GT PISTIL

Changement de comportement en psychologie et conception centrée utilisateur

Conférence IHM'25, Toulouse, 4 novembre 2025

Systèmes interactifs persuasifs/engageants /...

Persuasive Technologies (Fogg)

=> Persuasive principles, Functional triad, Influence principles

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BCSS : Behavior Change Support Systems (Oinas-Kukkonen)

=> PSD model (Primary task, Dialogue, Credibility, Social)

Systèmes interactifs persuasifs/engageants /...

Persuasive Technologies (Fogg)

=> Persuasive principles, Functional triad, Influence principles

BCSS : Behavior Change Support Systems (Oinas-Kukkonen)

=> PSD model (Primary task, Dialogue, Credibility, Social)

DBCI : Digital Behavior Change Intervention

=> BCT : Behavior Change Techniques

Planning

- Introduction

- Atelier No 1 (~20 minutes)
  Concevoir une application pour l'activité physique
- Synthèse
- Présentation No 1
  Théories en psychologie du changement de comportement

- 15h30 PAUSE

- Présentation No 2
  Interfaces motivationnelles en santé
- Atelier No 2 (~20 minutes)
  Re-concevoir une application pour l'activité physique
- Synthèse

Atelier No 1

Concevoir une application

(description textuelle et/ou quelques maquettes)

pour **pratiquer régulièrement**
de la **marche et/ou course à pied**

groupes de 2

raisons

aider des associations

but recherché

remise en forme

promener le chien pour marcher

Objectifs (....)

Objectifs de récurrence

objectif fixe / quantité stable

objectif fixé par soi-même (...)

objectif à la journée / hebdo
objectif progressifs
objectifs assignés (quête)

motivation

persuasion

messages décalés
personnage du tamagochi

discours positif
personnage sympathique

planification

notification (....)
planning des objectifs

Intervention

lien avec professionnels de santé
adapté au profil psychologique

feedback

tracé de la marche
nombre de calories
nombre de pas
fréquence cardiaque
historique (graphique)

social (....)

marche avec des amis
date de tamagochi
lien avec carnet contacts

satisfaction

émotions/plaisir

progression

badges (...)

nombre de pas (..)
temps
distance

dispositifs

montre connectée (..)
téléphone (...)

gains / récompenses (.....)

gagner des croquettes
badges (...)
points -> réduction facture / achat tapis
redistribution à des associations

[Skinner]

Renforcement / Punition

Type de changement de stimulus

Effets sur le comportement	Présentation ou augmentation	Retrait ou diminution
↑	Renforcement positif (S^{R+})	Renforcement négatif (S^{R-})
↓	Punition positive (S^{P+})	Punition négative (S^{P-})

[Skinner]

Types de stimuli de renforcement

Stimulus de renforcement
- Inconditionnel (ou primaire)
- Conditionnel (ou secondaire)

Stimulus de punition
- Inconditionnel (ou primaire)
- Conditionnel (ou secondaire)

Edible reinforcers

Sensory reinforcers

Tangible reinforcers

Activity reinforcers

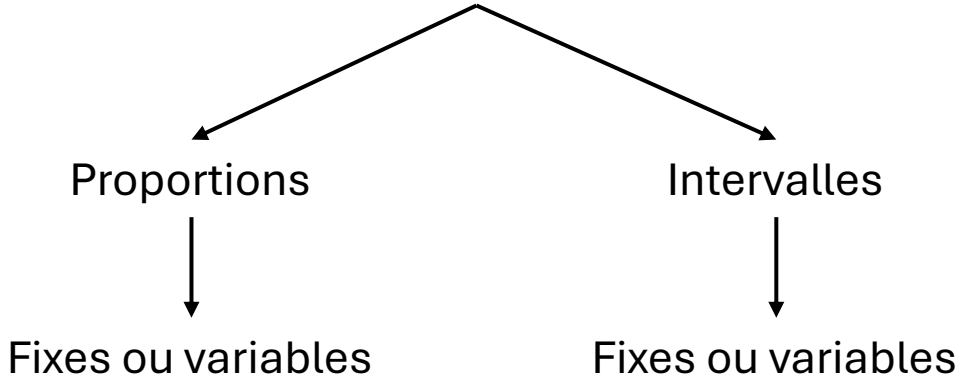
[Skinner]

Three-term contingency

$S^D : R \rightarrow (S^{R+}, S^{R-}, S^{P+}, S^{P-})$

Programme de renforcement continu (CRF)

Programme de renforcement intermittent (INT)



Renforcement différentiel (DRH, DRL, DRD, …)

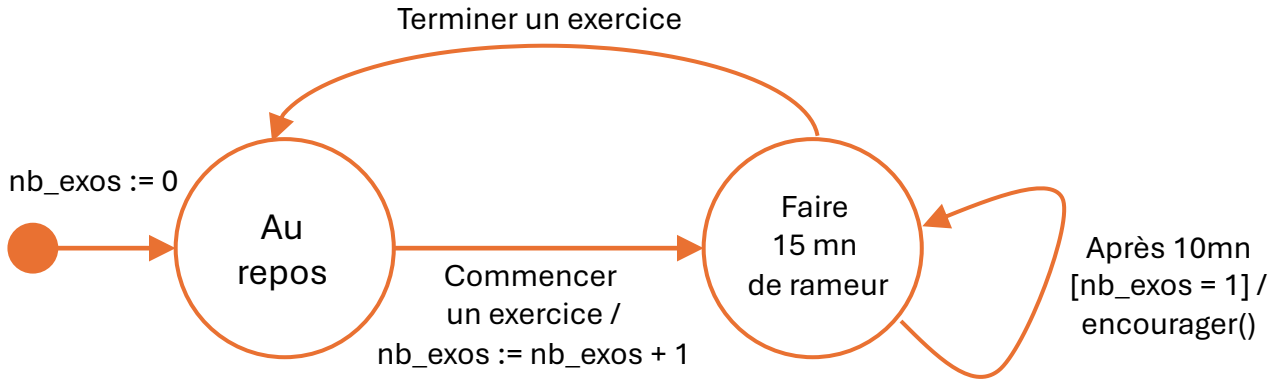
Programmes de renforcement combinés (Concurrent, multiples, …)

Programmes de renforcement

Exemples

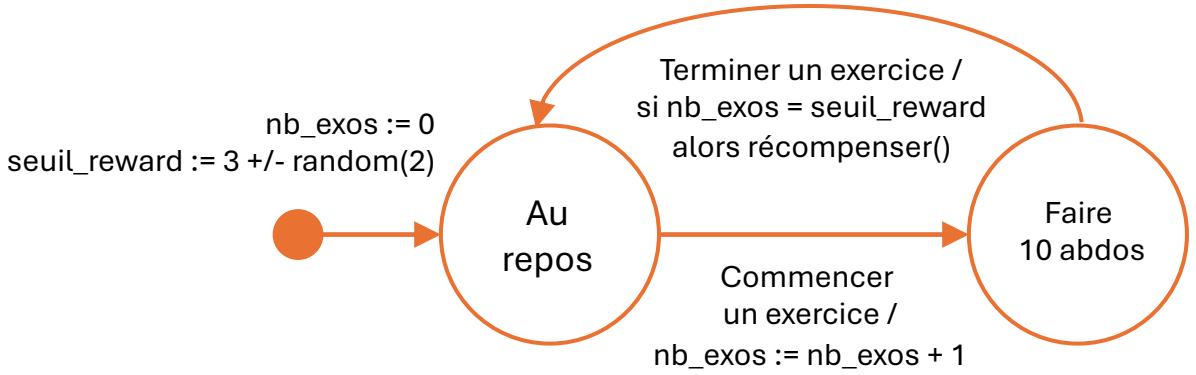
Intervalle fixe

Recevoir un encouragement
pour le tout premier exercice de rameur
au bout de 10mn



