

Young Consumers' Evaluation of School Meals

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ABSTRACT. This study determines the impact service quality on customer satisfaction in the school meal context. The empirical analysis reveals three dimensions of service quality (quality of food, atmosphere, and customer service), which have a high impact on customer satisfaction. A low level of satisfaction was identified but with differences between the various schools. Understanding the antecedents of pupils' satisfaction is important to policy makers, schools, and school meals providers. Due to the increasing importance of school meal

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programs and their high impact on nutritional status on young people, a high service quality in school meal programs is inevitable.

KEYWORDS. Customer satisfaction, school meal programs, service quality, structural equation modeling

INTRODUCTION

Children and adolescents worldwide are increasingly suffering from overweight and obesity. Recent statistics indicate that they are the fastest growing segment of the overweight and obese population (Flegal & Troiano, 2000; WHO/FAO, 2003). These days, 10 to 20% of Germany's children and adolescents are judged to be overweight (Benecke & Vogel, 2004). This fact leads to a plurality of problems. Thus, not only are overweight and obese children and adolescents more severely affected by social and psychological problems (e.g., discrimination, victims and perpetrators of bullying behavior, low self-esteem and long-lasting negative medical and psychosocial consequences) (Hill & Trowbridge, 1998; Janssen, Craig, Boyce, & Picket, 2004) but additionally by a number of physiological problems. Overweight and obese young people will probably become overweight or obese adults (Whitaker, Wright, Pepe, Seidel, and Dietz, 1997; Wright, Parker, Lammon, & Craft, 2001), and this often leads to a number of long-term health problems such as chronic diseases and risk factors (e.g., type 2 diabetes and cardiovascular disease) (Fagot-Campagna, Saaddine, Flegal, & Beckles, 2001; Sinha et al., 2002; Vereecken, De Henauw, & Maes, 2005; Williams, Bollella, & Wynder, 1995). Furthermore, the risk of morbidity and mortality in adulthood increases (Freedman, Khan, Dietz, Srinivasan, & Berenson, 2001; Must, Jacques, Dallal, Bajema, & Dietz, 1992). The future problems resulting from this situation constitute a considerable burden for the health care system. Costs are increasing due to the increase in adiposity or adiposity-related illness, and, thus, policy makers and the general public are showing a growing interest in preventive measures against the related ill health (Heseker & Schmidt, 2000; Pi-Sunyer, 1993).

One starting point is a balanced, age-based diet. This is not only a basic prerequisite for healthy physiological bodily development, but

also supports intellectual development and performance of children and adolescents (Heindl, 2003). There is no doubt of the value of schools trying to influence the habitualized process of food intake. However, to date, the studies available on the topic of the dietary situation among children and adolescents are primarily nutritional science studies (e.g., Burgess & Bunker, 2002; James, Thomas, Cavan, & Kerr, 2004; Kennedy, 2004; Mock, Adams, Snowdown, & Griffith, 1997; Prentice & Jebb, 2003; Ruxton, Kirk, Belton, & Holmes, 1993; Sichert-Hellert, Kersting, & Schöch, 1998), and only a few studies have been concerned with the subject of customer satisfaction with school catering (Booth, Neale, & Tilston, 1990; Cranage, Conklin, & Bordi, 2003; Ham, Hiemestra, & Yoon, 2002; Meyer, Conklin, & Carr, 1997; ZMP/CMA, 2005). But in this context, pupils' acceptance of healthy school meals is of particular interest. If acceptance is low, pupils tend to eat unhealthy snacks or fast food because this type of food is mostly more accepted by the peers (Birch & Fisher, 1998; Contento, Williams, Michela, & Franklin, 2006). Against this background the pupils' evaluation of school meals as a basic prerequisite for understanding their requirements on school meals. Therefore, the aim of this study is a better understanding of the dimensions underlying perceived service quality and their impact upon customer satisfaction in the school meal context.

THE IMPORTANCE OF SCHOOL MEALS

Nutritional Behavior of Children and Adolescents

Various factors influence prevalence of overweight and obesity, including genetic and metabolic disposition, socioeconomic status, family lifestyle, and behavioral determinants (Behme, 1996; Bouchard, 1994; Boumtje, Huang, Lee, & Lin, 2005; Ledermann et al., 2004; Mei et al., 1998; Rosenbaum & Leibel, 1998; Troiano & Flegal, 1998). The habitualized process of food intake that is influenced by experience with certain foodstuffs or becoming used to familiar types of taste is probably of special importance. Behavioral patterns are already set in an early stage of development and are likely to be carried forward into adulthood (Boumtje et al., 2005; Kelder, Perry, Klepp, & Lytle, 1994). Therefore, unhealthy patterns of lifestyle which already begin in childhood often lead to overweight and obesity in adulthood.

As is well known, nutritional patterns are set in early childhood and have a high impact on nutritional status (Birch & Fisher, 1998). Furthermore, the importance of social context has been mentioned in numerous studies (Contento et al., 2006; Croll, Neumark-Sztainer, & Story, 2001; Hamdan, Story, French, Fulkerson, & Nelson, 2005; Watt & Sheiham, 1997). Ward (1974) termed consumer socialization the process by which children acquire skills, knowledge and attitudes relevant to their functioning as consumers in the market place. Previous findings have acknowledged that parents, peers, mass media, and school education are key agents of consumer socialization (Moschis, 1987). In this respect, it has been shown that parents are probably most instrumental in teaching children basic rational aspects of being consumers (McNeal, 1987; Ward et al., 1974), while peers at school and at play are the source from which children learn the symbolic meaning of goods or expressive elements of consumption (Moschis & Churchill, 1978; Moschis & Moore, 1982). Evidently, socialization processes that children go through affect various outcomes, such as attitudes and behaviors.

More specifically, Birch and Fisher (1998) postulated that eating behavior was determined by exposure and accessibility, behavior of the family and peers, physiological consequences of ingestion, and by child feeding practices. The development of children and young adolescents is a complex social process that is affected by an increasing self-determination and independence, which in turn also is reflected in nutritional behavior. Eating and the food choice process for young people are also complex processes. Normally, self-determination in adolescence is of high importance for the food choice process. Adolescents wish to make the decisions on their own to demonstrate their independence. Thus, they wish to decide autonomously whether food is healthy or unhealthy. Researchers have analyzed the impact of consumption and availability of healthy and unhealthy food and concluded that the higher the availability of a type of food the higher the consumption (Baranowski et al., 1997; Hearn, Baranowski, & Baranowski, 1998; Weber Cullen & Zakeri, 2004).

