Diagramming Lifestyle by Haptic Mapping of Common Objects; Health Education Method for Visually Impaired

Presentation for annual meeting of
American Educational Research Association,
Chicago, IL, April, 2007

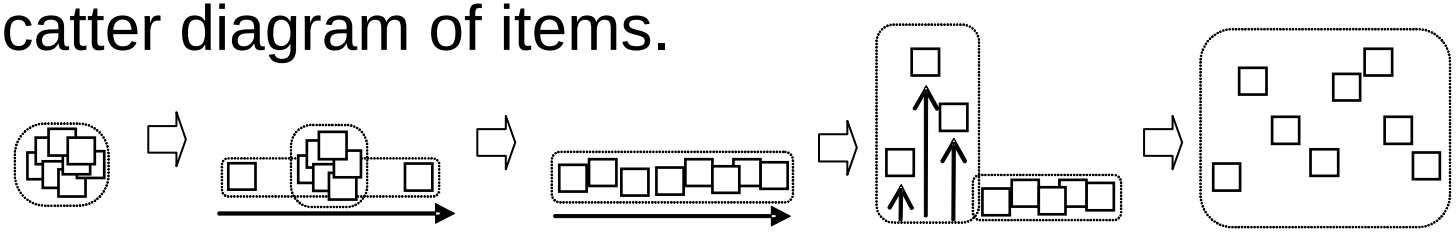
Masaki Moriyama
Fukuoka University
Fukuoka, Japan

Introduction

- The aim of this paper is to develop a diagramming method to help visually impaired people to reflect and communicate their health-related concerns about daily life. For this purpose, the author started from the two dimensional mapping procedure (Moriyama and Harnisch, 1992) and extended its applicability to visually impaired people by adopting haptic glance.

Method _ Two-dimensional mapping as prototype

- Two dimensional mapping (TDM) of key items was originally developed by the author to reveal subject's perspective and to assist communication. In TDM, subject is at first instructed to identify and select seven to twelve key items regarding a critical aspect of health. Each item (such as a name of food, a physical activity, and so on) is written on a small card. Then, subject is instructed to rank items along a horizontal scale of some extent regarding each item's life-related frequency or importance. Then, subject is further instructed to spread and locate items along a vertical scale corresponding to different extent of horizontal scale. As the result of these steps, the subject's individual view of health is externalized and shown as a scatter diagram of items.

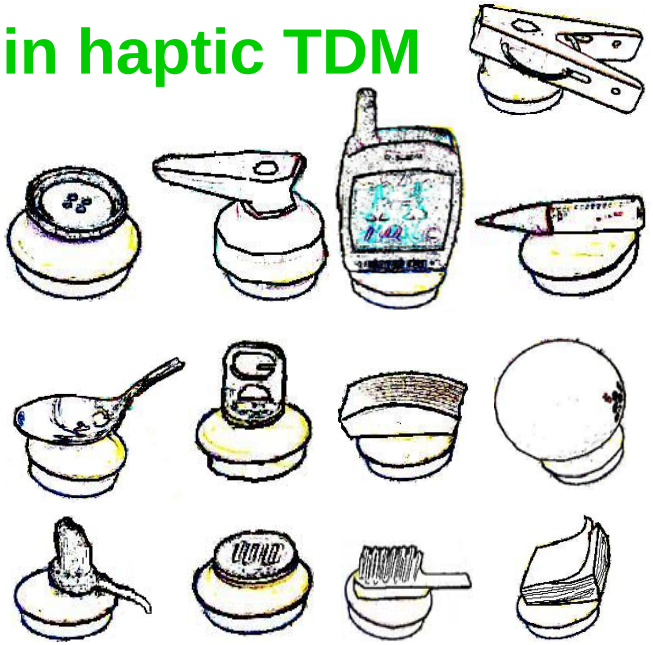


Method _ Idea to replace cards by objects

- The limitation of TDM is that, as all of items and scales are printed, visually impaired subjects are not able to use it. Therefore, in this research, the author tried to replace printed cards by common objects which bring up the image of life-related items by touch.
- Cards showing daily-life-activities (items) were replaced by common objects touched and utilized in the activity; for example, a spoon as “taking a meal”, a part of shoe sole as “taking a walk”, and so on. In order to stabilize and locate objects on the board, each object was fixed on a piece of magnet.

