



Centre de recherche  
sur le vieillissement  
Research Centre  
on Aging

Health and Social Services-University  
Institute of Geriatrics of Sherbrooke



# Encr **âge**

VOLUME 8, ISSUE 1, SPRING 2006

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## Learning New Information when Suffering from Alzheimer's: Methods to Help the Memory

By Nathalie Bier, doctoral student in clinical sciences



Nathalie Bier is conducting her work under the supervision of Lise Gagnon, Ph.D., and Johanne Desrosiers, Ph.D, both researchers at the Research Centre on Aging and professors at the Université de Sherbrooke; as well as Martial Van de Linden, Ph.D, of the Université de Genève in Switzerland; and in partnership with the Université de Liège's neuropsychology department in Belgium.

**F**or many years, researchers have been focusing their energy on developing medications that can enhance the memory of persons suffering from Alzheimer's disease. However, it is also possible to help people remember newly-acquired information by working directly on their memory.

A team from the Research Centre on Aging is leading studies on this topic. The process does not involve restoring long-term memory or preventing the disease's progress, but instead to use preserved memory abilities to favour learning small quantities of useful information to function in everyday life. People at the early and intermediate phases of the disease have preserved memory abilities. For example, it is possible to help people suffering from Alzheimer's learn how to use a microwave oven, to remember appointments or the names of persons in their immediate environment.

Different methods that aim to foster the acquisition of information have been developed to specifically address the needs and problem of persons suffering from Alzheimer's. These methods are applied by a loved one or by a caregiver, not by the person suffering from the disease. This kind of intervention might be used in conjunction with medication or an adapted environment in order to help the person

suffering from Alzheimer's remain at home as long as possible.

Current studies show the potential of three learning methods at the onset of the disease for dementia of Alzheimer type (DTA): the **spaced retrieval method**, the **vanishing cues method** and the **errorless method**.

Despite the potential of these learning methods, they must be tested both in laboratories and in homes before they can be used by all caregivers and their loved ones.

Our research objective is to evaluate their efficiency. First, the efficiency of the methods was measured at the Research Centre on Aging. We then applied them directly in the living environment of persons suffering from Alzheimer's in order to help them retain relevant information that improves certain aspects of their function in daily life.

The **spaced retrieval method** involves asking a person to use his memory to retrieve information after increasingly longer spans of time (after 10 seconds, 20 seconds, 30 seconds, 1 minute, 90 seconds... up to 5 minutes).

**DID YOU KNOW**

- **Episodic memory** retains events that have taken place until recently in our lives;
- **Semantic memory** is the accumulation of words and facts;
- **Procedural memory** remembers movements;
- **Perceptual memory** retains shapes of objects, sounds and so on;
- **Working memory** allows us to carry out tasks in the present.

At the onset of Alzheimer's disease, the procedural, perceptual and, to a certain extent, the semantic memory are well preserved, making it possible to learn new information in those forms.

*This newsletter is intended for people who participated in the Research Centre on Aging's projects.*

*It is also distributed to anyone who wants to receive it. Please contact us for more information!*

See **LEARNING NEW INFORMATION** on page 6...

# The Effect of Loss of Balance on the Ability to Avoid a Fall

By Alessandro Telonio, doctoral student in mechanical engineering



Alessandro Telonio is a student in the faculty of engineering at the Université de Sherbrooke. He is working under the supervision of Cécile Smeesters, engineer and researcher at the Research Centre on Aging, and assistant professor at the department of mechanical engineering in the faculty of engineering at the Université de Sherbrooke.

**P**reventing falls is a significant topic, especially among the elderly. Falls are the leading cause of death, hospitalizations, unforeseen treatments and handicaps in Canada, all age categories included. A Québec study stated that 290,000 elderly persons suffered a fall between 1997 and 1999. Another study calculated that the average hospitalization costs of a fall (excluding rehabilitation) is \$6,321 among persons aged 65 and older compared with \$4,792 for the remainder of the population.