This demonstrates the importance of school meal programs and their influence on healthy food choices among children and adolescents. All-day schools, as governmentally supported institutions, offer an opportunity, by means of a qualitatively highly nutritive lunch, to influence nutrition patterns. This might contribute to long-lasting, healthy food-related lifestyles and good behavior toward their diet on

the part of children and adolescents. Furthermore, several studies have analyzed the link between consumption of certain types of food and obesity (James et al., 2004; Kennedy, 2004; Prentice & Jebb, 2003). Finally, well-balanced school meals might influence the nutritional status of children and adolescents (Gleason & Sutor, 2003).

School Meals in Germany

In Germany today, the debate on school food is relatively new. The German education system differs from the international common all-day school system, and most pupils finish their school day at lunchtime.

Thus, most pupils in Germany eat lunch at home. In 2002, the German government started, not least due to the poor results of the German pupils in the OECD survey, a support program that provides for expansion of all-day schools to 10,000 by the end of 2007. Nowadays, nearly 7,000 all-day schools exist that are attended by approximately 1.1 million pupils, which is roughly 18% of all German schools or 12.5% of all German pupils (BMBF, 2007). There are different types of all-day schools in Germany: open all-day schools in which attending classes after lunch is optional, partially obligatory all-day schools in which attending classes in the afternoon is obligatory but only for some classes, and, finally, obligatory all-day schools in which all pupils have to participate in classes for the whole day. Thus, participation in school meal programs varies. In most cases, lunch participation is optional, but in some it is obligatory, particularly for younger pupils. Against the background of the politically promoted spread of all-day schools in Germany, school meal programs are gaining in importance.

Due to this recent development, the realization of adequate school catering is, however, quite problematical in the course of the everyday life of the school. There are many barriers, for example, a lack of professional know-how in the schools, a problem of acceptance among the older pupils, and narrow budget limitations of the local authorities. Thus, the institutional framework is weak, and the organization of school meal programs varies from school to school. There are different school meal providers, such as communal caterers, private companies, and non-profit associations organized by parents, teachers, or social organizations. Furthermore, there are different types of catering systems. A widespread catering system is the cook-and-hold system in

which meals are prepared in a centralized conventional system and are distributed to several schools and other foodservice canteens. The cook-and-serve system is the system with the highest nutritional quality. Meals are prepared in schools and are served directly to pupils. Thus, the loss in vitamins or nutrients is lower than in the cook-and-hold system. In addition, there are combined systems (cook-and-chill or cook-and-freeze) in which some components of the meal or the whole meal are delivered and prepared in school canteens (Heseker, 2003). Due to the lack of concrete regulations, the realization of adequate school catering is quite difficult, and the problems are numerous (cost pressure, low interest aspect in schools and local authorities, quality problems) and, finally, no consistent quality standards exist.

For there to be an influence on a pupils' nutritional status, a regular participation in school meal programs is necessary. As participation in numerous schools is optional, it would be of increasing importance to provide meals that are satisfactory to the pupils. In this context, service quality and customer satisfaction are of particular importance. A highly perceived service quality, which would lead to a high customer satisfaction, would be a precedent condition for a regular participation and would finally lead to a higher economic success for the providers of school meals (Olorunniwo, Hsu, & Udo, 2006). Concurrently, it could reduce cost pressure in the school meals sector. Up to now, pupils' views of school meal programs in Germany have rarely been analyzed, but these are an important factor of success. In the following chapter the literature of customer satisfaction with school meals, in particular, and the literature of customer satisfaction in general is analyzed. From this analysis a theoretical model for customer satisfaction with school meals follows.

CUSTOMER SATISFACTION IN SCHOOL FOOD

Literature Review

Nowadays, research dealing with school meals is a focus of nutritional science, analyzing the weight status or the adequate supply of vitamins and nutrients of pupils through school meal programs (e.g., Burgess & Bunker, 2002; Mock et al., 1997; Ruxton et al., 1993). From an economic perspective, the school food sector has not hardly been analyzed, but there is a body of literature dealing with

the economic perspective of the whole food-service sector. Especially, costs and process structures of different catering systems are analyzed in hospitals, staff canteens, and restaurants, and, in this context, also the customer-oriented dimension is discussed (e.g., Capra, Wright, Sardie, Bauer, & Askew, 2005; Gilbert, Veloutsou, Goode, & Mouthino, 2004; Hiemstra, 2000; Kim & Shanklin, 1999; Rodgers, 2005). In addition to being an aspect of preferences sciences, it is also an aspect of customer dimension. The preferences of pupils have also been analyzed very well (Chapman & Maclean, 1993; Hamdan et al., 2005; Story & Resnick, 1986; Watt & Sheiham, 1997), but only sparse literature can be found on the topic of customer satisfaction in school meals (Booth et al., 1990; Meyer et al., 1997) due to research being focused more on process and less on customer satisfaction. The most comprehensive study is that of Meyer et al. (1997) who analyzed different dimensions of customer satisfaction and identified three factors influencing pupil satisfaction. The key variables were quality of food, dining ambience, and staff. However, there are several other influencing factors, such as variety, time, cost, queue time, and portion size (Booth et al., 1990; Meyer et al., 1997). Ham et al. (2002) analyzed the factors affecting school lunch participation and implicated external factors such as type of school, type of campus, type of catering system, school enrollment, and price. The results show that these external factors affect lunch participation (Ham et al., 2002). Although, there are a number of studies analyzing service quality and customer satisfaction in the general foodservice context, literature dealing specifically with customer satisfaction with school meals was very scant, and no instrument for measurement of customer satisfaction with school meals was found.