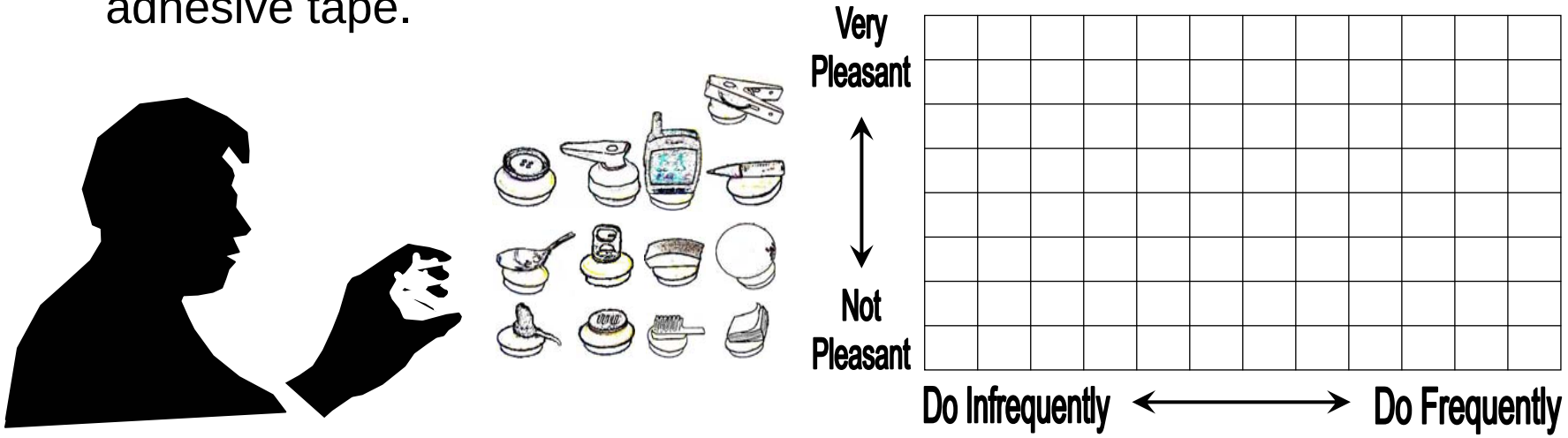
Cards in TDM

Objects in haptic TDM



Method _ Framework of Haptic TDM

- As the theme of TDM, “reflection of one’s daily life” was selected. As the platform for mapping, a commercially available rectangle magnetic-backed whiteboard of A3 size was prepared. Horizontal scale of TDM was defined as “subjective frequency of taking daily activity”, ranging from left to right extremity as “do infrequently” to “do frequently”. Vertical scale of TDM was defined as “subjective feeling of pleasantness after taking the daily activity”, ranging from bottom to top extremity as “feel unpleasant” to “feel pleasant”. Both scales were marked on the board, along bottom and left edges by adhesive tape.

