Cognitive aging, everyday life and distributed cognition

A proposal and background for thesis work
Mattias Kristiansson

With this text I want to present my current empirical aims and theoretical background for my continued thesis work. Up till now my work has mostly circled about theoretical and empirical specification of the joint scientific interest of the three related fields of cognitive aging, everyday life, and distributed cognition. Any feedback on this text and my presentation is most welcome.

The structure of this text is as follow. First, in section 1 I give a background to my general empirical question, that is:

A. Why there is a discrepancy between cognitive abilities as measured in laboratory studies and the use of such abilities in real-life settings?

I will argue, by presenting earlier empirical findings within, and theorizing within, cognitive aging, that elderly (+65) is a particularly interesting group to study in relationship to this question. In laboratory settings aging comes with declines, most pertinent in episodic memory abilities (Nilsson, 2003). But the consequences for this do not appear to be as large in real life as the decline suggest. One emphasized explanation for the laboratory/real-life discrepancy is that older adults utilize their physical environment more efficiently. Specifically they use external memory aids and routines more often. But these findings have their empirical base on self-reporting questionnaires. I will argue that further inquiries on this subject should be less focused on self-reporting questionnaires, and more on observations in natural environments.

In section 2 I will view this discrepancy through the perspective of situated and distributed cognition, which I believe would be a suitable framework of analysis. I will in this text focus on studies on everyday life. Altogether these ideas will lead to section 3 and a suggestion for future studies for my thesis work. This section will start with suggesting an ethnographic approach for investigating my research questions and turn to specific suggestions regarding types of activities and studies. At the very end I will pose some questions regarding my research approach that I would like to discuss at the seminar.

1. The difference between cognitive abilities in laboratory studies and real-life settings

The difference between understanding core cognitive abilities, such as decision-making, memory functions, and attention, in laboratory settings as compared to understanding cognitive abilities in the natural settings in which they develop and operate has to my knowledge to a large extent been debated within two psychological fields, memory and cognitive aging. Through the anthology Memory Observered Neisser (1982) noted that memory as a general phenomenon had seldom been studied in natural settings. This thread became a discussion on whether findings within laboratory could be generalized to other settings outside the laboratory across the four dimension, type of subjects, encoding situation, retrieval situation and type remembering content as proposed by Jenkins (1979), and often they could not (Roediger, 2008). Awareness of relative contribution of
different methodological approaches became increasingly important (c.f. Mook, 1989). According to Kvavilashvili and Ellis (2004) this discussion has now settled to be a not so fierce discussion on two distinct methodological stances. It appears as if cross-fertilization between these methodological traditions is now, at least in theory, considered as the norm, but there are still issues that this cross-fertilization has not explained, especially within cognitive aging.

Within cognitive aging the discrepancy was not so much about methodological approaches. It was, and is still today a question of explaining the difference in performance in cognitive ability test in laboratory and performance in everyday life. This difference was first noticed as a general discrepancy between laboratory measures of memory abilities and everyday functioning, such as the ability to work (c.f. Salthouse, 1987), but has also turned to specific comparison of core cognitive abilities, such as comparing laboratory measures of prospective memory with equivalent situations in everyday life (c.f. Kvavilashvili & Ellis, 2004). Kvavilashvili and Fisher (2007) for instance, gave the task to make a phone call on a specific time a week ahead to one group of younger adults and one group of older adults. Participants were asked to keep a diary of every instant when, and under what circumstances, they were reminded to make the phone call. First, older adults performed as good as the younger population. Second, their diary often suggested that they were reminded without any apparent triggers. They therefore concluded that remembering to do something in the near future of this type is partly regulated by automatic processes that cannot be reported on. Salthouse (2012) see four overall reasons for the general lab/real-life discrepancy: (1) Older adults seldom need to perform at their maximum, (2) older adults rely on cognitive abilities that do not decline, such as experience-based (known as crystallized abilities), (3) cognition is not the only determinant, personality can also be, (4) older adults accommodate and change their goals according to their level of functioning.