Service Quality and Customer Satisfaction in the Food Service Industry

Several researchers suggest that the construct of service quality is "elusive and abstract" (Cronin & Taylor, 1992), and a universal concept of measuring service quality may be useless (Levitt, 1981; Lovelock, 1983), rather it is either industry or context specific (Babakus & Boller, 1992; Spais & Vasileiou, 2006). Thus, the service quality dimensions for the foodservice industry must be characterized. Adebajo (2001) noted that customer satisfaction in the food industry in practice is often only measured by the "offering"

of tangibles (hard service attributes), but also softer service attributes have to be measured to recognize the preferences of the consumer and to identify the drivers of customer satisfaction. For the foodservice industry, Lee, Shanklin, and Johnsen (2003) propose two dimensions: tangibles (food and physical environment) and intangibles (relationship between customer and employees). An adequate combination of these two dimensions results in a highly perceived service quality. For instance, Capra et al. (2005) measured the patient satisfaction in hospitals where customer satisfaction is a multidimensional construct influenced by a variety of technical, environmental, and interpersonal factors. In most studies on hospital patient satisfaction, food quality was found to be the main predictor (Dube, Trudeau, & Belanger, 1994; Lau & Gregoire, 1998). Also, the relationship between customers and food service staff was examined, and interpersonal effects were found to be strong influencing factors on customer satisfaction. Johns and Howards (1998) analyzed the perceptions of service quality in restaurants and concluded that the quality of interpersonal effects of clients and food service staff is only one small component of the perceived overall experience; there are several other factors, such as service, food, price/value, environment, staff, atmosphere, drink, and location. Lee and Lambert (2000) also mentioned the high importance of waiting time on customer satisfaction.

Wall and Berry (2007) argued that food quality is the basis for assessing food service, and that the interaction between clients and employees is more important than dining ambience. Both dining ambience and human interaction aspects are also of high importance, whereas a positive assessment of the interaction between client and employee can overcome negative assessment of ambient aspects. Gilmore and Dolezal (2000) analyzed the impact of dining ambience on service quality and stated that dining ambience also influences the service and the food quality. Overall, there are several factors influencing perceptions on service quality and customer satisfaction, but food quality, dining ambience, and the interaction between the customers and the employees have the highest impact on customer satisfaction.

Measuring Service Quality and Customer Satisfaction

In recent years, there has been a broad debate about service quality and customer satisfaction and how to measure them. Particularly, the measurement of service quality has been extensively discussed

(Brown, Churchill, & Peter, 1993; Cronin, Brady, & Hult, 2000; Carman, 1990; Cronin & Taylor, 1992; Parasuraman, Berry, & Zeithaml, 1988). One well-established instrument for measuring service quality is the SERVQUAL scale (Parasuraman, Zeithaml, & Berry, 1985; Parasuraman et al., 1988), which is based on the assumption that the consumers compare their service expectations with perceptions of the service they receive (expectations–performance gap) (Parasuraman et al., 1985). Many authors criticize this approach due to the general nature of expectations (expectations of performance concerning a general sector) and the specific assessment of service (assessment of the actual performance of a specific firm) (Cronin & Taylor, 1992; Gilbert et al., 2004). Furthermore, Crompton & Love (1995) concluded that expectations measurement in restaurants gains no further information and tends to cause problems. Hence, a number of marketing scholars offer support for only performance-based approaches (Babakus & Boller, 1992; Bebeko, 2000; Brown et al., 1993; Churchill & Surprenant, 1982; Cronin & Taylor, 1992; Gilbert et al., 2004).

Even though some authors view service quality and satisfaction as similar concepts (Henning-Thurau, Langer, & Hansen, 2001), most researchers in the services domain agree that these two constructs are indeed different (Bitner, 1990; Boulding, Kalra, Staelin, & Zeithaml, 1993; Carman, 1990), mainly because service quality reflects what consumers rate as performance, and satisfaction reflects an attitude toward it (Bitner, 1990; Parasuraman et al., 1988, 1993). Cronin and Taylor (1992) analyzed the different relations and concluded that the higher the service quality the higher the customer satisfaction and, therefore, approved the considerations of Parasuraman et al. (1985, 1989).

Finally, all authors agree that customer satisfaction has a high impact on the success or failure of a firm. Satisfied customers, when compared to non-satisfied counterparts, are expected to be more loyal, recommend the firm, have a higher willingness to pay and higher purchase behavior, and in the end determine the economic success of a firm (Olorunniwo et al., 2006; Cronin & Taylor, 1992; Parasuraman et al., 1988). However, dissatisfied customers do not recommend the service performance, and they also could keep other potential customers away. This might be of special importance in school meals due to the great importance of social processes in adolescence.

Despite the increased interests in satisfaction with food intake, a review of the literature does not provide any comprehensive model that could be used to empirically examine this issue with children and adolescents as study objects. With this in mind, this study was undertaken to identify the underlying dimensions of perceived service quality in the school meal context and their impact on students' satisfaction with the consumption of their food.

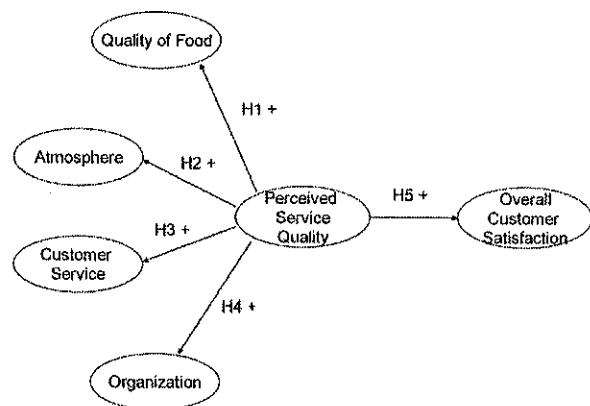
Theoretical Model of Customer Satisfaction in School Meals

Based on these previous findings, a theoretical model of customer satisfaction with school meals was created, including several elements of perceived service quality such as taste and quality of food, dining ambience, organizational aspects, and staff (see Figure 1).

Based on the literature, the following hypotheses were formulated.

- H1: Quality of food is a dimension of perceived service quality, and their relationship is positive.
- H2: Atmosphere is a dimension of perceived service quality, and their relationship is positive.
- H3: Customer service is a dimension of perceived service quality, and their relationship is positive.
- H4: Organization is a dimension of perceived service quality, and their relationship is positive.

FIGURE 1. Theoretical Model of Customer Satisfaction in School Meals



H5: Perceived service quality has a positive impact on overall customer satisfaction.

H6: Product quality has the highest impact on customer satisfaction.

METHODOLOGY AND DATA COLLECTION

Data Collection

Customer satisfaction scale items used in this study were adopted, and the items were developed through the reference to published literature (Meyer et al., 1997). All items are measured with a 5-point Likert scale model with "strongly agree," "agree," "neither agree nor disagree," "disagree," and "strongly disagree." Furthermore, a 5-point Kunin scale for the overall customer satisfaction item was used. Demographics such as gender and age were also evaluated. The questionnaire was developed in the German language. For content validity, the questionnaire was refined through several pre-testings by pupils, doctoral students, and professors, with focus on wording, which was of particular importance for the development of a questionnaire for pupils, instrument clarity, and validity.

