Service Processes as a Sequence of Events: An Application to Service Calls

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Service Processes as a Sequence of Events:

An Application to Service Calls[1]

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Abstract

In this paper the service process is considered as a sequence of events. Using theory from economics and psychology a model is formulated that explains how the utility of each event affects the overall evaluation of the service process. In this model we especially account for the peak-and-end rule and negative consumer time preference. This model is tested in the context of telephone service calls in the financial service market. Our results show that both the average utility and the positive peak of the events positively affect customer satisfaction with the service call. Surprisingly, the end of the sequence has a negative effect. Theoretical and managerial implications of these findings are discussed.

INTRODUCTION

Service delivery processes often concern a sequence of related events occurring at different points in time. An example is the visit of an amusement park in which during the day the visitor experiences a number of attractions. Generally, it is expected that these experiences add up to the total utility of the service independent of the time of occurrence of each outcome (Loewenstein and Prelec, 1993). For the amusement park this implies that an attraction experienced at the beginning of the day adds to the evaluation in the same way as an attraction visited at the end of the day. Stated differently, the overall evaluation of the amusement park does not depend on the order in which the attractions were visited. Based on this notion service marketers are advised to aim for customer satisfaction in every service encounter (Zeithaml and Bitner, 1996)

Recently, the assumption of time independence of outcomes has been questioned in the economic and psychological literature (e.g., Kahneman, 1994; Loewenstein and Prelec, 1993). Mechanisms, such as negative time preference, imply that sequences of outcomes in which the most preferred outcome is served at the end are preferred to sequences that start with the most preferred outcome. At the same time other researchers have questioned the summation of outcomes in general. They argue that the utility provided by a sequence of outcomes is mainly determined by both the average utility of the most extreme event(s) and the utility of the event at the end of the sequence (Kahneman, Wakker and Sarin, 1997). This is referred to as the peak-and-end rule.

The evaluation of service delivery processes has been of interest to marketing and service researchers already for years. A number of studies focused on how each separate element of the service delivery process contributes to the overall evaluation of the service. For instance, Szymanski and Hise (2000) studied the effect of different aspects of e-tailing on the overall customer satisfaction with an e-tailing service. However, to our knowledge there are

no previous studies that have acknowledged service delivery processes as a sequence of events. Considering the service delivery process as a sequence of separate events can explain why certain elements in a service process have a greater impact on the overall evaluation of the service than other aspects. It can also have important implications for the management of service processes. For instance, the peak-and-end rule suggests that a positive ending of a service process is crucial. Current practices in call centers are in line with this idea, as call center employees generally are instructed to take care of a happy ending.

Despite, these arguments in favour for considering the services as a sequence of events, one could also come up with some counter arguments. Customers might value a certain aspect of the service process more than other aspects. For example, when a customer comes up with a complaint in a service call and get it resolved within the service call, he will be satisfied, despite some negative experiences in the beginning of the service call (i.e. unfriendly behavior of call center representative). Moreover, the evaluations of service processes are often linked to prior experiences and may have long lasting effects. (e.g., Boulding et al., 1993; Verhoef, Franses and Donkers, 2002). The theory on sequences of events is often based on experiments, which are not linked to prior experiences. Thus, the question is whether we can apply these theories to service processes. Despite this concern we still chose to do so in order to test the applicability of this theory to services and to possibly detect some interesting results for service marketing theory and practice.

In this paper we consider service processes consisting of a sequence of events. We study service calls between call center employees and customers of a financial service provider. These service calls are considered as a sequence of events or episodes. Based on studies in the economic and psychological literature we test how these separate episodes might affect customer satisfaction with the service call.

The structure of this paper is as follows. We first discuss theories on the evaluation of a sequence of events. Subsequently, we discuss our theoretical model. We continue with a description of our research methodology and empirical results. We end with a discussion and managerial implications.