Another explanation is that older adults use so called external memory aids. In cognitive psychology strategies that incorporate the physical environment is seldom regarded. For instance Smith and Cohen (2008) suggest cognitive strategies for ameliorating the errors of losing object and come with the following categories: action replay strategy (mentally), mental walk strategy, reality-monitoring strategy (internal images of putting the object in a place), and physical search. Physical search was left unspecified. Lutz, Means and Long (1994) found that two common strategies for locating your parked car on a university campus was to stick to a favorite spot or relating the location to a visual landmark. Mentally retracing was seldom used. Unexpectedly Kvavilashvili and Fisher (2007) did not find external memory aids as an explanation for performance in older adults, which is partly contrary to previous findings in the field. Several findings suggest that older adults are far more likely to report that they use the external environment to help them remember (Cavanaugh, Grady, & Perlmutter, 1983; Dixon, Frias, & Bäckman, 2001; Intons-Peterson & Fournier, 1986). In contrast to the more automatic explanation for performance The Victoria Longitudinal Study (VLS) suggest that everyday performance within cognitive aging can be a function of the personal adaptive ability to change one’s strategies according to changes in internal memory abilities. Through the self-reporting questionnaire the Memory Compensatory Questionnaire (MCQ) studies have found several important relationships between aging and the use of external memory aids (c.f. Dixon, Frias, & Bäckman, 2001). MCQ measures five mechanisms that are viewed as core compensatory mechanisms for memory decline: (a) external aids, (b) internal mnemonics, (c) time invested on
tasks, (d) effort put into tasks and (e) reliance on social others. External memory aids is as measured by the MCQ the most commonly used mechanism, and the one that shows the largest increase as a consequence of age. Reliance on social others is the least common mechanisms. The VLS is to my knowledge the only series of studies that have compared objective memory score with the use of the external environment. Through this comparison findings suggest that high performers in objective memory score report that they increase the use of external memory aids as a consequence of aging significantly more than the low performers (Dixon & de Frias, 2004). This is important because it suggests that the use of the external environment is a cognitive task in itself that is not easily used as a compensatory strategy. This has also been confirmed with studies on people with Alzheimer’s that show an increase of reliance on social others while a control group show an increase of external aids (Dixon, Hopp, Cohen, de Frias, & Bäckman, 2003)¹.

What I do find interesting here is that this research suggests that there is a relationship between internal cognitive abilities and the use of the external world. Note, that despite important findings all these studies are, to more or less extent, based on self-reporting methods, that in the past has been blamed for not being able to capture a large extent of our cognitive processes (c.f. Nisbett & Wilson, 1977). In situ knowledge and description on how older adults go about handling everyday cognitive tasks in natural environments is to my knowledge a rather unexplored area. This calls for a need to compare self-reporting answers to actual behavior.

Another well-studied activity is medication adherence. In this category, independent of general cognitive functioning, older adults perform significantly better compared to any other age group (Park & Minear, 2004). The best predictable variable for medication adherence is environmental demands; in other words, living chaotic lives is a better predictor for bad medicine adherence than cognitive decline (Park & Minear, 2004). It is possible as a consequence of performing the same task over and over again that medication adherence becomes something like an automatic process in relation to features in the known environment (Park & Minear, 2004). Two possible explanations of this is that older adults either have reached something that can be compared to an expert-level of their everyday activities or have developed strategies that in the terms of Hertzog et al. (2009) would minimize the role of basic cognitive mechanisms (such as executive functions and memory). Other studies suggest that reliance on routines and incorporation of new tasks within already existing routines is the most successful strategy for remembering future actions for the older population (Ellis & Cohen, 2008). Routines can be defined as a behavioral pattern of individuals, groups or organization that takes places in a sequenced order on a time axis with cyclical occurrences that can be associated with individuals, groups or organizations (Zisberg, Young, & Schepp, 2009). Routines has been connected with the aging process, suggesting that older adults as a coping strategy to increase feeling of control of the everyday become more routinized (Bergua et al., 2006). In a sample of people aged 78 older Bergua et al. (2006) found associations between preferences for routines and anxiety traits and cognitive decline over time. Preference of routines has previously been correlated with the actual occurrence of routines (Bergua et al., 2006), and therefore, the occurrence of routines can be associated with cognitive decline in the older population. It is important to further understand