Over the past 20 years, many studies about loss of equilibrium and the ability to recover correct one's balance following minor or medium postural perturbations have been published. These studies have made it possible to identify many risk factors for falls connected to motor, perceptual-sensory and cognitive abilities. At the same time, other research has shown that lateral falls (sideways) increase the risk of a hip fracture. Recently, studies have focused on the ability to recover balance following postural perturbations in which it is not always possible to avoid a fall. The limited number of studies, the methodological differences among them and the absence of studies about the effect of direction on the ability to recover balance mean that the causes of the inability of elderly persons to recover their balance and therefore avoid falling are not yet understood.

## DID YOU KNOW

Studies show that falling while in the standing position can cause a hip fracture. Other observations indicate that most people who suffer fractures fall laterally (sideways). Finally, research has shown that falling sideways increases the risk of sustaining a hip fracture three to fivefold compared to other fall directions.

One of our projects aims to measure the effect of direction of the loss of balance on the abilities of elderly persons to recover their balance and avoid a fall. We have therefore simulated various situations: 1) a fall by a forward loss of balance; 2) an imbalance in the rear which imitates a sliding effect; and 3) a lateral loss of balance to simulate ground that unexpectedly moves.

Forty-eight persons will be participating in our study. They include 24 young adults in good health aged 18 to 30, and 24 persons in good health aged 65 to 86. Gender is equally

distributed in each group. Motor, perceptual-sensory and cognitive abilities will be evaluated through different clinical tests performed on each participant (see descriptions of each type of ability in table 1).



A participant is placed in a position of imbalance. She must take a few steps to avoid falling. A safety harness system prevents the participant from falling to the ground and suffering an injury. Sensors placed on various points on her body record all of her movements.

The same abilities will be evaluated during a task performed at the limit of balance recovery. Therefore, each participant will be inclining forward, backwards, towards his dominant side and towards his non-dominant side while being supported by a cable (see photos). After an unspecified time period, the cable will be released, creating an imbalance. The person will have to recover his balance in a single step to avoid a possible fall. The original angle of inclination will increase by 2.5 degrees in every trial until the participant is no longer able to recover his balance in a single step or use the safety harness to help him. All measures will be taken with instruments such as detectors placed on the muscles, a camera system to measure movement and so on.

We believe that the maximum angle of inclination among young adults will be greater than among the elderly. The direction of the inclination should also affect this age-related difference.

TABLE 1 - THE EVALUATED ABILITIES

MOTOR ABILITIES:	PERCEPTUAL-SENSORY ABILITIES	COGNITIVE ABILITIES
<ul style="list-style-type: none"><li>muscular strength</li><li>temporal range of movement</li><li>time, length and speed of step</li><li>balance</li></ul>	<ul style="list-style-type: none"><li>response time</li><li>sensitivity</li><li>visual acuity and sensory integration</li></ul>	<ul style="list-style-type: none"><li>attention</li><li>executive functions (more specifically the ability to suppress irrelevant information)</li></ul>

See *EFFECT OF LOSS OF BALANCE* on page 6...



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This better perception is confirmed by the physical measures that were gathered. In general, persons who stated that they have a good appetite have better mobility, as measured by balance; walking speed; and the ability to rise from a chair. They are also stronger. Women showed greater arm strength, and men greater leg strength.

**When asked: "Do you have a good appetite... Often? Sometimes? or Never?", many people who are in shape tend to answer: "I'm too hungry and it's not good for me."**

Appetite can be described as a group of sensations that generate a desire to ingest food. Appetite is not synonymous with hunger, which is a physical sensation expressed by a need whose satisfaction is required. Food is abundant in our society in which body image prevails. Appetite is viewed as an unnecessary, sinful desire.

However, lack or loss of appetite is a red flag for malnutrition. In almost every circumstances, it shows loss of weight or energy, as well as a reduction in resistance to infections or diseases. The question is: In order to be healthy, what is the balance between lack of appetite and excessive appetite?

