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# Evaluation of motivational profile and satisfaction: construction and psychometric validation of the Medical staff motivation inventory (MSMI)

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Gérald Gandon. Evaluation of motivational profile and satisfaction: construction and psychometric validation of the Medical staff motivation inventory (MSMI). Human health and pathology. 2021. dumas-03223677

**HAL Id: dumas-03223677**

**<https://dumas.ccsd.cnrs.fr/dumas-03223677>**

Submitted on 11 May 2021

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Année : 2021

**EVALUATION DU PROFIL MOTIVATIONNEL ET DE LA SATISFACTION  
PROFESSIONNELLE : CONSTRUCTION ET VALIDATION PSYCHOMÉTRIQUE  
DU "MEDICAL STAFF MOTIVATION INVENTORY" (MSMI)**

THÈSE  
PRÉSENTÉE POUR L'OBTENTION DU TITRE DE DOCTEUR EN MÉDECINE  
DIPLOME D'ÉTAT

Gérald GANDON

*[Données à caractère personnel]*

THÈSE SOUTENUE PUBLIQUEMENT À LA FACULTÉ DE MÉDECINE DE  
GRENOBLE

Le : 29/04/2021

DEVANT LE JURY COMPOSÉ DE

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## RÉSUMÉ

**Contexte.** Les organisations de santé ont été mises au défi d'être plus efficaces et productives et, dans le même temps, les indicateurs de santé mentale du personnel médical sont alarmants. La politique de santé doit améliorer l'expérience de la prestation de soins, en limitant l'épuisement professionnel, mais aussi en permettant au personnel médical de trouver du sens et du plaisir au travail. La théorie de l'autodétermination suppose que les individus endossent simultanément plusieurs types de motivation, ce qui constitue le profil motivationnel d'une personne. Alors que la motivation autodéterminée est liée positivement au bien-être des individus, la motivation contrôlée est davantage liée à des indicateurs de mal-être, tel que l'épuisement professionnel. Les environnements sociaux tels que les hôpitaux sont encouragés à promouvoir les comportements autodéterminés grâce à la satisfaction des besoins psychologiques (compétence, autonomie, affiliation). Pour appliquer la théorie de l'autodétermination dans le domaine de l'organisation hospitalière, nous avons développé le Medical Staff Motivation Inventory (MSMI) afin d'évaluer le degré d'importance (profil motivationnel) et de satisfaction de motivateurs spécifiques à l'hôpital.

**Méthodes.** Un pool d'items a été développé pour répertorier les motivateurs, les raisons d'aller au travail, couvrant les besoins psychologiques, pour le personnel médical hospitalier. L'importance d'un motivateur représente le sens personnel attribué à une activité, tandis que la satisfaction d'un motivateur (satisfaction motivationnelle) reflète la joie liée au sentiment de réussite et d'accomplissement. L'enquête a été administrée par courriel à 1,399 personnels de deux hôpitaux, de novembre 2020 à janvier 2021. Une analyse en composantes principales (ACP) du score d'importance a détaillé les dimensions regroupant les motivateurs. Un score composite de satisfaction globale et pour chaque composante a été calculé en pondérant la valeur de satisfaction de chaque motivateur par la valeur d'importance du motivateur. Pour la

validité convergente, nous avons corrélé les scores de satisfaction avec les trois dimensions du Maslach Burnout Inventory (MBI).

**Résultats.** Un échantillon de 367 personnels médicaux de deux hôpitaux a répondu à l'enquête en ligne. L'ACP sur l'importance des 21 motivateurs a indiqué une structure en 4 composantes sur 19 motivateurs, expliquant 45% de la variance : *travail d'équipe de qualité, autonomie professionnelle, agilité institutionnelle, reconnaissance*. Les scores composites de satisfaction motivationnelle sont négativement liés aux dimensions "épuisement émotionnel" et "dépersonnalisation" du MBI, et positivement à la dimension "accomplissement personnel". Chacun des répondants peut obtenir son propre profil motivationnel et sa propre satisfaction motivationnelle, dans un objectif d'amélioration de la qualité de vie au travail. Les graphiques et les scores à différentes granularités d'une organisation offrent un diagnostic des profils motivationnels et des propositions d'amélioration de la satisfaction motivationnelle au service des managers des organisations de santé.

**Conclusion.** Le MSMI est un outil permettant de répondre à "Comment améliorer l'expérience de la prestation de soins par les soignants ?". Il pourrait être une mesure de l'impact des organisations, politiques et procédures de santé sur le stress et la qualité de vie au travail du personnel médical hospitalier.

*Mots-clés:* personnel médical, médecins, motivation, autodétermination, satisfaction au travail, développement d'une échelle, épuisement professionnel.

## ABSTRACT

**Background.** Healthcare organizations have been challenged to be more efficient and productive, and at the same time, mental health indicators for medical staff are alarming. Health policy needs to improve the experience of providing care, not only by limiting burnout, but also by enabling medical staff to find meaning and pleasure in their work. The self-determination theory assumes that individuals simultaneously endorse several types of motivation, which constitutes a person's motivational profile. While self-determined motivation is positively related to individual well-being, controlled motivation is more related to indicators of ill-being, such as burnout. Social environments such as hospitals are encouraged to promote self-determined behavior through the satisfaction of psychological needs (competence, autonomy, relatedness). To apply self-determination theory to the field of hospital organization, we developed the Medical Staff Motivation Inventory (MSMI) to assess the degree of importance (motivational profile) and satisfaction of hospital-specific motivators.

**Methods.** An item pool was developed to inventory motivators, reasons for going to work, covering psychological needs, for hospital medical staff. The importance of a motivator represents the personal meaning attributed to an activity, whereas the satisfaction of a motivator (motivational satisfaction) reflects the joy associated with the feeling of success and fulfilment. The survey was administered via email to 1,399 staff at two hospitals from November 2020 to January 2021. A principal component analysis (PCA) of the importance score detailed the dimensions grouping the motivators. A composite satisfaction score overall and for each component was calculated by weighting the satisfaction value of each motivator by the importance value of the motivator. For convergent validity, we correlated the satisfaction scores with the three dimensions of the Maslach Burnout Inventory (MBI).

**Results.** A sample of 367 medical staff from two hospitals completed the online survey. PCA on the importance of the 21 motivators indicated a 4-component structure with 19 motivators, explaining 45% of the variance: *quality teamwork, professional autonomy, institutional agility, recognition*. Motivational satisfaction composite scores were negatively related to the MBI dimensions of "emotional exhaustion" and "depersonalization", and positively related to the dimension of "personal fulfillment". Each respondent can obtain his/her own motivational profile and motivational satisfaction, with the aim of improving the quality of work life. The graphs and scores at different granularities of an organization offer a diagnosis of motivational profiles and proposals for improving motivational satisfaction for managers of healthcare organizations.

**Conclusion.** The MSMI is a tool for answering "How can we improve the experience of providing care by caregivers?" It could be a measure of the impact of healthcare organizations, policies, and procedures on the stress and quality of work life of hospital medical staff.

*Keywords:* medical staff, physicians, motivation, self-determination, job satisfaction, scale development, burnout

## Introduction

*“What motivates me in a job? Why do I get up every morning to go to work?”*

Sometimes you ask yourself these questions when you get up, but as soon as you are at work, the day goes by so fast, that you no longer realize why you do it. Perhaps because of the content of the work (intrinsic motivation), such as the feeling of being useful or doing quality work, or perhaps because of a reward or recognition (extrinsic motivation), but surely because of a combination of both. Your motivation may come from yourself (autonomous) or from outside influences (controlled). Finally, sometimes you end the day feeling satisfied and sometimes frustrated. When the days follow one another and are satisfying then it contributes to well-being. Conversely, when the days are too often frustrating, then you lose the meaning of your work and you can burnout. One way to improve well-being at work and prevent burnout could be exploring how one found satisfaction in their work based on their own motivators (reasons to go to work). Identifying motivators corresponding to autonomous motivation and controlled motivation could help to strengthen well-being and reduce the risk of burnout. To develop a tool for reinforcing the self-determined motivations, we focused on a high-risk burnout population : medical staff.

Motivation theories, in particular the self-determination theory (SDT) (1), addressed the links between motivation and the dual concerns of performance and wellness in organizations (2). SDT is a macro theory of human motivation that has been widely successfully applied across domains including sport (3,4), physical activity (5), education (6), healthcare (7) and work (8). SDT specifically suggests that both employees' performance and their well-being are affected by the type of motivation they have for their job activities. SDT therefore differentiates types of motivation and supports that individuals endorse multiple types of motivation simultaneously, such as a person's motivational profile (8–10). Moreover, SDT consistently found that an environment supporting the satisfaction of psychological

needs (reaching the goal) facilitates self-determined behaviors and so psychological and physical wellness, and enhanced performance, especially on complex tasks (1,11).

Since the turn of the century, health organizations around the world have been challenged to be more efficient and productive by adopting the Triple Aim framework (12): improving the individual experience of care; improving the health of populations; and reducing the per capita cost of healthcare. At the same time, physicians experienced a higher risk of burnout than other professions (13), underlying the critical role of the workforce in healthcare transformation. A Quadruple Aim is needed (14): improving the experience of providing care. Sikka et al. (15) argued that the core of workforce engagement is the experience of meaning and joy in the work of healthcare. Meaningful work refers to the sense of importance of daily work, and joyful work to the feeling of success and fulfillment that results from meaningful work. They encourage adding regular measures of this work engagement and its opposite, employee burn-out. Several healthcare systems used burnout measures and interventions to reduce it (16) but the solutions do not address the underlying problem: a profound lack of alignment (joy) between caregivers' values (meaning) and the reconfigured health care system (17). This default could be developed with a tool, based on SDT, to help managers and healthcare organizations to define better indicators for improving the experience of providing care (15,17).

### **The continuum of motivation**

Motivation is the motor to satisfy one's psychological needs, the processes that account for the intensity, direction and persistence of one's efforts to reach a goal (1). Metaphorically speaking, just as motor and gas are crucial to driving, SDT regards motivation and satisfaction of psychological needs to be essential for humans to achieve self-fulfillment, to thrive and to be more protected from ill health. Human motivation has been conceptualized

and operationalized using multiple categorical dimensions, but along a simplex continuum structure (2). The first main distinction is between intrinsic and extrinsic motivations.

Driven by intrinsic motivation, the individual does an activity because he finds it interesting and that it brings him satisfaction or pleasure regardless of the environment. It is directly related to the self (e.g., "I go to work because it is intellectually stimulating") and reveals an individual's inherent tendency to seek novelty and challenge, to expand and exercise one's abilities, to explore and learn (1). The locus of causality, defined as the perceived origins of one's motivated actions, is totally internal in this case, and leads to self-determined behaviors.

In contrast, extrinsic motivation implies the person acts and behaves in function of consequences due to the environment (to get something pleasant or avoid something unpleasant). Although extrinsic motivations could be perceived only as restrictions or instrumental behaviors, SDT showed that a person can feel self-determined in the presence of these external factors (18), as these norms are internalized in a person's behavior repertoire. Internalization is defined as people taking in values, attitudes, or regulatory structures, such that the external regulation of a behavior is transformed into an internal regulation and thus no longer requires the presence of an external contingency (thus, I work even when the boss is not watching) (19). Based on "how much" an individual "takes in", SDT proposed different types of extrinsic motivations, ordered along the self-determination continuum from lower to higher levels of self-determination, referred to as external, introjected, and identified regulations (see Figure 1). *External regulation* occurs when behavior is regulated to obtain a reward or to avoid a constraint imposed by another person or environment (e.g., working because you have to pay off a loan). The locus of causality is external, as in operant theories. *Introjected regulation* refers to the process whereby an external demand becomes an internal regulation but not fully as own. The control on motivation is relative, mediated by internal pressure (avoid guilt or anxiety or to attain ego enhancements such as pride). Behaviors are



still perceived as non self-determined and the locus of causality is somewhat external. *Identified regulation* describes engaging in behaviors with a conscious valuing of a goal or regulation, such that the action is accepted or owned as personally important, in line with personal values and beliefs (e.g. apply for chosen training to acquire management skills). As the locus of causality is internal, behaviors appear more self-determined. *Integrated regulation* occurs when the extrinsic motivation is fully assimilated to the self (congruence with values and needs), sharing qualities with intrinsic motivation. Reasons for actions are so consistent with own schemes that behaviors are perceived as self-determined and the locus of causality is internal (e.g., apply for the position of unit leader to carry out his or her wishes to lead a team).

A third, debated (9) and early conceptualizations of motivation, amotivation, assumes an absence of motivation, a state of lacking the intention to act. One's behaviors are caused by factors out of control (e.g., , "I wonder why I am doing the activity and eventually abandon it"), such as there is no relation between actions and the results obtained. Behaviors are totally non self-determined, and the locus of causality is impersonal, neither internal nor external.

Despite empirical evidence for the distinctness of different types of motivation (19), SDT also hypothesizes that a continuum of self-determination underlies the regulations (1) (see Figure 1). Although conclusions drawn from various studies present some inconsistencies about this assumption (20), some studies developed a composite score describing a person's overall motivation, the relative autonomy index (RAI) (21). The RAI consists of assigning weights to the subscale of each regulation (namely, 2 for intrinsic, 1 for identified, -1 for introjected, -2 for external). A meta-analysis (9) on the continuum structure of self-determined motivation demonstrated the simplex pattern with relatively equidistance along types of motivation, supporting the idea that a single motivation score representing degree of self-determined could be used but different weights need to be used. In particular,

no hypothesis tested the value of counterbalancing self-determined motivations (positive weights) against non-self-determined ones (negative weights).

Furthermore, motivation profile studies applying person-centered analyses, such as latent profile analysis, support the notion that individuals endorse multiple types of motivation simultaneously (10,22–24). A person can therefore experience all types of motivation at the same time, but the profile of the dominant types would be more determinant of outcomes. When individuals behave with self-determination rather than control, associations with outcomes are positive (e.g., well-being or performance) (25,26).

The motivational continuum can be described as a gradient of self-determination. At one extreme, when the motivator (a reason to do the job) makes no sense, the individual attributes no identification, no importance, corresponding to amotivation. At the other extreme, motivator has a meaning specific to the individual, a very special importance, regardless of environmental factors: total self-determination. Along this gradient, the more an individual identifies with the motivator, the more self-determined perceived behavior is. In other words, the more the motivator is valued, considered as important, the more it is chosen, the more the process of internalization of external patterns is regulated by identification. Accordingly, for a given set of specific motivators, one's degree of motivational importance for each motivator draws one's motivational profile (such as a vector).

The most self-determined types of motivation (intrinsic/integrated motivations) lead to positive outcomes such as job satisfaction, well-being, engagement (27), while the less self-determined types (external/introjected motivations) lead to negative ones such as job burnout (19,28). One of the major challenges is therefore to understand how the internalization of extrinsic motivations can be fostered to strengthen the self-determination of individuals. The process of internalization is not described as a stage theory, i.e. it is not necessary to go through each stage (19). An individual can therefore, under certain conditions, integrate, internalize his/her extrinsic motivations, which may initially be perceived only as

constraints. SDT has shown that internalisation can be promoted or thwarted by environmental factors (e.g., job design, management style, relational atmosphere) (8,28,29). For instance, social environments such as workplaces can facilitate or forestall internalization as well as the maintenance of intrinsic motivation by supporting versus thwarting people's innate psychological needs (30).

**Figure 1.**

*The Self-Determination Continuum Showing Types of Motivation with their Regulatory Styles, and Loci of Causality.*

Amotivation	Extrinsic Motivation				Intrinsic Motivation
	External regulation	Introjected regulation	Identified regulation	Integrated regulation	
Non regulation Lack of motivation	Controlled motivation		Autonomous motivation		Intrinsic regulation
Impersonal causation	External causation	Relative external causation	Relative internal causation	Internal causation	Internal causation
Least self-determined	—————				Most self-determined

Deci EL, Ryan RM. The " what" and " why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*. 2000;11(4):227–68.

**Satisfaction of psychological needs**

Motivation and satisfaction of psychological needs are crucial for self-fulfillment and well-being like the motor and gas for driving. So the work environment of an individual would be the road and the road signs in the metaphor. It may make the travel easier or more difficult to reach the destination. Somewhat, SDT postulates that satisfaction of psychological needs provides the “royal road” for intrinsic motivation and internalization (2). Several studies demonstrated the needs for competence, autonomy and relatedness as basic psychological needs for the well-being and optimal functioning of individuals (26,31,32). Competence is defined as individuals’ inherent desire to feel effective in interacting with the

environment (1). Competence satisfaction allows individuals to adapt to complex and changing environments, whereas competence frustration is likely to result in helplessness and a lack of motivation. Autonomy represents individuals' inherent desire to feel volitional and to experience a sense of choice and psychological freedom when carrying out an activity. The need for relatedness is defined as individuals' inherent propensity to feel connected to each other, to be members of groups and to share the attention given to each other.

More specifically, work climates that promote satisfaction of the three basic psychological needs, with for instance environmental facilities, interpersonally supportive relations, design of autonomous and self-fulfilled tasks and jobs will enhance employees' intrinsic motivation and promote full internalization of extrinsic motivation (11,33). Development of a strong self-determined orientation, the "royal road", results from ongoing satisfaction of all three basic needs; you know how to drive, you are in good company and you have the steering wheel. Development of a strong controlled orientation results from some satisfaction of the competence and relatedness needs but a thwarting of the need for autonomy; you know how to drive, you're in good company but you can't decide which way to go. Development of the impersonal orientation results from a general thwarting of all three needs; you don't have the opportunity to learn to drive, you don't know who you are driving with, and you don't know where you are going (2,7,34,35). In particular, satisfaction of psychological needs at the workplace has been negatively linked to depression/anxiety (36), and job burnout (37).

The development of a work motivation tool must therefore assess both the motivational profile of an individual and the satisfaction obtained in the current work environment.

## **Motivation of medical staff and scales**

Several SDT-based validated measures of motivation exist in multiple life domains (38–42). In work domains, scales were developed sequentially in order to improve previous versions (27,43,44), but they remain at a domain level of analysis particularly for determining the different types of motivation in an individual (8,11). As Fernet (45) developed the work tasks motivation scale for teachers, a scale must be developed to assess work motivation for different motivators within medical staff in hospital organization.

Few studies on physicians' motivations either other medical professions exist (46–48). However, hospital physician burnout researchers have drawn up laundry lists of both individual and organizational factors (49,50). For instance, excessive workload, work hours, inefficient work processes and environments (51,52), lack of support and executive leadership (51) are the most quoted organizational factors. Researchers on physician burnout have raised the issue of autonomous and controlled motivations as a determining factor (50,53,54). In this field, an emphasis is the importance of meaning in work, illustrated by the finding that physicians who spend less than 20% of their work effort on the activity they find most personally meaningful are nearly three times more likely to be burned out than those who spend at least 20% of their work effort on such an activity (55). In a way, the less self-meaningful the activity is, the more controlled physicians feel, the more they burn out. We find here the notion of the values for the individual, "how true/meaningful is an activity" (43), just as in the SDT. Exploring the issue of motivation of physicians employed at Greek public hospitals, Tsounis et al. (56) found that physician motivation is a more complex issue than the usual aspects of staff management. They noted that the financial incentives cannot, by themselves, motivate physicians, whereas the development and utilization of incentives that are associated with achievement of goals (satisfaction of motivators), the possibility of professional development and recognition in the workplace, appear more effective.