THEORETICAL BACKGROUND

Sequences of events

According to Loewenstein and Prelec (1993) it is often difficult to consider a particular series of events as a sequence. For example, when the time between the different events is rather long, one could dispute whether this should be called a sequence. A service example might be the occurrence of different events in a customer's relationship with an insurance provider, such as claiming and paying a bill. Such events generally are separated by a relatively long time delay. Loewenstein and Prelec (1993, p. 93) argue that when outcomes are commensurable and tightly spaced, the logic for treating these events as a sequence will be more compelling. Commensurability of events refers to the fact that the events should have approximately the same characteristics or attributes. Thus, even when outcomes occur quickly after one another, they may not be considered a sequence when they have different attributes. For example, in the case of a visit to a shopping mall, shopping for groceries, fitting clothes, and visiting the bank should be considered as events with different attributes. As a result, they cannot be treated as a sequence of events.

In the literature on sequences of outcomes two evaluation modes can be distinguished. Some researchers focused on the ex ante preference formation of the sequence (e.g, Loewenstein and Prelec, 1993). In this case the utility of a sequence of outcomes was considered in advance. Other researchers investigated how a sequence of events is evaluated

ex post (that is after the occurrence of events) (e.g., Kahneman, Wakker and Sarin, 1997). The latter focuses on the experienced utility of the outcome sequence.

Preferences for Sequences of Events

Research on preferences for multiple outcomes focused on two important issues. First, researchers investigated whether consumers prefer separated or combined outcomes. Prospect theory suggests that humans prefer separation of positive outcomes, while they prefer the combination of negative outcomes (Thaler, 1980). However, Thaler and Johnson (1990) show that people also prefer separation of negative outcomes, while Linville and Fischer (1991) also could not find evidence for a preference for combining negative outcomes. Loewenstein and Prelec (1993) provided more conclusive evidence. They showed that people generally prefer separation of both positive and negative outcomes, which implies spreading of outcomes in a sequence of events.

A second important issue in research on preference formation for sequences of events concerns the preferred flow of outcomes. According to standard discounting models people should prefer the best outcomes occurring at the beginning of a sequence, because people aim to maximize the net present value of future outcomes. However, research has shown that people rather prefer sequences of events that show a positive development. For example, Loewenstein and Sicherman (1991) report that employees prefer an increasing over a decreasing wage profile, the latter having the highest net present value. This phenomenon is also referred to as negative time preference, which is considered irrational in an economic sense. Two mechanisms are believed to cause this type of preference: (1) savouring and dread, and (2) adaptation and loss-aversion. Savouring (dread) refers to the fact that people derive positive (negative) utility from anticipating a future event. For example, knowing that they will go on a summer holiday, people can already derive pleasure in advance. Adaptation

means that people get used to a certain stimulus level. New stimuli will be considered as either positive or negative deviations from the adaptation level. As people generally prefer gains with respect to the current adaptation level (Tversky and Kahneman, 1991), the new adaptation level tends to be higher than the previous one. Hence, people generally prefer improvements over time. Read and Powell (2002) provide some additional reasons for the preferences of a positive development in the sequence: appropriateness, people's expectations and convenience. Although people have a negative time preference for the development of outcomes, research also shows that people prefer a fast improvement over a slow improvement of outcomes (Hsee and Abelson, 1991).

Evaluation of Sequences of Events

Kahneman, Wakker and Sarin (1997) distinguish two types of experienced utility: instant utility and remembered utility. Instant utility is the pleasure or distress felt at a particular moment. Remembered or retrospective utility is defined as the retrospective evaluation of a temporally extended outcome (Kahneman, 1994). Each event in a sequence provides an instant utility to a consumer. If one evaluates the total sequence of events, one focuses on remembered utility. Remembered utilities have an adaptive function, as they determine whether a situation experienced in the past should be approached or avoided (Kahneman, Wakker and Sarin, 1997). Usually, it is assumed that the remembered utilities of a sequence of events equal the sum of the instant utilities of all events. This implies that the remembered utility can be predicted best with the average value of these instant utilities. However, recent research from Noble price winner Daniel Kahneman and his co-authors showed that this is often not true.

