인지적 크로노 에쓰노그래피:서비스 이용자의 의식적□무의식적 행동선택의 이해방법

Cognitive Chrono-Ethnography: A Method for Understanding People's Conscious and Unconscious Behavioral Selections while Receiving Services

Muneo Kitajima

National Institute of Advanced Industrial Science and Technology (AIST)
Center for Service Research

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1. INTRODUCTION

Our 24-hour day is roughly divided into three categories; the hours for work, the hours for biological activities, and the hours for leisure activities. Recently, with the development of ICT, many leisure-time opportunities have been provided by a number of service industries. Whether to use the service repeatedly or quit using it is solely up to the receptor of service, and the decision is not critical. However, since our ultimate purpose of living is to spend hours of satisfaction, provision of appropriate services to an individual receptor is of vital importance.

Part of our behavior is conscious but the rest is unconscious. Conscious behavior is controlled by rational processing system, whereas unconscious behavior is controlled by experiential processing system. Table 1 summarizes the differences between these two processing systems. Rational system is analytic, and therefore analytical method can be applied to understand conscious human behavior. On the other hand, experiential system is holistic. Therefore such method as Kansei-engineering is appropriate to understand unconscious human behavior. However, since service is intangible, heterogeneous, simultaneous in production and consumption, and perishable, conscious and unconscious behavior might occur simultaneously while receiving service. The purpose of my presentation is to introduce a new method for studying service receptors' conscious and unconscious behavioral selections while receiving service, "Cognitive Chrono-Ethnography," CCE in short, that has been developed by our group.[1]

Table 1. Two processing systems

Experiential Processing System	Rational Processing System
Pleasure-pain oriented: What feels best now	Rationally oriented: What yields the greatest net benefits
Connections determined by the principals of classical conditioning	Connections determined by the principals of logic
Has a long evolutionary history and operates in animals as well as humans	Has a brief evolutionary history, operates through language
Holistic	Analytic
Encodes reality in concrete images, metaphors and narratives	Encodes reality in abstract symbols, words and numbers
Rapid processing: Oriented toward immediate action	Slower processing: Oriented toward future action
Slow to change: Change requires repetitive or intense experience	Rapid to change: Changes with the speed of thought
Experienced passively, outside of conscious awareness [one is seized by one's emotions]	Experienced actively and consciously [one intentionally follows the rules of inductive and deductive reasoning]
Certainty is self-evident [seeing is believing]	Certainty requires justification via logic and evidence
Perception, motivation, and behavior are state dependent	The principles of logic are independent of local state

[1] The content of this manuscript is based on the paper submitted to the Human Factors and Ergonomics Society 54th Annual Meeting (2010) (Kitajima, Nakajima, Toyota, submitted).

2. COGNITIVE CHRONO-ETHNOGRAPHY

2.1. Outline of CCE

CCE consists of ethnographical field study that is designed by considering cognitive constraints in order to understand service receptors' behavioral selections in terms of their chronological development. In the following subsections, I will describe each of the three concepts of CCE, *i.e.*, Ethnography, Chrono(-logy), and Cognitive constraints, in this order.

2.1.1. Ethnographical field study

By definition, service is consumed at the place where it is provided and at the time when it is produced. Therefore the study must be conducted at the site where a service is implemented, not in a laboratory. In other words, the study method must be *ethnographical*.

2.1.2. Chronological understanding

What a person does at a specific moment is determined by contents loaded in working memory, which originate from the immediate environment and long-term memory. Sensory input from the environment is controlled by cognitive processes. Long-term memory cumulatively stores information as a person's living history and works as an autonomous system. Therefore, understanding the service receptors' behavior in the study field involves the following aspects:

1) Understanding active memories when they receive the service at the time of the observation, and
2) The developmental process of the active memories in their service-receiving histories.

In other words, the understanding of service receptors' behavior will be a *chronological* understanding. In CCE, a series of retrospective interviews will be conducted to analyze the memory structure.

2.1.3. Cognitive constraints

Service receptors engage in cognitive-behavioral processing. Therefore, ethnographical observables are constrained by service receptors' cognitive capabilities. This feature is described by the Model Human Processor with Real-Time Constraints (MHP/RT) (Toyota and Kitajima, 2010; Kitajima and Naitoh, in press) that extends the seminal "Model Human Processor" (Card, *et al.*, 1983) for simulating people's information processing tasks in the domain of daily activities by incorporating such ideas as long-term memory as an autonomous system, sophisticated goal management for pursuing satisfactory living, and real-time constraints to organize behavior synchronously with the environment.

Cognitive constraints include the following:

1) The capacity of working memory is limited,
2) The contents stored in working memory decays, *e.g.*, at the rate of two of three items in 10 seconds,
3) Memory is bound to the context in which it was formed, *i.e.*, encoding specificity principle,
4) Contents in long-term memory are retrieved by placing cues in working memory, and
5) Behavioral selection is not rational but controlled by *bounded rationality* and *satisficing principle* (Simon, 1996).