**Based on SDT literature, our goal is to develop and validate a self-reported measure of medical staff's motivation profile and motivational satisfaction: the Medical Staff Motivation Inventory (MSMI).** The MSMI meet two objectives: (1) to develop a motivational profile according to the different types of motivation (from extrinsic to intrinsic) according to a defined set of motivators; (2) to assess motivational satisfaction in the current work environment, i.e., the joy provided by the effective accomplishment of the motivators. These objectives of the MSMI are at two levels: (1) at the individual level to raise awareness of the motivations that drive the individual; (2) at the collective level to guide managers in improving the experience of providing care.

The pool of medical staff work-related motivators must cover at least the three basic psychological needs of autonomy, relatedness and competence. The importance that an individual may attach to each motivator could represent the regulation level on the motivational continuum, from amotivation to intrinsic motivation. We hypothesized that the more self-meaningful a motivator is, the more important a person rates it. The MSMI must be able to define a vector defining the individual's motivational profile, corresponding to the degree of importance attributed to each motivator. The factorial structure exploration of the importance vector should make it possible to find the psychological needs that they represent.

The satisfaction of a motivator reflects the satisfaction of the psychological needs. Motivational satisfaction, i.e. the subjective perception that an individual succeeds in satisfying his/her motivators regarding their environment (reaching the goal), must be able to cover the satisfaction of psychological needs. We hypothesized that the more the motivators are satisfied, the more the psychological needs are satisfied. In other words, the more an individual perceives their motivators to be satisfied in their current work environment, the more their psychological needs are met, the more intrinsic or internalized those motivators would be. More precisely, the more an individual's motivators are satisfied/attained, the more their psychological needs will be met, the more likely he will be to internalize more

motivators in the future. The MSMI must be able to define a vector defining the individual's motivational satisfaction, corresponding to the degree of satisfaction attributed to each motivator.

Furthermore, we hypothesized that the more the satisfaction of one motivator relates to a motivation considered as important (intrinsic), the more it contributes to overall motivational satisfaction, hence the need to take into account the motivational profile. We suggested that motivational satisfaction score should be weighted by the degree of importance of each motivator.

To enable application at both levels (individual and group), the motivational profile and motivational satisfaction vectors must be presented in graphical and automated form. The individual representations must be provided in an anonymous way and the collective ones must represent the different granularities of a health organization.

Finally, as recommended by Sikka et al. (15), measures of workforce engagement such as motivational satisfaction should be correlated with measures of health status such as burnout.

## Methods

### Measures

#### *Construction of the Medical Staff Motivation Inventory.*

The entire questionnaire was developed in French but the following examples were translated for publication.

A previous qualitative survey of the occupational health service of a university hospital interviewed 62 medical staff (44 doctors, 10 surgeons, seven biologists, one pharmacist, 18 of whom had managerial responsibilities), either through focus groups or individual interviews. This survey looked at the determinants and constraints of the quality of work life of hospital medical staff. Based on this report, we outlined a list of 35 motivational factors (motivators) that make up hospital medical staff's work. We then studied the international literature and available measures of work motivation (8,9) and made sure that the motivators covered the basic psychological needs of autonomy, competence and relatedness. We reduced to 26 motivators because of some redundancy or confusing items.

To determine an individual's motivational profile along the self-determination continuum, we asked the individual about the importance attributed to each motivator. The less important the motivator, the more it concerns an extrinsic and non-internalized motivation. Conversely, the more important the motivator, the more it concerns an internalized and intrinsic motivation. We use a 4-point Likert scale from not important (amotivation) to very important/essential (integrated and intrinsic motivation) to answer the question: "how important is this motivator considering "what motivates you in a job?"

The satisfaction of psychological needs is ensured by the fulfillment of motivators and the joy that comes from it, namely motivational satisfaction. The more an individual perceives their motivators to be satisfied in their current work environment, the more their psychological needs are met. To explore motivational satisfaction, we ask "to what extent is



this motivator currently satisfied?” with a 11-point Likert scale from not at all satisfied (0) to fully satisfied (10). This type of scale is usually used by physicians like the Visual Numeric Scale (VNS) for self-reported pain.

For each motivator, we assess organizational constraints (job content, work organization, interpersonal relationships) with “What is the main element that prevents me from striving for the optimal satisfaction of this motivator?”.

Commitment was asked with three items : pride of belonging and identification to the organization, attachment (team, manager, and trust), and energy (interest in the job, energy to work). A 4-point Likert scale asked from strongly disagree (1) to totally agree (4).

To test the relevance and comprehension of the items, we distributed a questionnaire to a group of 15 doctors (working group of a university hospital on psychosocial risks). This questionnaire included these 26 motivators with, for each, measures of importance and satisfaction but also items on organizational factors and commitment. At the feedback meeting, the questionnaire was described as too long and complex, with redundancy between certain items. We reduced to 21 motivators, dropped the commitment items, and narrowed organizational factors to seven single-items (see Supplementary Section).

### ***Maslach Burnout Inventory.***

The most widely used and accepted for burnout assessment is the Maslach Burnout Inventory (MBI) (50,57). This instrument consists of 22 items, each scored from 0 to 6 based on self-reported frequency of the feeling addressed by each item. The emotional exhaustion (EE) domain consists of nine items for a total score range of 0–54 (e.g., “I feel emotionally drained from my work.”). The depersonalization (Dep) domain consists of five items for a total score range of 0–30 (e.g., “I’ve become more callous toward people since I took this job.”). The personal accomplishment (PA) domain consists of eight items for a total score range of 0–48 (e.g., “I accomplish many worthwhile things in this job.”). The psychometric properties of the French Canadian version of the MBI are similar to those of the original

(58,59). In the present sample, the Cronbach's alpha values for these subscales were .89 and .7, and .79 , respectively.

## **Participants**

Data were collected by distributing the questionnaire in French language by email to all the medical staff of two French hospitals, representing 1,399 workers, from November 2020 to January 2021. We had the approval of each Institutional Medical Committee. Medical staff including physicians, surgeons, pharmacists, biologists and midwives were asked to fill out the questionnaire and consent form knowing that anonymised data would be processed for research purposes but also by the hospital's occupational health service to propose strategies for collective interventions. Consent was obtained from all of the participants involved, for participation and to further disseminate study findings as for any scientific format, by checking a box before starting the questionnaire. In view of the sensitive questions on burnout, the contact details of the psychologist in charge of hospital psychosocial risks were given at the beginning and end of the questionnaire. Two reminders were sent by email ten days apart. Participants received an email to their professional address with a link to the questionnaire developed on LimeSurvey (60). By clicking, the questionnaire began with a brief explanation of the objective of the research (i.e. to know the motivational profile and motivational satisfaction). For each item, presented randomly, they were asked to rate the degree of importance and satisfaction. Next, seven items on organizational factors were randomly presented. The Maslach burnout inventory (MBI) items were displayed in table format. Finally, age, gender, profession, practice area, and years of service were provided by categorical classes. A sample size was estimated to a minimum of 10 participants per item, i.e. 210 (61).

## Statistical Analyses

All analyses were completed with RStudio software version 1.2.5 (62), with the *psych* package version 1.9 (63). All our analysis scripts, auxiliary results, and data can be found on our OSF project page: <https://osf.io/suqwx/>. The statistical methods consisted of five steps: (1) evaluation of descriptive statistics for each motivator; (2) assessment of a principal component analysis on “importance” scores; (3) calculation of a motivational satisfaction score by component (the weighted motivational satisfaction, WMS) and an overall motivational satisfaction (overall WMS) score; (4) testing of the correlation between WMS scores and each of the three components of burnout; (5) graphic presentations for individual and group applications.

### *Factor structure.*

The sample was used for the principal component analysis (PCA) to group related items according to common themes, eliminate redundant or unuseful items and identify those items that were related to more than one component. Scree test and parallel analysis were also considered in the selection of items (64,65). Assumptions for PCA tests (normality, factorability) were checked. Factorability of the correlation matrix was evaluated using Bartlett’s test of sphericity and Kaiser-Meyer-Olkin’s (KMO) measure of sampling adequacy. Loadings greater than .40 were judged to be meaningful (66). The internal reliability and consistency of the components of the questionnaire were measured using Cronbach’s  $\alpha$ .

### *Creations of scores*

To evaluate the hypothesis that motivational satisfaction should be assessed regarding the individual motivational profile, we created the weighted motivational satisfaction (WMS) for each component, i.e. satisfaction score weighted by its importance score by motivator for each individual ( $WMS = \sum (importance_i \times satisfaction_i) / \sum (importance_i)$ ). In the

same way, the overall motivational satisfaction (overall WMS) score was computed for all motivators.

***Correlation tests.***

For convergent validity, after checking test assumptions (bivariate normality graphically), we estimated the appropriate correlation coefficients between the WMS means and the three components of burnout. According to Cohen (67), correlation coefficients in the order of .10 are “small,” those of .30 are “medium”, and those of .50 are “large” in terms of magnitude of effect sizes.

## Results

### Descriptives statistics

A total of 367 medical staff participated in the study (participation rate of 26.2%), 69.2% were women (n=254). The majority of respondents were physicians (n=247, 67%), worked in the profession for more than 4 years (n=293, 80%), and for more than 10 years in the institution (n=206, 56%), during between 41 and 60 hours per week (n=244, 66%) (Table 1).

**Table 1.**

*Descriptive analysis of the hospital staff sample*

Variable		Number	Percent
Gender	Female	254	69
	Male	113	31
Profession	Physician	247	67
	Surgeon	34	9
	Pharmacist	18	5
	Biologist	29	8
	Midwife	39	11
Practice area	University Hospital of Grenoble	326	89
	Alpes-Isère Hospital Center	41	11
Seniority in the profession	Less than or equal to 4 years ( $\leq 4$ )	74	20
	More than 4 years ( $> 4$ )	293	80
Seniority in the institution	Less than or equal to 5 years ( $\leq 5$ )	83	23
	Between 6 and 10 years	78	21
	More than 10 years ( $> 10$ )	206	56

Weekly working time	less than 40 hours	62	17
	between 41 and 50 hours	129	35
	between 51 and 60 hours	115	31
	between 61 and 70 hours	44	12
	between 71 and 80 hours	14	3.8
	81 hours and more	3	0.8
Total		367	100

First, we examined item completeness and the distributions of the item scores (importance and satisfaction) as indicated by the mean, median, standard deviation, skewness, kurtosis and graphical distributions in the sample (Table 2). There was no missing value, and items were non normally univariate and bivariate distributed.

The means of importance items ranged from 5.5 to 9.5. All standard deviations exceeded 1, except for “Doing quality work”. Skewness values showed that the importance scores particularly tended for high scores with a ceiling effect. Motivators with the highest means of importance scores were “Doing quality work” (9.5), “Feeling useful” (9.1), and “Having an intellectually stimulating activity” (9.1) whereas those with the lowest scores were “Developing managerial skills” (5.5), “Participating in the decisions in the institution” (5.8), and “To be recognized by the governance and its representatives” (6.5) (see Supplementary for barplot).

The means of satisfaction items ranged from 3.4 to 7.5, with the highest scores for “Feeling useful” (7.5), and “Having an intellectually stimulating activity” (7.4). Motivators with the lowest means of satisfaction scores are “Participating in the decisions of the institution” (3.3), “To be recognized by the governance and its representatives” (3.5), and “Developing managerial skills” (4.9). Distribution and standard deviations of these items are adequate.

**Table 2.**

*Mean, median, standard deviation (SD) of important and satisfaction scores for each motivator.*

Motivator	Importance			Satisfaction		
	Mean	Median	SD	Mean	Median	SD
Belonging to a peer group	7.3	8	2.1	6.2	6	2.5
Developing managerial skills	5.5	6	2.9	4.9	5	2.9
Participating in the decisions of the institution.	5.8	6	2.5	3.3	3	2.8
Participating in the decisions of the unit.	7.8	8	1.9	5.9	6	2.8
Taking on responsibilities (other than managerial)	6.9	7	2.4	6.2	6	2.6
Being a reference for the students.	7.4	8	2	6.4	7	2.3
Choosing the distribution of my working time	7.7	8	2	5.8	6	2.5
Being autonomous	8.2	8	1.7	6.9	7	2.3
Working as a team	8.9	9	1.3	7.3	8	2.2
Responding to team challenges	7.1	8	2.4	5.3	5	2.5
To be recognized by my peers.	7.4	8	2.1	6.4	7	2.2
To be recognized by the governance and its representatives.	6.5	7	2.8	3.5	3	2.8
To be recognized by my direct medical supervisor.	7.2	8	2.4	6.5	7	2.8
Feeling useful	9.1	10	1.2	7.5	8	1.9
Having an intellectually stimulating activity	9.1	10	1.1	7.4	8	2.1
Being creative, innovative	7.1	8	2.3	5.3	5	2.5
Doing quality work	9.5	10	.9	6.4	7	2
Developing technical skills	8.1	8	1.8	6.3	6	2.3
Working in multidisciplinary	8.4	9	1.6	7.3	8	2
Expressing my personal values	8.2	8	1.9	6.3	6	2.3
Balancing private and professional life	8.8	10	1.7	5.5	6	2.7

## Factor structure

Inter-item correlations with Spearman coefficients for importance score are almost all significant, ranging from 0 to .51 indicating that the factorability is adequate (see Supplementary). Bartlett's test of sphericity is significant and Kaiser-Meyer-Olkin index is 0.79 indicating that the score is factorizable. The scree plot and parallel analysis of PCA suggest that a 4-component solution should be retained, explaining 45% of the variance for the importance score. With the cutoff criterion of .4, loadings vary from .42 ("Being a reference for the students") to .75 ("To be recognized by my direct medical supervisor.") (Table 3). We named the first dimension of motivators: *institutional agility*, grouping "Developing managerial skills", "Participating in the decisions of the institution", "Being creative, innovative", "Taking on responsibilities (other than managerial)", "Participating in the decisions of the unit", and "Being a reference for the students". The second dimension, *quality teamwork*, groups "Working as a team", "Working in multidisciplinary", "Doing quality work", "Responding to team challenges", "Belonging to a peer group", and "Feeling useful". "Choosing the distribution of my working time", "Being autonomous", "Balancing private and professional life" and "Expressing my personal values" represent the *professional autonomy* dimension. The fourth dimension, *recognition*, gathers "To be recognized by my direct medical supervisor", "To be recognized by my peers", and "To be recognized by the governance and its representatives". The item "Responding to team challenges" cross-load between *quality teamwork* and *institutional agility*. Items "Developing technical skills" and "Having an intellectually stimulating activity" do not have sufficient loadings, respectively

For each individual, we computed a mean score of importance by dimension (Table 4). *Quality teamwork* (mean = 8.39) and *professional autonomy* (8.22) had the higher values well above *recognition* (7.04) and *institutional agility* (6.74). A PCA of these 4 dimension scores



with the same criteria as previously confirmed the simplex continuum of dimensions is confirmed.

Cronbach's  $\alpha$  value of .81 was found for the whole questionnaire. When explored for each dimension, values of .73, .66, .55 and .67 were observed for *institutional agility*, *quality teamwork*, *professional autonomy* and *recognition* dimensions respectively.

### **Composite scores of satisfaction.**

For each dimension, we calculated an individual composite score by multiplying the degree of importance by the degree of satisfaction for each motivator, divided by the sum of importance (WMS) (Table 4). As the pattern of a simplex continuum is found (principal component analysis of the 4 dimensions scores), an overall "weighted" motivation satisfaction score takes into account the influence of self-determination in an individual's overall motivational satisfaction. The means of WMS was 6.79, 6.18, 5.63 and 5.52 for *quality teamwork*, *professional autonomy*, *recognition* and *institutional agility* dimensions respectively. Scores varied somewhat by occupation, but the order of importance and motivational satisfaction was the same with two exceptions.

**Table 3.**

*Structure and loadings from a 4-component Principal Components Analysis with varimax rotation and cutoff of .4. “Developing technical skills” & “Having an intellectually stimulating activity” do not have sufficient loadings.*

Rotated Component Matrix	1	2	3	4
<b>1. Institutional agility</b>				
1.1 Developing managerial skills	.7			
1.2 Participating in the decisions of the institution.	.69			
1.3 Being creative, innovative	.68			
1.4 Taking on responsibilities (other than managerial)	.65			
1.5 Participating in the decisions of the unit	.57			
1.6 Being a reference for the students.	.42			
<b>2. Quality teamwork</b>				
2.1 Working as a team		.73		
2.2 Working in multidisciplinary		.57		
2.3 Doing quality work		.55		
2.4 Responding to team challenges	.45	.53		
2.5 Belonging to a peer group		.49		
2.6 Feeling useful		.45		
<b>3. Professional autonomy</b>				
3.1 Choosing the distribution of my working time			.72	
3.2 Being autonomous			.7	
3.3 Balancing private and professional life			.49	
3.4 Expressing my personal values			.43	
<b>4. Recognition</b>				
4.1 To be recognized by my direct medical supervisor				.75
4.2 To be recognized by my peers.				.72
4.3 To be recognized by the governance and its representatives				.72

**Table 4.**

*Mean and standard deviations (SD) of the motivational importance score and of the weighted motivational satisfaction (WMS) for each dimension of the MSMI, by profession.*

Mean (SD)	Institutional agility		Quality teamwork		Professional autonomy		Recognition	
	Importance	WMS	Importance	WMS	Importance	WMS	Importance	WMS
Physician	6.75 (1.54)	5.47 (1.71)	8.38 (1.00)	6.78 (1.50)	8.21 (1.23)	6.23 (1.67)	6.83 (1.88)	5.63 (2.05)
Pharmacist	6.96 (0.96)	6.08 (1.46)	8.41 (0.79)	7.07 (1.29)	8.14 (0.80)	6.57 (1.37)	7.93 (1.13)	6.43 (1.29)
Midwife	6.03 (1.59)	5.39 (1.56)	8.31 (0.84)	6.77 (1.32)	8.30 (1.05)	5.70 (1.96)	7.85 (1.72)	5.29 (1.96)
Surgeon	6.92 (1.60)	5.50 (1.86)	8.57 (1.03)	6.72 (1.57)	8.11 (1.47)	5.86 (1.98)	6.97 (2.38)	5.53 (2.08)
Biologist	7.29 (1.35)	5.79 (1.71)	8.33 (1.16)	6.86 (1.35)	8.35 (0.98)	6.48 (1.67)	7.30 (1.42)	5.68 (2.20)
Overall	6.74 (1.53)	5.52 (1.70)	8.39 (0.99)	6.79 (1.46)	8.22 (1.20)	6.18 (1.72)	7.04 (1.88)	5.63 (2.03)

## Correlations

Convergent validity is evaluated by correlations between the WMS scores and components of job burnout (MBI) (Table 5). The overall WMS score varied from 2.41 to 9.95 with an average of 6.23. The EE score ranged from 0 to 52 with an average of 19.4, the Dep score from 0 to 27 with an average of 6.3 and the PA score from 2 to 48 with an average of 37.9 (detailed results will be published in another article).