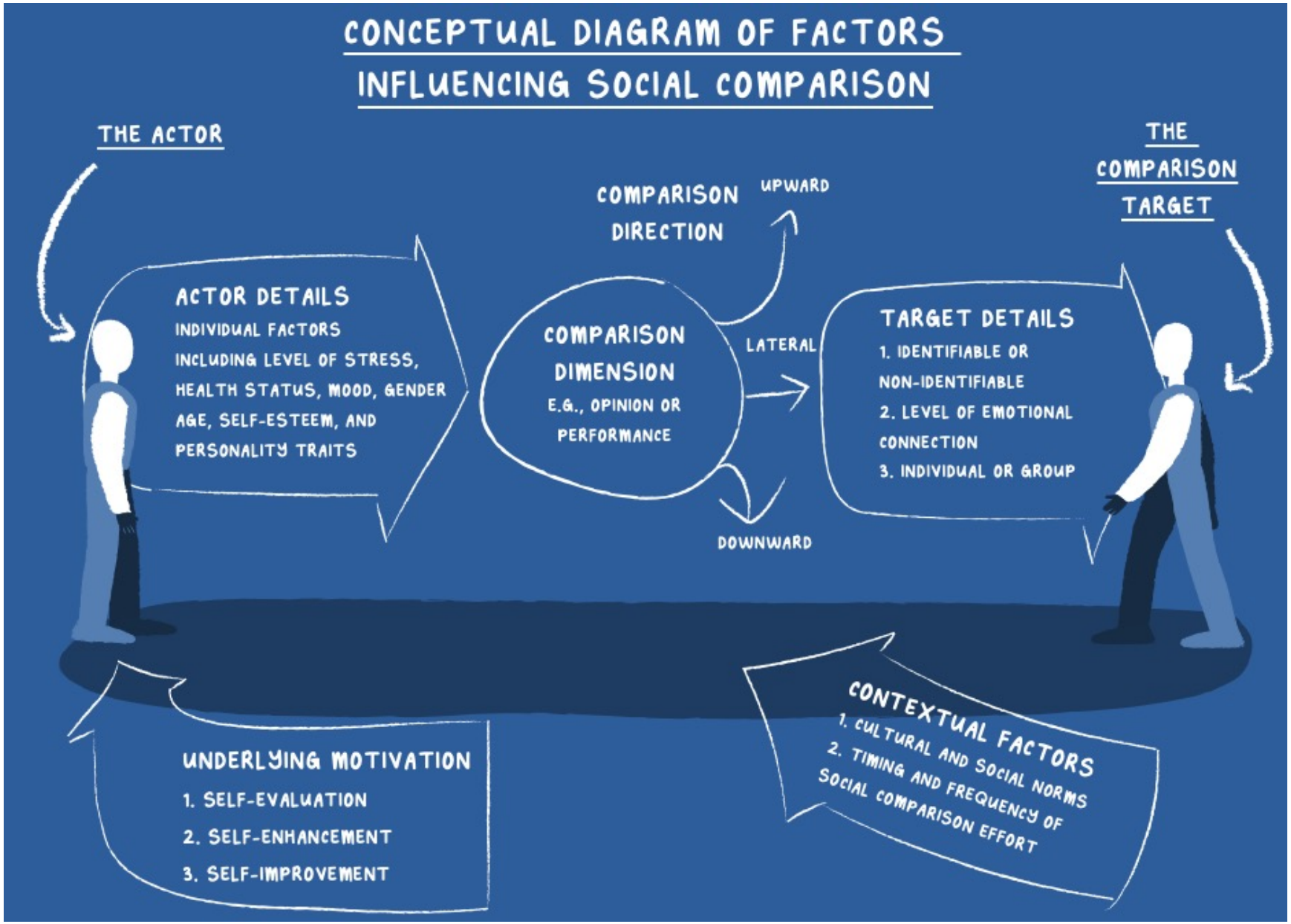
Proportion variable

Recevoir une récompense
après, en moyenne,
trois exercices d'abdominaux



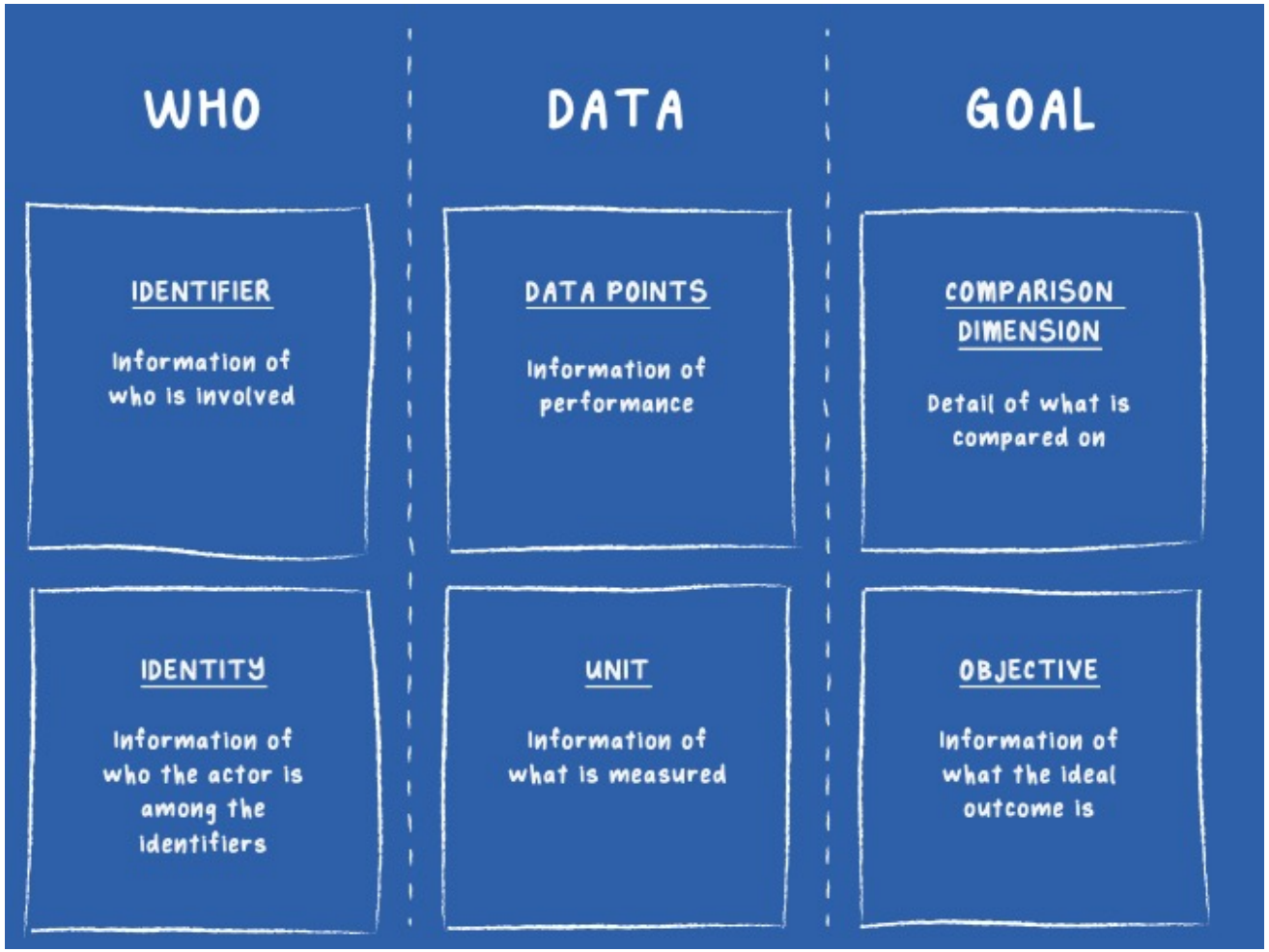
[Festinger]

Comparaison sociale : concepts



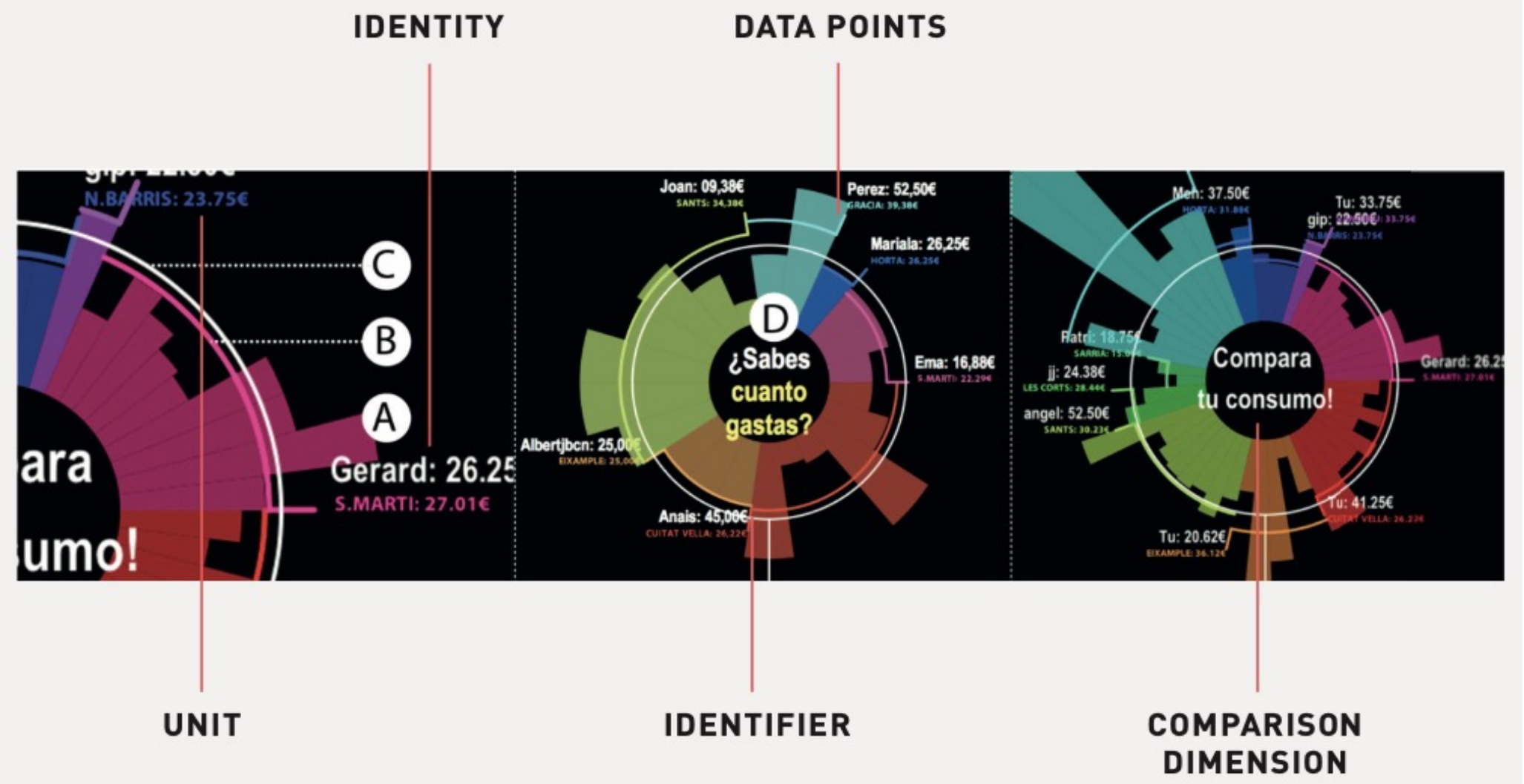
[Festinger]

Comparaison sociale : building blocks



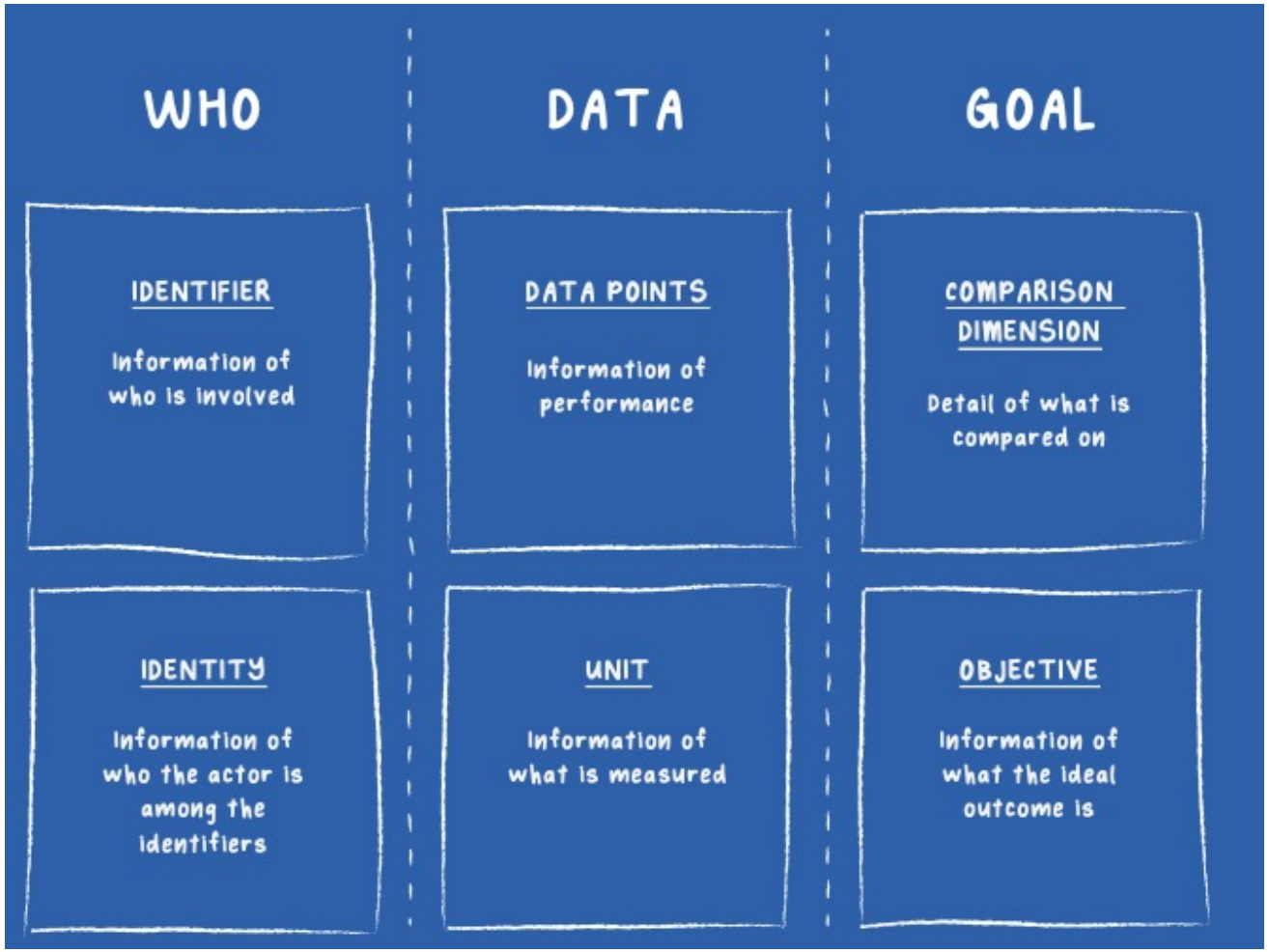
Reduce body fat!
body fat lost:
U1: 20%
U2: 10%
U1=Jane, U2=John

Comparaison sociale : building blocks



[Festinger]