The construct customer satisfaction is composed of items comparing school meals to other food providers (at home, at a fast food restaurant, prefer to eat somewhere else) and not, as expected, of the overall customer satisfaction items. Comparing food to other food is more an emotional process influenced by many different factors. All in all, the direct measuring of customer satisfaction is quite problematical.

Sampling and Fieldwork

For this survey, a total of 2,384 pupils attending grades 5 to 13 from 20 different schools and school types in Germany (mainly located in Lower Saxony) were questioned with a standardized questionnaire (see Table 1). Parallel to the pupils' customer satisfaction, business ratios for the catering services of each school were collected. The sample of schools was determined with the goal of obtaining both all-day schools with a long tradition and new all-day schools. Thus, the sample is characterized by pupils

with long experience of school meals and those with only short experience. Furthermore, schools were chosen based on the type of school and, finally, the feasibility of collecting data. School heads were contacted in advance and asked to organize the interviews of the pupils during classes. The interviewers (students

TABLE 1. Sample Profile

Characteristics	Frequency	Percentage
Type of school		
Secondary school	168	7.0
Grammar school	415	17.4
Comprehensive school	1173	49.2
Private school	628	26.3
Type of all-day school		
Open	7 schools, <i>N</i> =837	35.1
Partial obligatory	6 schools, <i>N</i> =518	21.7
Obligatory	7 schools, <i>N</i> =1,029	43.2
Type of catering system		
Cook and serve	6 schools, <i>N</i> =927	38.9
Cook and chill/freeze	8 schools, <i>N</i> =977	41.0
Cook and hold	6 schools, <i>N</i> =480	20.1
Type of provider		
Communal catering	3 schools, <i>N</i> =580	24.3
Private caterer	3 schools, <i>N</i> =216	9.1
Non-profit associations	3 schools, <i>N</i> =504	21.1
Self-directed by schools	5 schools, <i>N</i> =462	19.4
Sharing system	4 schools, <i>N</i> =457	19.2
Social association	2 schools, <i>N</i> =165	6.9
Gender of pupils		
Male	1,154	48.4
Female	1,183	49.6
Missing values	47	2.0
Grade		
5	423	17.7
6	562	23.6
7	309	13.0
8	282	11.8
9	238	10.0
10	214	9.0
11	111	4.7
12	124	5.2
13	39	1.6
Missing values	82	3.4

Source: Authors' calculation.

TABLE 2. Selected Ratios of Schools

Characteristic	Average	Minimum	Maximum
Number of pupils	727	272	1,700
Number of meals served per day	231	40	1,000
Price per meal (in Euros)	2.46	1.74	5.20

Source: Authors' calculation.

of the University of Göttingen, who had been trained by one of the authors) attended classes and picked up the questionnaires. Table 2 shows the business ratios that were collected in face-to-face interviews with the school heads.

Methodology

The analysis was divided into three steps. First, an exploratory factor analysis was used to determine the dimensions of perceived service quality in school meals. Second, a confirmatory factor analysis was carried out to test the validity of the dimensions of perceived service quality using an independent sample of subjects. Third, a combined measurement model was generated to measure the influence of the service quality dimensions determined on customer satisfaction. This approach enabled the authors to develop a model of measuring customer satisfaction with school meals of high validity, reliability, and consistency. Most research on measuring customer satisfaction with school meals and the food-service industry has been carried out through regression analyses. In the past few years, structural equation modeling has gained more and more importance. It allows an understanding of social processes and of testing theory-based hypotheses using different methods of multivariate analysis (regression and factor analysis) and examines the relationships among the latent constructs. Further on, more complicated models can be analyzed (Ullmann, 1996).

Researchers discussed the analysis of covariance structure models that were specified post hoc (post hoc model modification). This specification search was criticized by some authors because model modification is often created to improve goodness-of-fit statistics. The central issues concern consistency or stability and

cross-validation of the model modification using a specific sample. Therefore, it is very doubtful that modified models are generalizable to the entire population (Byrne, Shavelson, & Muthén, 1989; Cliff, 1983; MacCallum, 1986; MacCallum, Roznowski, & Necowitz, 1992). One approach to overcome the problem is to use an independent sample by dividing the sample into two sub-samples (Byrne et al., 1989; Cliff, 1983). The first sample serves to determine a well-fitting model using an exploratory factor analysis, and then hypotheses related to this model are statistically tested using confirmatory factor analysis on the data base from the second sub-sample. Thereby, the model is not influenced by the data, and the hypotheses can be tested within a confirmatory framework (Cliff, 1983). One main problem in most cases is the reduced size of the data base (Byrne et al., 1989). However, the present data base of 2,300+ pupils is sufficient to subdivide into two samples.

The authors followed this approach for two reasons: first, an exploratory procedure was needed to identify the dimensions of perceived service quality, and second, a confirmatory procedure was required to develop a reliable and valid tool for measuring perceived service quality and customer satisfaction. The data base of 2,384 pupils was divided into two samples. The first sample used for exploratory factor analysis was composed of 942 pupils, and the second one was allocated 1,427 pupils (due to the higher demands on sample size for the confirmatory factor analysis). The two samples were randomly divided but contain an equal distribution of pupils' ages and school types.

ANALYSIS AND RESULTS

Exploratory Factor Analysis (Identifying the Dimensions of Perceived Service Quality)

The aim of the exploratory factor analysis was to identify the dimensions of perceived service quality as perceived in pupils' minds. The exploratory factor analysis was carried out using the maximum likelihood and Varimax rotation. This analysis resulted in a four-factor solution. Due to the low Cronbach's alpha value of the fourth factor (0.489), and due to the relatively low contribution to

the value of explained variance (6.38%), it was not considered for further analysis. This factor includes organizational aspects, such as queue time and organization of school meals. Eventually, as Table 3 shows, three factors were retained, which together explain 58% of the total variance ($KMO = 0.922$). Based on the items comprising each factor, the factors were labeled "Quality of Food" (Factor 1), "Atmosphere" (Factor 2), and "Customer Service" (Factor 3). The reliability of each factor was assessed by Cronbach's alpha coefficients, which were all above .76 (see Table 3).