¹ This is in accordance with Baltes (1997) notion of the incompleteness of human architecture which states that as cognitive abilities decline, so do also the efficiency of cultural assistance.
the occurrence of routines and Bergua et al. (2006) asks whether routines nevertheless can moderate cognitive decline as a consequence of aging. Park and Minear (2004) suggest that laboratory measures can predict cognitive performance in real life settings, but just for novel situations. Understanding the role of routines in relation to the utilization of the external environment is an important area for future research.

“Routine” is a problematized concept within situated cognition according to Jean Lave (1988). Because routines are co-dependent on other routines Lave (1988) suggests that routines as reported on by individuals using them are a constructed simplification of how people handle everyday life. Everyday life and routines “is in fact a complex improvisation” (p.155).

B. I therefore want to ask the question of whether the use of the external world can be seen as an ability (as much as remembering itself is seen an ability). How are older adults creatively using the external world and how are they successfully incorporating these into their routine activities.
   a. If there is such abilities are those abilities used in equivalent ways across situations, activities and environments?
   b. What happens when cognitive complexity increases in natural environments?

The idea that older adults rely less on deliberate processes is in line with contemporary lifespan perspectives on cognitive aging (c.f. Craik & Bialystok, 2008; Enns & Trick, 2006, see also M. M. Baltes, 1995; P. B. Baltes, 1997; Marsiske, Lang, Baltes, & Baltes, 1995 for thorough theoretical discussions on a lifespan perspective on cognitive aging). Without going into a lifespan perspective on aging at any length here, what I do find important from this perspective is that lifespan changes (e.g. to handle everyday tasks) is a continuous adaptive process guided by opportunities and constraints that do not only originate from intracranial change but also from other structures (Marsiske et al., 1995). In my thesis work I want to aim to concretize structures that older adults use to handle everyday activities from a cognitive perspective. They can be social (e.g. interaction with friends or a spouse) and physical (e.g. “each thing has its own place”, cognitive artifacts etc.), but they can also be about the ways in which people go about doing things (e.g. order of actions, omission of some tasks in front of others) that can also be seen as reliance on routines. Focus on these aspects is derived from the theoretical perspective known as situated and distributed cognition. Next section will focus on situated and distributed cognition, with a specific focus on everyday life.

**Situated and distributed cognition and everyday life**

Through a mixture of an anthropological approach and experiments Lave (1977, 1982, 1988) investigated arithmetic abilities in the apprentice-based tailor profession in Liberia and arithmetic abilities in American supermarkets. By theorizing on cognition in everyday life she criticized the clear-cut dichotomy between formal and informal education and the idea that formal schooling in arithmetic is the only way in which children should learn arithmetic in everyday life. In the supermarket Lave (1988) took the anthropological perspective and asked: what kind of activity is arithmetic in the supermarket for the people conducting the activity? She found that people use

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2 The idea that older adults should live in prosthetic environments that hold a natural resilience for unwelcomed consequences comes rather capriciously from B.F. Skinner (1983).

3 Note that this in fact introduces a difference of two ways of reasoning in the cognitive aging field.
different resources and strategies in real life activities because of the inherent properties of the activity. Lave (1988) gives an example of three ways to solve the problem: (1) with pen and paper with a place holding algorithm, (2) with a calculator, (3) with assistance of a friend. Lave remarks that “the product may very well be the same in each case, but the process has been given structure — ordered, divided into units and relations, in action — differently in each case.” (p.98). Therefore we can say that the cognitive process is significantly different in each case. The functional relationship between agent and the world is different and it is not the same processes in the terms of the brain for each case. Regarding external memory aids for the older population we need to consider the ways in which they are used, not just the fact they are.

