Published in the proceedings of the HCI-International 2003, June 2003, Crete, Greece, part II, pp. 1034-1038.

The Design of a Recollection Supporting Device
A Study into Triggering Personal Recollections

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Abstract

The work in this paper is carried out in the context of the design of a device which supports recollecting personal memories. This device aims to help people recollect or reminisce about their life, together or alone, at home. From the (autobiographical) memory literature we concluded that we needed to fill the device's database with triggers instead of the memories themselves. For building this device we were interested in the following question 'what are the most efficient triggers for recollecting'. We carried out a field-study with media-types as triggers, that could be incorporated in such a device: photos, videos, sounds, smells and physical objects. One of the conclusions from this study is that certain types of triggers in fact reduce the number of memories people write down during recall. Therefore more research on recollection triggers is needed before the design phase of a device which supports recollecting can be finished.

1 Introduction

This paper describes a study preceding the design of a Recollection Supporting Device. By the latter we mean a physical device which can help people recollect memories from their lives, for example when reminiscing with friends or relatives, in the living room on the couch.
The remainder of this paper will give insights into the psychological background of memories and a study will be presented which was aimed at answering the question: what are the most efficient triggers for recollecting personal memories.

2 Memories

Many people feel the need to do something with their memories. They want to share them with others, for example by showing them their photos and talking about their memories. A number of studies have been reported in literature that focus on applications that aim to address this user need (for an overview on digital pictures, see Frohlich et al. 2002). Less knowledge is available on the human experience of remembering personal events in life, and how that can be supported. Therefore we organized a focus group that was conducted to explore the concept of 'memories' or 'recollections' from a user's perspective and to look at what can be done with memories in an application like a Recollection Supporting Device. The most important result was our finding that the ideal 'recollection supporting' device should not contain the *memories* themselves, but the *triggers* to those memories. We looked for support on this finding in human-memory theories.

2.1 Theory

The Constructionist approach to memory (see Guenther, 1998, for an overview) is generally believed to be a valid paradigm of how human memory works. This approach is based on the role of memory in anticipating the future. An important principle is that individual memories change connections between ideas and concepts in the corresponding cognitive systems, which results in

the storage of regularities and unexpected deviations. Constructionists believe that remembering is synonymous to reconstructing, based on the information stored. Therefore, forgetting means that too much stored information has changed adaptively, making reconstruction impossible. The Constructionist approach makes clear that, although people are not aware of this, recollections can change over time according to changed knowledge and beliefs.

Both this information as well as the reconstruction process itself support our idea of offering recollection triggers (in a Recollection Supporting Device) instead of the memories themselves. First of all, presenting 'the' memories is not possible, since they are in the owner's head and can change. But if there would be a way of presenting the original memory this could have the same effect as the finding of Conway and Pleydell-Pearce (p. 266, 2000): 'recall of memories that were inconsistent or dissonant with a lifetime period caused strong cognitive reactions'. Therefore, we decided for our experiment not to present 'the truth' in memories but to use triggers instead. In addition, we also did not want to judge the recollections of the participants on their authenticity.

Autobiographical memory is the part of human memory concerning the events of one's life. Conway and Pleydell-Pearce (2000) describe three levels of specificity in autobiographical memories, namely: lifetime periods ('when I was going to primary school'), general events ('every day I would walk home') and event-specific knowledge (ESK), where the ESK represents the smallest unit of a memory or the lowest level of specificity ('but one day I saw this cute puppy').

There is not much literature on triggering of specific autobiographical events, but there is one on autobiographical-picture triggering by Burt et al. (1995). They found that information in photos showing an *activity* brings up most memories followed by *location* and *participants*. The assumed explanation for this order is that most people join in activities mostly with the same people, often in the same location, whereas the activity varies most and is therefore the most unique characteristic. The time and date are also unique but, according to the same study (p. 62), 'time (date) information is not routinely stored in [human] memory'. Another important study by Gee and Pipe (1995) was carried out with physical objects triggering 6- and 9-year old children's recall. (The objects were introduced during an event with a magician and they were later shown to the children during the interviews.) One of their conclusions was that participants interviewed with objects recalled more and more correct information than did participants in the standard interview without objects. Another important finding was that the object triggers had a greater effect on participating children compared to children that observed the magicians activities.

