

# Cognitive Chrono-Ethnography as a Methodology for Defining People's Future Needs and Its Application



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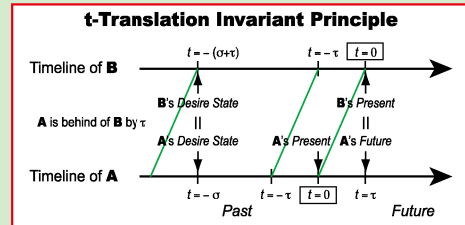
**Abstract:** This paper describes how people's future needs are derived by applying Cognitive Chrono-Ethnography (CCE), a study methodology for understanding people's *in situ* behavior selections in daily life. CCE starts by defining critical parameters for understanding people's behavior by considering the nature of behavior selection processes in the field in question, and then designing ethnographical field observations. The participant's behavior is recorded, followed by a series of structured retrospective interviews. Analysis of the interview results aids in developing models of present behavior selections and their chronological changes in the past. This paper claims that these models should serve as defining future needs of persons who would follow the same developing paths with a certain amount of time delay. This paper illustrates a CCE study of spectators of baseball games at a ballpark who have become frequent visitors in 5 years to show the utility of CCE for defining people's future needs.

## Publications

- Kitajima, M., & Toyota, M. Decision-making and action selection in Two Minds: An analysis based on Model Human Processor with Realtime Constraints (MHP/RT). *Biologically Inspired Cognitive Architectures*, 5, pp.82-93, 2013
- Kitajima, M., & Toyota, M. Simulating navigation behaviour based on the architecture model Model Human Processor with Real-Time Constraints (MHP/RT). *Behaviour and Information Technology*, 31, 1, pp.41-58, 2012
- Kitajima, M., Tahira, H., Takahashi, S., Midorikawa, T. Understanding tourist's *in situ* behavior. A Cognitive Chrono-Ethnography study of visitors to a hot spring resort. *Journal of Quality Assurance in Hospitality and Tourism*, 12, pp.247-270, 2012

## Defining People's Future Needs

The straight-forward question for identifying people's future needs would be "What do you want in the near future?" However, it is inherently impossible for people to provide reliable answers to this question because they will not be able to see accurately the state of the future world where their needs will be satisfied. Therefore the concept *future needs* should be regarded as the concept inaccessible to those who are asked to express it at the present time. Since it is inherently impossible for a person to express his/her future needs reliably and accurately, a methodology for defining



future needs should inevitably derive the person's future needs from outside of the person, e.g., from the other persons.

## Make inaccessible future needs accessible

A person has moment-by-moment desire for spending satisfactory and happy times in his/her living environment. Each person has his/her own unique living history. The personal history is stored in his/her long-term memory and significantly influences his/her way of reacting to his/her current environment with the given desire. What he/she wants to achieve at present can be considered as his/her present needs and what he/she will consider at a certain time in the future, he/she wants to achieve given the present needs are satisfied can be considered as his/her future needs, which are not accessible at present. We want to know them without directly asking him/her what he/she thinks his/her future needs are.

Consider the case where A is behind of B with the amount of time,  $\tau$ , in terms of the change of desire-state. In this scheme, defining future needs of A during the period spanning from the present,  $t = 0$ , to the future time,  $t = \tau$ , reduces to revealing the history of desire-state of B from the past time,  $t = -(\sigma + \tau)$ , to the present,  $t = 0$ . This paper suggests that this scheme should be called the **t-Translation Invariant Principle** for making inaccessible future needs of a person accessible to those who want to understand and use the person's future needs at the present time.

## Baseball Spectators' Future Needs

A CCE study started at the beginning of the 2008 regular season of Japan's professional baseball pennant race 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.

The case study revealed histories of nine elite monitors, which demonstrated how they moved through the fan stages. We identified features that motivated participants to advance from the fan stage, and those 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 define possible their needs when they are at the pre-fan stage and those when they are at the fan stage in the future.