Lave (1988) also suggest a definition of the everyday: “Everyday” is not a time of day, a social role, nor a set of activities, particular social occasions, or settings for activity. Instead, the everyday world is just that: what people do in daily, weekly, monthly, ordinary cycles of activity. A schoolteacher and pupils in the classroom are engaged in “everyday activity” in the same sense as a person shopping for groceries in the supermarket after work and a scientist in the laboratory. It is the routine character of activity, rich expectations generated over time about its shape, and settings designed for those activities and organized by them, that form the class of events which constitutes an object of analysis in theories of practice.” (p.14-15). Key formulations of this definition, as it is important for my work, are the “cycles of activities” and the “expectancies over time in certain settings”. Instantly we can see that routines, as they are expected by individuals, are inherent in the definition of everyday life. We can also have the notion from this definition that humans have an ability to expect and to form expectations of the activities and situations, and that this ability to form possible expectations will predict the ability to cope with a variety of possible situations. Below I will note that distributed cognition has to a large extent considered people trained to expect certain situation in a defined environment. But in many cases of everyday life we have not been trained as such, but we can have learned from the consequences of not predicting correctly.

Lave bolstered the idea of situated cognition and so did Suchman (1987) that set out the premises for a critique against the idea that humans act according to fixed plans and that a common feature of human intelligence would be plan before action. She studied human-machine interaction with two humans trying to make sense of a copying machine. Suchman (1987) concluded that despite having objectives; that is humans have agency and act according to some kind of a goal, the path towards the objective is not followed blind-folded, but instead according to the changing situation at hand. She introduced the term situated action. This is similar to the Lave’s (1988) discussion of the concept routines as noted earlier. What is left of plans in Suchman’s (1987) analysis is that they are indeed resources and representations for actions and therefore it is important to understand the relevance and role of plans. But her point is that humans use other resources where representational states only occur if actions are interrupted. Despite the role of plans they are not what we should study to understand a large part of human activities. Situated cognition pinpoints that cognition emerge from the situation in not fully anticipatable circumstance in an in a continuously changing world, and is not evidently preceded before a situation. When Suchman says that representational states only occur if actions are interrupted, Lave would say, “that happens all the time”. My take on this is that we must regard the stuff inside people that enters into situations, but also the ways in which people adapt to changes of terms in relation to the stuff that enters into situations.
A way to do this is to think about humans in their everyday life as experts: “Because most people become experts or near experts in dealing with their everyday environments [...] they probably know enough about these domains to have effective problem-solving methods for handling the majority of problems they confront.” (Kirsh, 2009, p. 289-290). Through this lens Kirsh has also described how humans use external representations to think (Kirsh, 2010) and how experts of activities, in specific ways, intelligently adapt their physical surroundings to reduce computational demands (Kirsh, 1995). A similar point was made by de Léon's (2003) in his study of the structure of a spice shelf. Clark (2008) use a more opportunistic term, the canny cognizer, to describe how humans use whatever resources that are available for reducing cognitive complexity in every instant. Through these perspectives, although differently expressed, humans do not compensate, humans simply adapt to situations they are continuously confronted with.

Situated cognition has the challenge to generalize findings across situations. Both Suchman and Lave describe future aims to find regularities across types of situations. Any two situations share commonalities and discrepancies. A situated theory must find a relevant level of types of situations. What is it about situations that make them cognitively similar? Is it about the kind of representational structures or is about what kind of computation that is required by the individual doing the task? Is it the subjective experience that decides what two situations are similar? I suggest that answers to these questions will increase the understanding of how routines and external memory aids can be part of the real-life/lab discrepancy.

Situated cognition is a suitable framework for my thesis work because it generates such questions. What a situated (and distributed) perspective also add to the self-reports of older adults is that the ecology of cognitive processes can in itself contribute to the cognitive processes (Tribble & Sutton, 2011). Parts of environments can together with actors form functional relationships that are not necessarily seen as an external memory aid per se.

