefficients for relative similarity and the tolerance and variance inflation factor (VIF) values for evidence of multicollinearity (Kline 1998). Because our variables had no VIF values exceeding 5.0 (variable VIF < 2.0), multicollinearity did not appear to be a significant problem in the data sets (Field 2000; Hair et al. 1998).

6. The construct pairs that did not meet the discriminant validity test of Fornell and Larcker (1981) but met those of Anderson and Gerbing (1988) in the exploratory sample were environment quality and atmosphere ($\chi^2_{diff} = 244.63$), environment quality and tangibles ($\chi^2_{diff} = 116.30$), interpersonal quality and relationship ($\chi^2_{diff} = 147.69$), interpersonal quality and interaction ($\chi^2_{diff} = 52.09$), technical quality and operation ($\chi^2_{diff} = 67.92$), and service quality and behavioral intentions ($\chi^2_{diff} = 108.30$); in confirmatory sample 1 were technical quality and operation ($\chi^2_{diff} = 23.69$), administrative quality and operation ($\chi^2_{diff} = 18.00$), environment quality and tangibles ($\chi^2_{diff} = 13.70$), and interpersonal quality and interaction ($\chi^2_{diff} = 56.66$); and in confirmatory study 2 were interpersonal quality and interaction ($\chi^2_{diff} = 15.90$).

7. At the dimensional level, Jarvis, MacKenzie, and Podsakoff (2003) suggested that the formative approach is appropriate (a) when the direction of causality is from the dimensions to the construct, the dimensions serve as defining characteristics of the construct, and changes in the dimensions should cause changes in the construct and (b) when the dimensions do not have the same or similar content, do not necessarily covary with one another, and do not have the same antecedents or consequences. On the basis of these criteria, we treated the first-order dimensions as formative indicators of the second-order dimensions and the second-order dimensions as formative indicators of the higher order service quality construct. At the measurement level (item level) Jarvis, MacKenzie, and Podsakoff suggested that the reflective approach is appropriate when (a) the relative homogeneity and interchangeability of scale items is high, (b) the degree of covariation among items within each dimension is high, and (c) indicators within each dimension are likely to be affected by the same antecedents and have similar consequences. On the basis of these criteria, we modeled the measurement aspect of our model reflectively.

8. Path coefficients with absolute values less than .10 were considered indicative of a small effect, values around .30 were considered indicative of a medium effect, and values greater than .50 were considered indicative of a large effect (Kline 1998).

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