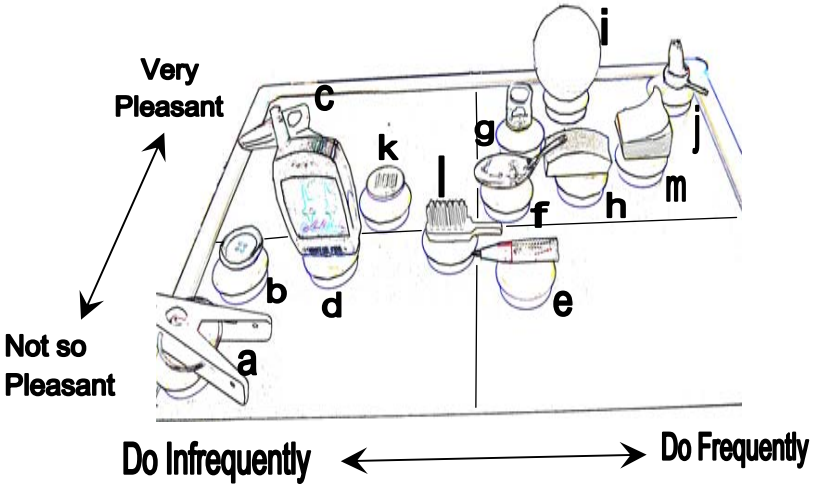


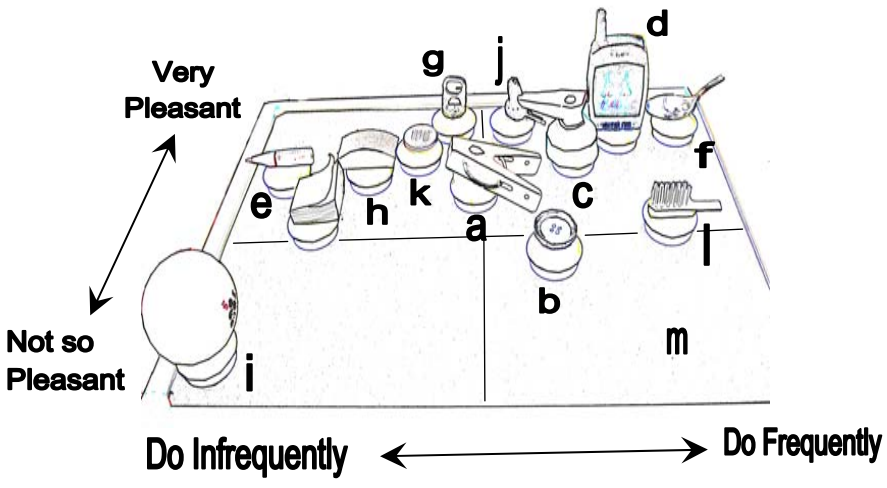
Results _ Two blind subjects' cases (1)

- Subjects were two unsighted persons, Mr. A and Miss B, both offered help voluntarily to develop haptic TDM. Both subjects were in late 20's. Mr. A lost his vision by a medication side effect at the age of 12. Miss B gradually lost her vision while she was student because of retinal pigment degeneration.
- At the trial, both subjects sit on a chair with their palm up on the board. Each of 13 objects was placed at subject's palm one by one, and most of objects' names were correctly identified by the subject within a minute. When subject was not sure to give a specified name, additional clues were given until the subject correctly name and image the object. After each object's name was identified such as "a spoon" or "a shoe sole", then the related item (name of activity) was announced such as "(a soon) for meal taking", "(shoes) for taking a walk", and so on. This process was repeated for all 13 objects, and in the end, both subjects were ready to haptically manipulate all objects simultaneously imaging corresponding daily-life activities. Then, each subject was at first instructed to rank 13 objects along the horizontal scale and then to spread objects along the vertical scale until his/her diagram was completed.

Results _ Two blind subjects' cases (2)

- Two blind subjects experienced haptic TDM sitting side-by-side. Both completed mapping by touch within 20 minutes, and externalized his/her characteristic diagram.
- Mr. A identified his most frequently doing and most pleasant activity as "hearing music", and his most infrequently doing and most unpleasant activity as "taking exercise". Miss B identified her most frequently doing and most pleasant activity as "taking a bath", and her most infrequently doing and most unpleasant activity as "washing clothes". After both subjects completed their diagramming, they touched their counterparts' diagrams, compared, and reflected their own uniqueness of daily life and related meaning toward health.