Ethnographical field observations must be designed by considering these cognitive constraints that should affect the service receptors' behavior. In addition, retrospective interviews for chronological understanding of the service receptors themselves are also regarded as cognitive-behavioral activities; thus, it is necessary to design the interview sessions by considering the abovementioned cognitive constraints.

2.2. CCE's Procedure

2.2.1. Step 1. Define the study field

It is important to specify the study field sufficiently to undertake successful CCE studies. Manifestations of cognitive constraints under the characteristic atmosphere of the study field will be observed in the study field.

2.2.2. Step 2. Define critical parameters

Critical parameters are initial hypotheses about the cognitive constraints that should work when service receptors' activities are organized in the study field. To do

this, it is necessary to examine the structure and dynamics of the study field in order to ensure the existence of chronological changes of the service receptors and construct hypotheses about the critical parameters, and then carry out a preliminary test.

Steps 1 and 2 are conducted interchangeably to define the parameter space to be explored.

2.2.3. Step 3. Select elite monitors

The question of a study would be *what such-and-such service receptors would do in such-and-such way in such-and-such circumstance?* Therefore, monitors of a study, *elite monitors*, might be selected by consulting the parameter space. Monitor selection is conducted by purposive sampling rather than by random sampling.

2.2.4. Step 4. Record the monitors' behavior

The elite monitors are expected to behave as they normally do at the study field. Their behavior will be recorded in such a way that the collected data is rich enough to consider the results in the parameter space, as unintrusively as circumstances allow.

2.2.5. Step 5. Conduct retrospective interviews

A series of structured interviews will be conducted to clarify the structure of the memory structure of the elite monitors. The data collected in Step 4 will be used in the interview sessions. The results of the interviews are analyzed for the purpose of defining the basis of the representations of the collected data.

2.2.6. Step 6. Construct models of service receptors

The last step of CCE is to construct models of service receptors that address *what such-and-such service receptors do in such-and-such a way in such-and-such circumstances.*

3. A CASE STUDY OF CCE: WHY DO FANS REPEAT VISITS TO BALLPARK?

This section describes a case study of CCE. The field of study was the ballpark of a Japanese professional baseball team, the Hokkaido Nippon-Ham Fighters. This study focused on the repeat visiting behavior of loyal fans of the Fighters. The specific study questions are shown in Fig.1, "*Why do loyal fans repetitively visit Sapporo Dome to watch professional baseball games?"* and *"How have they evolved to their current status of loyal fans?"*

This project[2] was started at the beginning of the 2008 regular season for the purpose of establishing a set of hypotheses concerning the processes of developing repeaters who attend games hosted by the Hokkaido Nippon-Ham Fighters at Sapporo Dome.

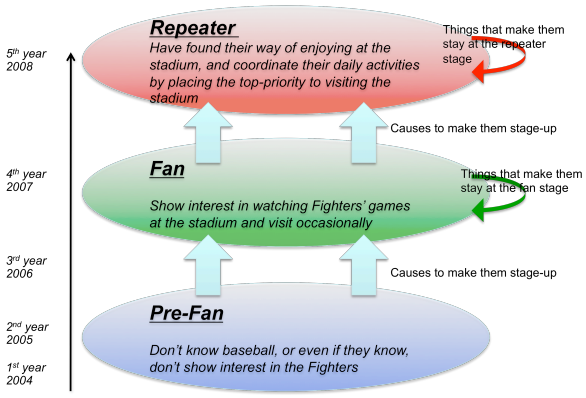

Figure 1. Evolution of fan loyalty.

3.1. Field Observation and Interviews

The following approach was taken for this study.

3.1.1. Selection of elite monitors (CCE-3)

Following a Web survey, nine highly loyal fans were recruited from the Fighters' fan club members. They had different attitudes towards professional baseball, cheering, and merchandising, and had visited Sapporo Dome several times. They were supposed to represent different "fan styles" and had different histories in reaching their current fan status.

3.1.2. Field observation (CCE-4)

The elite monitors were asked to visit Sapporo Dome three times to watch designated Fighters-hosted games.

[2] This research was entrusted by the Ministry of Economy, Trade and Industry (METI).

The following data were recorded: their viewing behavior by using a DVD camera recorder located three rows in front of the monitors' seats to capture their game-viewing behavior, the scene they were viewing by installing a small ear-mounted CCD camera, their vocalizations with a pin microphone, and their physiological responses to the events of the game by using an electrocardiograph and an accelerometer.