'Compared with memories evoked by photographs or names, memories evoked by odors were reported to be thought of and talked about less often prior to the experiment and were more likely to be reported as never having been thought of or talked about prior to the experiment' (p. 493, Rubin et al., 1984). A recent study into the effect of olfactory and visual triggers (Herz and Schooler, 2002) found that 'naturalistic memories evoked by odors are more emotional than memories evoked by other cues' (p. 21). Since this paper focussed on reported emotionality, the important aspect for the current study is that odors did trigger additional memories after triggering verbally. Based on this overview we decided to use triggers instead of 'memories', to let the participants create their object-triggers and to continue the rest of our idea, since such a study was not done before.

3 Triggering Experiment

We conducted a study to measure which type of recollection trigger is most efficient: photos, sounds, video, smells, or physical objects. This study consisted of two parts. The first part was a one-day unique event and the second part was the completing of two questionnaires: one with and one without a trigger. Before the actual experiment took place a pilot was run with two participants, in order to test the different activities on suitability and the time needed.

3.1 Part One – The Event

68 participants joined in a one-day unique event to Archeon, a history-theme park in the Netherlands. This day the Archeon was only open for us and followed a programme specified and optimized by the authors to ensure that as many experimental requirements as possible were met. Since the participants (to ensure a balanced gender-mix we only allowed adult couples) had to take part in five activities, the most important requirement was that all activities should last equally long, which was decided on 20 minutes. Because the activities could only be done by a maximum number of people at the same time the group of 68 people was divided in 5 subgroups, each group having two guides instructed by the authors before the start of the event. The ten guides were necessary to make sure that each group was in time for their activities at the right location and to collect memory triggers to be used in the second part of the experiment. Each group had the same order of activities, only the start (and thus the end)-activity was different.
The following two (out of five) activities were optimized such that we could gather unique material for each subgroup and for each trigger type:

1. Making a fibula - creating an ancient pin (the predecessor of the safety pin), from copper wire using a hammer, a pair of nippers and a piece of wood, while the room was smelling of vanilla incense,
2. Making felt - turning washed sheep's wool into felt with use of olive soap, and then creating a felt bracelet with it.

We used the following material for triggering the participants' recollections when they were filling out their questionnaires: photos (made by the guides), videos (made by the guides), artifacts (created by the participants themselves during each activity), sounds (recorded by the guides), smells (either copied from the activity [olive soap for making felt] or were applied by the authors [vanilla incense sticks were lit in the room in which fibulas were made]).
The guides of each subgroup were instructed to tape and make photos containing: activity, location and participants (based on Burt et al., 1995).

3.2 Part Two – The Questionnaires

The 68 participants had to fill out two free-recall questionnaires each, one with and one without a trigger. The questionnaires were administered in a living-room setting, 4 or 5 weeks after the Archeon-event. 9 Participants received two questionnaires without trigger. They served as control group to enable testing for order effects and differences in the two types of activities we asked them to recollect ('the making of a fibula' compared to 'making felt'). Furthermore, all six independent variables were balanced over all participants and their questionnaires: gender, activity, order, Archeon-group, days after Archeon they filled out the questionnaires and most important the condition (trigger type). We choose for written accounts compared to verbal accounts for logistic reasons, we now could test more participants in a shorter time frame.

3.3 Data Processing

Since we set-up a unique event which was used for triggering a month later, we could only check the data for ESKs (see Section 2.1). Our method counts the total number of ESKs, scores the type of memory and determines the memories' detailedness, this will be described elsewhere.
This method does not judge the content of memories (this in contrast to other recall studies) it only decides what is definitely not a memory, for example remarks like 'I am not sure about this'.
Two researchers were trained for about 10 hours on the pilot questionnaires before counting independently the actual 136 questionnaires with the newly developed method. Their ESK-data

gathered showed a correlation of 0.97. This indicates that if users of this method are trained well, they can count memories in a reliable way.

