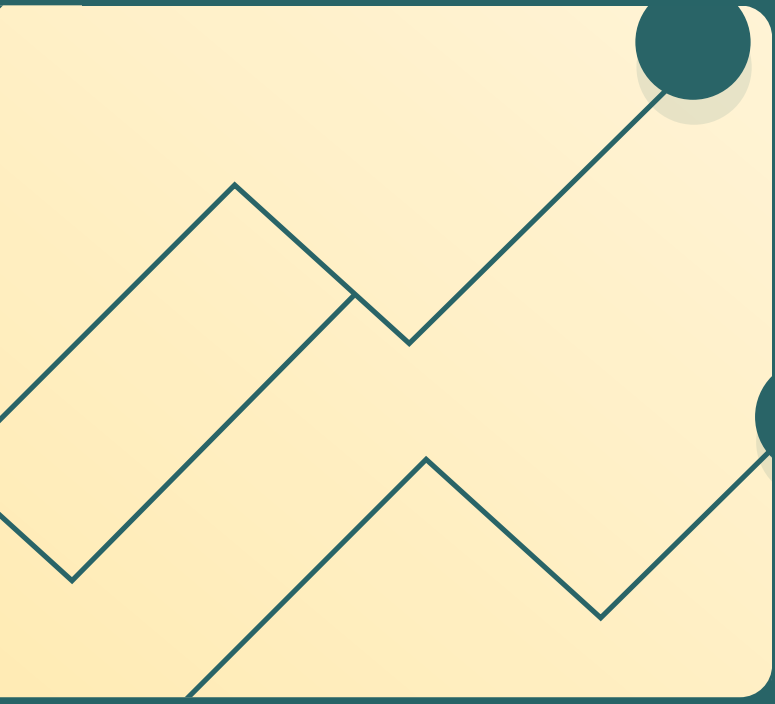
Models of Autonomy

A Social, Economic, and Mathematical Approach to Autonomy in the Ageing Process.



- Agent Based Models
- Complex-Systems approach
- Disability Frailty
- Interdisciplinary approach
- Lifecourse approach
- Quality of life

This project is supported by the Priority Research Program (PPR) Autonomy

The data presented in this document are drawn from the applicants submitted by the selected project.

Models of Autonomy in Brief

Université Paris Cité

Modelling the levers for healthy ageing to help prevent elderly people's loss of autonomy.

Project Leader: Archana Singh-Manoux, Epidemiologist.

12 researchers

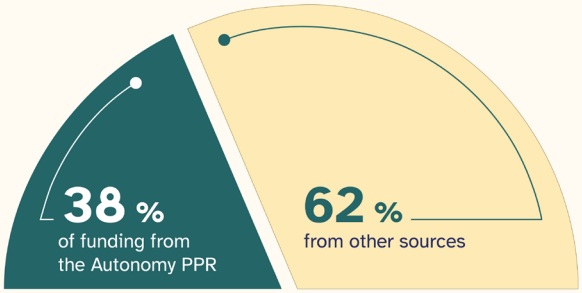
2 PhD students

3 postdoctoral researchers

8 Master's trainees

1 statistician

4 years of funding



Disciplines Involved

Computational Sciences | Economics | Epidemiology | Statistics | Mathematics | Public Health | Health Sciences

Models of Autonomy in Detail

Context

As populations continue to age, the lack of an adequate public health prevention policy is leading to a growing number of individuals experiencing significant loss of autonomy.

Despite increasing life expectancy, little research focuses on identifying issues that could help the elderly to maintain their independence and promote healthy ageing. . Important gaps remain, and result in social practices and health care system that fail to prevent individual behaviours and collective dynamics that heighten health risks, ultimately impacting long-term well-being.

Project's Objectives

1. Identify individual and environmental factor risks that undermine autonomy of older adults.
2. Develop prevention policies that help to reduce risks of loss of autonomy and support healthy ageing.

The Models of Autonomy project aims to produce and analyse a set of statistical data to identify key levers to improving disability prevention among the elderly.

A key focus is to provide policymakers with the necessary knowledge and tools measurements – such as physical fitness assessments and their ability to predict long-term disability on frailty, as well as quality-of-life measures – to guide decisions on prevention and care policies. These insights must also take into account the impact on well-being and cost to society.