Thus, the hypothesis H4, which describes the impact of the organization on the customer satisfaction must be rejected. For further analyses, only hypotheses H1, H2, H3, H5, and H6 can be maintained.

TABLE 3. Factor Loadings of the Individual Statements

Factor 1 (Quality of food): Cronbach's alpha = 0.783; 16.67 % of the variance		Factor loading
Food 1: Healthiness		.673
Food 2: Flavor		.712
Food 3: Freshness		.733
Food 4: Aroma		.659
Food 5: Nutritional value		.667*
Food 6: Sometimes school meals look unappetizing		-.629*
Food 7: School lunch is often served cold		.622*
Factor 2 (Atmosphere): Cronbach's alpha = 0.866; 12.03% of the variance		
Canteen 1: Appearance		.802
Canteen 2: Atmosphere		.732
Canteen 3: Relaxation effect		.802
Canteen 4: Do I feel comfortable?		.715
Canteen 5: Hip		.704
Factor 3 (Customer Service): Cronbach's alpha = 0.767; 11.19% of the variance		
Staff 1: All in all, I feel well cared for		.842
Staff 2: Food is prepared in an uncaring manner		-.721
Staff 3: The foodservice staff knows how to cook		.828
Staff 4: The foodservice staff tries to help me with special wishes		.704*

*Deleted after confirmatory factor analysis.

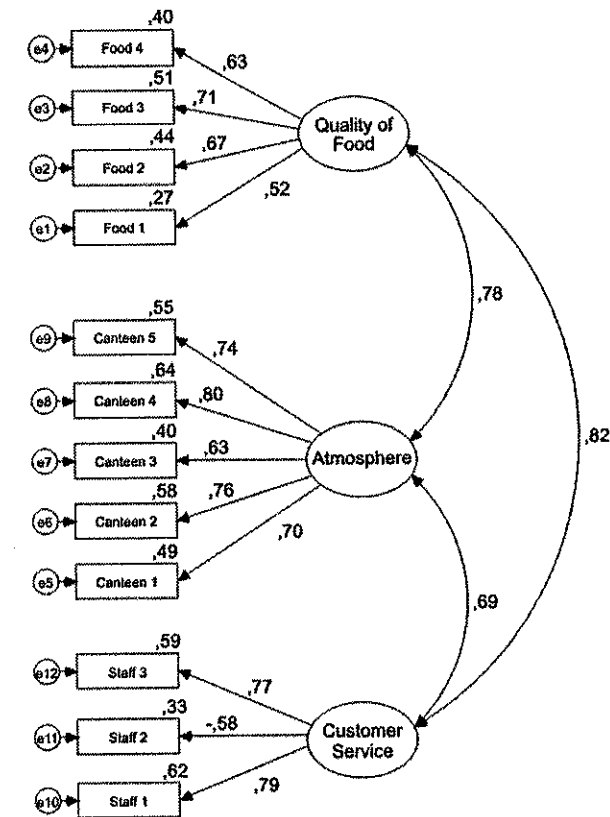
Confirmatory Factor Analysis

A necessary step in the causal analysis is to check whether the model is over-identified, which means that the number of parameters to be estimated is less than the number of data points (i.e., variances, covariances, and the observed variables) (Byrne, 2001). This model includes 12 observed variables with 78 data points ($12(12 + 1)/2$). Thus, with 78 data points and 27 parameters to be estimated, the confirmatory model has 51 degrees of freedom (i.e. $78 - 27$) and, as such, is an over-identified model (Byrne, 2001; Streiner, 2006). All path coefficients, which reflect the strength of the relationship between the latent and observed variables, are adequate (see Figure 2). The critical ratios (CR) range between 16.9 and 26.9, and, thus, all of them were highly statistically significant ($p \leq .001$).

The confirmatory factor analysis was conducted (with AMOS 5.0) with the set of 16 variables resulting from the exploratory factor analysis. Results suggested that four items should be excluded (see Table 3) in order to achieve a good fit of the model to the sample data. According to this, the fit statistics suggested a good model fit. The reliability of the factors was recalculated and resulted in high reliability coefficients for each factor ("quality of food" 0.709, "atmosphere" 0.866, and "customer service" 0.759).

Overall, the model fits the data very well (see Table 4). The most common overall model fit index, the chi-squared value, which represents the likelihood ratio test statistic, achieves a score of 136.823, ($p \leq 0.001$), thus indicating that the model has to be rejected (ideally, the p -value has to be non-significant at a level of ≥ 0.05). However, the chi-squared test is highly dependent on sample size, and in a large sample size, even minor or trivial deviations from the data can lead to statistical significance (Byrne, 2001; Streiner, 2006). Furthermore, it is common practice to use several fit indices for evaluating the model (Byrne, 2001; Millsap, 2007; Mulaik et al., 1989; Streiner, 2006). The standardized root mean square residual (SRMR = 0.0224) is an index of the average differences between the sample variances and covariances and the estimated model variances and covariances. In this case, it means that the model can explain the correlations with an average error of .022 (Byrne, 2001; Hu & Bentler, 1995). The goodness-of-fit index (GFI = .983) measures the relative amounts of variances and covariances that the proposed model is able to explain (similar to the R^2 in the regression analysis). The adjusted goodness-of-fit index

FIGURE 2. Measurement Model of Perceived Service Quality (chi-square = 136.823 [51 df]; $p = .000$ (CMIN/df = 2.683))



(AGFI = .975) is the GFI adjusted for the degree of parsimony in the model. The comparative fit index (CFI = .987) evaluates the fit of the estimated model relative to the fit of the independent model, where no relationships are estimated between the variables. And the root mean square error of approximation (RMSEA = .034), one of the most informative criteria in covariance structure modeling, is a measure that takes into consideration the complexity of the model (i.e., the degrees of freedom) (Byrne, 2001). Thus, all fit indices are of high quality and suggest a good model fit. Therefore, the measurement model of perceived service quality has been confirmed.

TABLE 4. Goodness-of-Fit Indices

Fit Index–Measurement Model	Acceptable Model Fit	Obtained Value*	Obtained Value**	Obtained Value***
Goodness-of-fit index (GFI)	≥ 0.90	0.983	0.982	0.976
Adjusted Goodness-of-fit index (AGFI)	≥ 0.90	0.975	0.974	0.966
Comparative fit index (CFI)	≥ 0.90	0.987	0.985	0.980
Standardized root mean square residual (SRMR)	≤ 0.05	0.0224	0.0246	0.0254
Root-mean-square error of approximation (RMSEA)	≤ 0.05	0.034	0.036	0.037

*Of the measurement model "perceived service quality."