Hutchins (1995a) introduced the term cognition in the wild by viewing cognitive abilities within cognitive functional systems. In this way one would be able to talk about how a cockpit remembers its speed (Hutchins, 1995b). Clark (2008) argues that to understand cognition it is necessary to change the unit of analysis to include significant parts of the external environment. Hutchins (1995a) would say that brains can indeed have the ability to remember, but the specific task of pilots to remember the speed of the airplane is realized by a functional system that resides in the cockpit (Hutchins, 1995b). This notion is a step away from the idea that there are such things as memory aids. To call something a memory aid in this context is a misattribution of what it does. This is something that would challenge the idea of external memory aids in cognitive aging.

For distributed cognition the goals of a system is always of premium importance (c.f. Hazlehurst, 1996). Goals can come from individuals, groups of individuals or culture, and the use of routines and external structures should be evaluated in relationship to these goals. For considering older adults in everyday life I must consider their goals, their viewpoint of doing things the way they do. Ethnographic methodologies is often suggested to be the best approach of doing this (Hazlehurst, 1996; Hutchins, 1995a).

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4 Considering goals it will also be necessary to relate my work to Activity Theory (Leontiev, 1978; Vygotsky, 1978) as this perspective have a different notions of subjects and goals as compared to distributed cognition.
Distributed cognition as introduced by Hutchins often study what could be called *invariant tasks*. The consequence of this is that it is possible to consider adaptive processes when they reached an equilibrium state, so that functional systems actually cope with current tasks and activities. But distributed cognition as a general idea does not necessarily insist that tasks need to be invariant. The focal point of distributed cognition is the organization of achieving a set of goals of a number of tasks in a defined cognitive system. An important feature of distributed cognition, and a possible problem is that Hutchins theory of distributed cognition largely focus on *coordination* of parts of the system that risks leaving out the creative process of individuals coping with specific situations (Kaptelinin & Nardi, 2006). Humans are powerful assemblers of cognitive resources (Clark, 2008) not at least in everyday life and it appears that older adults specifically are.

Schwartz and Martin (2006) consider the ability to learn and set out a grid where distributed cognition is viewed as something that can take place between stable/adaptable environments and stable/adaptable individuals (see figure 1). This grid does not insist on cognition as problem-solving of familiar tasks in a intelligently adjusted environment (Schwartz & Martin, 2008).

**Table 1: Four Quadrants of Distributed Cognition (adapted from Schwartz & Martin, 2006)**

<table>
<thead>
<tr>
<th>Individual</th>
<th>Adaptable</th>
<th>(1) Induction</th>
<th>(4) Mutual Adaption</th>
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<tbody>
<tr>
<td>Stable</td>
<td>(2) Symbiotic Tuning</td>
<td>(3) Repurposing</td>
<td></td>
</tr>
<tr>
<td>Stable</td>
<td>Adaptable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Physical and Social Environments

An example of quadrant 1 would be an abacus master that has vivid abilities to mentally simulate the structure of a stable board game. Quadrant 2 would be what Hutchins (1995b) refers to when considering highly trained pilots in designed cockpits. An example of quadrant 3 would be what for instance Kirsh (1996) talk about when someone arrange the environment to serve a function. Quadrant 4 would be when someone learns new things as they are confronted with a changeable environment. A home gardener constantly learning new things as the garden changes would be an example of this. (Schwartz & Martin, 2008)

This forms a framework for considering older people in everyday life. First, the notion that older adults rely more on experience-based cognitive processing suggest that they should be placed in the stable category of individuals. Second, everyday life consists of a variety of environments. A home environment is likely more stable than outside home environments. Third, the idea that older adults adapt or compensate through starting to rely on routines and external memory aids suggest that they have either gone through quadrant 4 or that they constantly are. There appear therefore to be different environments and different kinds of activities that need to be considered if we want to understand elderly’s use of the external environment.