Work Program

- Analyse risks and protective factors that enhance loss of independence.
- Develop a quality-of-life measurement tool for older people, incorporating social, health, economic, and emotional dimensions while taking into account for national preferences.
- Design Agent-Based Models (ABMs) that predict the effects of various policies on individual well-being and policy implementation costs.

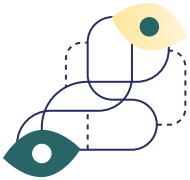
Methodology

The Models of Autonomy project aims to understand how life course dynamics shape the aging process and loss of autonomy. To achieve this, the research team draws on pre-existing longitudinal French cohort studies (GAZEL and CONSTANCES), as well as international ones (Whitehall, UK Biobank, SHARE). This allows them to study reasons of loss of autonomy and to compare underlying issues in various countries.

The project also evaluates the economic impact of national autonomy policies using the ICECAP-A indicator, which captures multiple dimensions of qualify of life. This indicator is employed in a survey conducted in France, assessing public perceptions of the key factors, according to the French population, contributing to well-being.

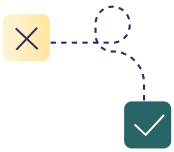
Finally, MOA uses Agent-Based Modelling to simulate society as a dynamic system, comparing the economic relevance of care policies versus prevention strategies aimed at mitigating loss of autonomy. This helps to identify the most effective and desirable approaches.

The premise of the Agent-based modelling is that the development of targeted, personalized preventive actions can help reduce the cost of health and social care. The method will involve the construction of a digital twin of a typical population in order to estimate the relative cost-benefit balance between care provided in instances of loss of autonomy compared to scenarios of prevention through various sampling schemes and detection tools.



Modeling

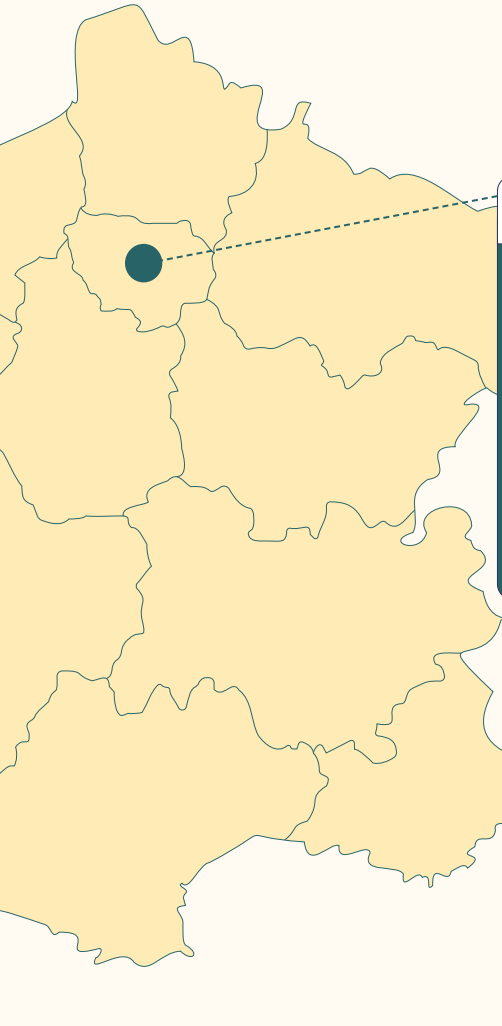
Health status prediction



Preferences and well-being

Partnerships

Academic Partners in France: Laboratories Involved



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CRESS (UMR 1153)
Centre de recherche en épidémiologie et statistiques

I3SP (URP 3625)
Institut des sciences du sport-santé de Paris

LIRAES (URP 4470)
Laboratoire Interdisciplinaire de recherche appliquée en économie-gestion et santé

Find Out More

If you are interested in the issues and challenges involved in the Models of Autonomy project and would like to find out more, the project's teams have put together a reading list of the latest scientific literature.

Understanding Risk Factors

- Dugravot, A., Fayosse, A., Dumurgier, J., Bouillon, K., Rayana, T. B., Schnitzler, A., ... & Singh-Manoux, A. (2020). Social inequalities in multimorbidity, frailty, disability, and transitions to mortality: A 24-year follow-up of the Whitehall II cohort study. *The Lancet Public Health, 5*(1), e42-e50.

- Herr, M., Cesari, M., Landre, B., Ankri, J., Vellas, B., Andrieu, S., & MAPT/DSA Study Group. (2019). Factors associated with changes of the frailty status after age 70: Findings in the MAPT study. *Annals of Epidemiology, 34,* 65-70.