The remembered utility of a sequence of events is accurately predicted by averaging the peak (most intense value) of instant utility recorded during an episode and the instant

utility recorded near the end of a sequence of events. This rule is referred to as the peak-and-end rule (Kahneman, Wakker and Sarin, 1997). Evidence for this rule has been gathered using experiments in which participants were exposed to unpleasant experiences, such as watching aversive movies, undergoing a colonoscopy in a hospital and immersing a hand to the wrist in cold water (e,g., Fredrickson and Kahneman, 1993; Kahneman et al., 1993; Redelmeier and Kahneman 1996).

The peak-and-end rule has two consequences. First, the remembered disutility of a bad episode can be reduced with the addition of an extra period of somewhat less discomfort that reduces the peak-end average. For example, Kahneman et al. (1993) showed that individuals exposed to an unpleasant episode, which was followed by a shorter less unpleasant episode, had higher remembered utilities than individuals exclusively exposed to the unpleasant event. A second consequence of the peak-end rule is duration neglect, which implies that the duration of experiences has little or no independent effect on the individual's remembered utility.

In line with the peak-and-end rule the well-known recency effect also predicts that the last outcome of a sequence of events should be the most prevalent in the evaluation process (Anderson, 2000). This effect assumes that the last event should be the most salient. In practice this effect is often used to instruct service employees to create a happy ending of a service experience.

Combining theories

Ariely and Carmon (2000) combine the insights from the literature on the preferences for sequences of outcomes and literature on the evaluation of sequences of outcomes. In a hospital study patients rated the pain every hour. These pain ratings were related to the evaluation of the overall pain. In their model they included the end pain rating, the slope of

the pain ratings, the peak of the pain ratings and the average of the pain ratings. Their results showed that both the end and the slope had a significant positive effect on the overall evaluations, while the peak and the end did not affect this evaluation. In our model we will follow the approach of Ariely and Carmon (2000) and apply it in a service setting. Note, furthermore that we also extend the model with the inclusion of the minimum peak in the sequence.

EVALUATION MODEL FOR SEQUENCES OF SERVIC E EVENTS

Based on the above theories, we develop models that explain customer i's experienced utility of a sequence of events of a particular service (μ_i). As noted, standard thinking in services research and economics, assumes that μ_i can best be predicted by the average instant utility of the outcomes (u_n) during the service process by customer i. We define the average instant utility of service elements, μ_i, for individual i as:

$$m_i = \frac{1}{N_i}\sum_{n=1}^{N_i} u_{n,i} \qquad (1)$$

with N_i the number of events occurring in the sequence. Our first model only includes the averaged instant utilities as an explaining variable and is formulated as follows:

$$u_i = b_0 + b_1 * m_i + x_i \qquad (2)$$

with β the quantified effects, and ξ a normally distributed error term.

Subsequently, we account for the peak-and-end rule, i.e., the implication that the experienced utility of a sequence of events is accurately predicted by the instant utilities of the

peaks and the instant utility at the end of the sequence ($EndU_i$). The peaks in the sequence include both the minimum ($MinU_i$) and maximum values ($MaxU_i$) of the instant utilities of the outcomes in the sequence. Note, that the inclusion of the instant utility of the end of the sequence is also in line with the theory on recency effects. Including the above terms, equation (2) becomes:

$$u_i = b_0 + b_1 * m_i + b_2 * MaxU_i + b_3 * MinU_i + b_4 * EndU_i + x_i \qquad (3)$$

Our final model also accounts for preferences regarding the trend in the sequence of events. Thereby, we focus on the finding that people prefer a positive development of events over time. This positive development is measured by estimating a separate regression of instant utility of each outcome on its timing in the sequence. The resulting regression coefficient (γ_i) is used as a measure of the development of the instant utilities of the outcomes in the sequence. Including the trend parameter in (3), our final model becomes:

$$u_i = b_0 + b_1 * m_i + b_2 * MaxU_i + b_3 * MinU_i + b_4 * EndU_i + b_5 * g_i * + x_i \qquad (4)$$

Based on the above theories, we expect that the estimated coefficients β each have a positive sign.

In line with prior research in the satisfaction and service literature, we use satisfaction with the service as a measure of experienced utility (Anderson and Sullivan, 1991; Bolton, 1998).