Bivariate normal distributions are graphically seriously violated, constraining the use of the non-parametric Spearman tests. All dimensions of the MBI correlated with the overall WMS score ( $\rho(\text{EE})=-.46$ ,  $p<.001$ ;  $\rho(\text{Dep})=-.30$ ,  $p<.001$ ;  $\rho(\text{PA})=.30$ ,  $p<.001$ ). Effect sizes are almost large for emotional exhaustion, and medium for depersonalization and personal accomplishment.

For exploratory purposes, we correlated each dimension of the MSMI with each dimension of the MBI (Table 5). The largest correlations with emotional exhaustion are with satisfaction of *professional autonomy* (-.49) and of *quality teamwork* (-.41). Correlations are medium between emotional exhaustion and satisfaction of *recognition* (-.31) or *institutional agility* (-.29). Medium correlations link depersonalization and satisfaction of *quality teamwork* (-.31) or *professional autonomy* (-.27). The personal accomplishment first correlates with satisfaction of *quality teamwork* (.29) and then with satisfaction of *institutional agility* (.25) and *professional autonomy* (.24).

**Table 5.**

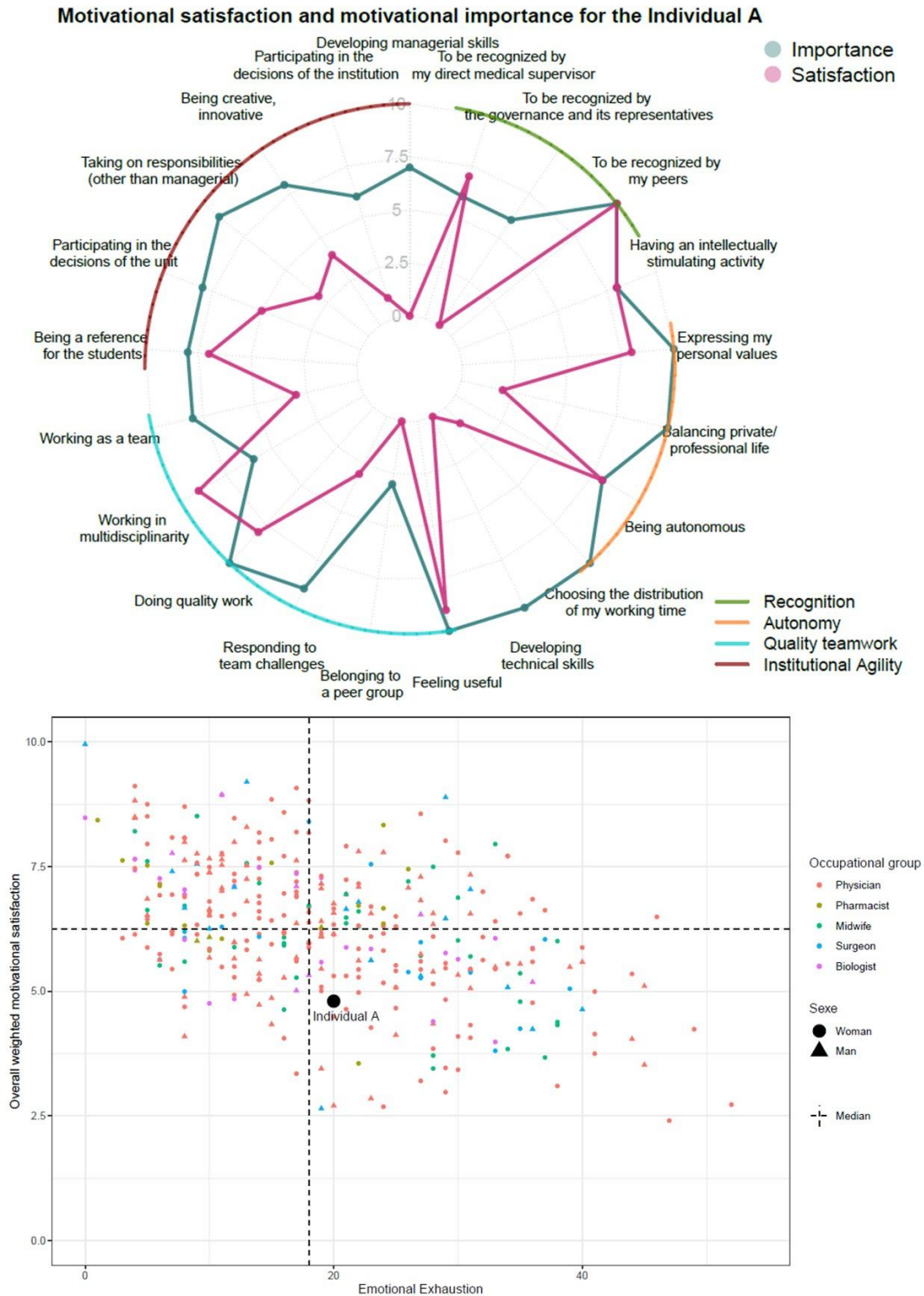
*Spearman's Correlation Coefficients between Medical Staff Motivation Inventory Scores and Maslach Burnout Inventory (MBI) Subscales, Mean and Standard Deviations of Scores.*

*WMS: weighted motivational satisfaction.*

	Emotional Exhaustion (MBI)	Depersonalization (MBI)	Personal Accomplishment (MBI)	Mean	SD
Institutional agility WMS	-.29	-.17	.25	5.52	1.7
Quality teamwork WMS	-.41	-.31	.29	6.79	1.46
Professional autonomy WMS	-.49	-.27	.24	6.18	1.72
Recognition WMS	-.31	-.19	.17	5.63	2.03
Overall WMS	-.46	-.30	.31	6.23	1.36
Mean	19.4	6.33	37.86		
Standard deviation (SD)	10.41	5.49	7.65		

**Figure 1.**

*Vectors of motivational profile and motivational satisfaction represented as a radar-chart for individual A. Representation of the overall weighted motivational satisfaction (WMS) and emotional exhaustion score of individual A within the study population.*



## Graphical applications

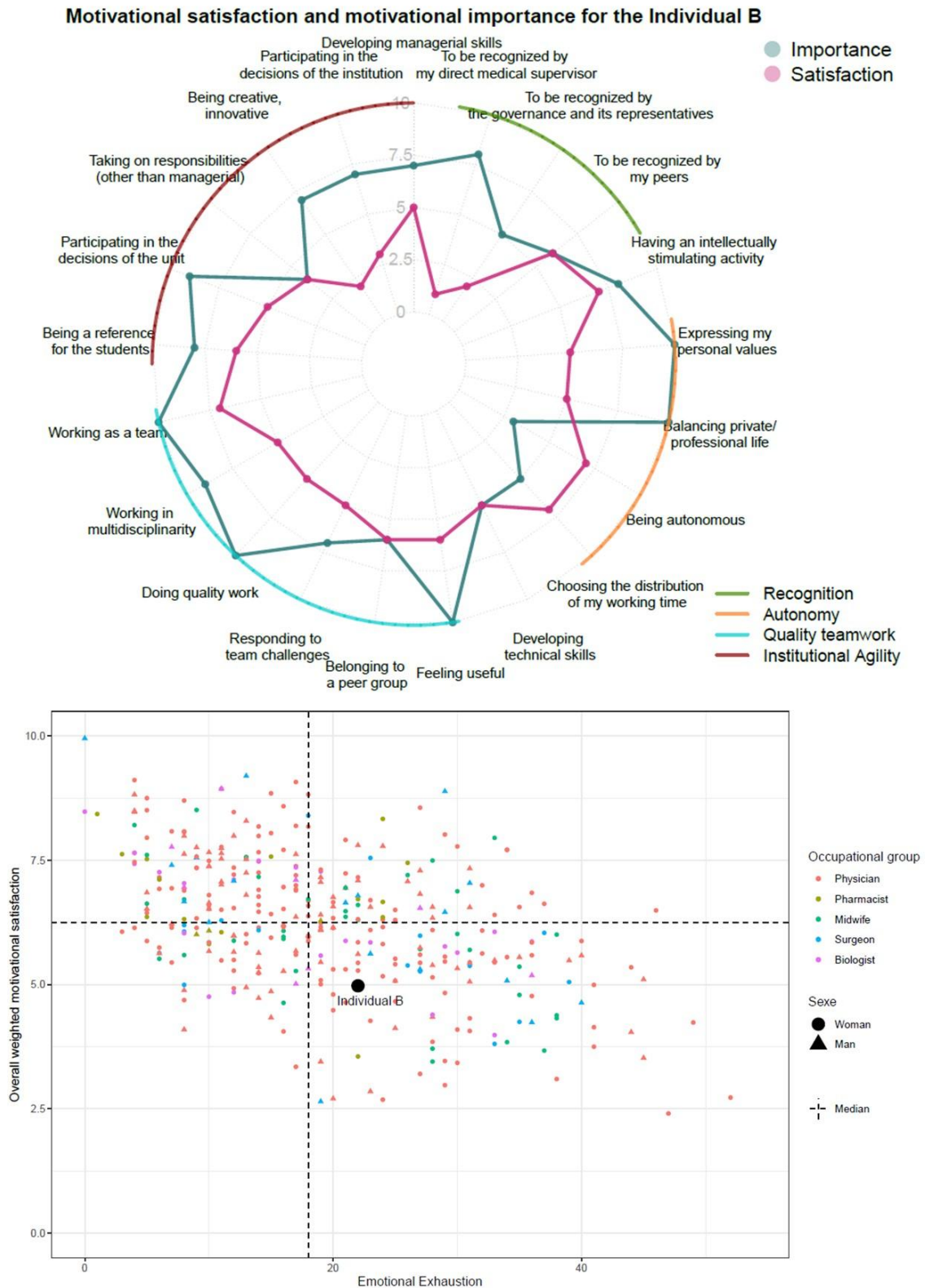
To allow a more intuitive application, we propose a graphical approach of the motivational profile and the motivational satisfaction. The motivation of each individual can be defined by 2 vectors; one corresponding to the degree of importance attributed to each motivator (internalization of motivations), and one to the degree of satisfaction. Figures 1 and 2 give two examples for individuals A and B with anonymized data. The lower part of the figures show that the 2 individuals have equivalent emotional exhaustion and overall WMS scores within the study population.

For individual A (Figure 1), the radar-chart shows very low satisfaction with the motivators of *institutional agility*, moderate satisfaction with those of *professional autonomy* and *quality teamwork* (except for “Belonging to a peer group”), and higher satisfaction with *recognition* (except for “To be recognized by the governance and its representatives”). Importance scores of motivators of *professional autonomy* are the highest, moderate for *quality teamwork* (except for “Belonging to a peer group”) and *institutional agility* and lower for *recognition*. The mean importance and motivational satisfaction scores by MSMI dimension for individual A also show this order (Table 6).

For individual B (Figure 2), the radar-chart shows very low satisfaction with the motivators of *recognition* (except for “To be recognized by my peers”), moderate satisfaction with those of *institutional agility* (except for “Being creative, innovative), *professional autonomy* and *quality teamwork* . Importance scores of motivators of *quality teamwork*, *professional autonomy* are the highest, moderate for (except for “Belonging to a peer group”) and *institutional agility* and lower for *recognition*. The mean importance and motivational satisfaction scores by MSMI dimension for individual B also show this order (Table 6).

**Figure 2.**

Vectors of motivational profile and motivational satisfaction represented as a radar-chart for individual B. Representation of the overall weighted motivational satisfaction (WMS) and emotional exhaustion score of individual B within the study population.



**Table 6.**

*Mean scores of importance and weighted motivational satisfaction (WMS) for individuals A and B for each dimension of the MSMI and for overall scale.*

		Individual A	Individual B
Institutional agility	Importance	7.7	7
	WMS	3.5	4.3
Quality teamwork	Importance	7.7	8.7
	WMS	6.0	5.7
Professional autonomy	Importance	9.5	7
	WMS	4.6	5.6
Recognition	Importance	7.3	6.3
	WMS	6.5	2.8
Overall	Importance	8.1	7.3
	WMS	4.8	5.0
MBI	Emotional Exhaustion	20	22
	Depersonalization	8	5
	Personal Accomplishment	33	46

At a collective level, the same type of graphs can be made at different granularities of a hospital such as the division, the department, or according to the professional seniority (see Ancillary results for an example).



## **Discussion**

This study is the first to apply the SDT to assess the different aspects of motivation of hospital medical staff, a first step in developing strategies to improve quality of work life and reduce burnout. Following an initial qualitative stage based on interviews with 62 hospital medical staff (focus groups), the experience of an occupational health department in a university hospital, and a review of the literature, we created the first tool to measure the motivational profile and the motivational satisfaction of medical staff, in order to identify practical actions to reinforce the meaning of their work: the MSMI. We listed 21 motivators, evaluated according to two scales: (1) the importance that an individual attributes to a motivator reflects the degree of internalization of the motivation on the self-determination continuum; (2) the satisfaction that an individual attributes to a motivator reflects the joy generated by the fulfillment of the motivator in the current work environment. We subsequently explored the inverse relationships between these satisfactions and job burnout.

### **Participation rate**

The health context related to the COVID-19 pandemic, as well as the large daily email load faced by medical staff, may have influenced the availability of medical staff to respond to this study and thus the participation rate.

### **Motivators**

The highest scores on importance scale were for “Doing quality work”, “Feeling useful”, and “Having an intellectually stimulating activity”, which relate to the very interests of the activity, namely intrinsic motivation. In contrast, the lowest scores were for motivators “Developing managerial skills”, “Participating in the decisions in the institution”, and “To be recognized by the governance and its representatives”, which depend on people other than the individual himself/herself. This finding supports a parallel between the importance scale and the self-determination continuum. The pattern of high scores, with all averages above 5, is

consistent with the idea that caregivers view their work as a vocation with a high level of altruism resulting in considerable intrinsic and integrated motivations (17). Moreover, the motivational satisfaction scores also show that satisfaction with the task itself (care or diagnostic assistance) is more easily fulfilled. The difficulty in satisfying motivators “Participating in the decisions of the institution”, “To be recognized by the governance and its representatives” and “Developing managerial skills” corresponds to the lack of support from health organizations and the executive leadership (50).

### **Factor structure of the MSMI**

The factor analysis of the MSMI suggests a 4-dimensional model with 19 motivators along a simplex pattern of motivational continuum. The two most important dimensions are *quality teamwork* and *professional autonomy*, whose motivators cover the basic psychological needs of the SDT (30). The items of *professional autonomy* like “Choosing the distribution of my working time”, “Expressing my personal values” or “Being autonomous” can easily be related to the psychological needs of autonomy. The items of *quality teamwork* like “Working as a team”, “Working in multidisciplinary” or “Belonging to a peer group” can refer to the psychological needs of relatedness. The items of *quality teamwork* like “Responding to team challenges”, “Doing quality work” or “Feeling useful” meet the needs of competence. These basic psychological needs meet the needs of daily activity: managing one's work organization, the content of the task, direct relations with colleagues and close teamwork.

*Recognition* involves associations of basic psychological needs; before the individual can be sensitive to recognition, he/she must be able to demonstrate competence (high satisfaction), be aware of it, and believe that this competence can be seen. When the physician feels sufficiently competent and autonomous (joy from needs fulfillment, namely high satisfactions), he/she talks about it to his/her colleagues more regularly (“To be recognized by my peers”), then to his/her superior during the annual interview for example (“To be recognized by my direct medical supervisor”). Recognition by governance (“To be recognized

by the governance and its representatives”) is often equated with financial rewards, representing essentially an extrinsic motivation; the adequacy of these rewards with the reality experienced by the individual on a daily basis is often disconnected and contributes to reinforcing controlled rather than autonomous motivation.

Finally, when the basic needs are sufficiently fulfilled, the individual can then consider other objectives such as management or institutional involvement (“Developing managerial skills”, “Participating in the decisions of the institution”, “Taking on responsibilities (other than managerial)”, “Participating in the decisions of the unit”), or conducting projects, or teaching activities (“Being creative, innovative”, “Being a reference for the students”). Thus, asking for motivation for *institutional agility* when the basic needs are not satisfied can lead to frustration and so to burnout. A health organization that notices a decline in the institutional investment of its medical staff must evaluate the satisfaction of *professional autonomy* and *quality teamwork* before proposing new responsibilities, such as management. In addition, offering more recognition such as thanks or rewards when individuals cannot satisfy their needs for autonomy and competence in their work environment contributes to reinforcing controlled motivation and therefore increases the risk of burnout (68). Logically, the motivator “Responding to team challenges” cross-loads between *quality teamwork* and *institutional agility* because, first, it carries the competence of the challenge in team collaboration but therefore assumes a commitment to the team but also to the institution that determines the challenge.

Two items had no sufficient loadings. “Developing technical skills” could be too specific to certain professions (such as surgeons, interventional physicians), who represent too small a proportion of our sample to develop a dimension related to their specificities. “Having an intellectually stimulating activity” is shared between *professional autonomy*, *quality teamwork* and *institutional agility*. One explanation could be that this motivator depends on the individual’s stage of satisfaction. If an individual satisfied the needs of autonomy, he/she

would like to satisfy the needs of competence and relatedness firstly, or conversely to the extent that these psychological needs are considered basic. If the three basic needs are satisfied then the intellectual stimulation is represented by the creativity or by taking more responsibilities (managerial or not).

According to the weak internal consistency (69), the use of a simple numerical score per dimension or overall smoothes the intra-individual variability, namely the essential information about the individual self-meaning of the work. We thus recommend the use of the graphical approach of the MSMI in management or occupational health services.

### **Variance explained**

However, some precautions seem to be necessary for the use of this scale. The importance score model does reflect a continuum, i.e. there is continuity in the internalization of motivations, but this model explains 45% of variance, below the recommended value of 50% (66). Several reasons can be raised. First, although most inter-item correlations were statistically significant, the effect sizes were relatively small (from 0 to .51). In other words, the proposed items share a proximity but may be insufficient to determine a consistent latent factor. The purpose of factor analysis is to identify latent factors explaining the correlation between variables. If the interrelation between the variables is low, then the common variance that can be explained is low. Another explanation lies in the item distributions: some items had low variance due to a ceiling effect, which de facto reduces the explainable variance.

### **Implications from the WMS**

The WMS takes into account the importance attributed to each motivator in the calculation of the overall and dimensional satisfaction of the individual. This weighting is a reminder of how much the satisfaction of essential psychological needs contributes more to overall satisfaction and therefore to health outcomes. The WMS means of the most important dimensions, namely *quality teamwork*, *professional autonomy*, was not very high, probably explained by the loss of meaning in the work decried by physicians in several studies (51,55).

According to this hypothesis, if basic psychological needs are not satisfied, other motivators such as *institutional agility* or *recognition* cannot be internalized, which is consistent with the observations made on importance scores in this population. A study that assessed only medical staff satisfaction might conclude that the most urgent need would be to improve satisfaction of *recognition* (by increasing salaries, for example) or *institutional agility* (by involving staff in more meetings). However, this would reflect a lack of understanding the need to first satisfy basic psychological needs, through the satisfaction of *professional autonomy* and *quality teamwork*. If these latter motivations are sufficiently satisfied, then the individual can internalize the other motivations and the leverage effect can take place. Offering a raise or a bonus to a person who is discouraged by a lack of satisfaction, autonomy or competence reinforces the feeling of loss of control and meaning in his/her work and leads to burnout.