3.1.3. Retrospective interviews (CCE-5)

Structured interviews were conducted after each visit to Sapporo Dome. In the interviews, the behavior records, the viewing-scene records, and the broadcasted TV video of the game for the characteristic events, including scoring scenes, field events between innings, and events for which the monitors exhibited remarkable changes in physiological data were replayed. The purpose of the first interview was to understand how they enjoyed the game. The purpose of the second interview was to understand how they developed their loyalty from the pre-fan stage several years ago, to the fan stage a few years ago, and then to the current repeating stage. The purpose of the third interview was to understand what triggered the state changes and what factors helped them retain each fan stage (see Fig.1).

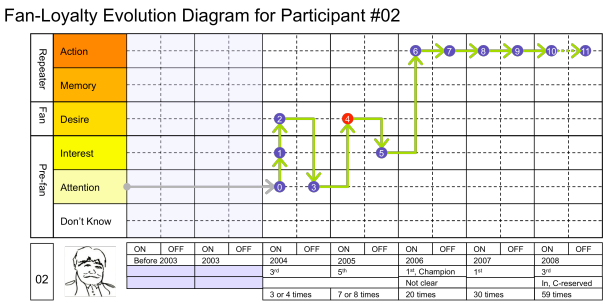

Figure 2. An example of fan loyalty evolution diagram.

3.1.4. Construct fan loyalty evolution model (CCE- 6)

The results of interviews were summarized as fan-loyalty evolution diagrams. They represented in detail how individual monitors had evolved their loyalty by specifying triggers for stage changes, circumstances that made them stay at a particular stage, and activities in both the regular season and in the off-season. An example fan loyalty evolution diagram is shown by Fig.2.

3.2. Developmental Processes of Repeaters (CCE-6)

The nine diagrams were collapsed to derive a model of developmental processes of repeaters as shown by Fig.1.

3.2.1. From the pre-fan stage to the fan stage

Three cases were found.

1) *Retirement of a star player* and *expectation of league championship.* In the 2006 regular season, two events triggered three monitors who had little knowledge about professional baseball and another three monitors who had knowledge about professional baseball but did not have enough interest in it to progress to the fan stage. One event was an announcement by the then-star player, outfielder Tsuyoshi Shinjo, that he was retiring, relatively early in the regular season. This news was reported frequently in various media. The other event was that the Fighters were in the first championship race of the league and Japan's professional baseball leagues.

2) *Watch the fans cheering.* Two monitors who had little knowledge about professional baseball and one monitor who had little interest in professional baseball advanced to the fan stage after watching live cheering.

3) *Know the players and the team* and *unexpected talent of players outside baseball.* Regardless of their knowledge level of professional baseball, knowing players and the team triggered monitors to progress to the fan stage. Three monitors who knew professional baseball reacted to the players' behavior outside baseball, causing them to advance to the fan stage.

3.2.2. From the fan stage to the loyal-fan stage

Ten cases were found.

1) *Watching live games at the stadium.*

2) *Knowing the rules of baseball and the team.*

3) *Watching games by oneself*, *one's wife became a fan by following his lead*, *communication with his/her friends at the stadium*, or *meeting persons who visited the stadium*. The common feature of these triggers is the establishment of an environment where fans could comfortably watch the games with someone who contributed to building a relationship with them.

4) *Presence of players who always come to mind*. The monitors who had little knowledge about baseball or professional baseball, those who were fans of other professional baseball teams, and those who became fans at the end of the regular seasons tended to find opportunities that should provide information about players, teams, and the Fighters in particular. They were eager to attend off-season events such as talk shows and advanced to loyal fans in the next regular season.

5) *Collecting the Fighters' goods*.

6) *Recording events of live games and/or collecting the recordings as proof of watching the games.*

7) *Expectation of the climax series and the Nippon series*, and *eagerness to watch those series*.

8) *Communication with the other fans when watching live games*.

9) *Network community* that they accessed during live games to exchange information and post opinions.

10) *Seeing the players closely*, and those who had special interest (or who followed pro-baseball) said that their greatest interest was in seeing live action on a professional field.

4. CONCLUSION

My presentation introduced a new study method, CCE, to understand people's heterogeneous daily activities. Simon (1996) stated as follows: *An ant [a man], viewed as a behaving system, is quite simple. The apparent complexity of its behavior over time is largely a reflection of the complexity of the environment in which it finds itself*. The apparent complexity, or heterogeneity, of man's leisure activities will be resolved once we appropriately frame the study field by considering cognitive constraints. CCE is an effective way of dealing with people's daily activities, stemming from the simple mechanism of daily behavioral selections, MHP/RT.

The case study revealed histories of nine elite monitors, which demonstrated how they moved through the fan stages, from the pre-fan stage to the fan stage and ultimately to the loyal-fan stage. Three features were identified that motivated monitors to advance from the fan stage, and ten features that motivated them to advance from the fan stage to the loyal-fan stage. These features should suggest possible paths that potential loyal fans follow and should provide valuable hints for designing efficient fan services that help potential fans comfortably progress to the loyal-fan stage. These fan services would be regarded as CCE-based service designs that provide people more satisfactory leisure times.

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