**Of the basic structural model "perceived service quality."

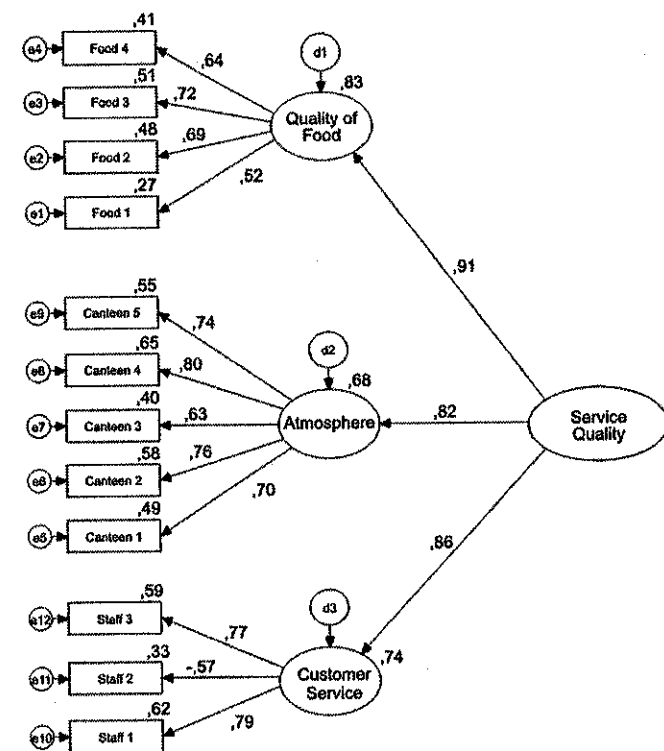
***Of the structural model "customer satisfaction."

Structural Model of Perceived Service Quality

Overall, the measurement model for "Perceived Service Quality" has been confirmed. The next step is to test a basic structural model for the Perceived Service Quality. For this purpose, the latent variable "service quality" was added to the model and used as a dependent variable for the three dimensions already identified in the measurement model (see Figure 3). First, the chi-squared values of both the measurement and the structural model have to be compared. The difference between the models of 9.26 with 1 degree of freedom is not significant, which means that the structural part of the model does not lead to any misfit. The other fit indices are all of them above the accepted levels (see Table 4). This suggests that the construct of "service quality" is described very well by the sample. Furthermore, the latent variable "service quality" explains a high variance of the factors. The indicator reliability of each factor reflects how much of the variance is explained by the construct "service quality" (quality of food = 83%, atmosphere = 68%, customer service = 74%). Thus, hypotheses H1, H2, and H3 have been confirmed.

As discussed in previous sections, service quality is expected to have a high impact on customer satisfaction. Therefore, to measure such influence, a more comprehensive model of customer satisfaction with school meals was constructed and tested (see Figure 4). As shown in Table 4, the model fit indices are of high quality. These

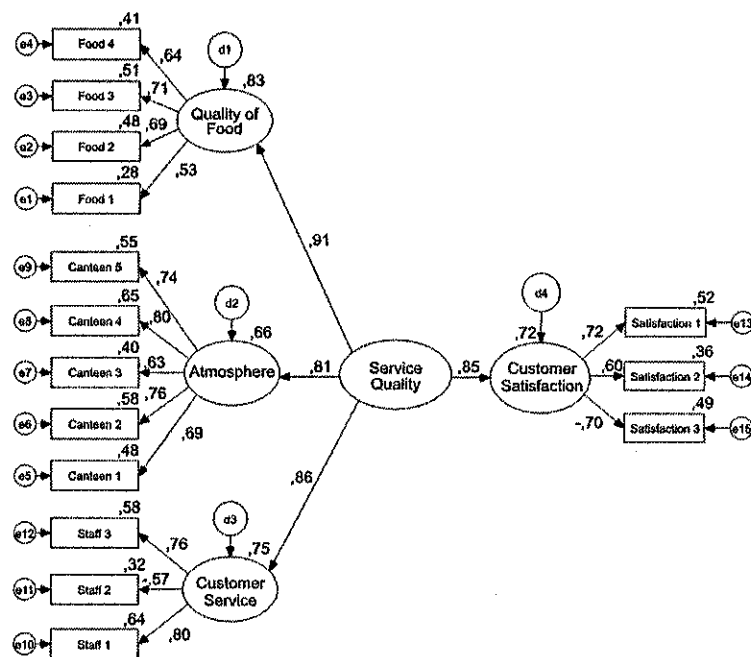
FIGURE 3. Structural Model of Perceived Service Quality (chi-square = 146.091 [52df]; $p = .000$ (CMIN/df = 2.809))



results suggest that perceived service quality can explain 72% of the customer satisfaction, and, finally, we can consider that the higher the service quality the higher the customer satisfaction. Therefore, hypothesis H5 has also been confirmed.

Hypothesis H6 proposed that the latent construct quality of food has the highest impact on customer satisfaction. To test this hypothesis, it is necessary to check the direct effect (please note that there is no indirect effect) of each independent dimension of perceived service quality upon the dependent variable customer satisfaction (see Figure 5).

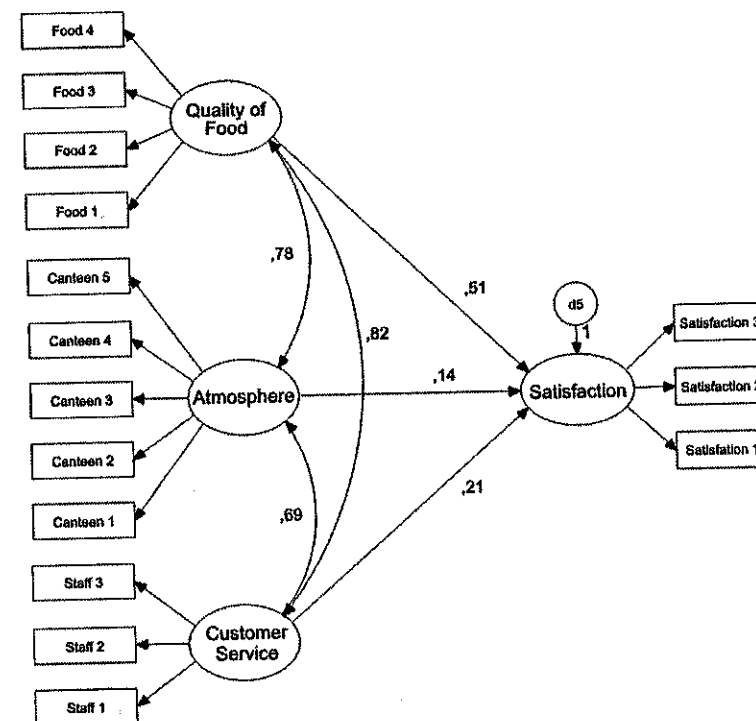
FIGURE 4. Customer Satisfaction with School Meals (chi-square = 252.158 [86df]; $p = .000$ (CMIN/df = 2.932)