## Cognitive Chrono-Ethnography (CCE)

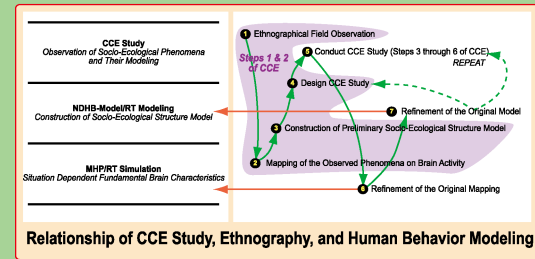
CCE deals with a person's moment-by-moment decision-making process in the real environment for the purpose of understanding chronological development of his/her interaction with the environment for him/her to achieve his/her desire.

### How to Conduct a CCE Study

**Step 1:** For a given study field, CCE starts with constructing hypotheses concerning how a person interacts with the current environment with a given desire through careful observations of the study field to specify it sufficiently.

**Step 2:** Then perform qualitative simulations of person's behavior in the specified field running on a cognitive architecture, such as MHP/RT. The hypotheses in CCE are typically about critical parameters that should be useful for analyzing people's behavior in the domain in question.

**Step 3:** The respective critical parameters may take several values and therefore each individual in the study field will be associated with a specific combination of values of critical parameters and their distinctive behavior will be associated with the specific combination of the values of the critical parameters. Study participants (elite monitors) are selected for field observations to follow. The study question is "what such-and-such people would do in such-and-such a way in such-and-such a



Relationship of CCE Study, Ethnography, and Human Behavior Modeling

circumstance." Therefore, elite monitors are selected by consulting the parameter space. In this process, it is necessary that the points in the parameter space are appropriate for analyzing the structure and dynamics of the study field.

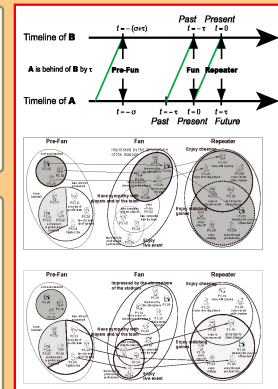
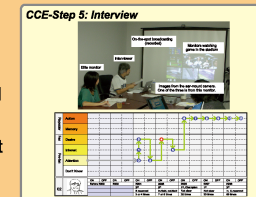
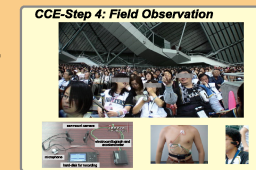
**Step 4:** Observational studies will be designed by referring to the critical parameters in order to better understand behavior of the people who are characterized by a specific combination of the values. The elite monitors are expected to behave as they normally do in the study field.

**Step 5:** The collected data are used to clarify the structure of the memory of the elite monitors by conducting a series of structured interviews.

**Step 6:** The last step of CCE is to construct models that address "what such-and-such people would do in such-and-such a way in such-and-such a circumstances."

The t-Translation Invariant Principle could be applied for the fans of the professional baseball team as follows. In the case study, the trajectories of the elite monitors from 2004 through 2008 could be considered as typical developmental paths from their pre-fan stage, to their fan stage, and ultimately to their loyal-fan stage. The common triggers were identified for developing from the pre-fan stage to the fan stage, and from the fan stage to the loyal-fan stage. The principle claims for a fan's future needs as follows, if we go back to the year of 2008:

about baseball?", "do you know about professional baseball?", "do you purchase tickets for watching professional baseball game at the stadium", would be useful to classify a fan into the fan similar to those shown by the figure.



A fan at his/her pre-fan stage now, the year of 2008, whose attitudes towards the professional baseball team are the same as one of the elite monitor's, say E, will take the same developmental path from 2008 through 2012 as E has taken from 2004 to 2008 given the appropriate triggers are to be provided to him/her timely.

As shown by the figure to the right, the developmental paths of the nine elite monitors depended on their attitude toward the professional baseball team when they had been in the pre-fan stage. This suggests that questionnaires concerning their attitudes toward professional baseball, e.g., "do you have knowledge

## CCE-Step 6: Modelling