3.4 Experimental results

Two main results will be presented here. The first one concerns general absolute values scored in this experiment. For example, the average number of ESKs for all participants was 18.5 (St.dev.=9.6), where there was no significant difference between the conditions ($F(df=5,63)=1.88$, $p=0.11$) but NoTrigger and Smell scored highest (Mean=19.6) and Object and Sound lowest (M=15,4). The time it took people to fill out their questionnaires was on average 15.6 minutes (S=6.6), which was significant ($F(5,63)=4.01$, $p=0.003$) and where Smell was faster (M=12.1) than the rest (M=[15.4,17.2]). The average number of details per questionnaire was 127 (S=68), which was not significant ($F(5,63)=2.09$, $p=0.078$) and where most details were generated in the NoTrigger and the Smell condition (M=134) and the least in the Sound-condition (M=106).
The second main result (based on differences between the two questionnaires from each person) is that the NoTrigger condition seems to generate an equal or higher number of ESKs relatively than the triggered conditions (see Figure 1). Actually, we found that women produce significantly less ESKs when they are triggered compared to when they are not ($t(30)=-2.21$, $p=0.035$). This effect was not found for men ($t(27)=-0.71$, $p=0.486$).

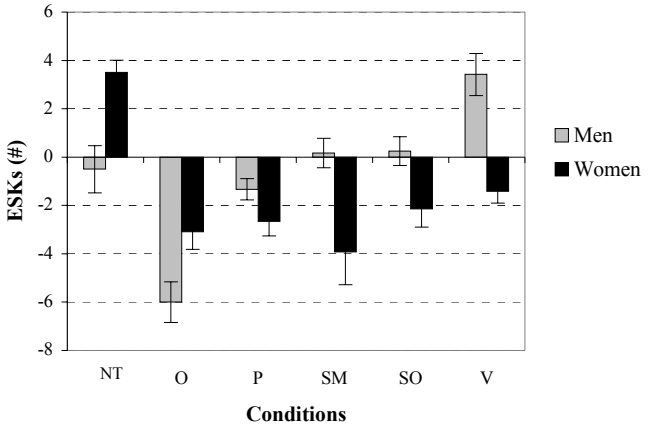

Figure 1. Differences in number of ESKs, NoTrigger-values subtracted from Trigger-values, per gender: NoTrigger (control group), Object, Photo, Smell, Sound and Video.

4 Discussion & Concluding remarks

Based on the theory in Section 2.1 we expected to find more ESKs in certain triggered conditions as opposed to the NoTrigger-condition. But this was not the case. Possible explanations for this finding could be:

a. Filter-effect. From the results described above we got the impression that a trigger has a filtering and restricting effect on the number of memories. Perhaps the more information is given the more constraints are put on the internal search;
b. Speed. It is known from literature that sensory triggers can change mood quickly, but then the memory comes more slowly (Rubin et al., 1984), perhaps this has an influence on the total number of memories recollected for certain triggers;

c. Person-dependency. Triggers might be personal, some people say they have preferences, but this does not prove that those modalities (or combinations) are also internal preferences. Furthermore age could also play a role, which could explain why Gee and Pipe (1995) found that children recalled more in conditions with object-triggers compared to without objects;
d. Long-term effect. We expect certain types of triggers to work better for older events.

We concluded that for our Recollection Supporting Device more research is needed. We do not yet remove triggers from our design requirements, since we believe that triggers might also play an important role in other dimensions of recollecting, for example:

a. Pleasure. We did not test whether certain trigger-types increase the enjoyability of recall;
b. Mood. Olfactory triggers increase emotionality (Herz and Schooler, 2002), perhaps this mood creates a better context and therefore improves other aspects of recall;
c. Intensity. Since we did not look into the content of the memories, there might be a difference in certainty of the reconstructions or intensity of the recollective experience.

Based on the results described above and a planned study we will build a Recollection Supporting Device.

5 Acknowledgements

The authors like to thank I. Wessel, L. Reynders, J. van den Heuvel, J. Hoonhout, G. Hollemans, B. de Ruyter, A. Leurs, E. Aarts, J. Engel, all volunteers and participants, the Archeon for their cooperation and the other members of the long-term research project of which this study was a part: E. Dijk, N. de Jong, E. van Loenen, D. Teixeira and Y. Qian.

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