RESEARCH METHOD

Context

The context of the study is a service call center in a financial service market. Customer service call centers have been the most important medium for customers to communicate with companies in the last ten years (Anton, 2000). Hence, call centers are an important instrument in a firm's Customer Relationship Management (CRM) (Winer, 2001). Many firms use call centers as focus of their customer satisfaction strategy (Feinberg et al., 2000). As a consequence, the customer's evaluation of a service call is rather important. This becomes even more prevalent from a CRM perspective, as empirical evidence shows that satisfied customers are more loyal (Bolton, 1998) and thus generate more profits during their lifetime.

Data Collection

During two months in the beginning of 2001 inbound service calls of a large European financial service provider were selected. The following selection criteria were used:

(1) Service calls should be calls with existing customers of the financial service provider (not prospects);

(2) There should be enough variation in the topics of the service calls;

(3) Service calls that were very emotional (angry etc.) were not selected, because the investigation might have harmed the customer's relationship with the company further;

(4) Each customer was selected only once;

(5) A maximum of five service calls per agent was allowed;

The selection occurred after each working day. The customers of the selected service calls were approached with a short telephone questionnaire during the evening of the same day. The minimal time interval between the service call and the questionnaire was one hour. The questionnaire measured the customer's evaluation of the service call. This resulted in 98 usable service calls with its accompanying questionnaires.

Sample Description

In line with the age of the customer population of the financial service provider, the average age of the respondents was approximately 40 years with a minimum of 21 and a maximum of 84 years. The majority of the respondents had at least high school education (82%), and 34% had at least a bachelor degree. An explanation for the relatively high percentage of highly educated people is that this financial institution focuses on wealthy people in its marketing strategy. The average duration of the service calls was 208 seconds. In line with our selection criteria, the topics varied among the service calls. In total the service calls considered 31 topics, the most frequent of which were the arrangement of money transfers and the provision of balance information.

Measurement

The evaluation of the service call was measured using two five-point scales with the following adjectives: very unpleasurable – very pleasurable; very dissatisfied – very satisfied. These questions were based on Oliver and Swan (1989) and Crosby and Stephens (1987). The reliability coefficient alpha of these two items was .82 ($r = 0.71$, $p < 0.01$).

For the measurement of the instant utilities in the service calls, the service calls were divided into episodes. The division into episodes was based on the topics covered in the call. For example, when a customer both asked for account information and reported problems

with his/her bankcard, this was considered as two separate episodes. In most cases also the introduction and the ending of a call were considered as separate episodes. Using this methodology, we did not follow the approach used by Doucet (1998), who considered each time period the same person was speaking as a separate episode. We have chosen our methodology, because this division is more in line with how customers would categorize different events. It is also in line with prior research in service marketing, where different elements of the service process (i.e., ordering, payment and delivery of products by e-tailer) are considered as separate parts of the service. [i]

Subsequently, for each episode instant utilities were measured as follows. The words of each customer used in the conversation with the service representative were scored using the Dictionary of Affect in Language (Sweeney and Wissel, 1984). Positive words, such as "friendly" obtained a high score, while negative words, such as "worried" obtained a low score. The minimum that could be obtained is 1, while the maximum score was 3. For each episode the scores were averaged. This way, an indication of episode utilities was obtained that was independent of the customer's experienced utility of the conversation.

EMPIRICAL RESULTS

Descriptive Analysis

Table 1 shows the averages and standard deviations for the variables concerned. The averaged episode utilities of the service calls equalled 2.39. The average utility varied between 1.77 and 2.69. As expected, the mean minimum instant utility (MinU) lied well below the average utility, while the mean maximum instant utility (MaxU) exceeded the average utility. The average utility of the last episode (EndU) was 2.51, somewhat higher than the average utility (μ). The trend coefficient γ indicated that the instant utilities increased during the service call

in general. Note, however that this was only a slight increase and that the average value was 0.045 with a standard deviation of 0.10. Finally, most customers were rather satisfied with the service call, given the average value of 4.27 on a five-point scale.