An investigated example of where we can expect stable individuals to stable (social) environments is older couples. Harris, Keil, Sutton, & Barnier (2011) investigated factors that influence the performance of older couples in autobiographical tasks. They found a number of communicative factors that inhibited and facilitated performance. Both a situated and distributed approach of cognition aim to find regularities of cognition, incorporating both individuals and external social
and physical world (Hutchins, 1995a; Latour, 1995; Lave, 1988; Suchman, 1987). This is a goal that is shared with the cognitive aging scientific community, although the theoretical and methodological approaches are different.

In the material of my master thesis I saw a couple of examples from the elderly population of the use of external resources to remember, from which we can draw some conclusion, that in my thesis work need to be verified and investigated more thoroughly. For instance: (a) how subjects use external aids, how they for instance are located, can be as important as the fact that humans are using external aids. (b) Using the external world is a task as much as the task to remember itself. (c) People creatively create their environment, despite the occurrence of explicit memory problems. (d) What can be viewed as adding to the ability to remember in a specific situation cannot always easily be consciously reported on.

To sum up, my research questions can now be phrased as follow:

- How do memory abilities work in real-life settings, and how can this understanding explain the discrepancy between laboratory studies on memory and the use of such abilities in real-life in the normal older population?

This has traditionally mostly been investigated through experiments and self-reporting questionnaires. I aim to approach this by observations (specifically an ethnographic approach as described below). As there is also an idea within cognitive aging that older adults perform worse in novel situations and good in routine activities I also aim to understand cognitive strategies in relationship to this, specifically:

- Can the use of the external world be seen as an ability as much as remembering itself is seen an ability.
  - How are older adults creatively using the external world, and how are they successfully incorporating these into their routine activities and non-routine activities.
  - Are these strategies used in equivalent ways across situations, activities and environments? If not, why is that so?
  - What happens to these strategies when cognitive complexity increases in natural environments?
  - What role has the ability to form expectations of situations for this general ability to use the external world?

3. Suggested studies

To answer these questions I will now formulate some suggested studies. My aim is that they should capture important varieties that are included in the questions above.

For the studies I want to focus on the normally aged; this as opposed to my master work that was a mixture of both normally aged and pathological declines. I hope to recruit participants from elderly centers in Linköping. I also want to try to recruit from home healthcare service. This is because that people going to elderly centers are a particular healthy group of older adults, and could therefore be a biased cohort. The only exclusion criteria that I have are that they have no
known diagnosed cognitive declines. At the start of my studies I will focus generally on people +65, but it is also possible that I should aim for people +75 because this group has a clearer average decline.

3.1 Methods
My methodological approach will in essence basically be derived from ethnography where I want to understand the perspectives of the individuals themselves and how they act in their natural environments. It is also possible to name my approach a cognitive ethnography. This is because my research question strive to understand the relationship between cognition in laboratory settings and natural settings, similar to how Hutchins (1995a) introduced the term. This can be viewed as the approach where anthropology meets cognitive psychology (Ball & Ormerod, 2000). The arrangement of cognition in the material and social world is of a large importance to understand this difference (Hollan, Hutchins, & Kirsh, 2000). All the suggested studies below aim to describe the ecology of cognition and how people act and reason in these ecologies, aiming to find regularities or differences within individuals (across situations) and across individuals in general. What I will focus on in my ethnographic work is mostly derived from the situated and distributed cognition approach but I also want to compare and use the Memory Compensatory Questionnaire as material for my questions in the field.

3.2 Specific studies
First, I want to study routine activities and less routine-like activities. There are generally two reasons for this: (a) since several researchers suggest that one of the reasons for the discrepancy between laboratory studies and real-life studies in cognitive aging is that older adults to large degree rely on well-developed routines. This is plausible since we can expect older adults to have a larger degree of experiences of everyday activities. (b) Situated and distributed cognition suggest that the understanding routines and peoples expectancies of activities is important to understand human’s relationships with their environment. Since routines and expectancies of activities are not easily applied to any cognitively relevant activity (as noted in section 2) it is not evident what can be considered routine, as it is likely that every routine activity have non-routine situations from time to time. I see this as a possibility to try out, and problematize the concepts further.