In order to gain a better understanding of the role of appetite and its impact in our daily lives, we have compared the perception of appetite with many nutritional characteristics as well as health and muscle strength. We have used data collected during the first visit of the 1,793 participants in the NuAge study. They

are being monitored for a 5-year period. NuAge focuses on the role of nutrition as a determinant for successful aging. Nutritional status, physical output and emotional state are being measured in a series of tests among the participants who were selected for their relatively good health.

Most participants in the NuAge study (85% men and 80% women) stated that they often have a good appetite. The latter also perceive themselves to have a better health (physical and mental) and demonstrate more vitality than persons who stated that they have a less good appetite.

It is important to note that all persons who reported having a good appetite have a greater desire to eat meat, poultry, fish and vegetables. Moreover, contrary to popular belief, the participants did not mention having a greater desire for foods containing fat or sugar.

These tastes are reflected in energy and nutritional intakes. Among the 300 participants whose nutritional data has been analysed, the diet of persons declaring a good appetite is richer in energy and provides a higher level of proteins, essential minerals (iron, calcium, magnesium, potassium) as well as vitamins (C, K, niacin, thiamin and riboflavin).

Finally, the old saying "Eat well, live well" appears to have an ounce of truth to it. Having a good appetite is synonymous with a quality diet and superior functional abilities from which arises a better perception of one's health.

We now need to determine the mechanisms adjacent to these relations. Is appetite a key element of a good diet? In turn, is appetite stimulated by an adequate diet? What role does exercise play in these relations? Many other questions need enlightening. The four upcoming years of taking measurements in the NuAge study will allow us to shed some light. Meanwhile, *bon appetit!*

## DID YOU KNOW

The acronym NuAge is formed from the words **Nutrition and AGE.**

NuAge is the name given to a study on the effects of nutrition on successful aging among the elderly. People in the Montreal area and in Sherbrooke will be participating in this research project over a 5-year period.



Marie-Andr ee Roy, a research officer of the Sherbrooke team, meets a NuAge participant.

# Continuity of Services in Integrated Services Networks for Elderly Persons Suffering from Loss of Autonomy

By Yves Couturier, Ph.D.; Sébastien Carrier and Dominique Gagnon, master's students in social services



Yves Couturier is a researcher at the Research Centre on Aging and an associate professor at the Université de Sherbrooke's arts and humanities faculty.

**T**he present reforms in the health and social services sector are based on improving continuity of services from one professional to another. This continuity of services is a characteristic of quality services. But what does continuity mean?

Research has led to the identification of three forms of continuity. First, **management continuity** assumes that the measures taken by healthcare workers are all oriented towards a common objective. For example, it is vital that the doctor and the social worker agree on home support for an elderly person. Second, **informational continuity** implies easy access to useful information at the appropriate time. The pharmacist will have access to the medical information required to carry out his job. Third, **relational continuity** emphasizes that the client's knowledge is acquired over time through significant and stable relations. For example, it is vital that the elderly person has a significant professional whom he can consult when needed.

The studies' authors come to a critical conclusion: continuity is first and foremost a living experience, which makes it difficult to measure or observe. This condition forces researchers to focus on the experiences lived by clients who use health services and healthcare professionals.

Our research team interviewed 63 practitioners (social workers, doctors and so on) working on the clinical records of 18 elderly persons suffering from loss of autonomy who live in the Sherbrooke, Coaticook and Mégantic areas. All records involved at least one case manager, most likely a healthcare professional whose job is to coordinate services for persons suffering from loss of autonomy.

We believe that the relevance of case management varies in accordance with the type of continuity being observed. We noted that **management continuity** is overall quite efficient. We observed that the case manager's work makes room for better consistency between the caregivers' roles, be it doctors, nurses, social workers and so on. However, we also observed that

this strong consistency doesn't prevent certain debates among healthcare professionals from taking place. One example is the question: what is the best way to provide care to a person suffering from loss of autonomy? In fact, organisational rather than clinical issues can lead to bottlenecks in patient care.