Comparaison sociale : building blocks



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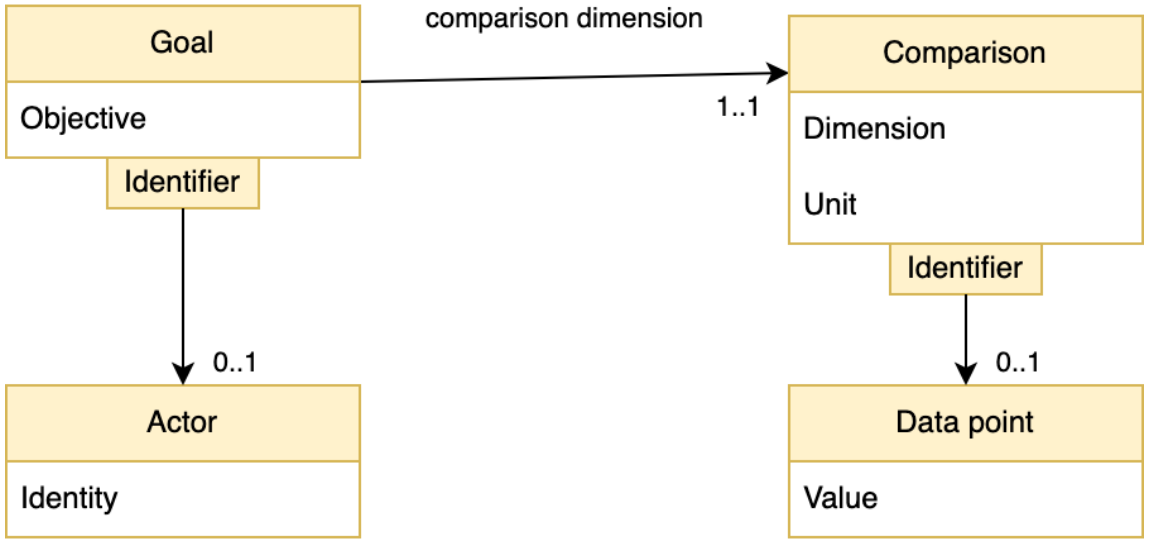
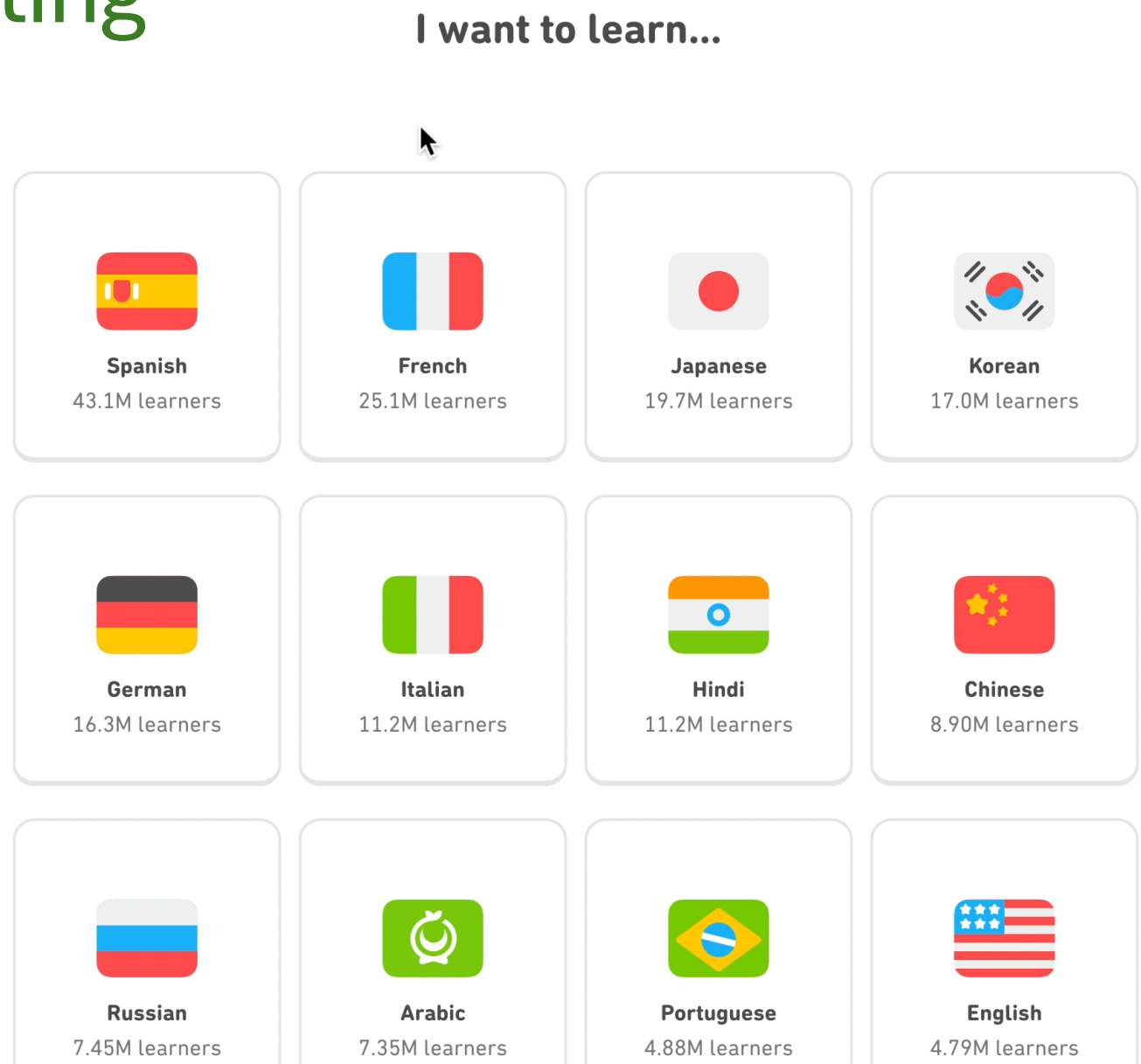


[Locke&Latham]

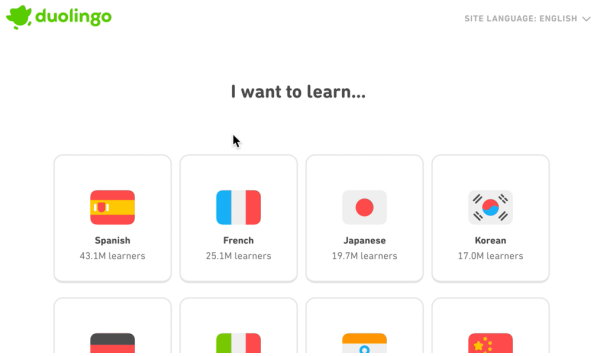
Goal-Setting



[Locke&Latham]

Goal-Setting

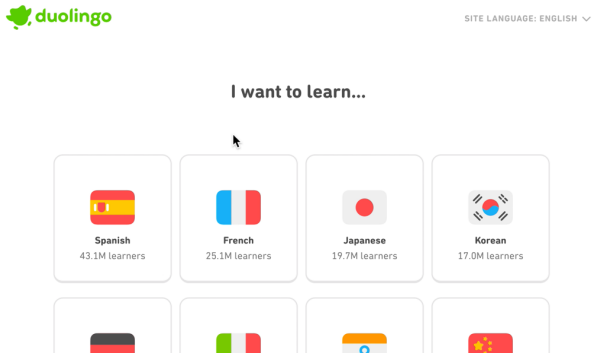
D'un objectif général ...



[Locke&Latham]

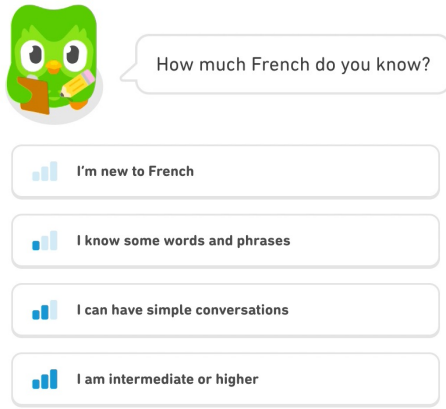
Goal-Setting

D'un objectif général ...

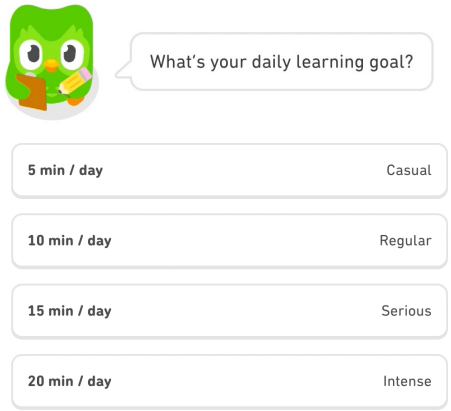


... à un objectif caractérisé [goal properties]

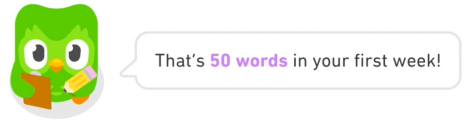
Difficulté



Durée



Précision & Granularité

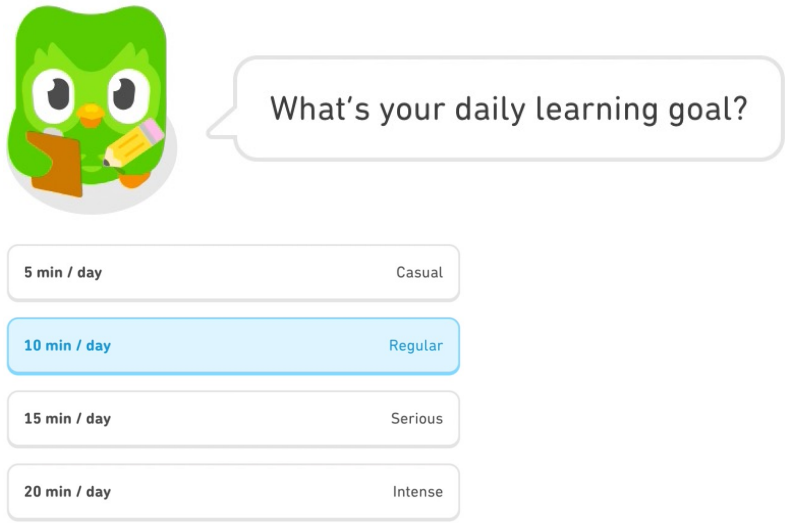


[Locke&Latham]

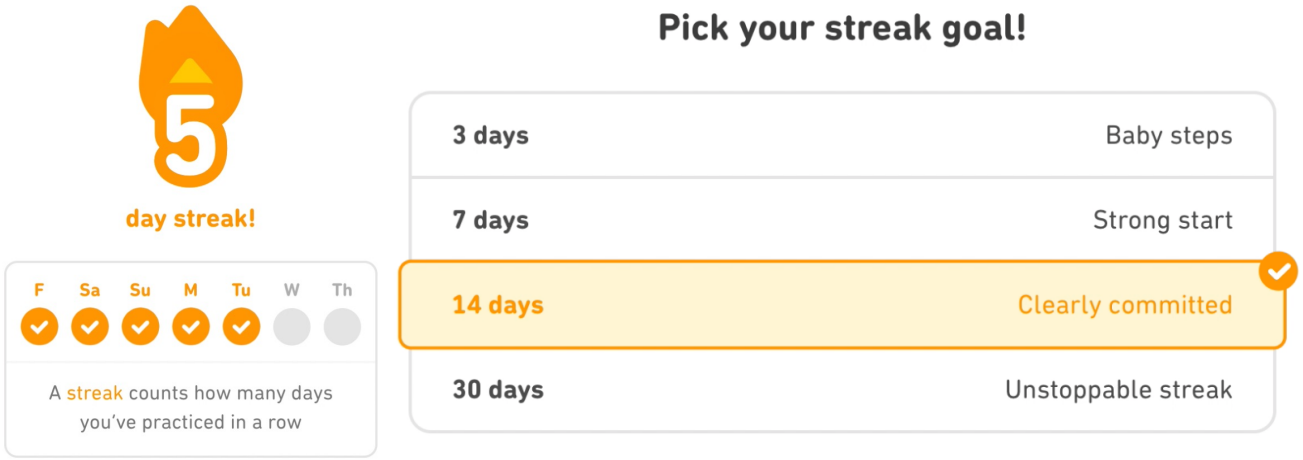
Goal-Setting

Temporalité

[proximal goal]



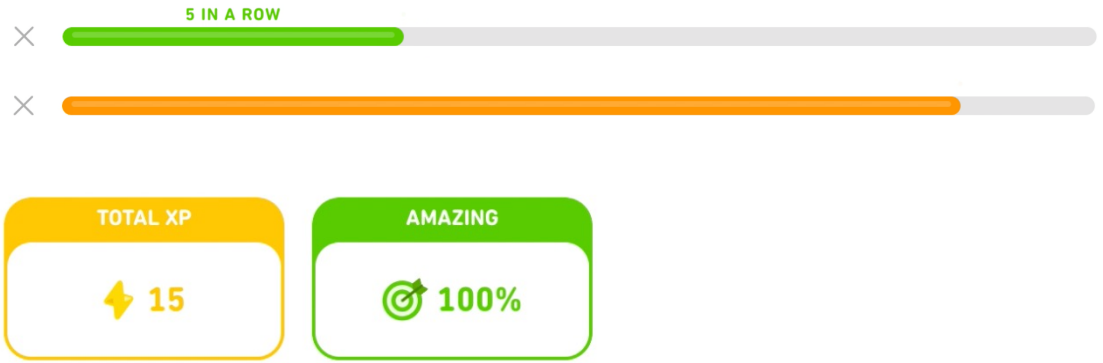
[distal goal]



[Locke&Latham]

Goal-Setting

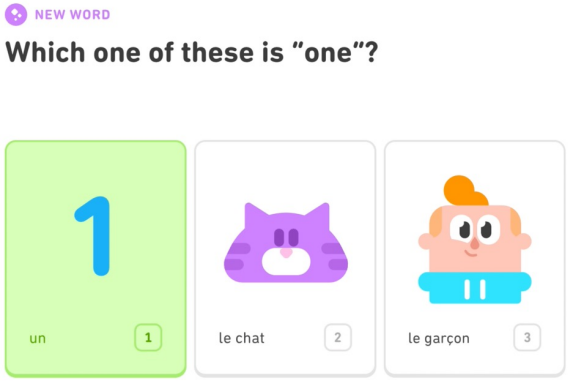
[feedback] [performance]



[achievement] [satisfaction]

Lesson Complete!