### **Convergent validity with MBI**

In this study, we related the overall motivational satisfaction negatively to emotional exhaustion and depersonalisation, and positively to personal accomplishment, which is consistent with the literature (33,70,71). The medium to large correlations with emotional exhaustion highlight the important relationship between the achievement of certain goals and the associated emotional experience. The satisfaction scale does not only question the attainment/fulfillment of goals but also the joy, the emotional feeling following this achievement. Similarly, the medium correlations with personal accomplishment reinforce the hypothesis that motivational satisfaction is related to self-fulfillment. Moreover, the *recognition* dimension is less correlated than the other dimensions of the MSMI; one explanation is that this dimension corresponds more to the recognition by others, rather than by the individual himself/herself, of a well done job.

### **Perspectives**

Confirmatory studies, test-retest studies and sensitivity-to-change analyses, as well as predictive validity with longitudinal data will later allow to achieve the validation of this new scale.

This study encourages the development and application of tools to measure the experience of providing care in healthcare organizations, using a more positive and complementary approach than burnout.

## Conclusion

Worldwide healthcare organizations must meet the goals of improving the quality and safety of care, but also of improving the experience of providing care by the caregivers themselves, by enabling them to obtain meaning and pleasure in their work. Based on a preliminary qualitative study with 64 hospital medical staff, the Medical Staff Motivation Inventory (MSMI) is a tool that, based on self-determination theory (SDT), proposes 21 motivators covering the multidimensional representation of motivation. Each individual is driven by several types of motivation simultaneously, which defines his/her motivational profile along the self-determination continuum. In this thesis, we developed and validated the psychometric properties of the MSMI to determine the motivational profile and motivational satisfaction of hospital medical staff. This tool allows each respondent to obtain a graphical diagnosis of his/her motivational profile and motivational satisfaction, but also allows healthcare organizations to evaluate, at different organizational granularities, motivational profiles and satisfactions, and to propose ways for improving the experience of providing care, according to 4 dimensions: *quality teamwork*, *professional autonomy*, *institutional agility*, and desire for *recognition*. This thesis also shows the primacy of the motivations of professional autonomy and quality teamwork. In terms of perspectives, future studies will be able to confirm the factorial structure of the MSMI and to study its predictive validity (from prospective cohorts) in relation to mental health indicators, but also to the quality of care, attractiveness and loyalty of caregivers. The tool is already being used at the Grenoble-Alpes University Hospital, in conjunction with the occupational health department and institutional committee, to support quality of work life initiatives for medical staff.

**THÈSE SOUTENUE PAR : Gérald GANDON**

**TITRE :**

**EVALUATION DU PROFIL MOTIVATIONNEL ET DE LA SATISFACTION PROFESSIONNELLE : CONSTRUCTION ET VALIDATION PSYCHOMETRIQUE DU "MEDICAL STAFF MOTIVATION INVENTORY" (MSMI)**

**CONCLUSION :**

Au niveau international, les organisations de santé doivent répondre aux objectifs de l'amélioration de la qualité et de la sécurité des soins, mais aussi de l'amélioration de l'expérience de la prestation de soins par les soignants eux-mêmes, en leur permettant d'obtenir du sens et du plaisir dans leur travail. En se basant sur une étude préliminaire qualitative auprès de 64 personnels médicaux hospitaliers, le Medical Staff Motivation Inventory (MSMI) est un outil, qui, à partir de la théorie de l'autodétermination (TAD), propose 21 motivateurs recouvrant la représentation multidimensionnelle de la motivation. Chaque individu est animé par plusieurs types de motivation simultanément, ce qui définit son profil motivationnel selon le continuum d'autodétermination. Dans cette thèse, nous avons développé et validé les qualités psychométriques du MSMI pour déterminer le profil motivationnel et la satisfaction motivationnelle du personnel médical hospitalier. Cet outil permet à chaque répondant d'obtenir graphiquement le diagnostic de son profil motivationnel et de sa satisfaction motivationnelle, mais également aux organisations de santé d'évaluer, à différentes granularités organisationnelles, profils et satisfactions motivationnelles, et de proposer des pistes d'amélioration de l'expérience de la prestation de soins, selon 4 dimensions : un travail d'équipe de qualité, une autonomie professionnelle, une agilité institutionnelle, et une envie de reconnaissance. Cette thèse montre en outre la primauté des motivations d'autonomie professionnelle et du travail d'équipe de qualité. En termes de perspectives, de futures études pourront confirmer la structure factorielle du MSMI et d'étudier sa validité prédictive (à partir de cohortes prospectives) vis-à-vis d'indicateurs de santé mentale, mais aussi de la qualité des soins, et de l'attractivité et de la fidélisation des soignants. D'ores et déjà, l'outil est utilisé au CHU Grenoble-Alpes, en lien avec le service de santé au travail et les instances institutionnelles, pour aider aux démarches de qualité de vie au travail du personnel médical.

**VU ET PERMIS D'IMPRIMER**

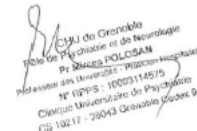
**Grenoble, le :**

**LE DOYEN**



**Pr. Patrice MORAND**

**LE PRÉSIDENT DE LA THÈSE**



**Pr. Mircea POLOSAN**



### **Acknowledgments**

This study was conducted with support and cooperation of the Institutional Medical Committee of University Hospital of Grenoble (France) and Alpes-Isère Hospital Center (France). The authors would like to thank the occupational health service of University Hospital of Grenoble (France), especially occupational psychologists (Ms. Garali and Pavillet) and Dr Anselmetti for the previous study. The authors would also like to acknowledge the support of physicians who participated and gave their insights with dedicated concern.

## Bibliography

1. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000 Jan;55(1):68–78.
2. Deci EL, Ryan RM. Self-determination theory: A macrotheory of human motivation, development, and health. *Can Psychol Can*. 2008;49(3):182–5.
3. Frederick CM, Ryan RM. Self-determination in sport: A review using cognitive evaluation theory. *Int J Sport Psychol*. 1995;26(1):5–23.
4. Lonsdale C, Hodge K, Rose E. Athlete burnout in elite sport: A self-determination perspective. *J Sports Sci*. 2009 Jun 1;27(8):785–95.
5. Teixeira PJ, Carraça EV, Markland D, Silva MN, Ryan RM. Exercise, physical activity, and self-determination theory: A systematic review. *Int J Behav Nutr Phys Act*. 2012 Jun 22;9(1):78.
6. Niemiec CP, Ryan RM. Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory Res Educ*. 2009 Jul 1;7(2):133–44.
7. Ng JYY, Ntoumanis N, Thøgersen-Ntoumani C, Deci EL, Ryan RM, Duda JL, et al. Self-Determination Theory Applied to Health Contexts: A Meta-Analysis. *Perspect Psychol Sci*. 2012 Jul 1;7(4):325–40.
8. Deci EL, Olafsen AH, Ryan RM. Self-determination theory in work organizations: The state of a science. *Annu Rev Organ Psychol Organ Behav*. 2017;4:19–43.
9. Howard JL, Gagné M, Bureau JS. Testing a continuum structure of self-determined motivation: A meta-analysis. *Psychol Bull*. 2017;143(12):1346–77.
10. Moran CM, Diefendorff JM, Kim T-Y, Liu Z-Q. A profile approach to self-determination theory motivations at work. *J Vocat Behav*. 2012 Dec 1;81(3):354–63.
11. Gagné M, Forest J, Vansteenkiste M, Crevier-Braud L, Broeck A van den, Aspelis AK, et al. The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries. *Eur J Work Organ Psychol*. 2015 Mar 4;24(2):178–96.
12. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff Proj Hope*. 2008 Jun;27(3):759–69.
13. Shanafelt TD, West CP, Sinsky C, Trockel M, Tutty M, Satele DV, et al. Changes in Burnout and Satisfaction With Work-Life Integration in Physicians and the General US Working Population Between 2011 and 2017. *Mayo Clin Proc*. 2019 Sep;94(9):1681–94.
14. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. *Ann Fam Med*. 2014 Dec;12(6):573–6.
15. Sikka R, Morath JM, Leape L. The Quadruple Aim: care, health, cost and meaning in work. *BMJ Qual Saf*. 2015 Oct;24(10):608–10.
16. Panagioti M, Panagopoulou E, Bower P, Lewith G, Kontopantelis E, Chew-Graham C, et al. Controlled Interventions to Reduce Burnout in Physicians: A Systematic Review and Meta-analysis. *JAMA Intern Med*. 2017 Feb 1;177(2):195–205.
17. Hartzband P, Groopman J. Physician Burnout, Interrupted. *N Engl J Med*. 2020 Jun 25;382(26):2485–7.
18. Niemiec CP, Ryan RM, Deci EL. The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *J Res Personal*. 2009 Jun 1;43(3):291–306.
19. Gagné M, Deci EL. Self-determination theory and work motivation. *J Organ Behav*. 2005;26(4):331–62.
20. Chemolli E, Gagné M. Evidence against the continuum structure underlying motivation measures derived from self-determination theory. *Psychol Assess*. 2014;26(2):575–85.
21. Grolnick WS, Ryan RM. Autonomy in children’s learning: An experimental and individual difference investigation. *J Pers Soc Psychol*. 1987;52(5):890.

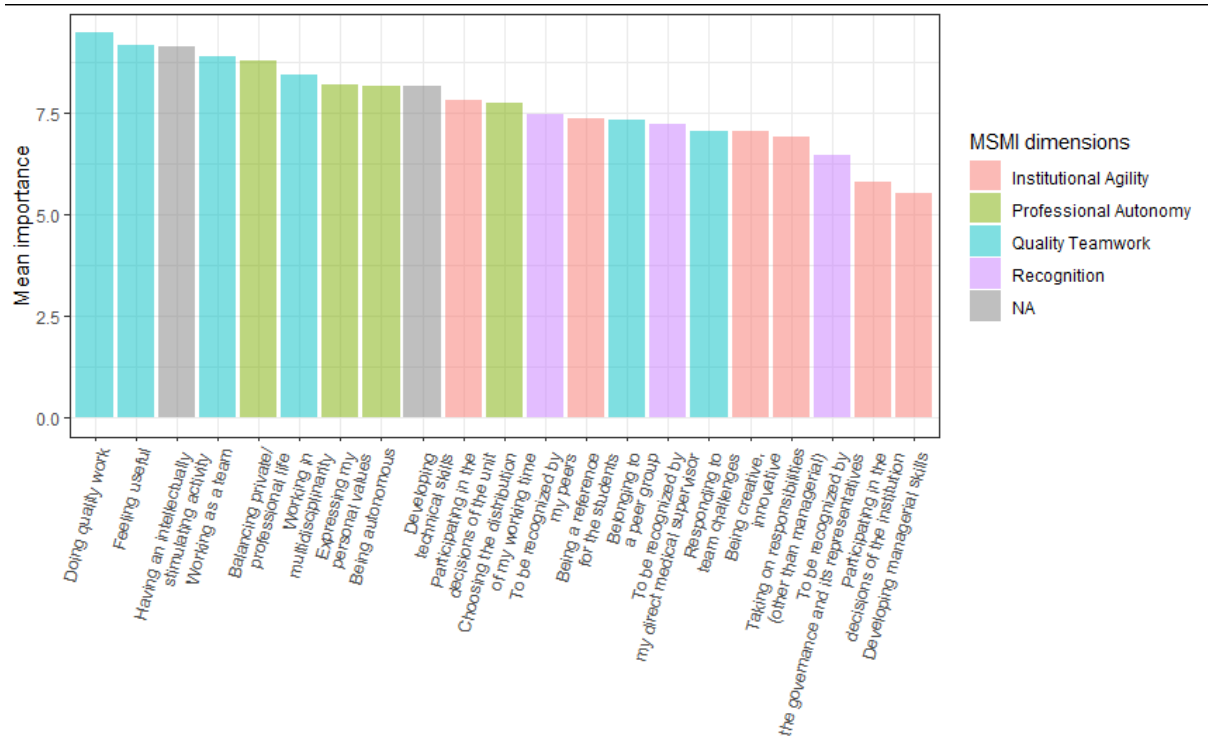
22. Gillet N, Berjot S, Paty E. Profils motivationnels et ajustement au travail : vers une approche intra-individuelle de la motivation, Summary. *Trav Hum.* 2010 Jun 18;73(2):141–62.
23. Manganelli L, Gillet N, Laurent V, Forest J. Une analyse des profils motivationnels afin de mieux comprendre l'effet des contraintes et ressources professionnelles en emploi. *Hum Organ.* 2017 May;3(1):9–20.
24. Van den Broeck A, Lens W, De Witte H, Van Coillie H. Unraveling the importance of the quantity and the quality of workers' motivation for well-being: A person-centered perspective. *J Vocat Behav.* 2013 Feb 1;82(1):69–78.
25. Howard J, Gagné M, Morin AJS, Van den Broeck A. Motivation profiles at work: A self-determination theory approach. *J Vocat Behav.* 2016 Aug 1;95–96:74–89.
26. Vansteenkiste M, Neyrinck B, Niemiec CP, Soenens B, Witte HD, Broeck AV den. On the relations among work value orientations, psychological need satisfaction and job outcomes: A self-determination theory approach. *J Occup Organ Psychol.* 2007;80(2):251–77.
27. Blais MR, Brière NM, Lachance L, Riddle AS, et al. L'inventaire des motivations au travail de Blais. [The Blais Inventory of Work Motivation.]. *Rev Québécoise Psychol.* 1993;14(3):185–215.
28. Fernet C, Guay F, Senécal C. Adjusting to job demands: The role of work self-determination and job control in predicting burnout. *J Vocat Behav.* 2004 Aug 1;65(1):39–56.
29. Hon AHY. Shaping Environments Conducive to Creativity: The Role of Intrinsic Motivation. *Cornell Hosp Q.* 2012 Feb 1;53(1):53–64.
30. Olafsen AH, Deci EL, Halvari H. Basic psychological needs and work motivation: A longitudinal test of directionality. *Motiv Emot.* 2018 Apr 1;42(2):178–89.
31. McDonough MH, Crocker PRE. Testing Self-Determined Motivation as a Mediator of the Relationship between Psychological Needs and Affective and Behavioral Outcomes. *J Sport Exerc Psychol.* 2007 Oct 1;29(5):645–63.
32. Milyavskaya M, Koestner R. Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personal Individ Differ.* 2011 Feb 1;50(3):387–91.
33. Broeck AV den, Vansteenkiste M, Witte HD, Lens W. Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work Stress.* 2008 Jul 1;22(3):277–94.
34. Su Y-L, Reeve J. A Meta-analysis of the Effectiveness of Intervention Programs Designed to Support Autonomy. *Educ Psychol Rev.* 2011 Mar 1;23(1):159–88.
35. Van den Broeck A, Ferris DL, Chang C-H, Rosen CC. A Review of Self-Determination Theory's Basic Psychological Needs at Work. *J Manag.* 2016 Jul 1;42(5):1195–229.
36. Baard PP, Deci EL, Ryan RM. Intrinsic Need Satisfaction: A Motivational Basis of Performance and Well-Being in Two Work Settings1. *J Appl Soc Psychol.* 2004;34(10):2045–68.
37. Fernet C, Austin S, Trépanier S-G, Dussault M. How do job characteristics contribute to burnout? Exploring the distinct mediating roles of perceived autonomy, competence, and relatedness. *Eur J Work Organ Psychol.* 2013 Apr 1;22(2):123–37.
38. Brière NM, Vallerand RJ, Blais MR, Pelletier LG. Développement et Validation d'une Mesure de Motivation Intrinsèque, Extrinsèque et d'Amotivation en Contexte Sportif: L'Échelle de Motivation dans les Sports (ÉMS). [Development and validation of a scale on intrinsic and extrinsic motivation and lack of motivation in sports: The Scale on Motivation in Sports.]. *Int J Sport Psychol.* 1995;26(4):465–89.
39. Cooper S, Lavaysse LM, Gard DE. Assessing motivation orientations in schizophrenia: Scale development and validation. *Psychiatry Res.* 2015 Jan 30;225(1):70–8.

40. Levesque CS, Williams GC, Elliot D, Pickering MA, Bodenhamer B, Finley PJ. Validating the theoretical structure of the Treatment Self-Regulation Questionnaire (TSRQ) across three different health behaviors. *Health Educ Res.* 2007 Oct 1;22(5):691–702.
41. Pelletier LG, Tuson KM, Haddad NK. Client Motivation for Therapy Scale: A Measure of Intrinsic Motivation, Extrinsic Motivation, and Amotivation for Therapy. *J Pers Assess.* 1997 Apr 1;68(2):414–35.
42. Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. The Academic Motivation Scale: A Measure of Intrinsic, Extrinsic, and Amotivation in Education. *Educ Psychol Meas.* 1992 Dec 1;52(4):1003–17.
43. Gagné M, Forest J, Gilbert M-H, Aubé C, Morin E, Malorni A. The Motivation at Work Scale: Validation Evidence in Two Languages. *Educ Psychol Meas.* 2010 Aug 1;70(4):628–46.
44. Tremblay MA, Blanchard CM, Taylor S, Pelletier LG, Villeneuve M. Work Extrinsic and Intrinsic Motivation Scale: Its value for organizational psychology research. *Can J Behav Sci Can Sci Comport.* 2009;41(4):213.
45. Fernet C, Sénécal C, Guay F, Marsh H, Dowson M. The Work Tasks Motivation Scale for Teachers (WTMST). *J Career Assess.* 2008 May 1;16(2):256–79.
46. Brandstätter V, Job V, Schulze B. Motivational Incongruence and Well-Being at the Workplace: Person-Job Fit, Job Burnout, and Physical Symptoms. *Front Psychol* [Internet]. 2016 [cited 2020 Feb 5];7. Available from: <https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01153/full>
47. Janus K, Amelung VE, Baker LC, Gaitanides M, Schwartz FW, Rundall TG. Job Satisfaction and Motivation among Physicians in Academic Medical Centers: Insights from a Cross-National Study. *J Health Polit Policy Law.* 2008 Dec 1;33(6):1133–67.
48. Ratanawongsa N, Howell EE, Wright SM. What motivates physicians throughout their careers in medicine? *Compr Ther.* 2006;32(4):210–7.
49. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *Lancet Lond Engl.* 2009 Nov 14;374(9702):1714–21.
50. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. *J Intern Med.* 2018;283(6):516–29.
51. Shanafelt TD, Dyrbye LN, Sinsky C, Hasan O, Satele D, Sloan J, et al. Relationship Between Clerical Burden and Characteristics of the Electronic Environment With Physician Burnout and Professional Satisfaction. *Mayo Clin Proc.* 2016 Jul;91(7):836–48.
52. Dyrbye LN, West CP, Burriss TC, Shanafelt TD. Providing primary care in the United States: the work no one sees. *Arch Intern Med.* 2012 Oct 8;172(18):1420–1.
53. Schaufeli WB, Bakker AB. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J Organ Behav.* 2004;25(3):293–315.
54. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet Lond Engl.* 2016 05;388(10057):2272–81.
55. Shanafelt TD, Balch CM, Bechamps GJ, Russell T, Dyrbye L, Satele D, et al. Burnout and career satisfaction among American surgeons. *Ann Surg.* 2009 Sep;250(3):463–71.
56. Tsounis A, Sarafis P, Bamidis P. Motivation among Physicians in Greek Public Health-Care Sector. *Br J Med Med Res.* 2014 Feb 11;4:1094–105.
57. Maslach C, Jackson SE, Leiter MP, Schaufeli WB, Schwab RL. Maslach burnout inventory. Vol. 21. Consulting psychologists press Palo Alto, CA; 1986.
58. Dion G, Tessier R. Validation de la traduction de l'Inventaire d'épuisement professionnel de Maslach et Jackson. *Can J Behav Sci Can Sci Comport.* 1994;26(2):210.
59. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.*