As regards **informational continuity**, we have observed that case management, backed by efficient information tools, allows for the dissemination of information that is relevant to the flow of users in the departments. However, there still remains some problems, namely in the incomplete rollout of information systems. Some doctors do not have access to the patient's computerized record because they don't have a computer in their practice.

Moreover, we have observed the significance of direct contact among professionals in supporting this form of continuity. Informational continuity is more concentrated in regions in which healthcare workers know each other and interact on a daily basis in a context of work sharing. This observation raises questions about the underlying risks related to the strong growth in the size of health and social services facilities that Québec is presently experiencing. It reminds us of the importance of proximity among healthcare workers, in the same working environment.

Finally, **relational continuity** remains the area of continuity that needs the most development. We have observed many gaps in this form of continuity. They can be explained, among other reasons, by work organisation, which creates discontinuities that are often unavoidable (vacations, sick leaves and so on). This final form of continuity, at the core of the user's final perception of services rendered, calls for the elaboration of services that are less centred on information systems. The clinical relation with the client allows the elderly person to participate in the decision-making process regarding the services which will be provided to him. The significant relation not only humanizes care, but also gives the elderly person the ability to orient his clinical evaluation in real time. It is clear that improvements in the continuity of service delivery are significant, even if we must continue to reflect upon this subject. †

# PRISMA : Research Applied by the Healthcare Network

By Michel Raïche, research coordinator and doctoral student in clinical sciences



Michel Raïche is the coordinator of PRISMA-Estrie. He undertook doctoral studies in clinical sciences at the Université de Sherbrooke. The results of his studies will complement PRISMA's. He is conducting his work under the supervision of Dr. Réjean Hébert; Ms. Marie-France Dubois and Ms. Nicole Dubuc, researchers at the Research Centre on Aging and professors at the Université de Sherbrooke's faculty of medicine and health sciences (Dr. Hébert is also the dean of the faculty).

## THE INTEGRATED SERVICES NETWORK ENCOMPASSES SIX ELEMENTS:

- coordination among institutions, departments, practitioners;
- a single entry point for accessing all services;
- case managers for persons requiring many services;
- an individualized service plan to coordinate the services required by the needs;
- a uniform evaluation tool for all practitioners;
- a computerized medical record (rather than on paper) that is accessible on a computer for nurses, social workers, doctors and so on;

**L**ast fall, the PRISMA team received a national award for the application of knowledge. This award highlighted that the knowledge acquired during this study has really been applied. Who applied it? Québec's entire healthcare network. The 1,551 seniors who participated in the study also contributed to improving healthcare services. This award also belongs to them because no results or improvements would have been made possible without their contribution.

PRISMA is the acronym for Program on Research for Integrating Services for the Maintenance of Autonomy. The group of researchers led by Dr. Réjean Hébert is attempting to evaluate the efficiency of the health and social services network by testing a better coordinated and integrated network.

The integrated service network encompasses six elements (see table). In the PRISMA study, we have observed whether or not these elements are present, and in what percentage, in the healthcare network in Estrie and Chaudière-Appalaches. We have also observed what their effects are on the autonomy of elderly persons, institutionalization, satisfaction towards the services rendered, empowerment (the feeling of participating in healthcare decisions that regard the user, caregivers, the use of healthcare services (public, private and community), and the costs of the services that were used. The study was led in both rural and urban areas.

In order to gather all the data in this four-year study, the 1,551 participants were met every year in their homes. Every two months, we called to enquire which healthcare services were

used. Did the healthcare services allow them to maintain autonomy? Obviously, human beings are not genetically programmed to live 400 years. However, can humans approach the maximum life expectancy while remaining as autonomous for as long as possible? This study cannot answer every question, but we know that an integrated network helps elderly persons remain at home longer and in a satisfying manner. This is quite interesting, as this is the wish of most elderly persons.