-- Insert Table 1 about here --

Table 1 also provides the correlation coefficients between the variables. The correlation coefficients were rather high with values between .09 and .68. These high correlations can be explained by the fact that episode utilities interacted with one another, while also some independent variables were to some extent based on others. For example, the average value of the instant utilities (μ) of the episodes was based on MaxU, MinU, EndU and the utilities of other episodes. Furthermore, there were significant positive correlations between satisfaction and μ, and satisfaction and MinU, while there was a significant negative correlation between the trend parameter (γ) and satisfaction.

Regression Analysis

After deleting two outliers, we estimated equations (2), (3) and (4) with OLS regression analysis. The estimation results are shown in Table 2. To assess whether the model fit increased significantly we used Wald tests, in which we compared the F-values of the restricted models with the less restricted (or extended) model (Pindyck and Rubinfeld, 1998). The high correlations between the independent variables might suggest possible multi-collinearity problems in our regression analysis. We computed VIF-scores to assess the presence of multi-collinearity[ii]. In our most extended model, the maximum VIF-score was 4.3. As this score was below 6, multi-collinearity did not severely affect our regression results (Hair et al., 1998). Furthermore, μ remained significant in equations (2) and (3) despite the

inclusion of other correlated variables. This is also an indication that multi-collinearity was not problematic (Leeflang et al., 2000).

-- Insert Table 2 about here --

Equation (1) only included a constant and the averaged utilities of the separate episodes (μ). This model explained approximately 5% of the variance and was significant (p=.03). The estimated coefficient for the averaged utilities was positive and significant (p=.03). The addition of MaxU, MinU and EndU in equation (2) led to a significant improvement in the model fit (p=.02) according to the Wald-test. The R^2 of the extended model was .149. The coefficient for MaxU was positive and significant (p=.03). No significant coefficient was found for the effect of MinU (p=.33). Surprisingly, a significant negative coefficient (p=.01) was found for EndU. Note that the coefficient for the average utility (μ) remained significant (p=.04). Thus, both the averaged utilities of the episodes in the service call and the positive peak explained the experienced utility of the service call. In the final model the trend parameter (γ) was included. The model fit did not increase significantly (p=.64). This was reflected in the very small increase of R^2, valued at .151. The regression coefficient for γ was positive but not significant. The significance of the other explanatory variables was almost the same as in (3).

DISCUSSION

In this paper a service process was considered as a sequence of events. Based on highly valued economic and psychological theories on the evaluation of sequences of events we developed a model that was tested in the context of service calls in the financial service market. To our knowledge service processes have never before been treated as a sequence of

events. Researchers in economics and psychology only refer to it as possible application areas of their theories (e.g., Ariely and Carmon, 2000). Moreover theories concerning the evaluation of sequences of events have never been used in service marketing research.

According to the peak-and-end rule one would predict that both the peaks and the end of the service call would mainly affect the evaluation of the service call. Our results were not fully in line with this prediction. However, our results do support that specific service processes can be considered as a sequence of events. In contrast with the peak-and-end rule our results showed that the average utility of the service call was a significant predictor of the experienced utility. In addition, the positive peak (MaxU) of the sequence had a positive effect on the experienced utility. This effect is in line with prior research on sequence of events (e.g., Ariely and Carmon, 2000). However, the negative peak (MinU) had no effect. To some extent, the latter finding contradicts traditional theories in service research, which stated that negative deviations should have a stronger effect than positive deviations (e.g, Anderson and Sullivan, 1993; Antonides, Verhoef and Van Aalst, 2002). Surprisingly, we found a negative effect of the end utility of the service call on customer satisfaction. This result is difficult to explain and contradicts with prior research (Ariely and Carmon, 2000). Perhaps it is due to the fact that service calls usually have a happy ending, because representatives are instructed to act this way. Consequently, customers may discount the happy ending, leading to less pleasant experiences. Furthermore, customers may feel obliged to end the call in a nice way. Then, when they think of the call in retrospect, they become relatively dissatisfied. This reasoning implies that a routinely applied happy ending strategy might have negative consequences.