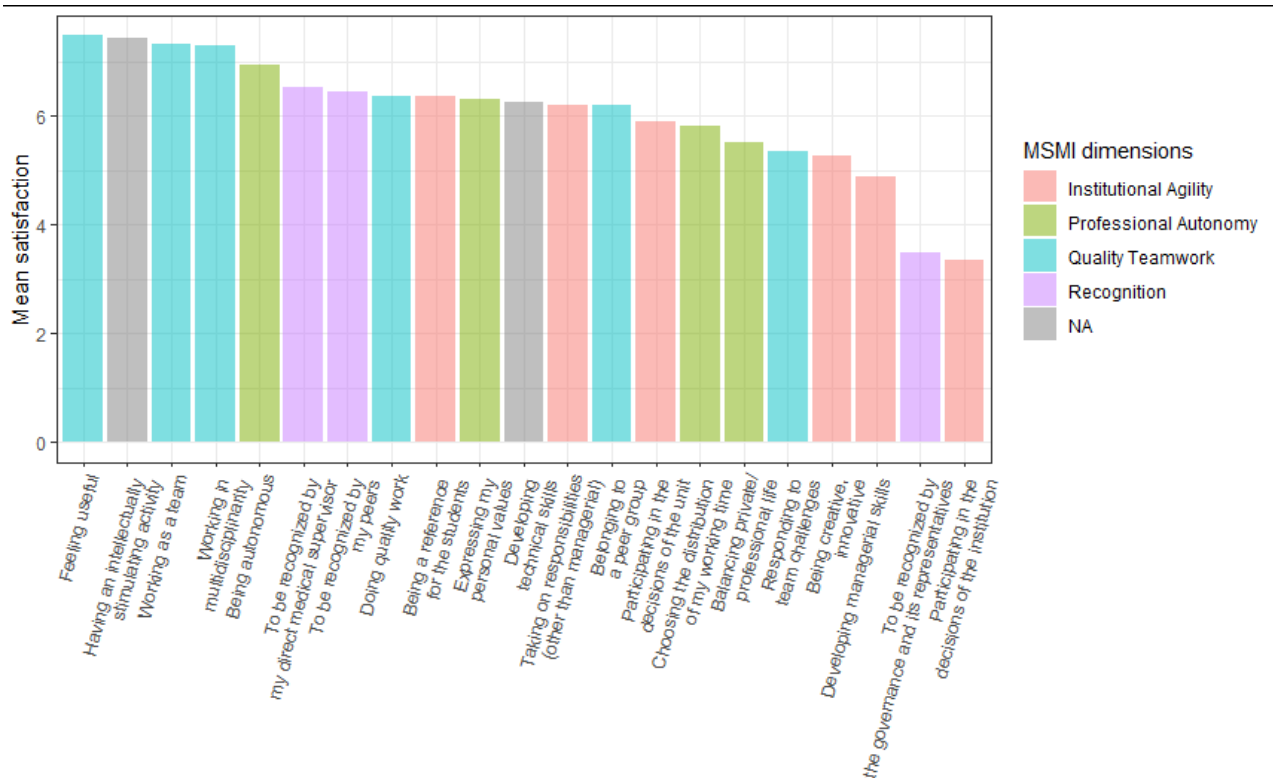
- 2001;52:397–422.
60. LimeSurvey Project Team / Carsten Schmitz. LimeSurvey: An Open Source survey tool [Internet]. Hamburg, Germany: LimeSurvey Project; 2012. Available from: <http://www.limesurvey.org>
  61. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. *Front Public Health* [Internet]. 2018 Jun 11 [cited 2020 Apr 25];6. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6004510/>
  62. RStudio Team. RStudio: Integrated Development Environment for R [Internet]. Boston, MA: RStudio, Inc.; 2015. Available from: <http://www.rstudio.com/>
  63. Revelle W. psych: Procedures for Psychological, Psychometric, and Personality Research [Internet]. Evanston, Illinois: Northwestern University; 2019. Available from: <https://CRAN.R-project.org/package=psych>
  64. Cattell RB. The Scree Test For The Number Of Factors. *Multivar Behav Res*. 1966 Apr 1;1(2):245–76.
  65. Raïche G, Walls TA, Magis D, Riopel M, Blais J-G. Non-Graphical Solutions for Cattell’s Scree Test. *Methodology*. 2013 Jan 1;9(1):23–9.
  66. Peterson RA. A Meta-Analysis of Variance Accounted for and Factor Loadings in Exploratory Factor Analysis. *Mark Lett*. 2000 Aug 1;11(3):261–75.
  67. Cohen J. *Statistical Power Analysis for the Behavioral Sciences—Second Edition*. 12 Lawrence Erlbaum Associates Inc. Hillsdale N J. 1988;13.
  68. Glass DC, McKnight JD. Perceived control, depressive symptomatology, and professional burnout: A review of the evidence. *Psychol Health*. 1996 Jan 1;11(1):23–48.
  69. Tavakol M, Dennick R. Making sense of Cronbach’s alpha. *Int J Med Educ*. 2011 Jun 27;2:53–5.
  70. Fernet C, Gagné M, Austin S. When does quality of relationships with coworkers predict burnout over time? The moderating role of work motivation. *J Organ Behav*. 2010;31(8):1163–80.
  71. Tung Y-C, Chou Y-Y, Chang Y-H, Chung K-P. Association of intrinsic and extrinsic motivating factors with physician burnout and job satisfaction: a nationwide cross-sectional survey in Taiwan. *BMJ Open*. 2020 Mar 1;10(3):e035948.

## Supplementary Section

### Annex 1. Mean importance scores of motivators

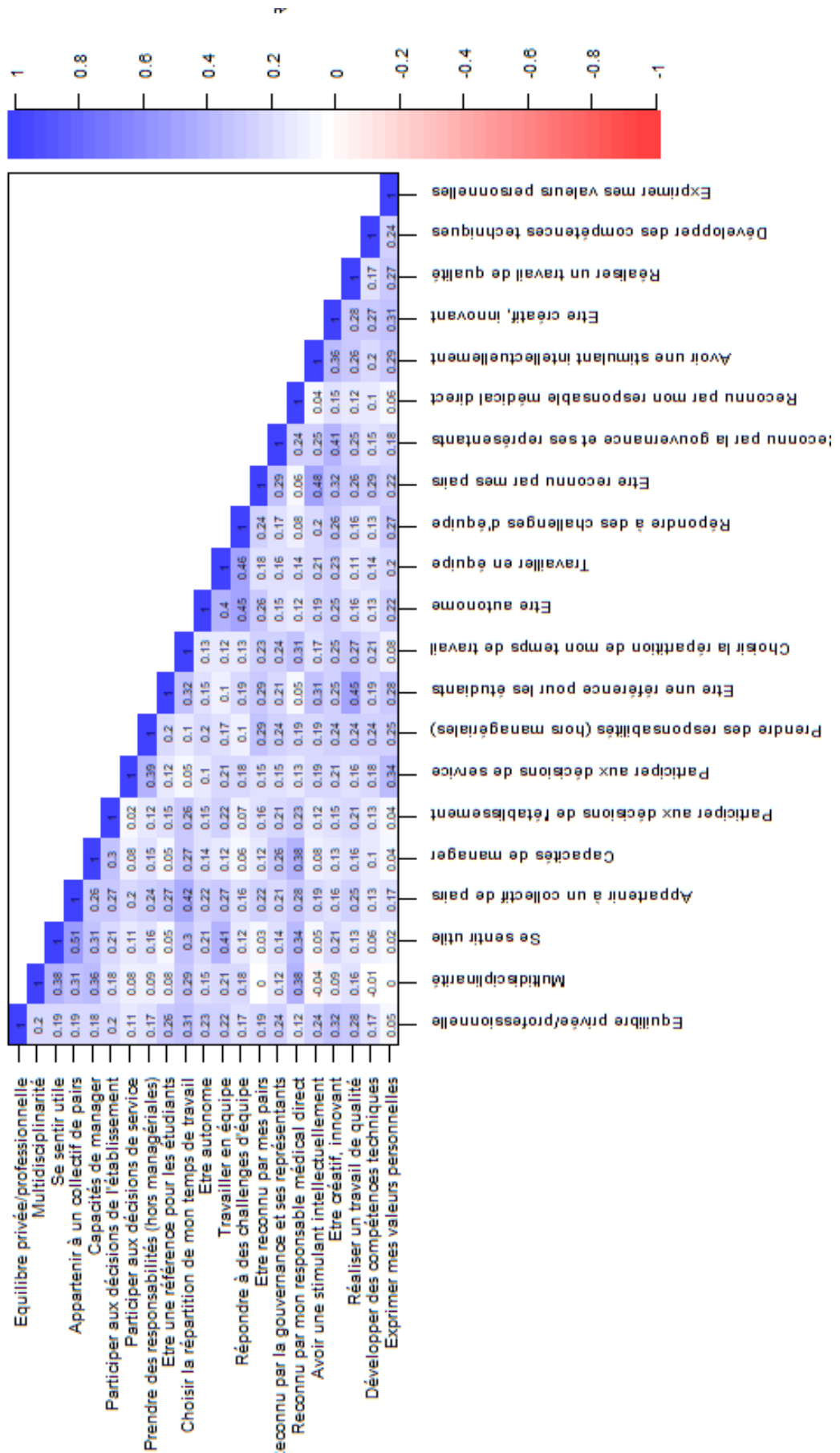


### Annex 2. Mean satisfaction scores of motivators



### Annex 3. Correlation plot of importance scores

Annex 3. Correlation plot of importance scores



**Annex 4.** *List of questioned motivations*

N°	Intitulé	Exemple	Translations for publication
1	Appartenir à un collectif de pairs	Me sentir intégré dans un collectif de pairs.	Belonging to a peer group
2	Développer des capacités de manager	Pouvoir développer des capacités de manager et de leadership.	Developing managerial skills
3	Participer aux décisions de l'établissement	Pouvoir prendre part aux décisions/orientations de l'organisation dans lequel j'exerce.	Participate in the decisions of the institution.
4	Participer aux décisions du service	Participer aux décisions concernant l'organisation du service.	Participate in the decisions of the unit.
5	Prendre des responsabilités (hors managériales)	Pouvoir assumer davantage de responsabilités professionnelles dans les domaines cliniques, mais aussi d'enseignement à l'hôpital, ou de recherche clinique, comme développer, renforcer ou initier une activité clinique, ou participer aux projets transversaux... (hors responsabilités de gestion d'équipe).	Taking on responsibilities (other than managerial)
6	Etre une référence pour les étudiants	Pouvoir transmettre aux étudiants (internes/externes), son savoir, son savoir-faire et son savoir-être.	Be a reference for the students.
7	Choisir la répartition de mon temps de travail	Réaliser mon organisation du temps de travail et le déroulement de ma journée, de ma semaine en fonction des besoins d'activité.	Choosing the distribution of my working time



8	Etre autonome	Etre libre relativement de choisir comment je réalise mon activité (indépendance de décision/d'action sur les différentes situations professionnelles se présentant à moi en fonction de mon évaluation, de mes connaissances et dans le respect des règles de bonnes pratiques).	Being autonomous
9	Travailler en équipe	Travailler avec une équipe qui me manifeste de l'intérêt, interagir avec mes collègues de travail (médicaux, paramédicaux) pour assurer le travail quotidien	Working as a team
10	Répondre à des challenges d'équipe	Répondre aux objectifs fixés grâce à un travail d'équipe, construire dans la durée une réponse optimisée à un besoin hospitalier, se dépasser collectivement.	Responding to team challenges
11	Etre reconnu par mes pairs	Etre reconnu par mes pairs pour le travail que j'effectue.	To be recognized by my peers.
12	Etre reconnu par la gouvernance et ses représentants	Etre reconnu par l'organisation, via la gouvernance et ses représentants, pour mes efforts et mon travail.	To be recognized by the governance and its representatives.
13	Etre reconnu par mon responsable médical direct	Etre reconnu par mon responsable médical direct dans mes efforts et le travail accompli.	To be recognized by my direct medical supervisor.

14	Se sentir utile	Se sentir utile du fait d'une influence positive sur la prise-en-charge des patients.	Feeling useful
15	Avoir une activité stimulant intellectuellement	Avoir du plaisir à apprendre de nouvelles choses, utiliser mes capacités de réflexion et d'analyse dans mon activité.	Have an intellectually stimulating activity
16	Etre créatif, innovant	Démontrer mes capacités de créativité et d'innovation.	Be creative, innovative
17	Réaliser un travail de qualité	Pouvoir dire que mon travail est réussi.	Doing quality work
18	Développer des compétences techniques	Apprendre de nouvelles méthodes et améliorer mes connaissances et capacités techniques.	Developing technical skills
19	Travailler en multidisciplinarité	Travailler avec un réseau étoffé et multidisciplinaire de professionnels, intégrer un milieu professionnel aguerri.	Working in multidisciplinary
20	Exprimer mes valeurs personnelles	Avoir une activité qui a du sens et en phase avec mes valeurs personnelles au quotidien.	Expressing my personal values
21	Equilibrer vie privée/vie professionnelle	Pouvoir équilibrer mon temps entre ma vie privée et ma vie professionnelle.	Balancing private and professional life

### **Ancillary results: applications on the CHUGA sample**

Dans cette thèse-article, nous souhaitons ajouter un paragraphe (non soumis à publication scientifique) pour montrer un exemple d'application d'analyse collective des résultats du MSMI. Les résultats ci-après concernent uniquement le Centre Hospitalier Universitaire de Grenoble-Alpes, les données étant toujours anonymisées avec impossibilité de recoupement d'informations.

326 personnels ont répondu, correspondant à un taux de participation de 25.4% (1283 invitations). La majorité des répondants étaient des femmes (67.8%), médecins (63.5%), titulaires (80%) et dans la profession depuis plus de 4 ans (78.5%) (Table 1bis). 74.8% (n=244) avaient un statut hospitalier, et 23.3% un statut hospitalo-universitaire. Un peu plus de la moitié (56.4%) travaillait au CHUGA depuis plus de 10 ans, et 22.7 % depuis moins de 5 ans. Deux tiers travaillaient entre 41 et 60 heures par semaine.

Le Table 2bis représente la répartition des répondants selon les lieux d'exercice et les pôles du CHUGA. La grande majorité travaille sur le site Nord (65%) et l'HCE (24.2%). Concernant les sites grenoblois, le Pôle Couple-Enfant était le plus représenté (influence de la présence des sage-femmes).

La Figure 1bis montre les scores moyens d'importance attribuée à chaque motivateur selon les professions. Les motivateurs les plus importants semblent assez communs à toutes les professions ("Réaliser un travail de qualité", "Se sentir utile", "Avoir une activité stimulant intellectuellement", "Équilibre vie privée/professionnelle", "Travailler en multidisciplinarité", montrant l'envie d'un travail de proximité de qualité. La recherche de compétences techniques est logiquement plus prépondérante pour les chirurgiens. "Etre autonome" semble exacerbé pour les biologistes et les sage-femmes, possiblement en lien avec des procédures qualité souvent très contraignantes pour les premiers, et avec l'articulation/supervision par les obstétriciens pour les sage-femmes. Les médecins semblent moins à la recherche d'une reconnaissance par leurs pairs que les pharmaciens; cet écart

pourrait s'expliquer par le colloque singulier de la consultation médicale comme source principale de reconnaissance venant des patients, qui permet aux médecins de ne pas ressentir un besoin prioritaire de reconnaissance, par rapport aux pharmaciens hospitaliers dont l'essentiel de l'activité se fait en lien avec ses pairs (peu de consultation de pharmacien). Le même type de constatation se fait sur l'importance attribuée à la reconnaissance par le supérieur direct. Les sage-femmes ont un désir d'implication dans le service ou dans les décisions d'établissement moindre que les autres professions questionnées, très probablement en lien avec la place prépondérante des obstétriciens dans cette mission, mais qui semble être contre-balançée par un besoin de reconnaissance par le supérieur et par la gouvernance (et ses représentants). Les représentations graphiques sous forme de radar (Figure 2bis) illustrent également ces profils motivationnels, bien que la lecture de ces subtilités y soient plus difficiles en raison de l'effet plafond des scores d'importance.

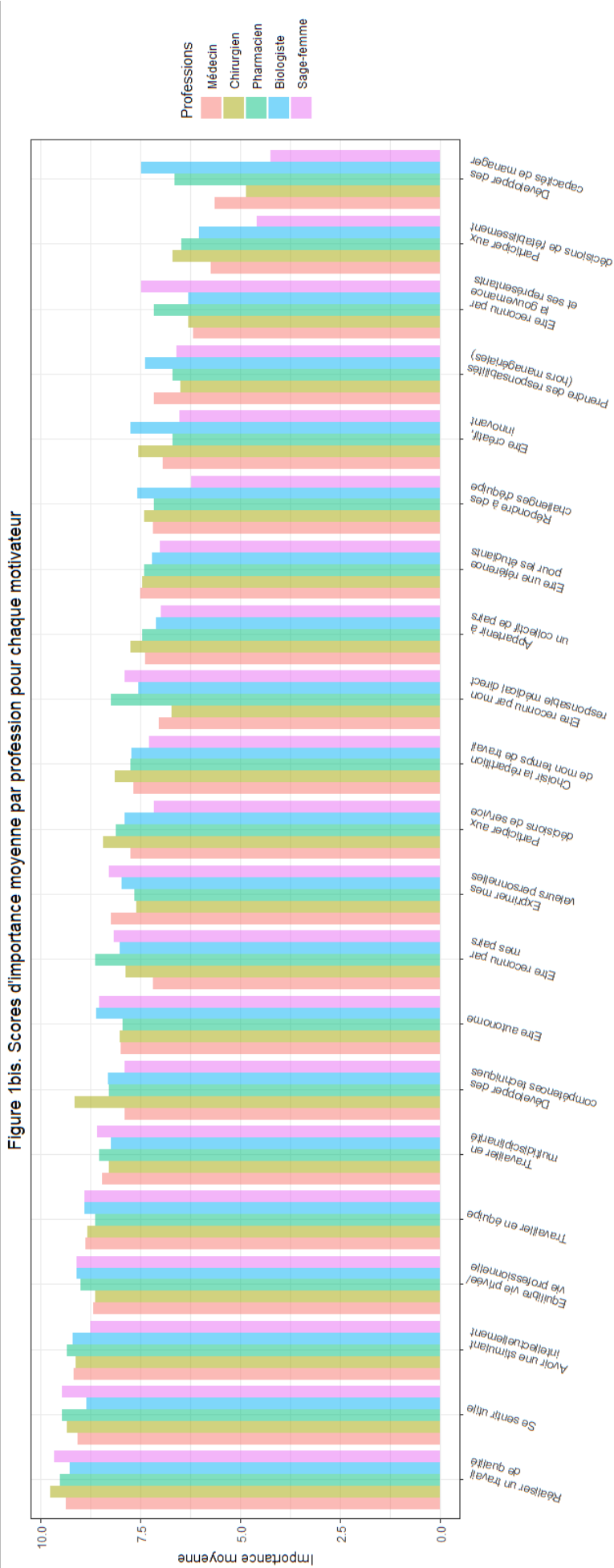
Concernant l'ancienneté dans la profession, la Figure 3bis montre un intérêt un peu plus important des motivateurs relevant de l'agilité institutionnelle pour les personnels exerçant depuis plus de 4 ans dans la profession. Dans le même sens, cet intérêt semble progressivement plus important selon l'avancée dans les années d'ancienneté dans l'institution (Figure 4bis). L'implication institutionnelle, dans des projets créatifs, ou de prise de responsabilité par exemple, semblent donc s'associer avec l'ancienneté. Cependant, la satisfaction semble rester assez faible, ce qui pourrait conduire à une augmentation de la frustration.