[task complexity]



[Locke&Latham]

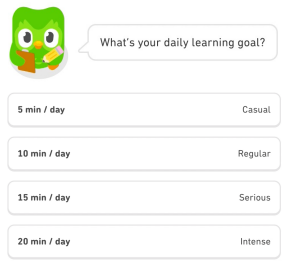
Goal-Setting

[commitment]

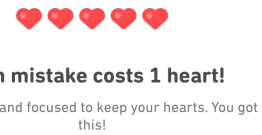
=

[importance]

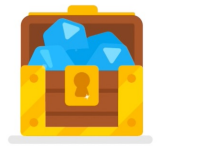
[goal sources]



[incentives]



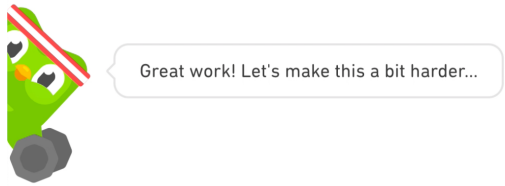
[rewards]



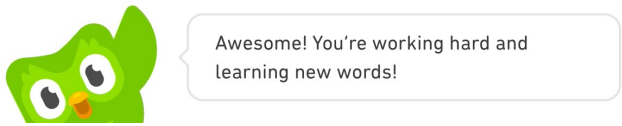
+

[self-efficacy]

Modèle de confiance



Persuasion



Goal-Setting

Building Blocks

Goal
Objective
Target
Difficulty
Time Frame

Importance
Benefits
Relevance
Engagement
Consequences

Action
Task
Complexity
Frequency
Intensity
Duration
Resources
Situations

Progress
Variable
Unit
Data

Planning
Milestones
Reminders

Satisfaction
Achievement
Enjoyment

Interfaces et Interactions Motivationnelles en Santé

Jean-Claude MARTIN

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INTERVIEW
JULIEN
SASTRE
SELECTIONNEUR EQUIPE DE FRANCE

Sélectionneur équipe BMX Racing JO Paris 2024

- 8 Champions du monde, 0 JO
- Collaboration => Coopération
- Théorie de l’AutoDétermination

Laboratory LISN - CNRS, Université Paris-Saclay, CS Team “Cognition Perception Use »

J.-C. Martin (Head) | C. Clavel | N. Sabouret | V. Demulier | V. Boccara | E. Prigent | B. Ravenet | C. Le Bail

8 permanent researchers

3 **Computer Science** + 5 **Psychology** / **Ergonomics** + 15 PhD students and postdocs

Inspire from Psychological theories
for designing human-computer interactions

Designing human-computer interactions
to better understand humans

5 thèses sur motivation, activité physique, santé, personnalisation, gamification

1. Gabriela Fernandes. **Rôle de l'orientation régulatrice et des émotions dans la pratique régulière d'activités physiques et sportives**. Allocation doctorale CNRS GDR Sport et activité physique. Thèse débutée le 3 Octobre 2022. Directeur de thèse : JC Martin (35%). Co-encadrement : Xavier Sanchez (40%), Brian Ravenet (25%). ED Sciences du sport, de la motricité et du mouvement humain (SSMMH).

2. Rébéca Colombié. **Etude des facteurs qui permettent d'induire des émotions positives vis-à-vis de l'activité physique chez des adolescents dans le cadre scolaire de l'EPS et de nourrir un rapport positif vis-à-vis de l'AP pour une pratique physique durable**. Thèse débutée le 27 novembre 2023. Directeur de thèse : Jean-Claude Martin (50%). Co-encadrement : Charline QUICLET (50%).

3. Morghane Aubert. **Personnalité et changement de comportement : application au coaching personnalisé informatisé pour patients diabétiques**. Co-encadrante : Céline Clavel (50%), JCM (50%). Débutée le 01/12/18. Soutenue le 16 Septembre 2022.

4. David Rei. **Interactions Humain-Machine Adaptées à la Personnalité des Utilisateurs : Application de Motivation à l'Activité Physique.** Allocation doctorale de l'Ecole Doctorale STIC, Paris Saclay, débutée le 01/09/2019, soutenance prévue le 25 mars 2024. Directeur de thèse : Jean-Claude Martin (20%). Co-encadrants : Brian Ravenet (50%) et Céline Clavel (30%). Soutenue le 25 mars 2024.

5. Florian Debackere. **Interaction Homme-Machine: e-Coaching personnalisé, motivationnel et adaptatif pour les activités physiques de patients lombalgiques**. Thèse débutée le 01/10/2020. Financement projet BACK-4P. Directeur de thèse : Jean-Claude Martin (50%). Co-encadrante : Céline Clavel (50%). Soutenue le 22 Octobre 2024.

BACK PAIN

Debackere, F., Clavel, C., Roren, A., Rannou, F., Nguyen, C., Tran, V.-T., Messai, Y., Martin, J.-C. Evaluation of a tailored mobile application for self-management of low back pain: towards a metamodel for designing behavior change technologies (2025). Proceedings of the ACM (Association of Computing Machinery) CHI conference on Human Factors in Computing Systems. Yokohama, Japan. April 26, 2025 to May 1. 26 pages. https://docs.google.com/document/d/1JNn5c8SLod18sAIUeaQecEWY7W_jTR4Z/edit?usp=sharing&ouid=113794616771059627631&rtpof=true&sd=true

Florian Debackere, Céline Clavel, Alexandra Roren, Viet-Thi Tran, Yosra Messai, François Rannou, Christelle Nguyen, and Jean-Caude Martin. 2023. Design framework for the development of tailored behavior change technologies. In Adjunct Proceedings of the 31st ACM Conference on User Modeling, Adaptation and Personalization (UMAP '23 Adjunct). International Workshop on Adaptive and Personalized Persuasive Technologies (ADAPPT). Association for Computing Machinery, New York, NY, USA, 140–146. https://drive.google.com/file/d/18NFfnfvwfw0B9WUM8wRLbvr13gRW8dgv/view?usp=sharing

WALKING

Rei, D., Clavel, C., Martin, J.-C., Ravenet, B. (2024) Adapting goals and motivational messages on smartphones for motivation to walk. Journal Smart Health. Volume 32, June 2024. https://www.sciencedirect.com/science/article/pii/S2352648324000382

Falck, M., Martin, J.-C., Le Scanff, C., Clavel, C. (2023) Impact of a Regulatory Fit Motivational Virtual Coach on Users During Physical Activity. Psychology, 2023, Vol.14 No.11, Scientific Research Publishing. https://www.scirp.org/journal/paperinformation.aspx?paperid=129521

RUNNING

Gomes Fernandes G., Martin J.C., Sanchez X. (2023). Commercial running apps : How much do they support users' psychological needs? European college of sport science (ECSS) en juillet 2023

Abstract :
https://drive.google.com/file/d/1DULP3Gh7cKObJ0BV6ht7f-aIR68NQEEC/view?usp=drive_link (page 592)

Poster :
https://docs.google.com/presentation/d/1LOT8nfgu65g57AAgk18sC6NJR9ZNnK9M/edit?usp=sharing&ouid=113794616771059627631&rtpof=true&sd=true

Gomes Fernandes, G., Ravenet, B., Martin, J.-C., Sanchez, X. (2024) Design of mobile phone and smartwatch running apps that better motivate and fit user's needs: A user-centred, participatory research. 17th FEPSAC Congress. Insbruck, Austria. 15/07 - 19/07/24. WWW.FEPSAC2024.EU. .JPEG

DIABET

Aubert M, Clavel C, Le Scanff C, Martin J.-C. (2024) Intervention to Improve Well-Being, Nutrition, and Physical Activity in Adults: Experimental Study. JMIR Form Res 2024;8:e47251 https://formative.jmir.org/2024/1/e47251 DOI: 10.2196/47251

Plan

1. Contexte

2. Application pour motiver à marcher

3. Application BACK-4P pour le mal de dos

Interact to motivate

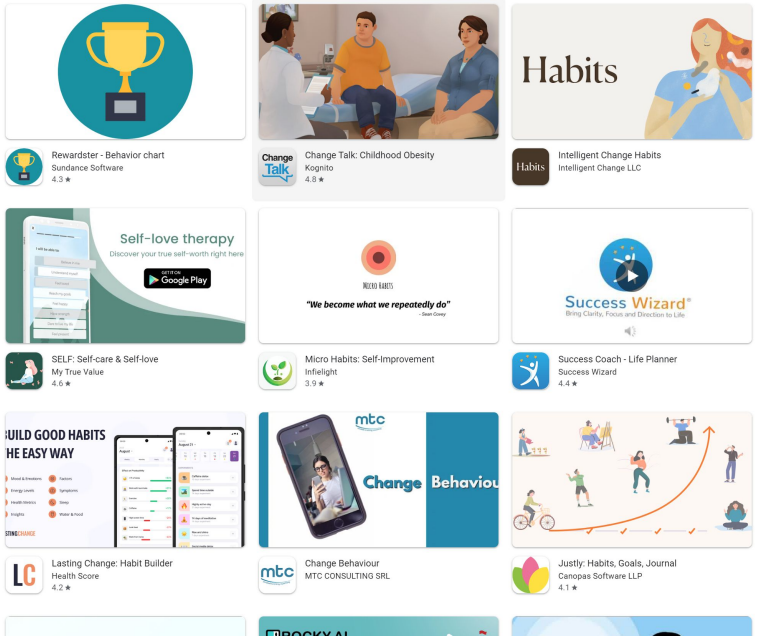
(Milne-Ives et al. 2020)

Using Motivational Interviewing Approaches

RNAO Communications
1,69 k abonnés
S'abonner

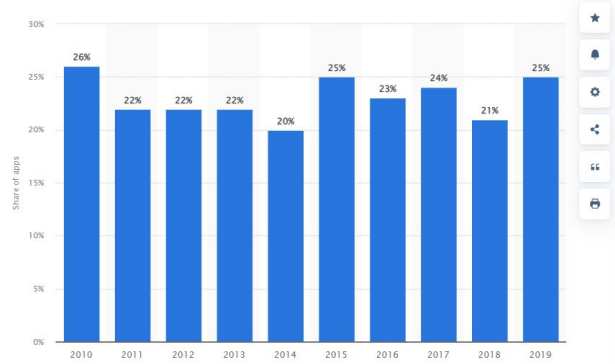
2,3 k | Partager | Télécharger | Extrait

215 k vues il y a 8 ans
...afficher plus



Motivate to interact

Percentage of mobile apps that have been used only once from 2010 to 2019



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Release date
May 2019

Region
Worldwide

Survey time period
2010 to 2019

Number of respondents
12,000 respondents

Special properties
data is based on Localytics platform, wider industry metrics may vary

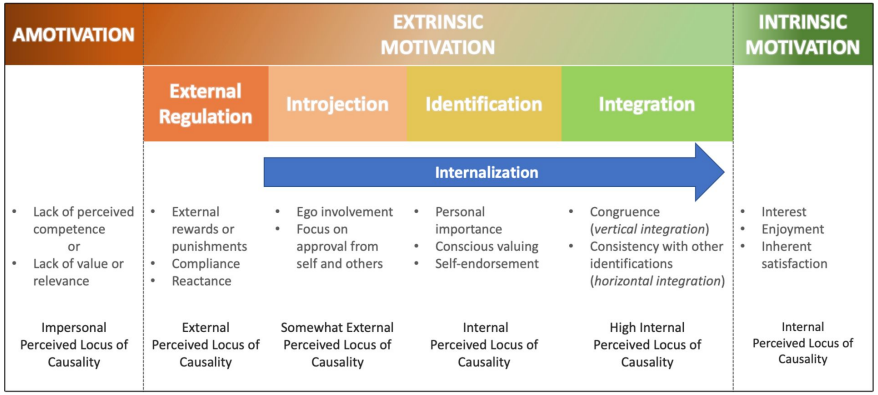
Mobile apps: abandonment rate 2012-2019

Published by Laura Ceci, Aug 25, 2023

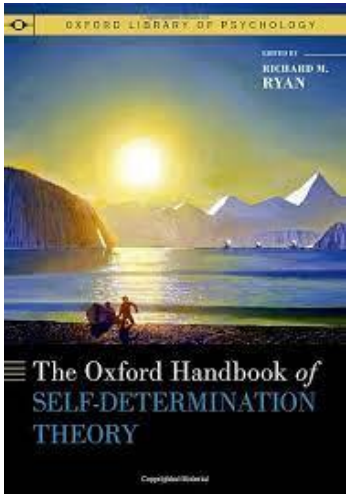
The statistic shows the percentage of apps used only once after their installation from 2010 to 2019. During the most recent survey period, it was found that 25 percent apps downloaded by mobile app users worldwide were only accessed once after download.

Theories of motivation

- Motivation: “how to move oneself or others to act”
- Content theories (what) and process theories (how)
- Self-Determination Theory (Deci & Ryan 1985)
  - 6 mini theories, including Basic Psychological Needs Theory (BPNT)
    - Autonomy, Competence, **Affiliation**
  - Continuum of motivation from amotivation, extrinsic to intrinsic motivation

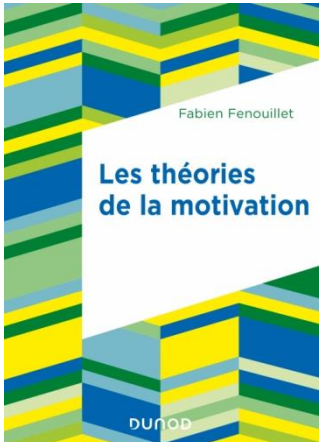


Note. From the Center for Self-Determination Theory © 2019. Reprinted with permission.