We did not find evidence for a positive trend effect in the sequences. We explain this as follows. First, the time period of the sequence of events was rather short, compared with time periods in earlier research. In this short time period, people may not have cared much

about the development of the episode utilities. Second, the positive trend hypothesis has been tested mainly with preferred sequences of utilities instead of experienced utilities. In this research we focused on the experienced utilities.

MANAGEMENT IMPLICATIONS

Our research suggests that service managers should think of service processes as sequences of events. This especially holds for services, which cover a relatively short time period and consist of rather related events or episodes. In the management of these processes managers should be aware that satisfaction is not created solely by the average quality of the events in the service process. Satisfaction can be further enhanced with the provision of a positive peak experience. Our research also indicates that managers should be careful in using happy-ending strategies. Probably customers are aware of these strategies and become dissatisfied when they experience happy endings as standard routines. Endings should probably be more in line with the overall 'tone' of the telephone conversation.

RESEARCH LIMITATIONS AND FURTHER RESEARCH

This research has the following limitations. First, we only considered service calls as an example of a service process that can be considered as a sequence. Future research might consider other contexts. Second, our sample was rather small. However, the effort involved in measuring the instant utilities of the service calls did not allow us to include more cases. Third, our research concerned customers of only one financial service provider. Future research could be extended to other industries as well as to other service providers.

Besides the future research topics that arise from our research limitations, we also have some additional avenues for future research. First, future research may focus on the conditions in which a negative end effect in service sequences occurs. Second, in this research

we focused exclusively on customer experiences. Future research might also consider the agent's experience and interactions between agents and customers. It would be especially interesting to study how customers react to different agents and how agents react to different customers. Finally, future research might consider how the evaluation of sequences of events affects customer loyalty. This issue is especially interesting in the light of the increasing attention for customer relationship management (Hogan, Lemon and Rust, 2002).

Finally, based on the results of this research we believe that there is value in the use of the theories of sequences of events. However, as our study concerns only one specific application, we hope that this study will be able to stir up service research thinking and research on this very interesting topic.

Table 1

Averages, Standard Deviations and Correlations

			Pearson Correlation Coefficients					
	Average	**Standard Deviation**	m	**MaxU**	**MinU**	**EndU**	g	**Sat**
m	2.39	0.20	1.00					
MaxU	2.66	0.18	.18*	1.00				
MinU	1.83	0.48	.68**	.55**	1.00			
EndU	2.51	0.11	.52**	.28**	.50	1.00		
Trend (g)	0.04	0.10	–.52**	.09	–.51	.24**	1.00	
Sat	4.21	0.55	.24**	.15	.23**	–.81	–.22**	1.00

Notes:
* $p < .10$
** $p < .05$

Table 2

Estimation Results Regression Analysis

		Equation (2)		Equation (3)		Equation (4)	
		Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	(β_0)	2.71	3.83**	4.44	3.14**	4.65	3.12**
μ	(β_1)	0.65	2.20**	0.88	1.83**	1.04	1.75**
MaxU	(β_2)			0.68	1.91**	0.67	1.86**
MinU	(β_3)			0.08	0.44	0.08	0.47
EndU	(β_4)			-1.68	-2.65**	-1.92	-2.36**
γ	(β_5)					0.38	0.48
F-value (d.f.)		4.85** (1,91)		3.80** (4,87)		3.06** (5,86)	
R^2 (Adj. R^2)		0.051 (0.041)		0.149 (0.110)		0.15` (0.102)	

Notes: p <.10; ** p ≤ .05

Only for β_4 a two-sided p-value is reported, because the coefficient sign contrasts our expectations

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ENDNOTES

[i] Despite, the arguments in favour of our method, we also divided the service calls in episodes using the approach of Doucet (1998). Using this method, we do not find any significant effects of the variables considered. Considering each time period the same person was speaking as a separate episode appeared to be meaningless in explaining customer satisfaction with the call.

[ii] An indicator of the effect the other predictor variables have on the variance of a regression coefficient, it is directly related to the tolerance value ($VIF_i=1/R_i^2$). Large VIF values also indicate a high degree of multicollinearity among the independent variables (Hair et al., 1998).

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