Economics and Dependency

- Coast, J., Smith, R. D., & Lorgelly, P. (2008). Welfarism, extra-welfarism and capability: The spread of ideas in health economics. *Social Science & Medicine, 67*(7), 1190-1198.

- Grewal, I., Lewis, J., Flynn, T., Brown, J., Bond, J., & Coast, J. (2006). Developing attributes for a generic quality of life measure for older people: Preferences or capabilities?. *Social Science & Medicine, 62*(8), 1891-1901.

- Roussel, R. (2017). Personnes âgées dépendantes : les dépenses de prise en charge pourraient doubler en part de PIB d'ici à 2060. *Etudes et résultats, 1032*.

- Rapp, T., Ronchetti, J., & Sicsic, J. (2022). Impact of formal care consumption on informal care use in Europe: What is happening at the beginning of dependency?. *Health Policy, 126*(7), 632-642.

How to model health's phenomenons

- Aguayo, G. A., Donneau, A. F., Vaillant, M. T., Schritz, A., Franco, O. H., Stranges, S., ... & Witte, D. R. (2017). Agreement between 35 published frailty scores in the general population. *American Journal of Epidemiology, 186*(4), 420-434.

- Kojima, G. (2017). Frailty as a predictor of disabilities among community-dwelling older people: A systematic review and meta-analysis. *Disability and Rehabilitation, 39*(19), 1897-1908.

- Kuh, D., Karunananthan, S., Bergman, H., & Cooper, R. (2014). A life-course approach to healthy ageing: Maintaining physical capability. *Proceedings of the Nutrition Society, 73(*2), 237-248.

- Tracy, M., Cerdá, M., & Keyes, K. M. (2018). Agent-based modeling in public health: Current applications and future directions. *Annual Review of Public Health, 39*, 77-94.

Partners


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Want to learn more about the project ? Get in touch with us:

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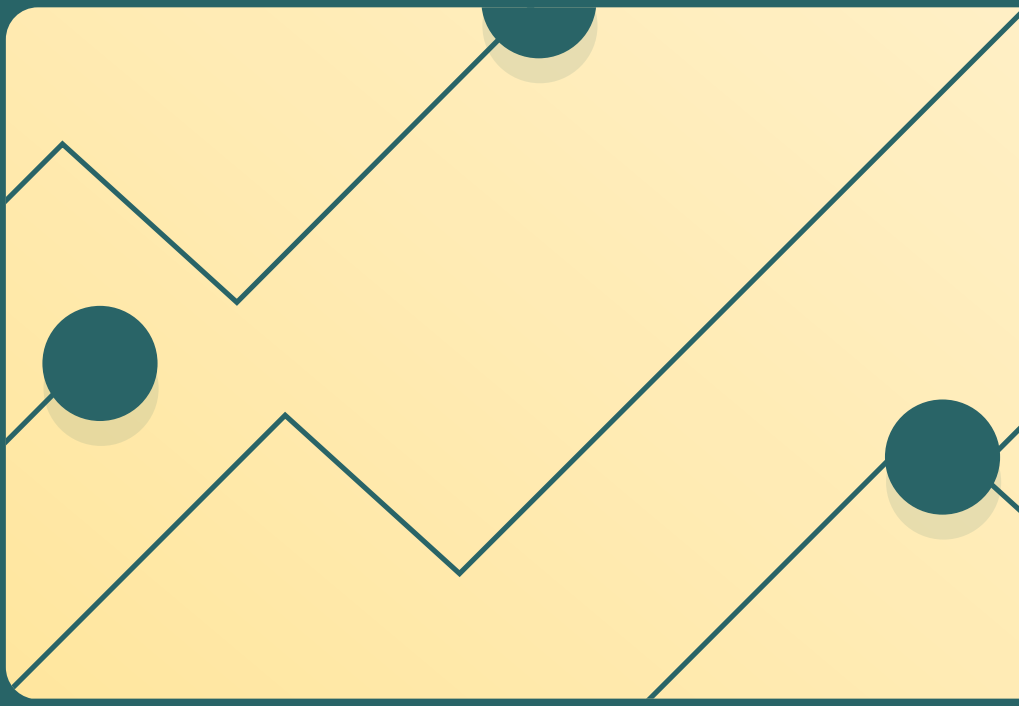

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