**Table 1bis.** *Caractéristiques démographiques de l'échantillon du CHUGA*

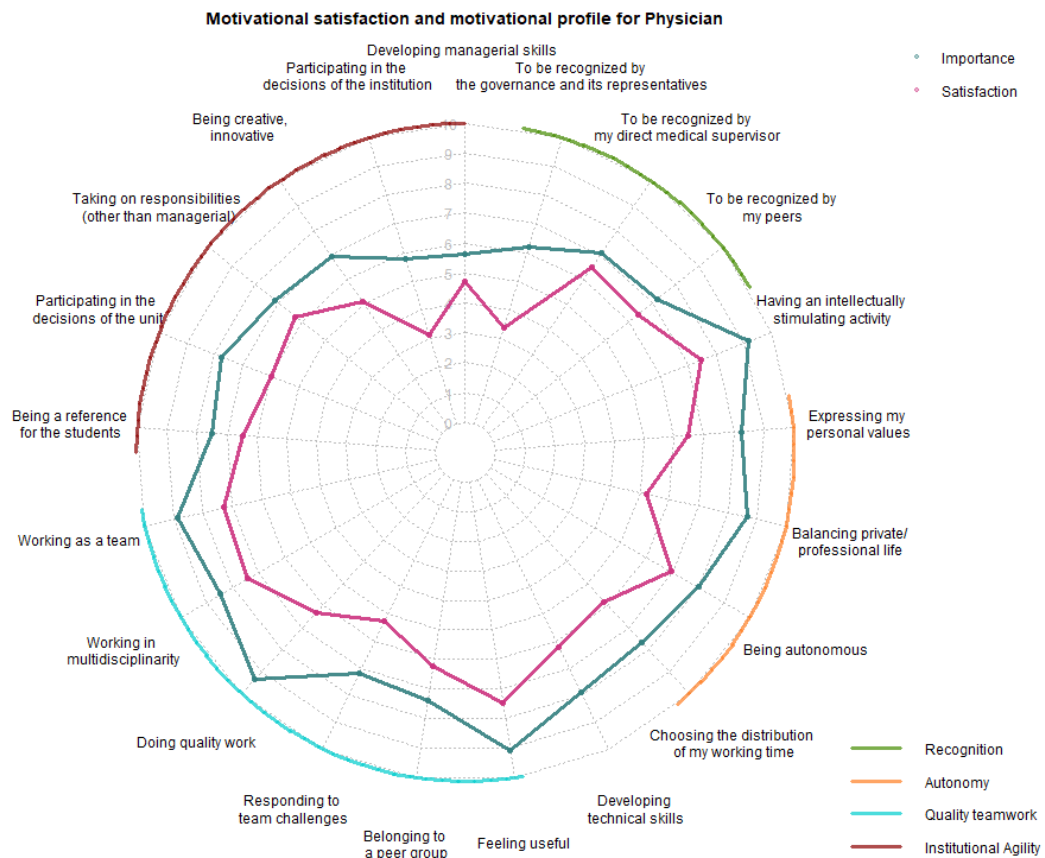
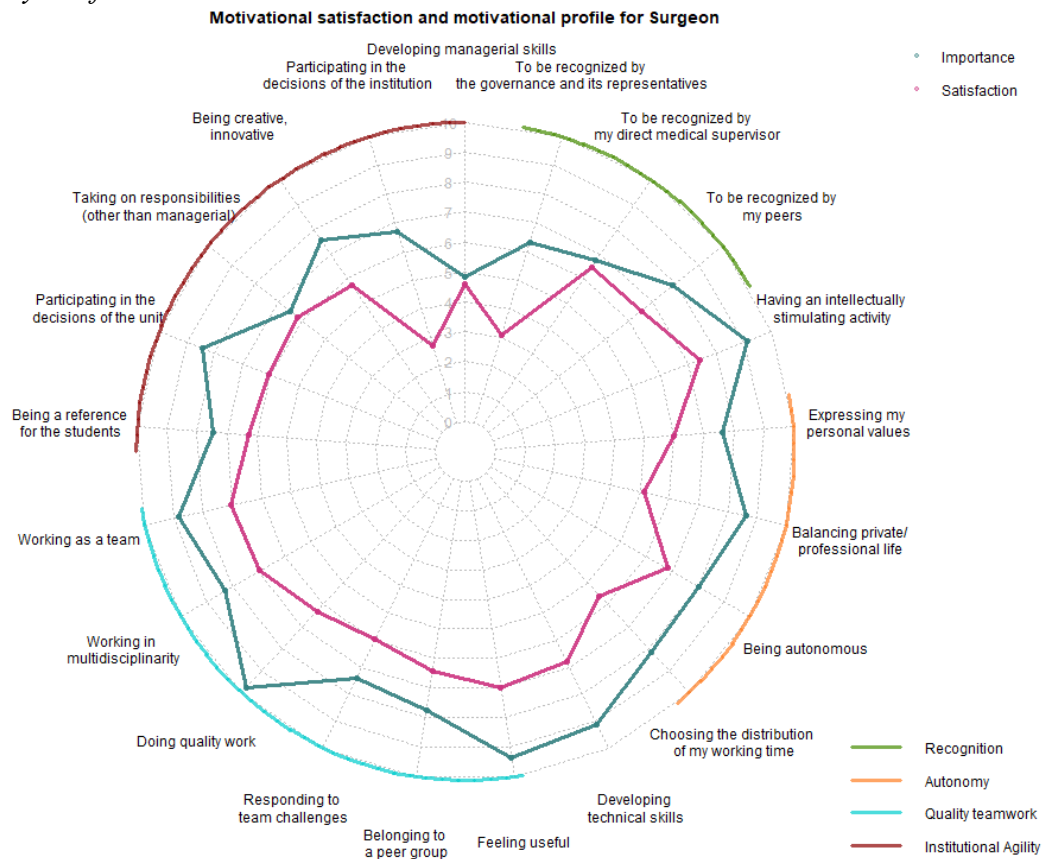
	<i>N</i>	%
Sexe		
Femme	221	67.8%
Profession		
Médecin	207	63.5%
Chirurgien	34	10.4%
Pharmacien	17	5.2%
Biologiste	29	8.9%
Sage-femme	39	12.0%
Statut		
Titulaire	261	80.1%
Contractuel	61	18.7%
Vacataire	4	1.2%
Hospitalo-Universitaire	76	23.3%
Hospitalier	244	74.8%
Ne souhaite pas répondre	6	1.8%
Ancienneté dans la profession		
Inférieur ou égal à 4 ans (= 4)	70	21.5%
Plus de 4 ans (> 4)	256	78.5%
Ancienneté dans l'établissement		
Inférieur ou égal à 5 ans(= 5)	74	22.7%
Entre 6 et 10 ans	68	20.9%
Plus de 10 ans (> 10)	184	56.4%
Temps de travail hebdomadaire		
moins de 40 heures	47	14.4%
entre 41 et 50 heures	110	33.7%
entre 51 et 60 heures	108	33.1%
entre 61 et 70 heures	44	13.5%
entre 71 et 80 heures	14	4.3%
81 heures et plus	3	0.9%

**Table 2bis.** Représentativité des sites/pôles du CHUGA

	N	%
Lieu d'exercice principal		
Couple-Enfant	79	24.2%
Nord	212	65.0%
Sud	19	5.8%
Voiron	16	4.9%
Pôle Grenoblois		
PAR	25	7.7%
PALCROS	19	5.8%
PCMS	16	4.9%
PCE	72	22.1%
DIGIDUNE	19	5.8%
PPMGC	14	4.3%
PRéNeL	18	5.5%
PTV	28	8.6%
PUMA	13	4.0%
Pôle Biologie et Pathologie	33	10.1%
PCGCI	0	0.0%
Pôle Imagerie	11	3.4%
Pôle Pharmacie	7	2.1%
Pôle Recherche	5	1.5%
Pôle Santé Publique	15	4.6%
Pôle Management	2	0.6%
Pôle Voironnais		
Pôle Femmes-Enfants	9	2.8%
Pôle Médico-chirurgical et Anesthésie	3	0.9%
Pôle "Ressources"	0	0.0%
Pôle Soins urgents, Médecine, Gériatrie et Soins de Supports	3	0.9%

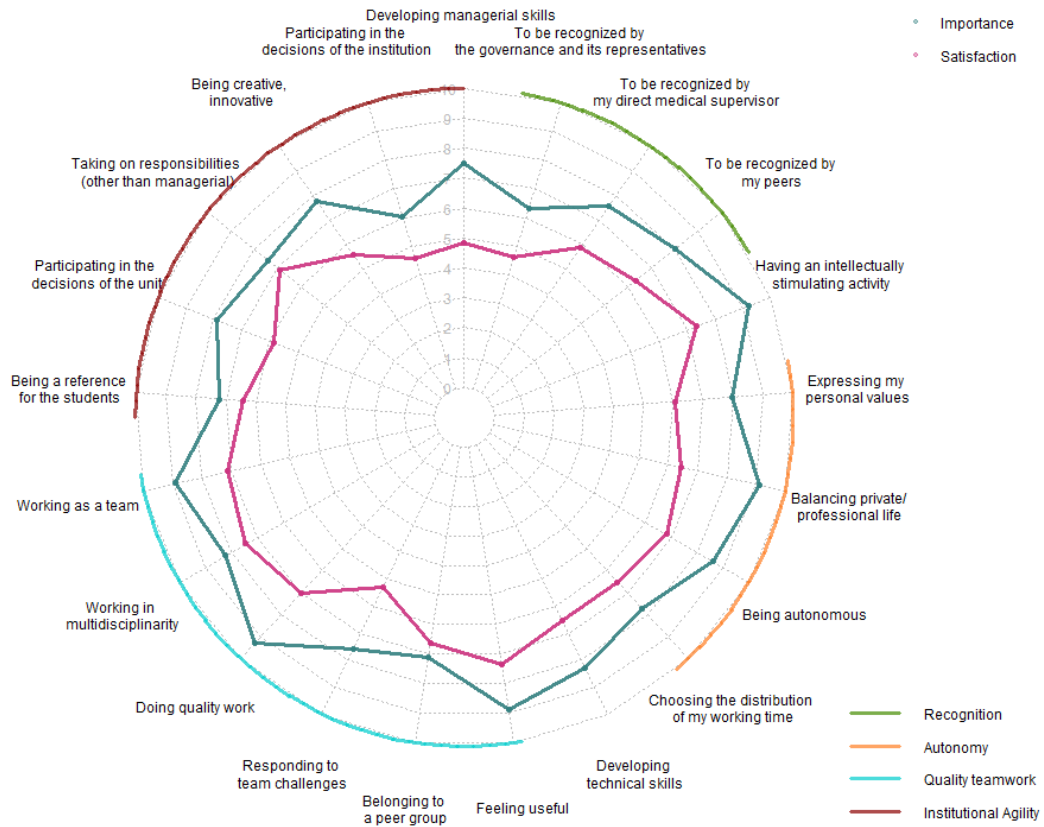


**Figure 2bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by Professions

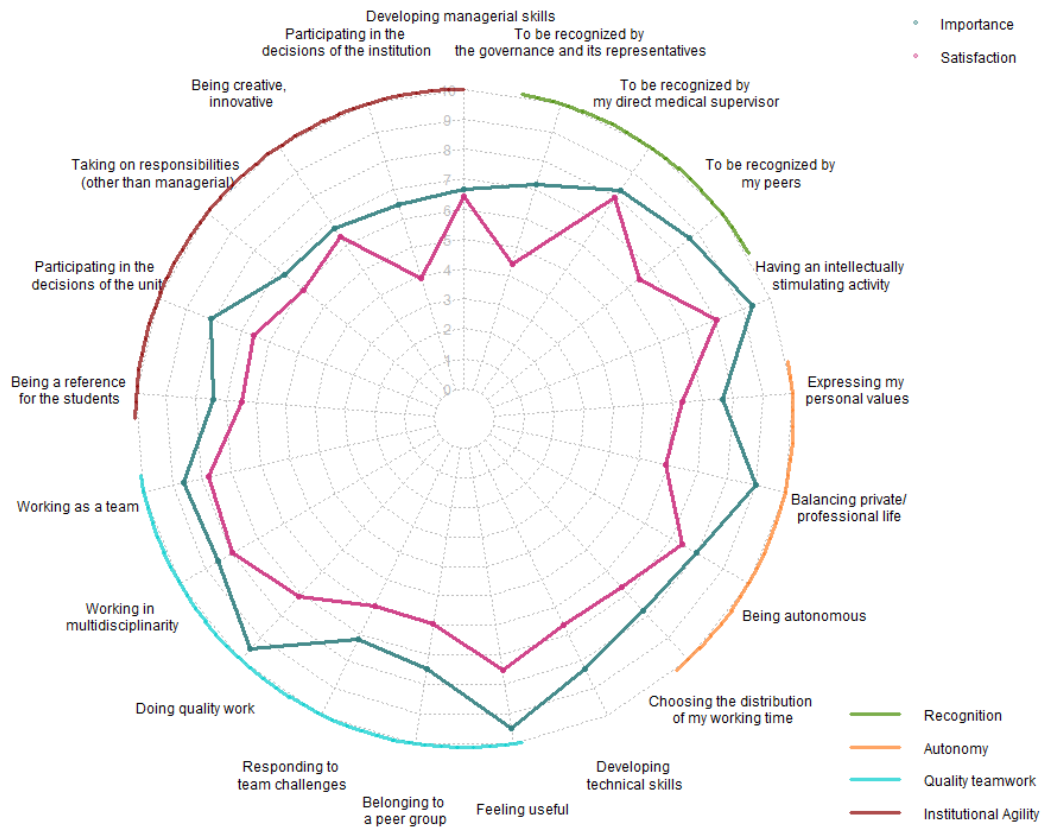




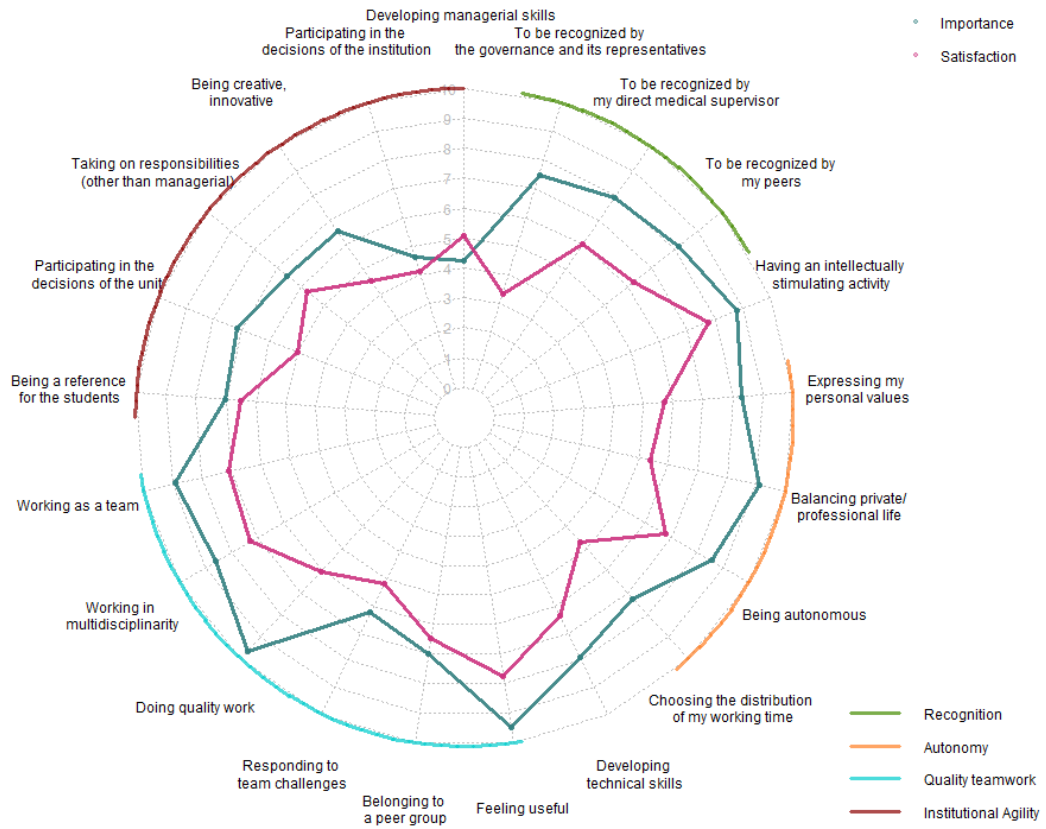
**Motivational satisfaction and motivational profile for Biologist**