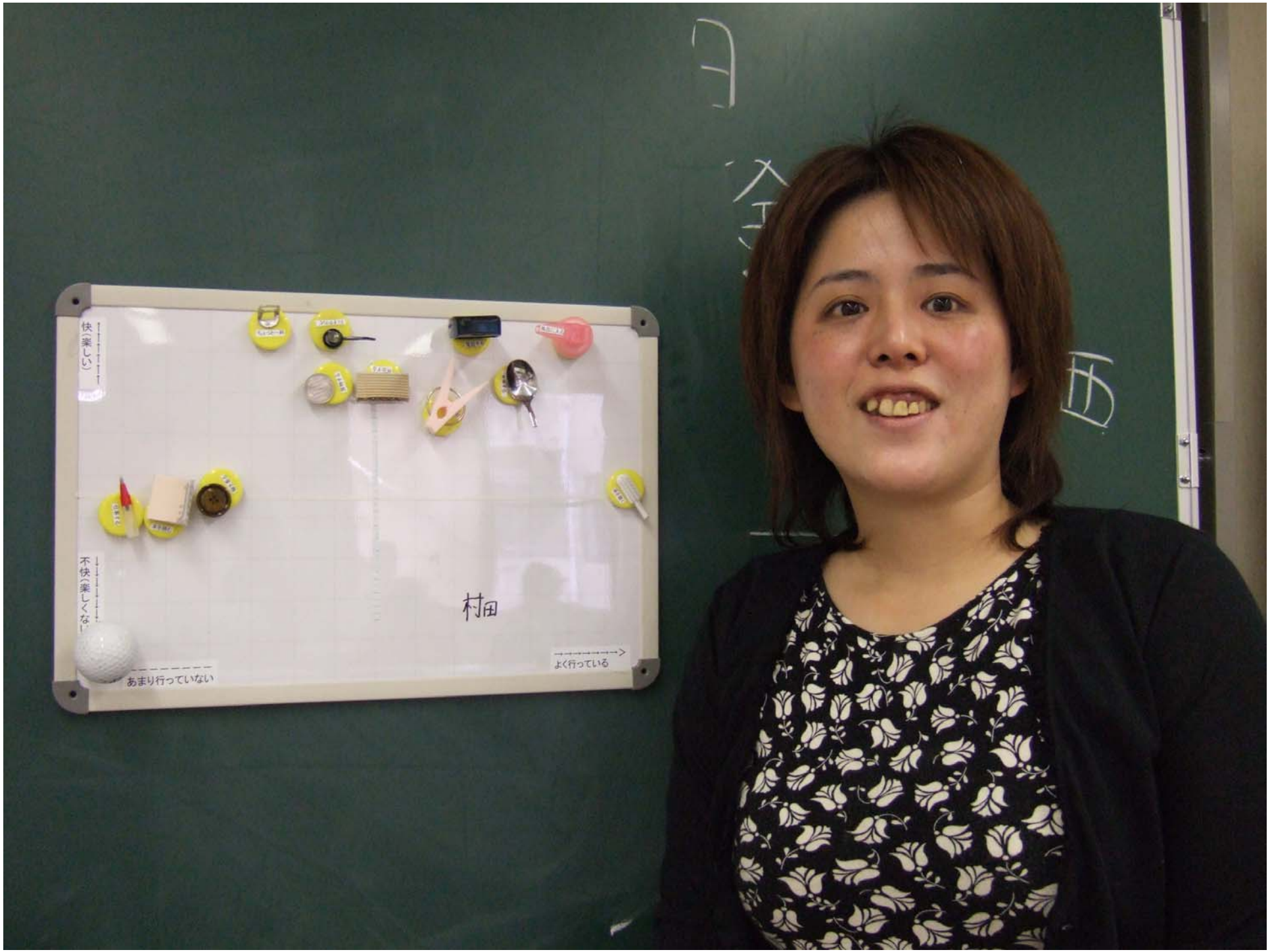
Results _ Low vision symposium participants cases

- The subjects were in total 154 participants of low vision symposiums held in Kokura and Nagasaki, Japan. According to diversified visual status, subjects were classified as normally sighted 91, low vision 34 and blind 29.
- As the result of haptic TDM, 90 (98.9%) out of 91 normally sighted subjects, 34 (100%) out of 34 low vision subjects, and 24 (82.8%) out of 29 blind subjects successfully completed their haptic diagrams within 30 minutes without having assistance from other participants. One (1.09%) normally sighted subject and 4 (13.85%) blind subjects got some assistances from neighboring participants and completed their diagram. The rest one (3.4%) blind subject could not complete the diagram.
- After participants completed diagramming, they were asked to write down comments freely regarding their new haptic experience. Among 154 participants, 141 wrote down some meaningful comments. Concerning their diagram and related life style, 59 (64.8%) of normally sighted, 24 (70.6%) of low vision, and 19 (65.5%) of blind reported reflective comments.

Discussions

- The present study started from TDM (Moriyama and Harnisch, 1992) and added tactile clue for visually impaired people to use. There were some reasons that the author did not use Braille to represent key items. One reason was that only 21% of Japanese visually impaired people understand Braille (Ministry of Health and Welfare, 2001). Most of them, especially those who lost vision in adulthood, do not want to learn Braille. Therefore, the author focused on the haptic ability of recognition, because a certain level of haptic ability to recognize everyday life objects are obtained naturally without any intensive learning. Other reason was that not only visually impaired people but also normally sighted people usually have much interests to identify objects haptically (Moriyama et al., 1998b). In this study, more than 80% of subjects completed their diagramming independently within 30 minutes, and more than 60% of subjects gave reflective comments about their everyday life. Therefore, haptic TDM is expected as a barrier-free health communication method regardless of visual status.


快（楽しい）
よく行っている


快（楽しい）
不快（楽しくない）
村田
よく行っている
あまり行っていない