(Ryan 2023)

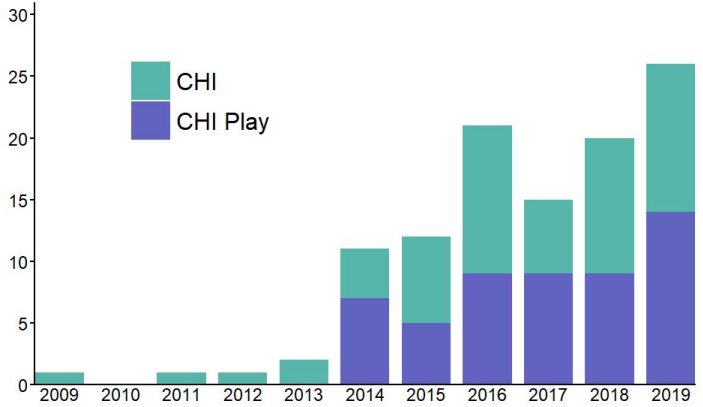
(Fenouillet 2023)



Motivation in Human-Computer Interaction

- (Tyack CHI 2020)
  - Self Determination Theory in HCI games

- (Brühlmann CHI 2018)
  - Motivation = the “Why” of interaction
  - Defines the User Motivation Inventory to measure different types of motivation for technology use



Subscale	Item
Amotivation	1. I use [X], but I question why I continue to use it 2. I use [X], but I wonder what is the point in using it 3. I use [X], but I don’t see why I should keep on bothering with it
External regulation	1. Other people will be upset if I don’t use [X] 2. I use [X] because others will not be pleased with me if I don’t 3. I feel under pressure from others to use [X]
Introjected regulation	1. I would feel bad about myself if I quit [X] 2. I would feel guilty if I quit using [X] 3. I would feel like a failure if I quit using [X]
Identified regulation	1. Using [X] is a sensible thing to do 2. The benefits of using [X] are important to me 3. Using [X] is a good way to achieve what I need right now
Integrated regulation	1. I use [X] because it reflects the essence of who I am 2. Using [X] is consistent with my deepest principles 3. I use [X] because it expresses my values
Intrinsic motivation	1. I use [X] because it is enjoyable 2. I think using [X] is an interesting activity 3. Using [X] is fun

RESEARCH-ARTICLE
OPEN ACCESS
April 2025

'It's a spectrum': Exploring Autonomy, Competence, and Relatedness in Software Development Processes and Tools

Novia Wong, Nai-Yu Cheng, Bruna Oewel, Katherine E Genuario, SarahElizabeth Stoeckl, + 4

CHI '25: Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems • Article No.: 151, Pages 1–19 • https://doi.org/10.1145/3706598.3713250

The recent surge of research on software developer mental health challenges highlights the importance and urgency of studying solutions to support developer wellbeing. Self-Determination Theory (SDT) offers a valuable framework for exploring wellbeing at ...

WORK IN PROGRESS
April 2025

A Self-Determination Theory-based Career Counseling Chatbot: Motivational Interactions to Address Career Decision-Making Difficulties and Enhance Engagement

Hyerim Han, Bogyeom Park, Kyoungwon Seo

CHI EA '25: Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems • Article No.: 48, Pages 1–9 • https://doi.org/10.1145/3706599.3720286

Post-college unemployment represents a significant social problem, driven by graduates' career decision-making difficulties. Many individuals seek career counseling, but most methods focus on information delivery rather than motivation. Without sufficient ...

RESEARCH-ARTICLE
September 2021

Informed Choices, Progress Monitoring and Comparison with Peers: Features to Support the Autonomy, Competence and Relatedness Needs, as Suggested by the Self-Determination Theory

Gabriela Villalobos-Zúñiga, Iyubanit Rodríguez, Anton Fedosov, Mauro Cherubini

MobileHCI '21: Proceedings of the 23rd International Conference on Mobile Human-Computer Interaction • Article No.: 13, Pages 1–14 • https://doi.org/10.1145/3447526.3472039

The use of fitness apps (some based on behavior change theories) is increasing. Recently a taxonomy mapped app features to the Basic Psychological Needs (BPNs) posited by the Self-Determination Theory (SDT), providing the opportunity to inform the ...

Personalization vs. Tailoring

Persuasive System Design (PSD)

(Oinas-Kukkonen and al., 2009)

Personalization

Requires a lot of individuals data

Tailoring

Need only data allowing to identify the user's profile

7 key tailoring concepts

(op den Akker and al., 2014):

- Feedback
- Goal setting
- User targeting
- Inter-human interaction
- Self learning
- Context awareness
- Adaptation

F. Debackere, C. Clavel, A. Roren, V-T. Tran, G. Snoubra, Y. Messai, F. Rannou, C. Nguyen, J-C. Martin (2022) Profiling of low back pain patients for the design of a tailored coaching application. 10th int Conf on affective computing & intelligent interaction (**ACII 2022**), IEEE Nara, Japon. Octobre

Tailoring motivational messages

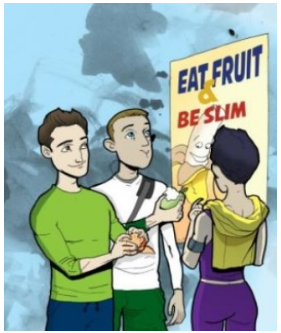
- Tailored text messages sent by email or displayed on a mobile device can also be effective in encouraging people to be more physically active (Martinez et al, 2013).

REGULATORY FOCUS THEORY (RFT) Théorie de l'Orientation Régulatrice (TOR)

Higgins (1998, 2012)

PROMOTION

- Need for achievement
- Achieving one's goals



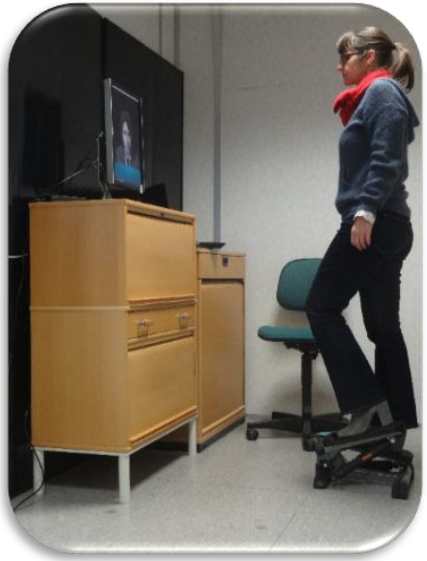
PREVENTION

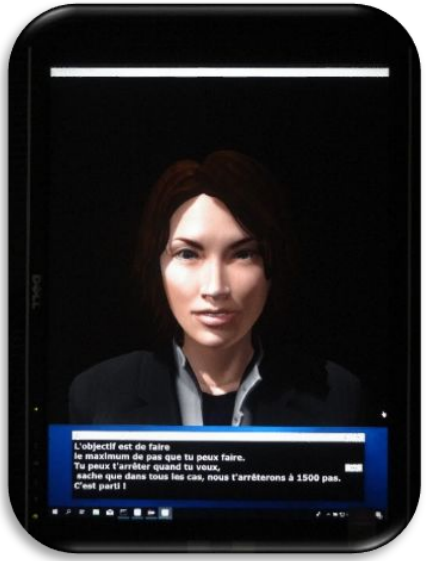
- Need for security
- To feel protected

Regulatory fit – more effective to present information that matches individual's orientation (Higgins, 2012)

Framing – refers to the way information is presented to individuals (Tversky and Kahneman, 1981)

Tailored Motivational Interactions
Virtual coach physical activity





- Promotion focus
  "You've taken 1,000 steps. Good for you! Your perseverance will pay off. "
- Prevention focus
  - "You've taken 1,000 steps. Keep up the good work. You mustn't slacken your efforts"

- Motivational messages in fit with user's personality improve performance for prevention users
- Theories : Self Determination Theory / Regulatory Focus Theory

Falck, M. , Martin, J. , Le Scanff, C. and Clavel, C. (2023) Impact of a Regulatory Fit Motivational Virtual Coach on Users during Physical Activity. Psychology, 14, 1743-1756. doi: 10.4236/psych.2023.1411102

Challenges
Limitations of User Centered Design (in eHealth)

“One can probe how one should persuade or support patients with diabetes to be more physically active, but **if the participant is unmotivated to do so, every question or probe is likely to result in a negative reply**, if not an aversion to the design session in itself,
or could lead to a socially accepted reply just to be over and done with the session.

J Med Internet Res. 2022 Oct; 24(10): e37341.
Published online 2022 Oct 5. doi: 10.2196/37341

PMCID: PMC9582917
PMID: 36197718

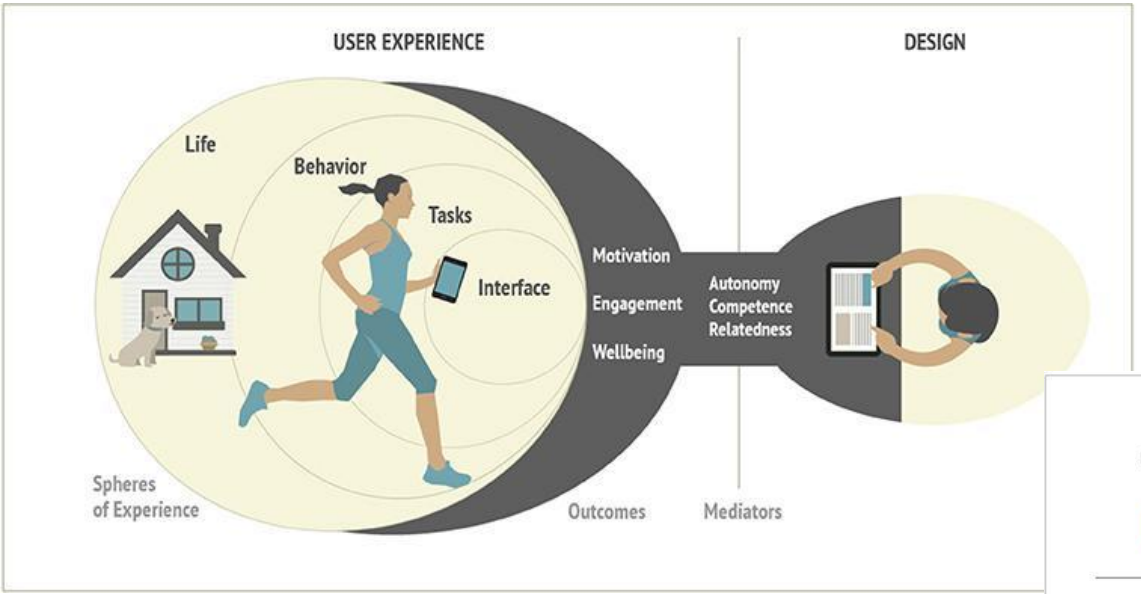
The Limitations of User-and Human-Centered Design in an eHealth Context and How to Move Beyond Them

Monitoring Editor: Tiffany Leung

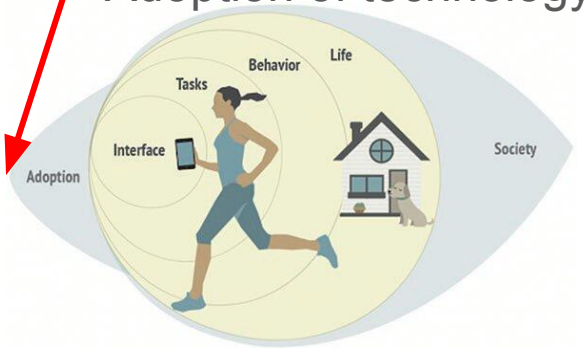
Reviewed by Pieter Gorp, Sari Kujala, and Tracie Risling

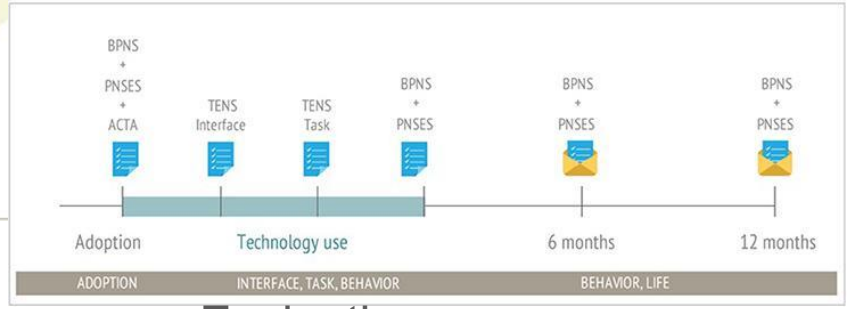
Lex van Velsen,[1,2] Geke Ludden, PhD,[corresponding author3] and Christiane Grünloh, PhD[1,4]

Challenges
Framework for designing motivational HCI



Adoption of technology



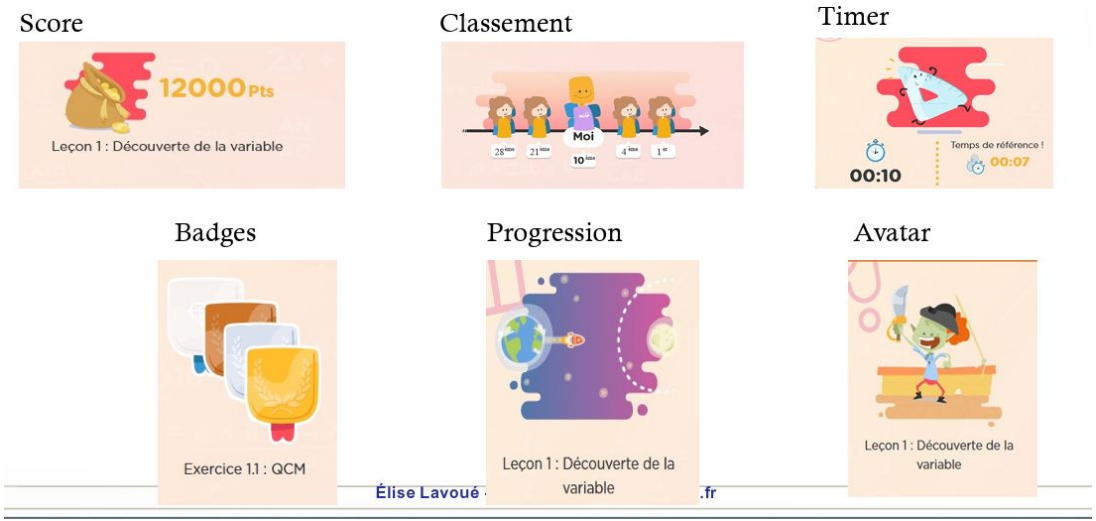


Evaluation measures
(TAM, SUS, …) but SDT focused

Peters D, Calvo RA and Ryan RM (2018) Designing for Motivation, Engagement and Wellbeing in Digital Experience. *Front. Psychol*. 9:797.