Second, I want to study different environments and specifically the difference between activities in home environments and outside home. The reasons for this are once again two-fold: (a) some suggest that performance in everyday life is dependent on more automatic processes. Automatic processes are generally aided in constant environments that do not change very often. The home environment could be expected to be such environment as opposed to environments outside home; at least environments outside home change less predictably. (b) Distributed cognition emphasizes the cognitive coupling with the physical and social world. At least in terms of the physical coupling the home environment will likely provide with more opportunities for such coupling.

The studies suggested below focus on older adults, while a possibility would be to use a younger comparison group, but that would also introduce a necessity to prioritize my structure below.
### 3.2.1 Ethnography of everyday life

With this study I want to study a rich variation of everyday activities and situations according to above dichotomies. In terms of ethnography I will aim to capture the perspectives of the participants and observe what people actually do. This study should run more intensively in the beginning of my thesis work but I will continue to come back to relevant themes for specific participants when necessary and possible.

A possibility for this study is to later include some kind of cognitive test for episodic memory, since no previous studies (to my knowledge) have compared an objective memory as measured in laboratory settings with a rich ethnographic material.

Overall I expect to have around 30 participants for this study.

### 3.2.2 Cooking in everyday life

The reason to study cooking is that it is possible to compare with other studies within situated and distributed cognition that has studied cooking (de Léon, 2003; Kirsh, 1995). Another reason for doing ethnography of cooking is that it can be viewed as a rather closed activity to the kitchen, an environment that is known to the participant. I would also like to capture the full process of preparing shopping, shopping and cooking. This is because earlier parts of the process can constrain later parts. For the cooking session in the kitchen I would also, if possible, videotape. I think that there can be interesting findings from in-detail analyses of the interaction with the physical world.

I expect to have about 10 participants for this study that may overlap with previous study.

### 3.2.3 Non-routine cooking

The idea for this study is to compare with the previous study. From a cognitive aging perspective, this should be a harder kind of activity. I imagine two possibilities for this. Either I choose an already existing activity such as Christmas preparations (which could be counted as a specific kind of routine activity), or I choose a pre-defined activity from my side, such as a three-course dinner for four and therefore create a semi-experiment.

<table>
<thead>
<tr>
<th>Non-routine activities</th>
<th>Routine activities</th>
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<tbody>
<tr>
<td>Activities outside home environment</td>
<td>4.1; 4.3; 4.4</td>
</tr>
<tr>
<td>Activities in the home environment</td>
<td>4.1; 4.3</td>
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</tbody>
</table>
I expect to have about 10 participants for this study that can overlap with previous studies.

### 3.2.4 Maintenance of boats
This activity is relevant because it occurs on a yearly basis and is often located far from home whereupon specific kinds of preparations will be necessary. Another reason for this study is that I could balance out the cooking activity that for this generation could be a highly gender-specific activity.

### 3.2.5 Older adults that are still working
The idea of this study comes from the possibility of participants to reflect on how things were done when they were younger, and also on the fact that working as a senior consultant (for instance) is a rather cognitively demanding task. This study would also be less based on observations and more on interviews.

These studies can be approximated on a time axis as below:

![Time axis diagram]

### 3.3 Questions
Since I realize that my research question can be answered in several ways I would like to discuss some open questions:

- Several of my studies focus on cooking (for some reasons as mentioned). But are there other activities that could capture the same aspects, or different aspects that that I do not capture with this activity?

- A methodological question is for how long I should follow particular individuals? I should have some kind of minimum. And it is also possible to follow particular individuals for several years continuously or to come back to specific individuals each year to see differences.

- My analytical framework will be inspired by situated and distributed cognition: are there aspects of this (or these) theoretical perspective(s) that will be a challenge to apply to this domain or group of people? Earlier, for instance, I mentioned the problem of defining...
what a cognitive situation is. The answer to this will not be answered beforehand but any clue for an answer should also guide what activities and situations I choose to study.
References


Latour, B. (1995). Cogito ergo sumus! or psychology swept inside out by the fresh air of the upper deck... *Mind, Culture, and Activity, 3*(1), 54–63.