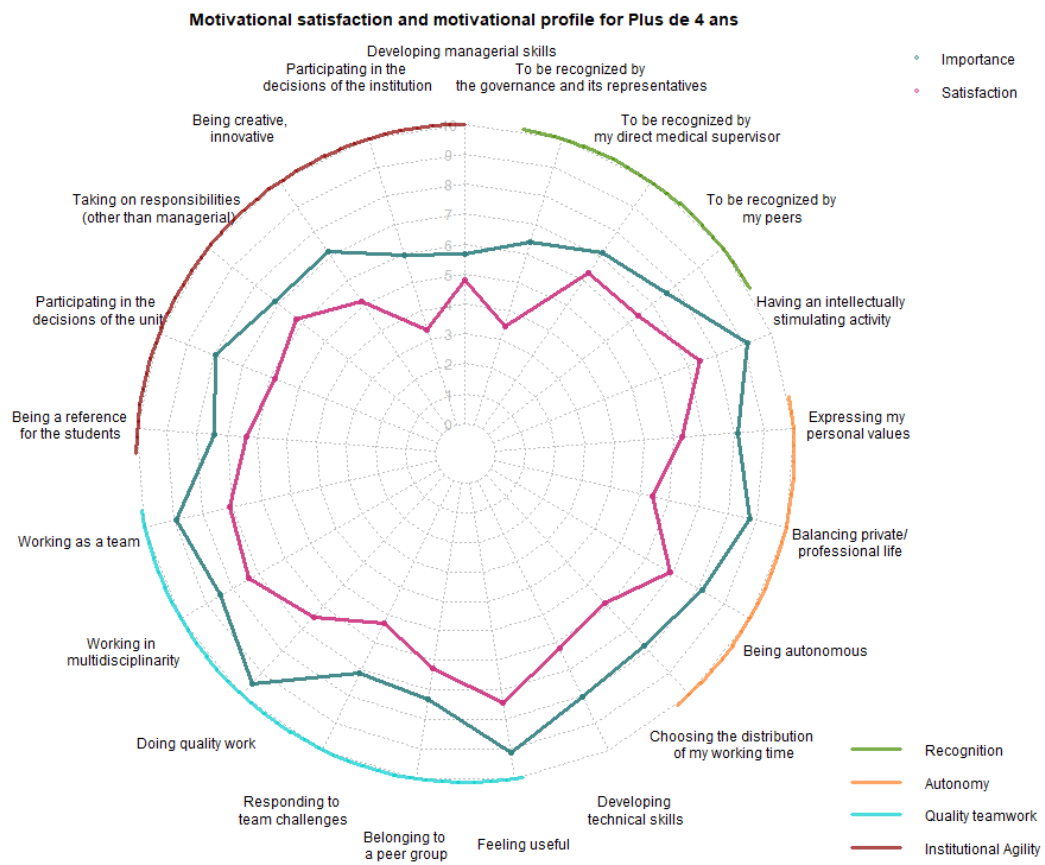
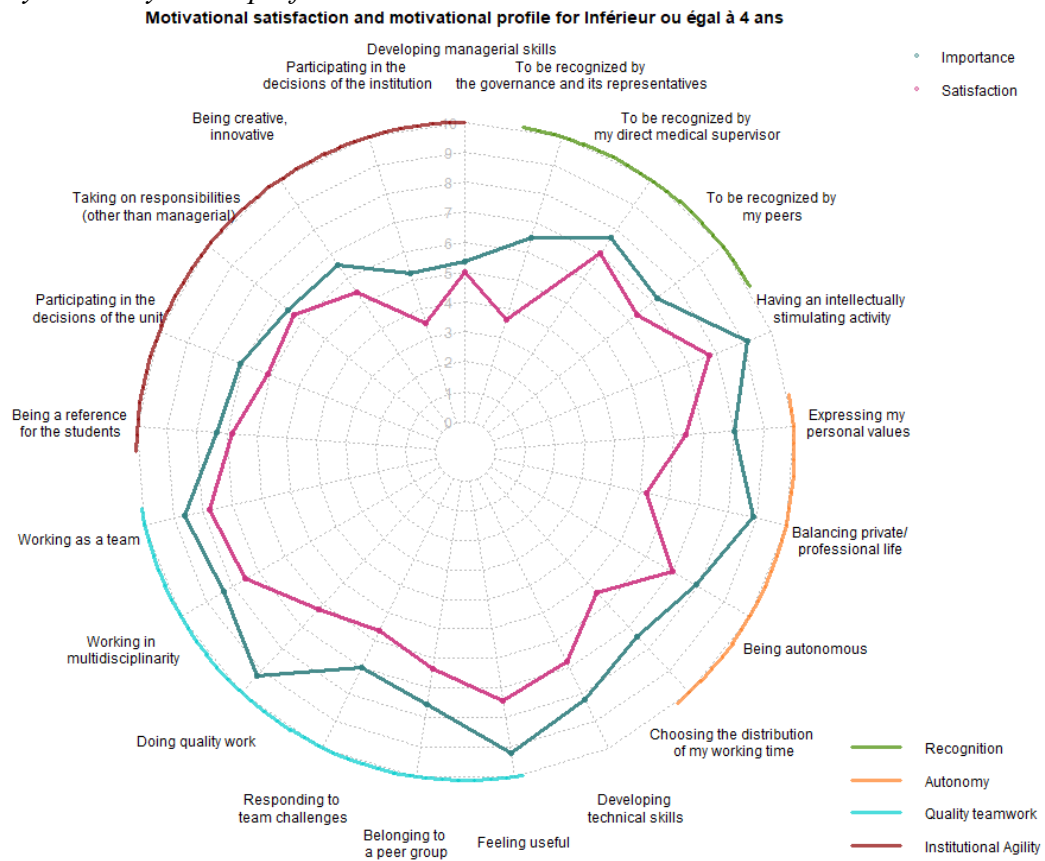
**Motivational satisfaction and motivational profile for Pharmacist**



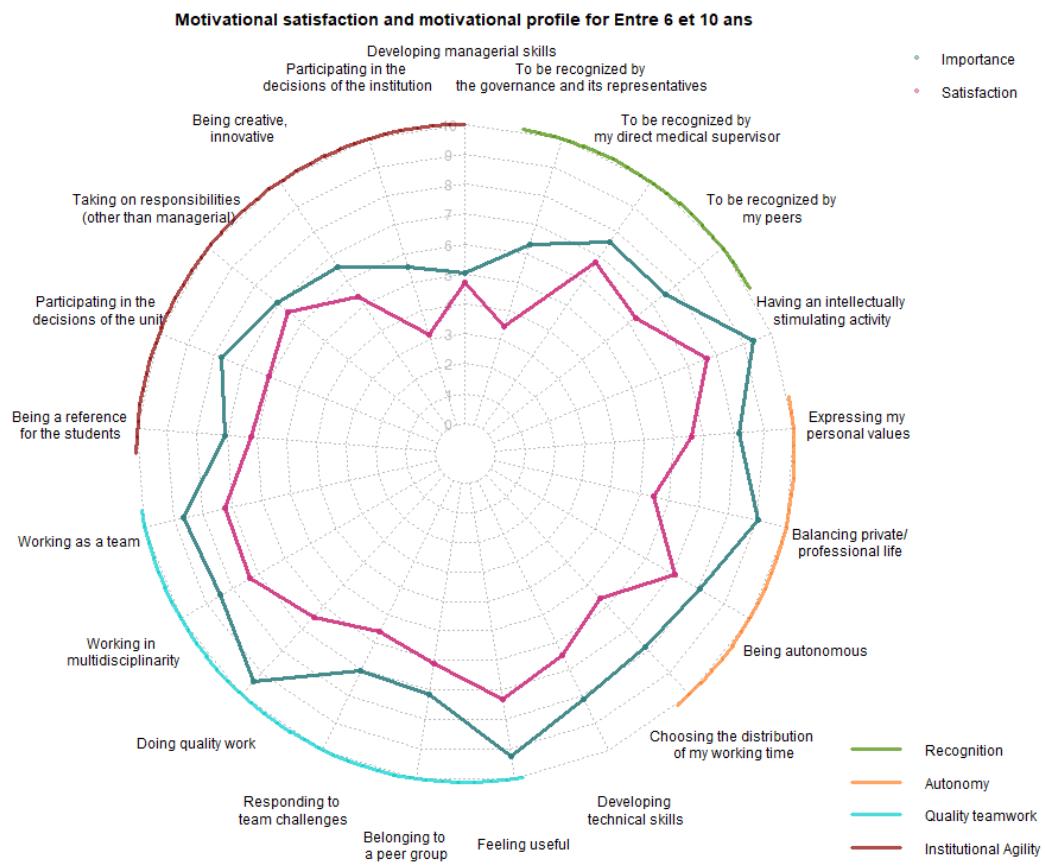
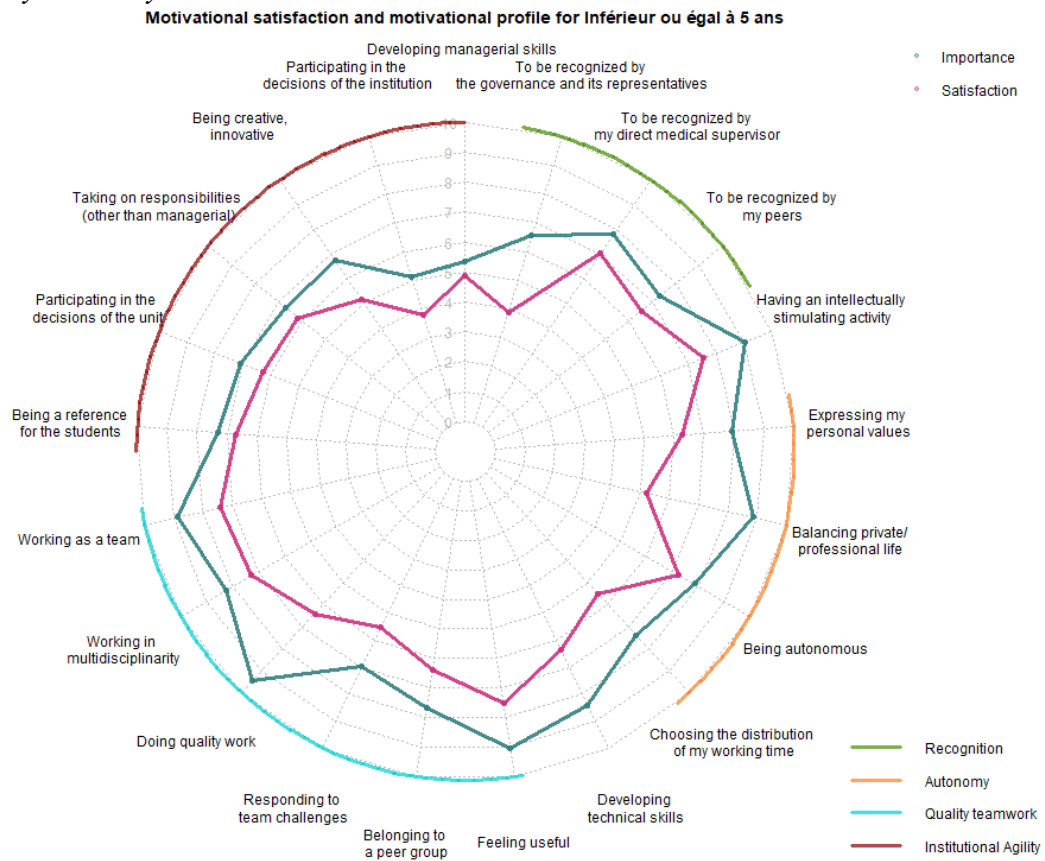
### Motivational satisfaction and motivational profile for Midwife



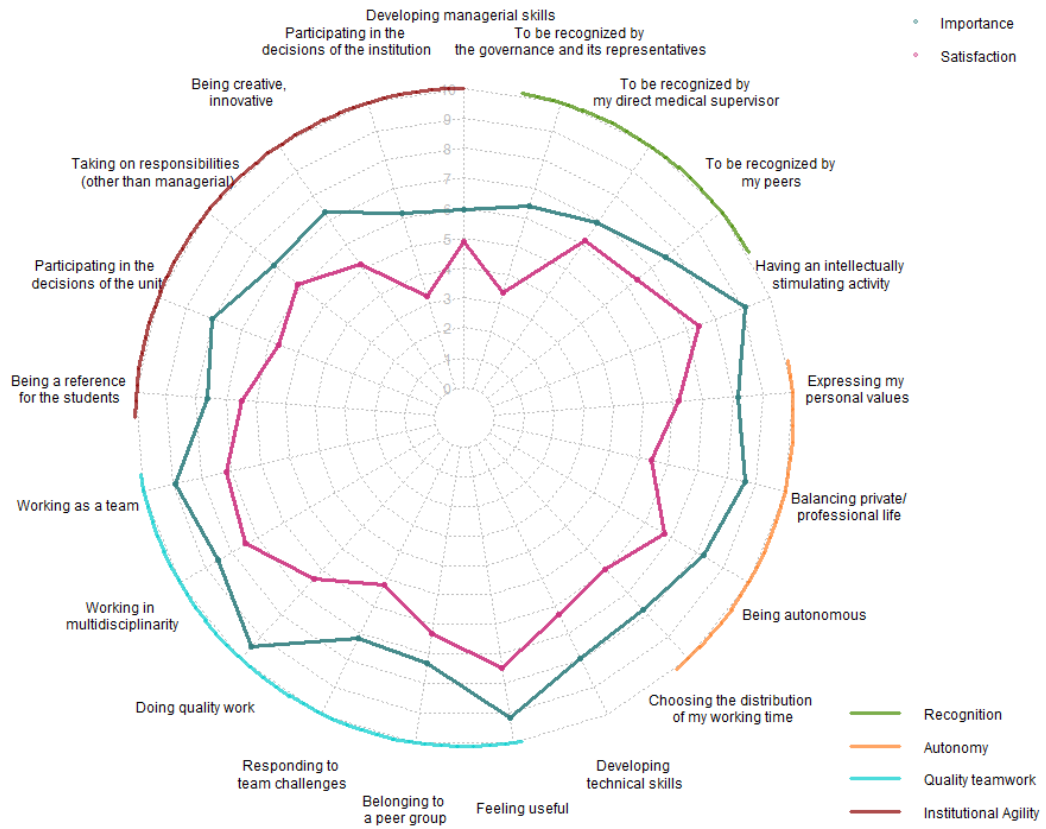
**Figure 3bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by Seniority in the profession



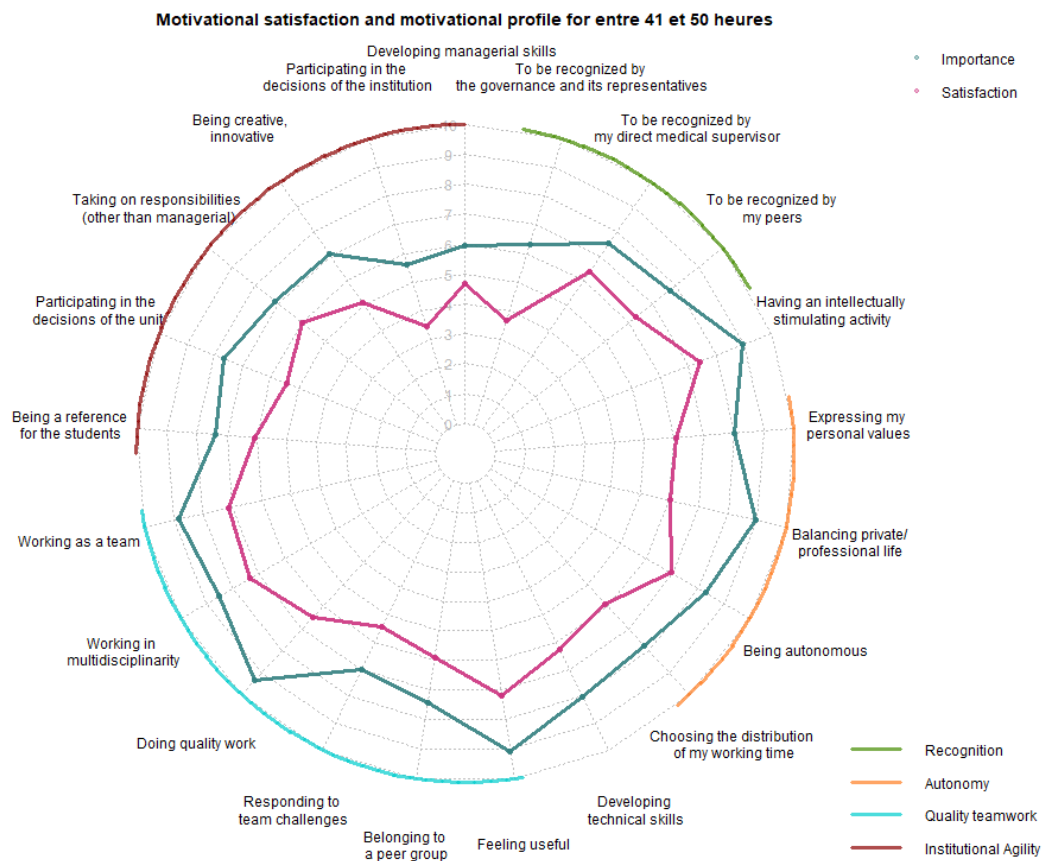
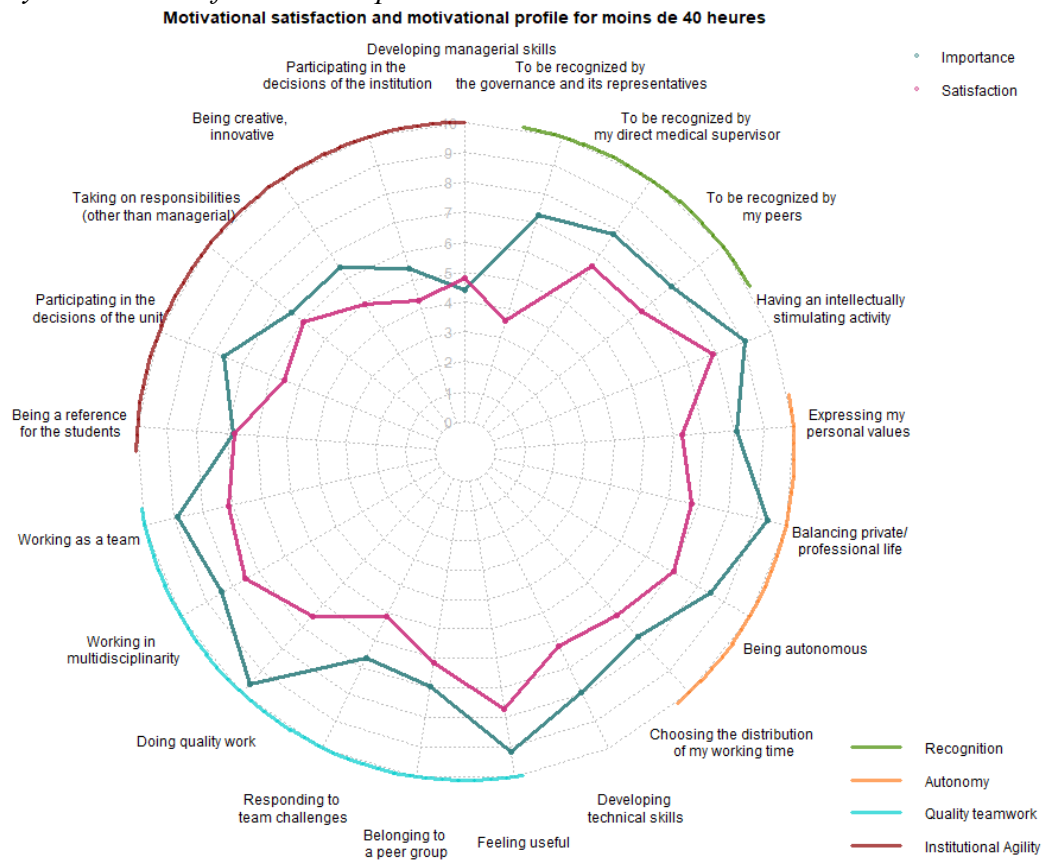
**Figure 4bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by Seniority in the institution