Gamification / ludification adaptative (Elise Lavoué & Audrey Serna LIRIS)

- Utilisation d'élément de design de jeu dans des contextes non jeu » (Deterding 2011)
- Eléments de gamification
- Profils de joueur HEXAD (Andrzej Marczewski 2015)
  - Achiever
  - Disruptor
  - Free Spirit
  - Philanthropist
  - Player
  - Socializer



S. Dumas Reyssier, A. Serna, S. Hallifax, J.-C. Marty, S. Simonian & E. Lavoué (2023) How does adaptive gamification impact different types of student motivation over time?, Interactive Learning Environments.

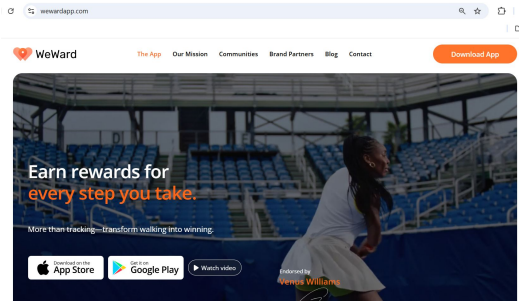
Plan

1. Contexte

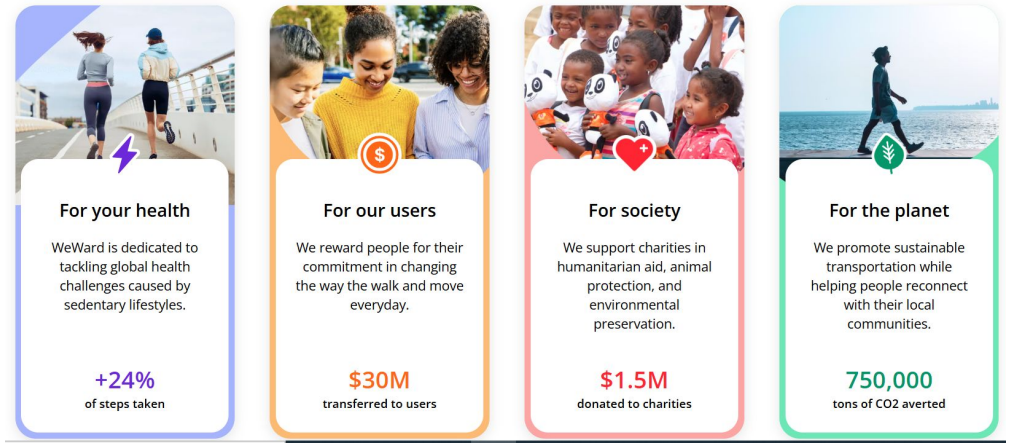
2. **Application pour motiver à marcher**

3. Application BACK-4P pour le mal de dos

WeWard: a gamified mobile application for motivating to walk

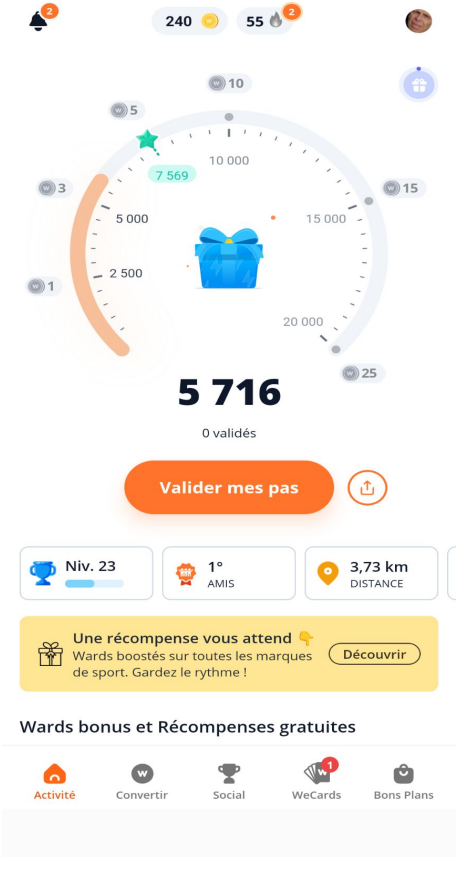


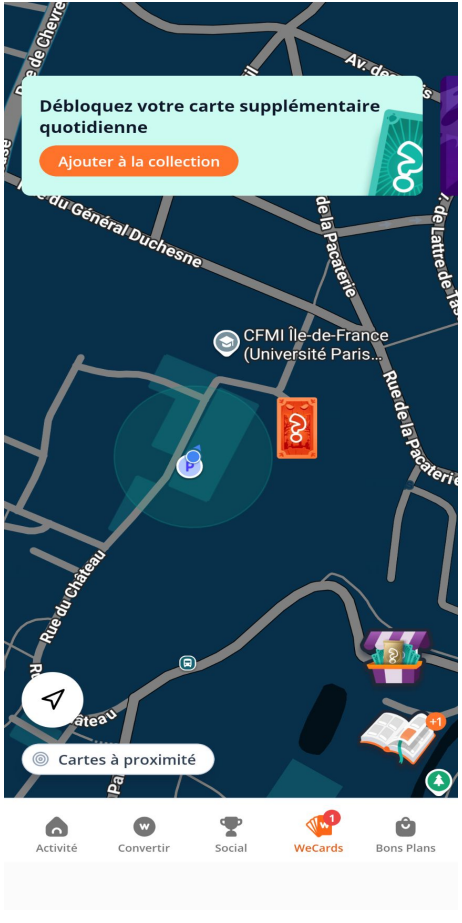
- 25 million walkers across 29 countries
- Founded in 2019 Yves Benchimol and Tanguy de La Villegeorges
- gamified challenges, financial incentives, and socially-driven experiences

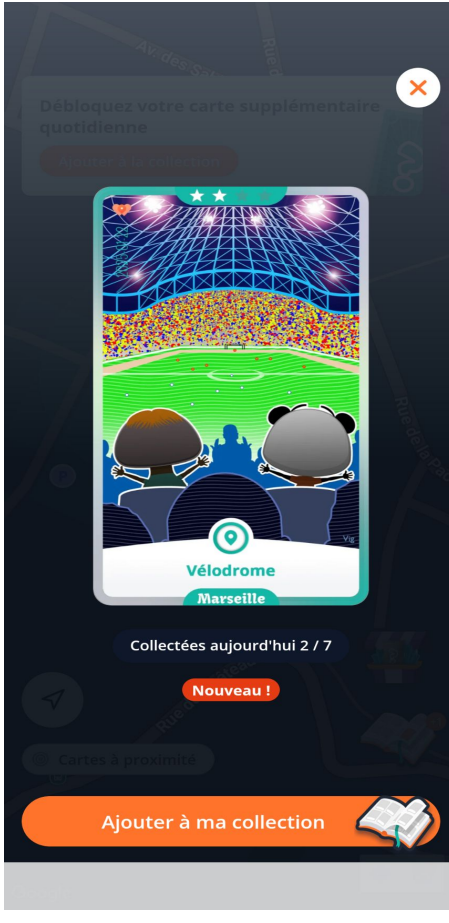


https://www.wewardapp.com/

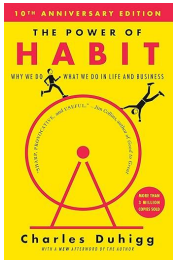
WeWard: a gamified mobile application for motivating to walk

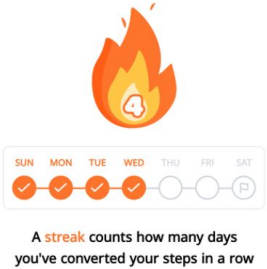






WeWard: a gamified mobile application for motivating to walk





- Bestselling book The Power of **Habit**, C. Duhigg
  - Cue: A notification reminding users to validate their steps.
  - Routine: The act of walking and validating steps.
  - Reward: The satisfaction of seeing the Streak grow and earning Wards.
  - Over time, this loop becomes automatic, turning daily walking into a habit.
- Daniel Kahneman and Amos Tversky : loss aversion
  - users aren't just working toward a goal, they're also avoiding the disappointment of losing their progress
- WeWard's Streak
  - visual counter that tracks how many consecutive days you've validated your steps in the app.
  - every day you log your steps, it grows by 1, represented by a flame.
  - the longer your Streak, the more flames you accumulate.
  - if you miss a day, your Streak resets to zero.
- Social
  - Amis / Ligue / Communauté, classement

https://www.wewardapp.com/

WeWard: a gamified mobile application for motivating to walk


Université Paris Nanterre

École doctorale 396 : Économie, Organisation et Société
Laboratoire : EconomiX (UMR 7235)

Membre de l'université Paris Lumières

Claire MOLLIER

Comportements et Perceptions à l'épreuve de la comparaison sociale

Expériences en laboratoire et sur le terrain

Thèse présentée et soutenue publiquement le 26 novembre 2024
en vue de l'obtention du doctorat de **Sciences économiques** de l'Université Paris Nanterre
sous la direction de Monsieur Tarek JABER-LOPEZ
(CSIC, Instituto de Políticas y Bienes Públicos)

- RCT 20 000 utilisateurs : 3 types de messages
  - comparaison avec pairs => augmente utilisation appli
  - comparaison avec soi => plus actif
  - augmente le nb de pas des utilisateurs inactifs

- 14 000 utilisateurs
  - femmes enregistrent plus souvent leur pas mais marchent moins
  - => importance des interactions

Et aussi : Nabil Kabbadj, Hadrien Bajolle, Nicolas Louvet, Nudging sustainable mobility: an empirical analysis based on the WeWard app, Transport Policy, Volume 172, 2025, 103786, ISSN 0967-070X, https://doi.org/10.1016/j.tranpol.2025.103786.
https://www.wewardapp.com/blog/science-backs-weward-digital-nudges-proven-to-boost-walking-and-cut-emissions

Plan

1. Contexte

2. Application pour motiver à marcher

3. **Application BACK-4P pour le mal de dos**

Mobile health applications

- Project BACK 4P - CNRS, APHP, Fondation Arthritis Recherche

Reduces costs *(Du et al., 2020)*

Improves the accessibility and reach of health coaching *(Whitehead & Seaton, 2016 ; Du et al., 2020)*

Not widely downloaded or used *(IQVIA, 2021)*

Average quality and effectiveness rarely empirically assessed *(Irvine et al., 2015 ; Machado et al., 2016)*

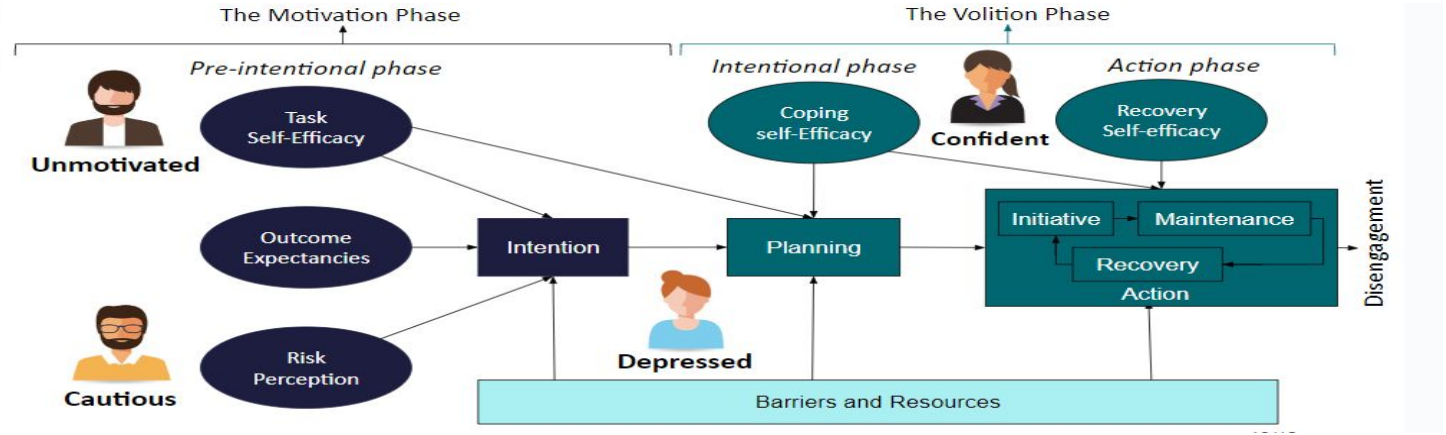
Involving **healthcare professionals and patients** *(Torous et al., 2019 ; Michie et al., 2017)*