For this sample, 65% of the variance of Customer Satisfaction was explained by its three antecedents Quality of Food, Atmosphere, and Customer Service. Of these, the stronger contributor to the Customer Satisfaction is Quality of Food (0.51), with an effect more than three times that of Atmosphere (0.14), and more than twice that of Customer Service (0.21). Thus, H6 can also be confirmed.

In order to test the validity of the proposed model, the invariance between different groups was analyzed. The test of invariance was conducted first with the sub-sample ($n = 1,427$), and then with two different samples divided according to gender (males = 1,154, females = 1,183). Results of such a procedure revealed that both the difference in the first sub-sample (difference of chi-squared value = 10.877 ($df = 11$), $p \leq .05$), and the difference between the gender groups (difference of chi-squared value = 19.07 ($df = 11$), $p \leq .05$) were non-significant, thus supporting the validity of the model.

FIGURE 5. Direct Effects of Customer Satisfaction with School Meals (chi-square = 283.484 [84df]; $p = .000$ (CMIN/df = 3.375)



Therefore, the underlying latent constructs are considered equivalent across different groups and allow testing of mean differences across groups (Byrne et al., 1989).

Customer Satisfaction

The three items of customer satisfaction received relatively low scores from the pupils (see Table 5). Especially when comparing eating at home with eating at school, the school food was ranked poorly and the standard deviation was not as high as in other items. Likewise, instead of school canteens, most pupils prefer to eat somewhere else.

Furthermore, schools were rated differently. There are significant differences between the various schools. The best school ranked the

TABLE 5. Customer Satisfaction

Characteristics	Dimensions of Satisfaction					
	Satisfaction 1: In Comparison with the Food at Home, School Food is Better*		Satisfaction 2: In Comparison with the Food at McDonald's, School Food is Better*		Satisfaction 3: I prefer to Eat Elsewhere*	
	Mean	SD	Mean	SD	Mean	SD
Poorest school	-1.54	.59	-1.13	1.12	1.26	1.13
Best school	-.78	.79	.43	1.23	-.09	1.06
Total	-1.12	.81	-.54	1.24	.59	1.18

N = 2,384.

*Scale level from -2 = strongly not agree to +2 = strongly agree.

school food lower than food at home but better than food at McDonald's, and they do not prefer to eat somewhere else. This school is a grammar school (which indicates a higher education level) with a long tradition in school meals. In contrast, the worst school is a comprehensive school, which implies a lower education level. It is also a school with a long tradition of offering school meals, but participation is obligatory for pupils in the classes 5 to 10. Thus, pupils' perception of the service quality might be influenced by the compulsion to eat at school. Possibly, this pressure, which as far as the school organization is concerned has an exceedingly positive effect, might lead to negative reaction effects (Aronson, Wilson, & Akert, 2004).

In assessing school meals, we found significant differences in age. The younger pupils (grade 5, approximately 10–11 years of age) are more satisfied and evaluate all three dimensions of service quality better than the older pupils, particularly than pupils of the age of 12–16. This target group is exceedingly dissatisfied. Surprisingly, older pupils of the age 16–19 (grades 11–13) become more and more satisfied, particularly in evaluating the quality of food. Older pupils from 16 years onward evaluate school meals as healthier and tastier. This might indicate a decreasing peer pressure and more self-confident food choice processes in school meal programs. Now the

TABLE 6. Clusters of Students as Healthiness Perceivers

Variable	Low Healthiness (30.9%)	Medium Healthiness (34.8%)	High Healthiness (34.3%)
A healthy diet is important to me.	1.17 ^a	0.91 ^b	0.91 ^b

Note: The healthiness categories shown above represent a three-way split of the sample (with approximately equal subsample sizes) based on respondents' scores on the 5-point overall perception of healthiness. Numbers are mean values based on a 5-point scale (2 = strongly agree to -2 = strongly disagree). Means with the same superscripts are not significantly different; means with different superscripts are significantly different at $p < .01$.

socialization process is at a new level and separation from adults begins to decrease.

Students' Perceptions of Food Healthiness

This section shows the results of analyzing students' perception of how healthy is the food served in the canteen of their schools. To explore such perceptions, three different observed variables were used: "the school food is very healthy," "the school food is too fat" (reverse score), and "the school lunch is fattening" (reverse score). A new construct named "Perception of Food Healthiness" was calculated for each student with the average score of the three observed variables. Then, using two tertiles, we identified three different student segments of similar size: high, medium, and low healthiness perceivers. Table 6 reports the scores of different observed variables for each of the three groups of students.

Results show that those students that perceive low healthiness in the food served at canteens are the ones that give more importance to a healthy diet. In order to identify more precisely what variables could explain the belongingness to one of the three segments, we ran several statistical tests with the demographic variables (grade, gender, type of school, etc.). The only significant association found was that between the variables "perception of food healthiness" and "type of school" ($\chi^2 = 42.9$, $df = 6$, $p < 0.01$). The main association detected was that students from private schools are more prone to perceive as healthier the food served in school canteens. This finding could mean that these students are less strict in their

evaluation of the food and/or that canteens located at private schools are indeed offering healthier food.