Québec's Health and Social Services Department has decided to organise the healthcare network in an integrated form for elderly persons. We can therefore assert that the knowledge acquired during this study has been applied.

SMAF, a functional autonomy evaluation tool, is now used throughout Québec. The acronym SMAF stands for functional autonomy measurement system. It was developed by Dr. Réjean Hébert. It is another reason that led the Canadian Institutes of Health Research to give Dr. Hébert and the PRISMA team the CIHR Knowledge Translation Award. The \$20,000 bursary accompanying the award will be used to publish a book on PRISMA's final results as well as to organize the fourth and final congress in 2006 during which study results will be disseminated to decision-makers, managers and healthcare professionals.



From left to right: Dr. Alan Bernstein, president of the Canadian Institutes of Health Research, who gave Dr. Hébert and the PRISMA team the CIHR Knowledge Translation Award; Mr. Michel Tournant, co-researcher for PRISMA, and Mr. Michel Raïche, study coordinator for PRISMA.



# PRISMA

## ...LEARNING NEW INFORMATION

This method was quite efficient among the participants in the early stage of DTA whom we met in our laboratory. It also turned out to be directly efficient in the living environment for using a calendar. It also allowed a woman to remember the time and location where people were praying the rosary in a seniors' residence.

The **vanishing cues** means giving clues to help a person find information. At first, you must provide many clues. You then gradually reduce the quantity of clues until the person can come up with the answer by himself. For example, in our study, we showed pictures of a person accompanied by his family name to individuals in the early stage of DTA. We read information with the participant. During the remaining trials, we gradually reduced the number of letters in the family name until the participant was able to come up with the answer on his own. This method turned out to be quite efficient in the laboratory and in the living environments of persons suffering from Alzheimer's. Thanks to this method, we even helped a music lover learn again how to use a cassette deck.

The **errorless method** attempts to the best extent possible to limit the number of errors. This method's logic goes as follows: Because people suffering from DTA suffer from significant memory impairment, they cannot remember that they made a mistake and will tend to repeat it. In our study, we showed pictures of persons associated with their family name. We repeated the information many times, while simultaneously preventing the participants to guess the correct answer. We then made sure that only the correct answer was repeated. This method was efficient with participants in the early stage of DTA.

In summary, all three methods are efficient. However, more participants made de most of the spaced retrieval method, which appears to be the most efficient one. We are currently pursuing our research to better understand the mechanisms of these methods and to understand why the spaced retrieval method appears to be the best of the three. Another component of this study examines the efficiency of the methods among elderly persons who do not suffer from memory impairment. Elderly persons can experience some memory problems in their everyday life. These methods might help compensate some of their problems, such as remembering other people's names or appointments.

This is an innovative area of research. A better understanding of these methods will make it possible to improve interventions among people suffering from Alzheimer's and their caregivers. ♪

## ...EFFECT OF LOSS OF BALANCE

The project being submitted will help identify the most important abilities related to the capacity of balance recovery and that are dependent on the direction of the loss of balance. We believe that a limited number of the participants' motor, perceptual-sensory and cognitive abilities will explain a significant portion of the maximal angle of inclination variance for each inclination direction. From the results obtained, the project should help improve the identification of persons who are at risk of falling and the efficiency of fall prevention programs. Doing so can help elderly persons minimize the risk of sustaining injuries and increase their chance of remaining autonomous for a longer period. ♪

### Don't miss the upcoming conference by the Board of Governors:

#### Developing Tissues and Human Organs for a Better Quality of Life

By **Patrick Vermette, Ph. D.**

Researcher at the Research Centre on Aging and Assistant professor at the Department of Chemical Engineering and the Department of Orthopedic Surgery of the University de Sherbrooke

**Tuesday, April 18, 2006 at 2 p.m.**

**At the Amédée-Beaudoin  
Community Centre  
10 Depot St., Lennoxville**

Admission is free for all attendants.



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