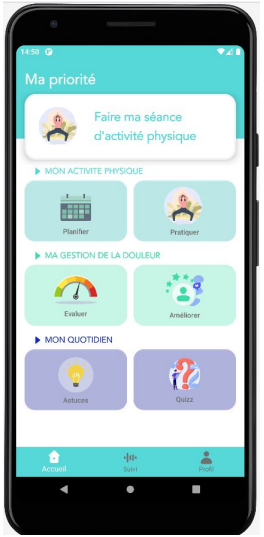
Drawing on behaviour change theories *(Michie et al., 2017; Walsh & Groarke, 2019)*

Designing an adaptive intervention *(Blandford, 2019; Greenhalgh et al., 2017; Michie et al., 2017)*

Designing Tailored Motivational Interactions for Back Pain Patients

- HAPA model for behavior change in health
- Individual profiles
- Motivational messages tailored according to Self Determination Theory
- Adapted recommandations

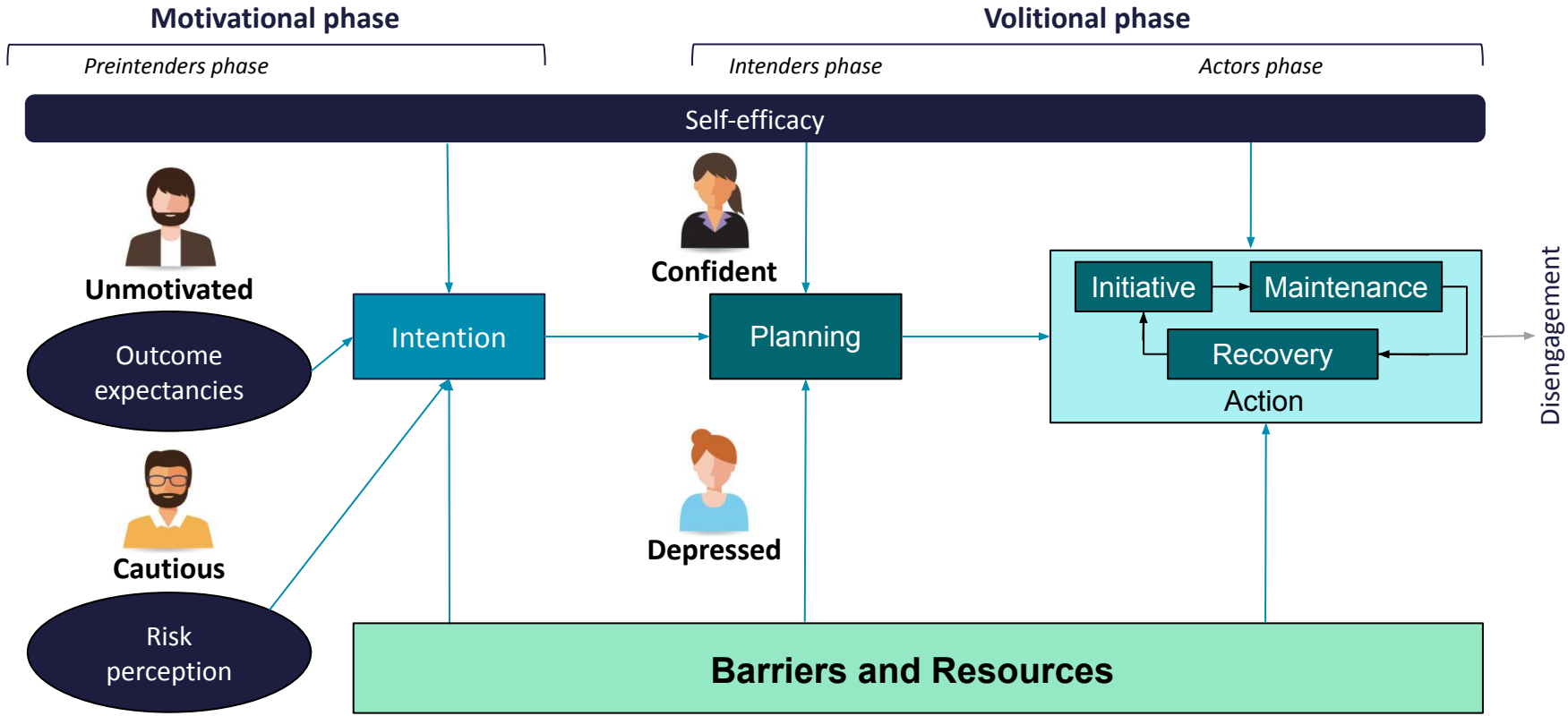




F. Debackere, C. Clavel, A. Roren, V-T. Tran, G. Snoubra, Y. Messai, F. Rannou, C. Nguyen, J-C. Martin (2022) Profiling of low back pain patients for the design of a tailored coaching application. 10th int Conf on affective computing & intelligent interaction (**ACII 2022**), IEEE Nara, Japon. Octobre
Project BACK 4P

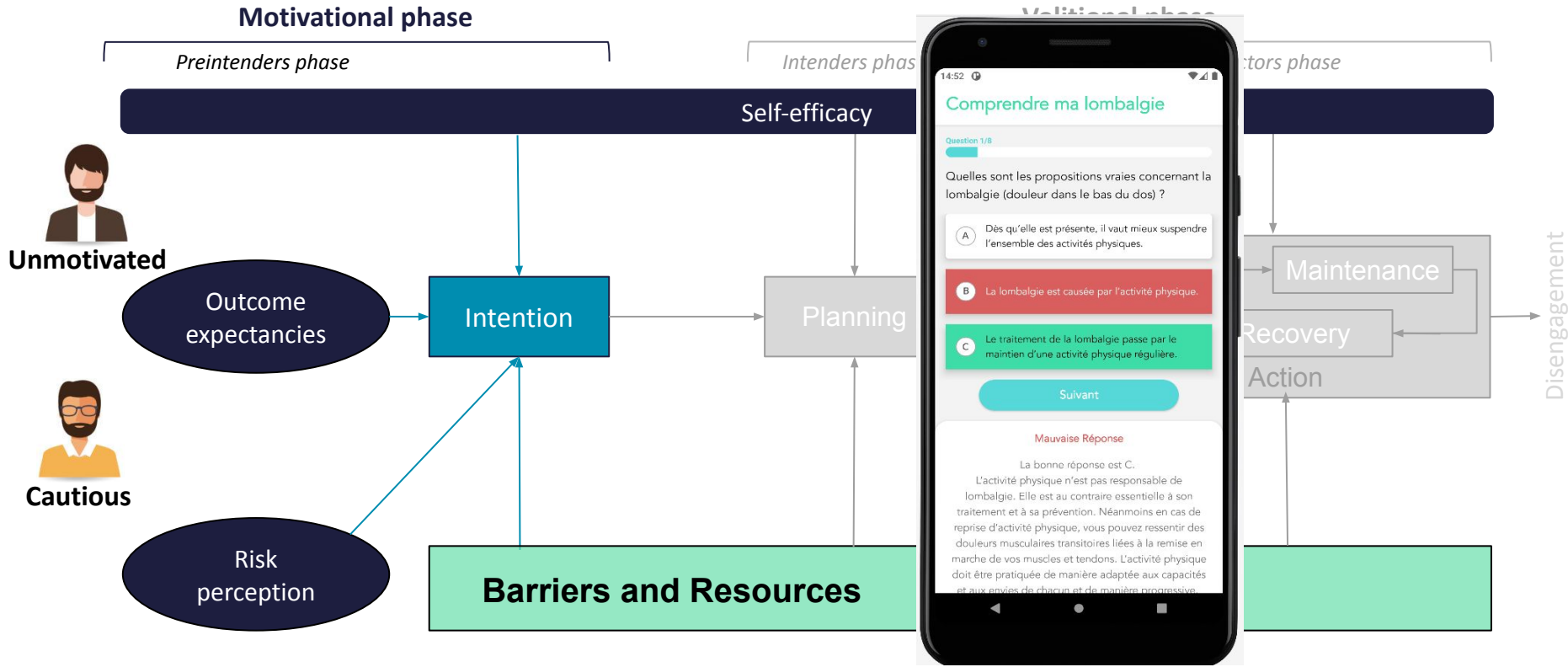
Back pain patients and the HAPA model : tailored vs personalised

- Debackere, F., Clavel, C., Roren, A., Rannou, F., Nguyen, C., Tran, V.-T., Messai, Y., Martin, J.-C. Evaluation of a tailored mobile application for self-management of low back pain: towards a metamodel for designing behavior change technologies (2025). Proceedings of the ACM (Association of Computing Machinery) CHI conference on Human Factors in Computing Systems. Yokohama, Japan. April 26, 2025 to May 1.

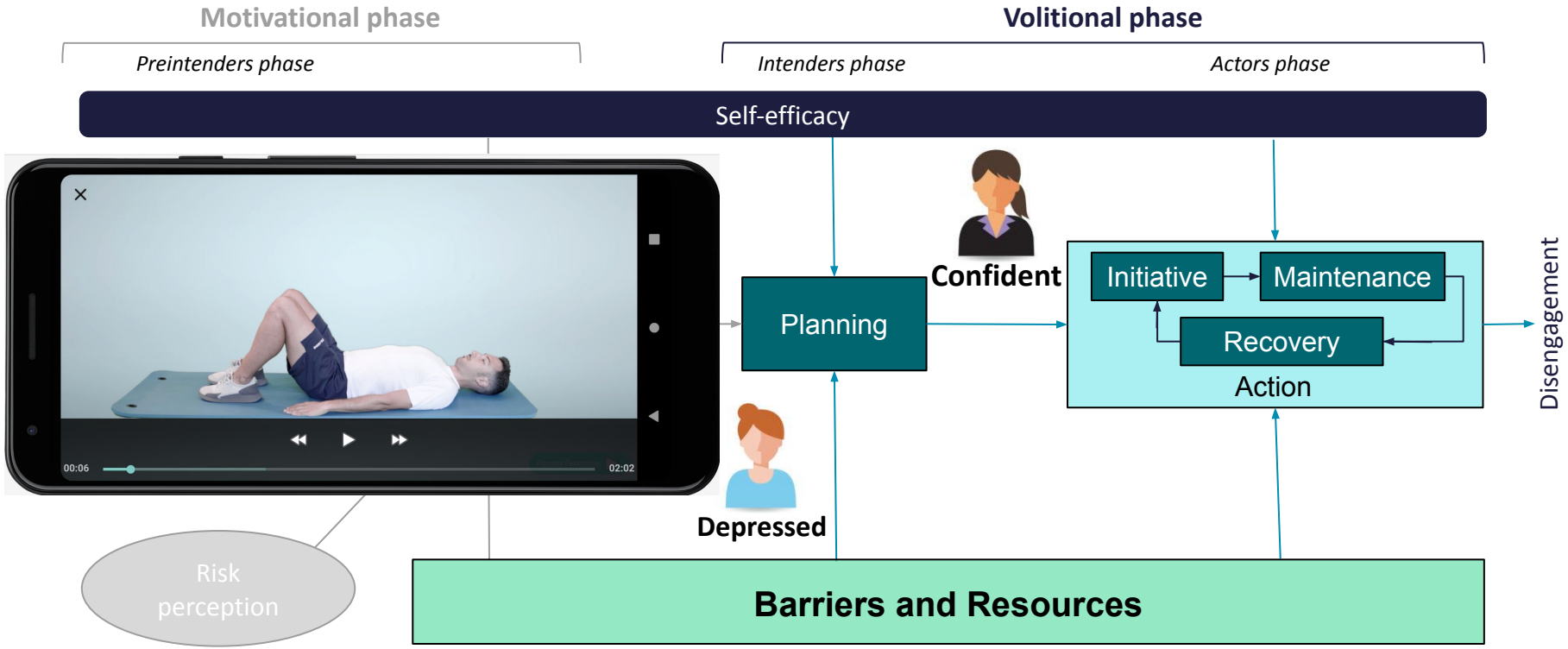


Designing personalised application for helping back pain management: QUIZZ

- Debackere, F., Clavel, C., Roren, A., Rannou, F., Nguyen, C., Tran, V.-T., Messai, Y., Martin, J.-C. Evaluation of a tailored mobile application for self-management of low back pain: towards a metamodel for designing behavior change technologies (2025). Proceedings of the ACM (Association of Computing Machinery) CHI conference on Human Factors in Computing Systems. Yokohama, Japan. April 26, 2025 to May 1.



Designing personalised application for helping back pain management: VIDEO EXERCISES



Designing personalised application helping back pain management: MOTIVATIONAL MSG

Unmotivated

"Avoid other health problems by giving yourself a moment to do your exercise session!"

Confident

"Feel the pleasure of exercising by taking a moment to do your exercise session!"