DISCUSSION AND IMPLICATIONS

Similar results from studies of customer satisfaction in the foodservice industry lead to the conclusion that the factors product quality, atmosphere, and customer service represent a uniform perception pattern of the customers of canteens and cafeterias. The dimensions included both tangibles (food and environment) and intangibles (interaction between pupils and kitchen staff), whereas quality of food has the highest impact on overall customer satisfaction. Furthermore, the correlation among these factors is relatively high. This suggests that there are dimensions of a higher importance, but actually only an adequate combination of all three factors leads to high satisfaction. Furthermore, customer service is of higher importance than the design of the canteen. Thus, the results of this study confirm the findings of Wall and Berry (2007) who concluded that food is the basis for assessing foodservice, and the human aspects are more important than ambient aspects. However, one great difference must be highlighted between the current study and that of Wall and Berry (2007). They used a sample of adults age 18 and older. We used a sample of children and teenagers younger than 19 years of age. We may then argue that younger food consumers follow the same structural pattern as adults, since they also assign more importance to the functional part of the foodservice experience (i.e., quality of food). Other aspects, such as the organization of the school meal programs, are less important for pupils and have no influence on customer satisfaction.

Compared with other catering institutions, the results of the school survey revealed a very poor performance. Particularly, the comparison with eating at home, which has the highest influence on the overall satisfaction, becomes increasingly negatively rated. The differences between the various schools indicate that there is a great deal of leeway on the part of the school authorities and the cafeteria management. The best school stands out, mainly because of the high opinion toward the food quality and the customer service. The pupils can also have their favorite meals there and consider themselves well taken care of. However, this school does not provide optimal

organizational requirements (for example, the pupils have to order their meals a week in advance). Still, our results confirm that these organizational aspects do not have an influence on customer satisfaction, and the perceived quality of food and the perceived customer service are of higher importance. This indicates that the best school attaches more value to service than the school which was ranked poorest. Thus, marketing activities are very important, and school meal providers should pay more attention to it. However, in order to gain reliable results in this respect, surveys in a higher number of schools will be necessary.

The construct quality of food includes items such as healthiness, freshness, aroma, and taste. These days, young adults know a lot about healthy and unhealthy food, and pupils classify fast food as unhealthy and fattening, and healthy food such as fruits and vegetables as low fat or healthy food that is high in vitamins and nutrients. Furthermore, young people associate the consumption of healthy food with eating at home with the family, while eating away from home is associated with fast food consumption with their peers. However, pupils do not know about the long-ranging consequences of a healthy diet. For children, healthy food tends to have a poor image and is considered to be more expensive, more boring, less available, less tasteful, and less convenient than fast food (O'Dea, 2003; Watt & Sheiham, 1997). Primarily, adolescents eat fast food for its taste, appearance, convenience, and its overall availability, and the consumption of unhealthy food is associated with a social distance to adults and parents and means having fun with peers, which highlights the high importance of the social context (Chapman & Maclean, 1993; Hamdan et al., 2005; Story & Resnick, 1986; Watt & Sheiham, 1997). Eating with friends includes a highly perceived control by peers. Although some pupils might prefer to eat healthy food, they tend to eat more unhealthy food to be accepted by their friends (Contento et al., 2006).

In the literature, lunch in school is considered as eating at home associated with healthy eating practices (Prattala, 1989) as well as eating away from home associated with unhealthy eating practices (Watt & Sheiham, 1997). Due to the different dimensions of customer satisfaction, the results of this study reveal that pupils equate school meals with both eating at home and eating away from home. This suggests that there are different groups of pupils with different requirements from school meals. The high standard deviations of

the different items of customer satisfaction also support this presumption. At least, this indicates different target groups with different ratings, which can be underlined by the analyses regarding the different students' perception of the healthiness of school meals. Students who pay more attention to a healthy diet perceive school meals as more unhealthy than those to whom a healthy diet is less important. Thus, there is a target group that prefers healthy food even in the peer context in schools and who expect to get a healthy diet in schools.

Both the foodservice staff and the dining ambience have a high impact on pupils' perceptions of school meals. The construct atmosphere is constructed of items such as atmosphere, feeling good, and relaxing. This indicates that the intangibles of the canteen are more important than tangibles. Indeed, the item "The canteen is hip" highlights the social importance of school meals (the "hipper" the canteen, the higher the perceived service quality). The look of the canteen is also important. Particularly older pupils have had experience in the out-of-home industry, which is appealing and suitable for the young. The behavior of the foodservice staff is also of high relevance for pupils. On the one hand, experience at home is affected by good "service" on the part of the mothers or parents. On the other, customer service in the out-of-home industry is of high relevance and might be higher than in canteens in school. Thus, the comparison between eating at home and eating away from home leads to a lower ranking of the customer service and the dining ambience in the school meals context due to the high standards at home or in the out-of-home sector.

All in all, a high service quality is necessary for a high customer satisfaction in school meal programs. Due to the increasing importance of school meal programs and their high impact on nutritional status of children and adolescents, public policy makers as well as private providers of school meals are being required to offer healthy and well-balanced school meals with reference to social processes in the food choice by young adolescents. By offering healthier snacks and communicating short-term benefits, school food can be made more attractive. In this context, school meal providers should pay more attention to service quality and marketing activities. The availability of healthy food and nutritional information can support the self-determined process of choosing healthier food. Furthermore, school is one important area for providing children and adolescents

with nutritional knowledge and skills (Frobisher, Jepson, & Maxwell, 2005). Thus, schools, educational interventions, and health care providers must provide support for developing strategies in self-confident food choices. Finally, the availability of healthy food is of high importance for its consumption (see above). The results highlight the fact that healthy food is essential for a high customer satisfaction.

Until now, neither in Germany nor in a number of several other European countries (such as Spain, Portugal, and France) do quality standards or nutritional guidelines exist for school meal programs. Policy makers have to determine acceptance standards, which should be implemented in tendering procedures. Finally, parents should support their children in making healthy choices and participating in school meal programs. At least, a higher willingness to pay will be necessary to implement a higher quality service and to set higher standards.

Limitations and Further Research

One limitation of this study is its scope. This study is characterized by a high participation rate but represents only a small study population. Thus, a further study in different regions would be helpful for confirming the results. Furthermore, the sample is characterized by a heterogeneous structure with different types of school and different school meal providers and catering systems, which might lead to inconsistent results. In order to gain reliable results in this respect, surveys in a higher number of schools will be necessary. Due to the differences in schools, it is necessary to examine the social demographic and external effects such as gender, age, type of school, reason for participation, and type of catering system in further research to reveal further influencing factors on assessing service quality in school meals. Finally, research may focus on changing habits of young adults and the social importance of peers in the school meal context.

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