External regulation	Introjected regulation	Identified regulation	Integrated regulation	Intrinsic regulation

Extrinsic motivation | **Intrinsic motivation**

Self-determination continuum

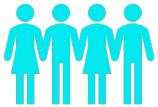
Hypothesis

H1. Interaction results in (a) a good user experience and (b) good engagement

H2. Intervention enables the process of behaviour change to evolve

H3. Adaptation increases these effects

Participants



60 participants downloaded the app

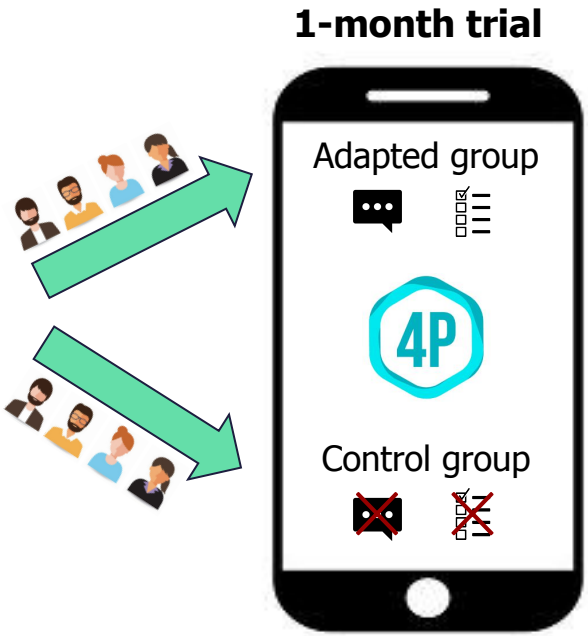
67% of woman
Age : m ≃ 46 years
(sd ≃ 14 years)

31 participants completed the final questionnaire

Method

Level of physical activity
(Craig et al., 2003)
Profile characteristics:

- **Motivation**
  (Boiché et al., 2016)
- **Fears and beliefs**
  (Waddel et al., 1993)
- **Self-efficacy**
  (Lacasse et al., 2015)
- **Depression**
  (Kroenke & Spitzer, 2001)

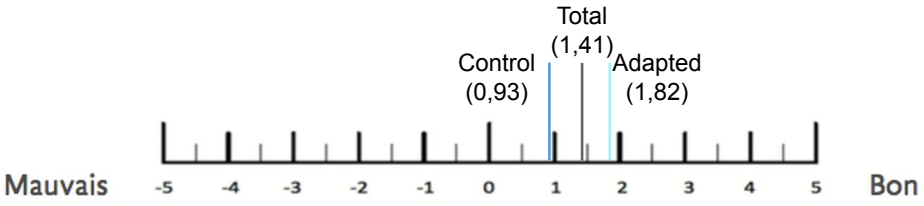


User experience
(Lallemand & Koenig, 2017)

Protocol validated by the CER of the University of Paris-Saclay and by the CNRS Data Protection Department

Results of the interaction

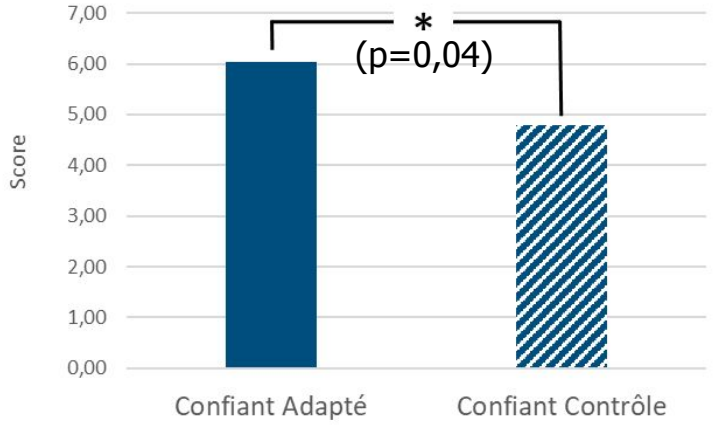
User experience



31 respondents : 17 Adapted / 15 Control

1 Unmotivated	**2 Cautious**	**5 Depressed**	**23 Confident**
1 Control	2 Adapted	2 Adapted 3 Control	13 Adapted 11 Control

Avoiding negative emotions

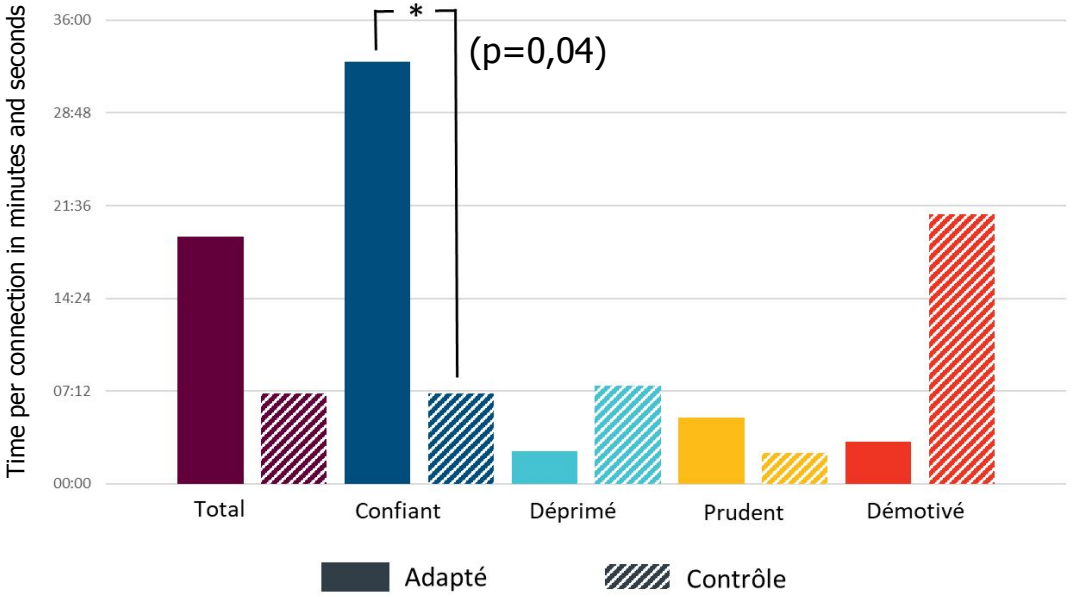


- **H1a (interaction UX) validated**
- **H3 (adaptation) partially validated for confident users**

Results of the interaction

Engagement to use

- Use stopped after 14 days (*sd=12.5 days*)
- Average duration of 13min30s per connection (*sd=49min*)
- Total duration of use 1h15min (*sd=2h04min*)



60 participants : 32 Adapted / 28 Control

3 Unmotivated	**11 Cautious**	**13 Depressed**	**33 Confident**
2 Adapted	7 Adapted	6 Adapted	17 Adapted
1 Control	4 Control	7 Control	16 Control

✗ **H1b (interaction engagement) invalidated**

✓ **H3 (adaptation) partially validated for confident users**

Journal Springer JMUI

Home > Journal on Multimodal User Interfaces

Journal on Multimodal User Interfaces

Publishing model

Hybrid

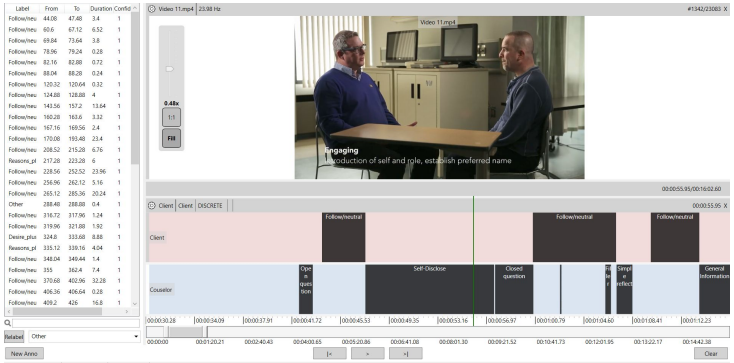
Interfaces et Interactions Motivationnelles en Santé

Jean-Claude MARTIN

Professor of Computer Science
LISN Laboratoire Interdisciplinaire des Sciences du Numérique
CNRS, Université Paris-Saclay
jean-claude.martin@lisn.upsaclay.fr

Understanding Motivational Interviewing

- Limitations of UCD for **amotivated** participants
- Motivational Interviewing enhances motivation through the resolution of ambivalence
- Using facial expressions improves change talk detection
- Corpus of pedagogical motivational interviews annotated with MI-SCOPE coding scheme
- Transition diagrams visualization



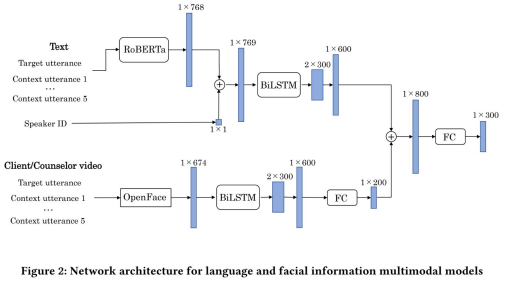
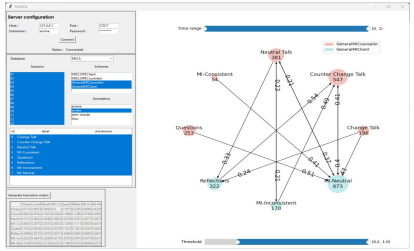


Figure 2: Network architecture for language and facial information multimodal models

Transition probabilities between client and counselor categories throughout MICA corpus.

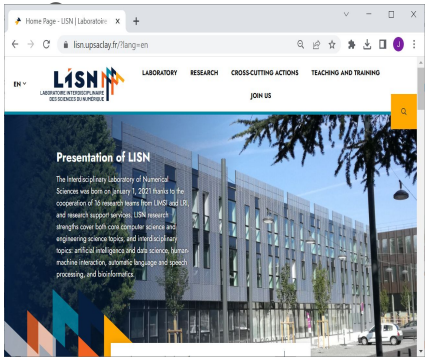


Yukiko I. Nakano, Eri Hirose, Tatsuya Sakato, Shogo Okada, Jean-Claude Martin (2022) Detecting Change Talk in Motivational Interviewing using Verbal and Facial Information. Proceedings of the 24th ACM International Conference on Multimodal Interaction (**ICMI'2022**). Bengaluru (Bangalore), Inde. (15% oral acceptance rate). Best-Paper Runner-Up Award

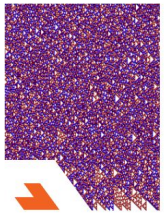
ANR PANORAMA project - Japan France Germany

Laboratory LISN - CNRS, Université Paris-Saclay, CS Département Interaction avec l'Humain (IaH)

- 180 chercheurs et EC



La recherche en 5 départements

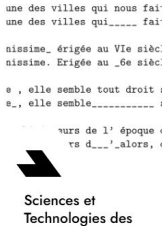


Algorithmes, Apprentissage et

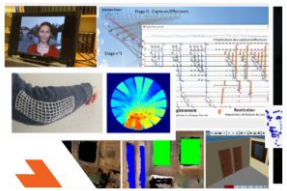
Interaction avec l'Humain

Mécanique des Fluides-

Science des Données



Sciences et Technologies des



Architectures et Modèles pour l'Interaction (AMI)

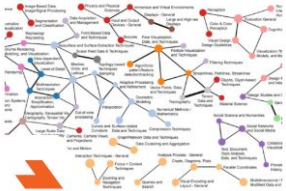
Cognition Perception et Usages (CPU)

EXtreme Situated Interaction – EX-SITU

Interacting with Large DAta (ILDA)

Virtual &Augmented ENvironments for Simulation & Experiments (VENISE)

Augmented Reality & Artificial Intelligence (ARAI)



Visualisation Analytics (AVIZ)

Atelier No 2

Réviser

la conception de votre application
en s'appuyant
sur des concepts théorique

Personalisation (..)

Self-set goals (..)

Raisons : profilage (recuillir des infos pour déterminer le profil)

Profilage (....)

Renforcement

Message négatifs (j'ai faim)

Message positifs (je veux passer du temps avec toi)

Renforcement à proportion fixe puis proportion variable (gagner des accessoires)

proportion variable de marche avec récompenses

Gain à chaque réalisation d'une quête (programme FR (nb de pas fixe conduisant à des r

Feedback

Information sur la nutrition du tamagoshi

Message positifs (je veux passer du temps avec toi)

Self-efficacy

Persuasion (personnage type Duolingo -> role model)

Raisons de faire la tâche

- Demander pourquoi marcher : Identifier des profils pour per
- Perte de poids, etc ...
- Participer à des causes (objectif personnel en lien à des obj
- Satisfaire les besoins fondamentaux

Goal-Setting (..)

Objectif quotidien (temporalité)

Objectif spécifique

Définition de l'objectif (tâche spécifique, difficulté, réaliste, temporalité)

- 'quantité' de marche

Planification des objectifs

Expression de la satisfaction

Progression (avancement), en fonction de l'évolution du tamagoshi (nécessite de s'appuyer sur des recommandations), de l'avatar

Self-set goal

UX

Design minimaliste

SDT

Transposer les besoins fondament

SMART

Specifique : marche

Mesurable : nb de pas

Applicable : 'tranches' pas

Relevant :

Temporalité : différentes temporalités en lien avec les rais

Social

Voisins

Stock de croquette des amis / entraide (partage de croquettes)

Profil social -> jouer sur l'émulation

Comparaison (challenge)

récompenses), pour faire évoluer le jeu)

rsonaliser

ectifs individuels)

taux

sons de faire la t*ache*