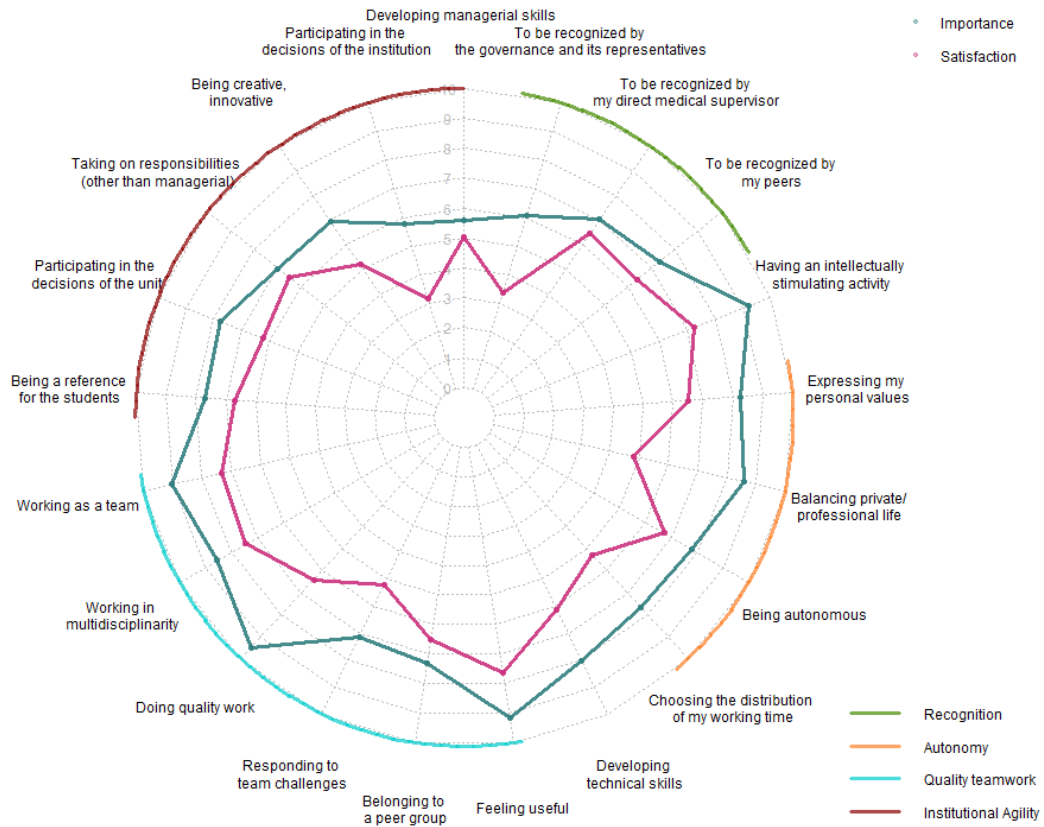
**Motivational satisfaction and motivational profile for Plus de 10 ans**



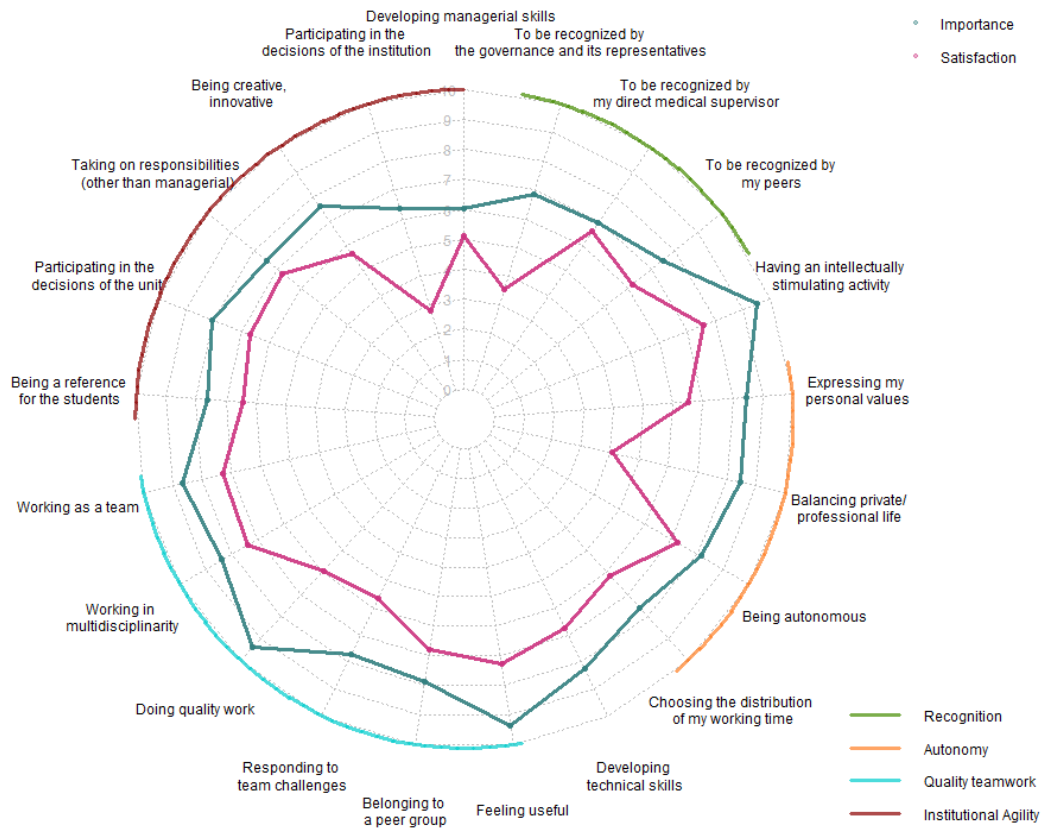
**Figure 5bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by the number of workhours per week



**Motivational satisfaction and motivational profile for entre 51 et 60 heures**

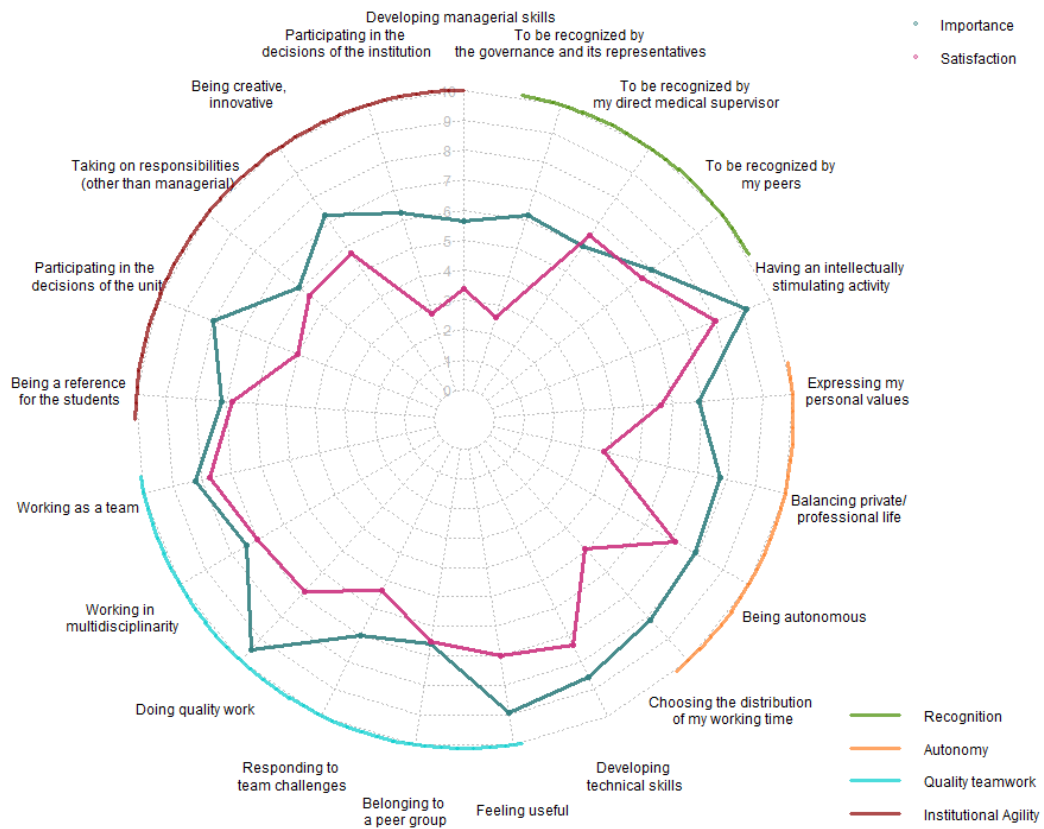


**Motivational satisfaction and motivational profile for entre 61 et 70 heures**

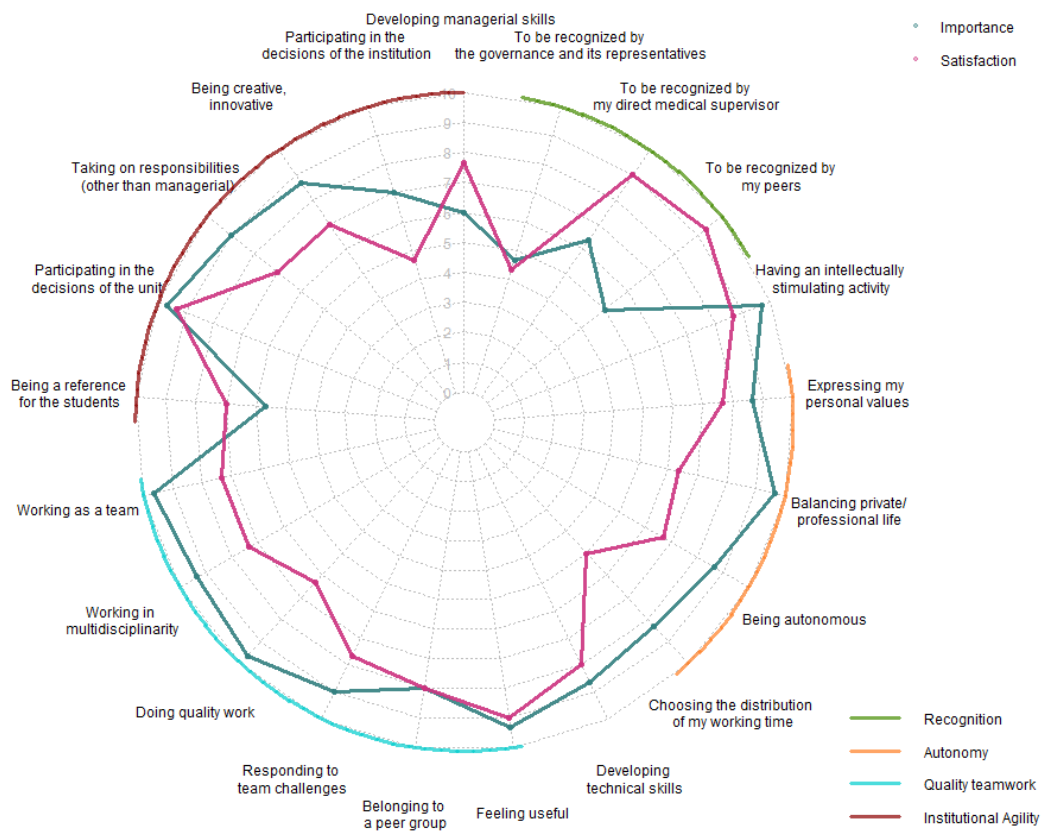




**Motivational satisfaction and motivational profile for entre 71 et 80 heures**

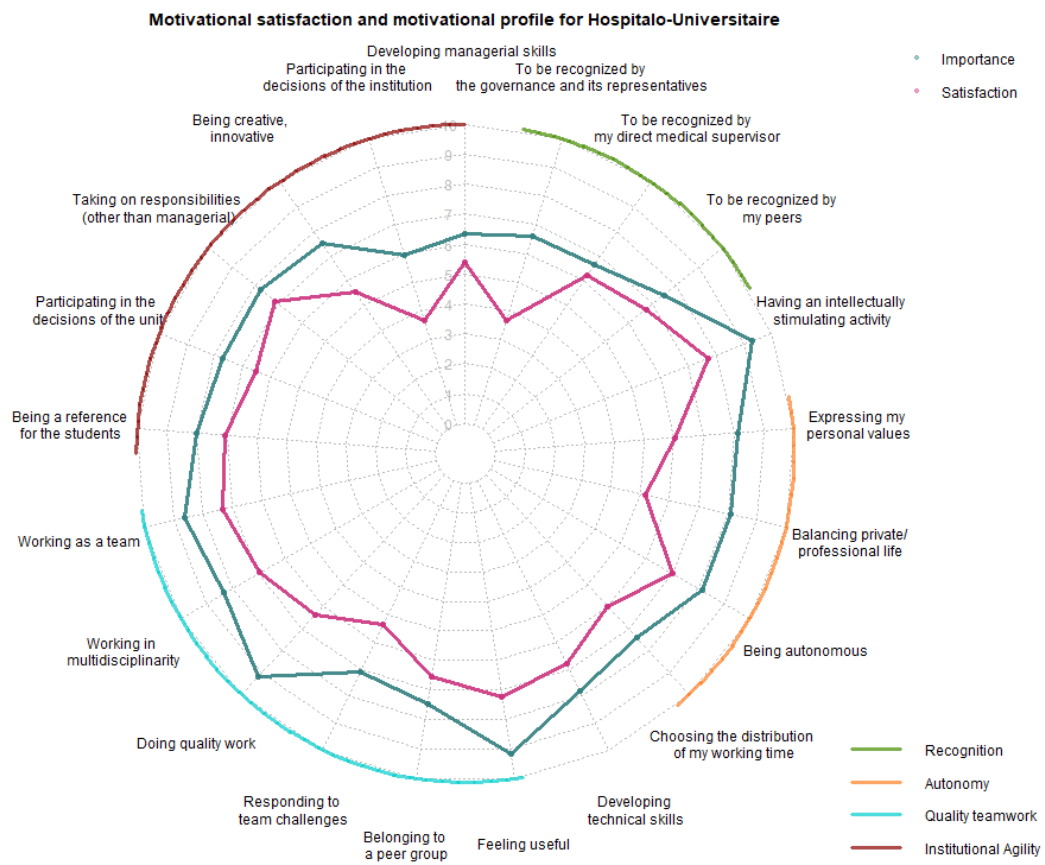
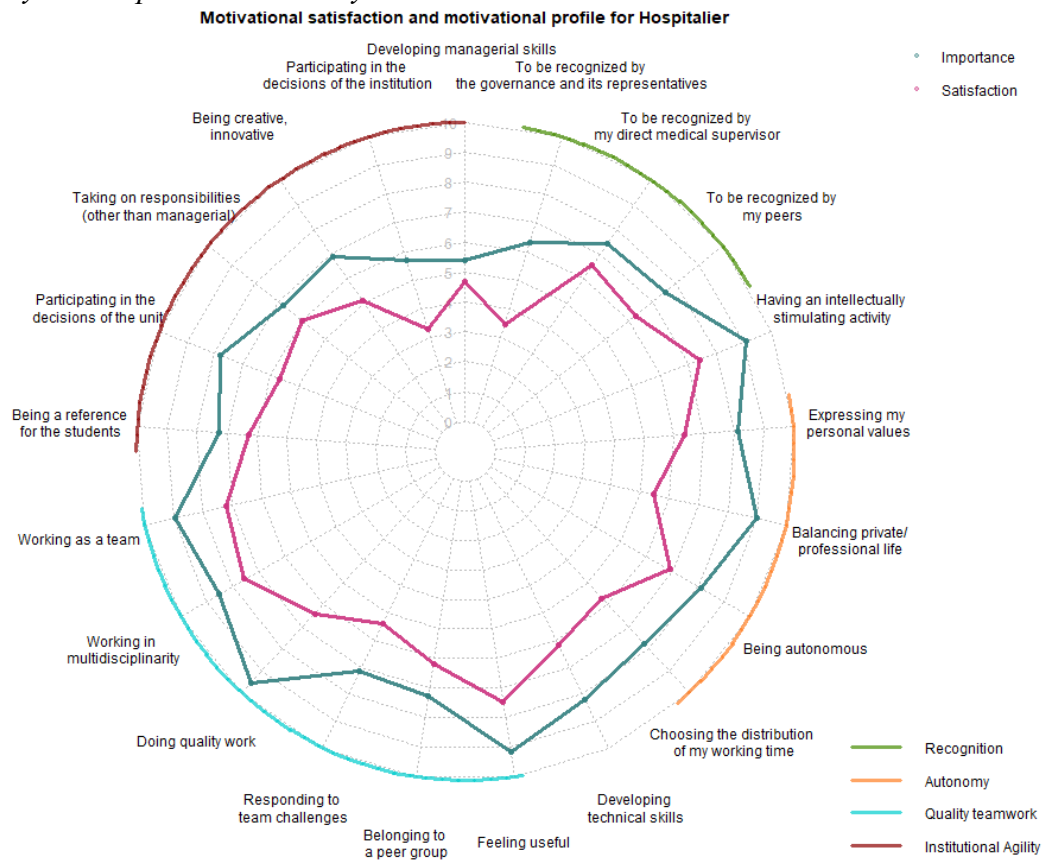


**Motivational satisfaction and motivational profile for 81 heures et plus**

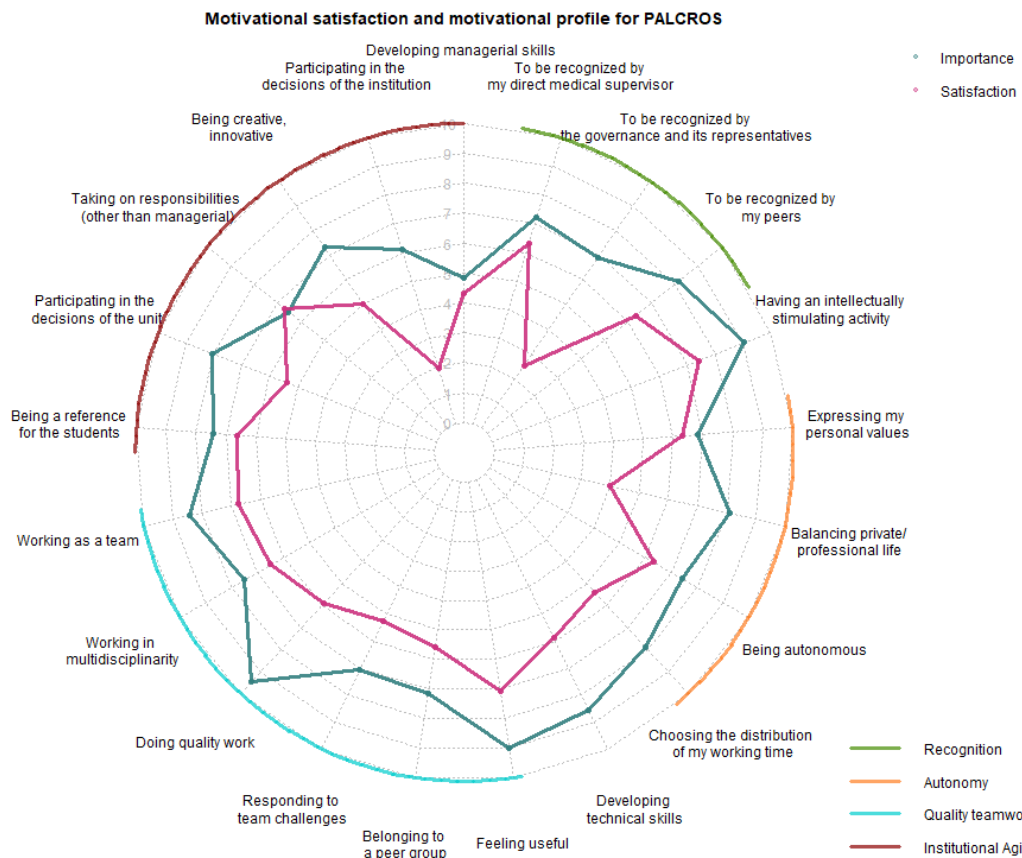
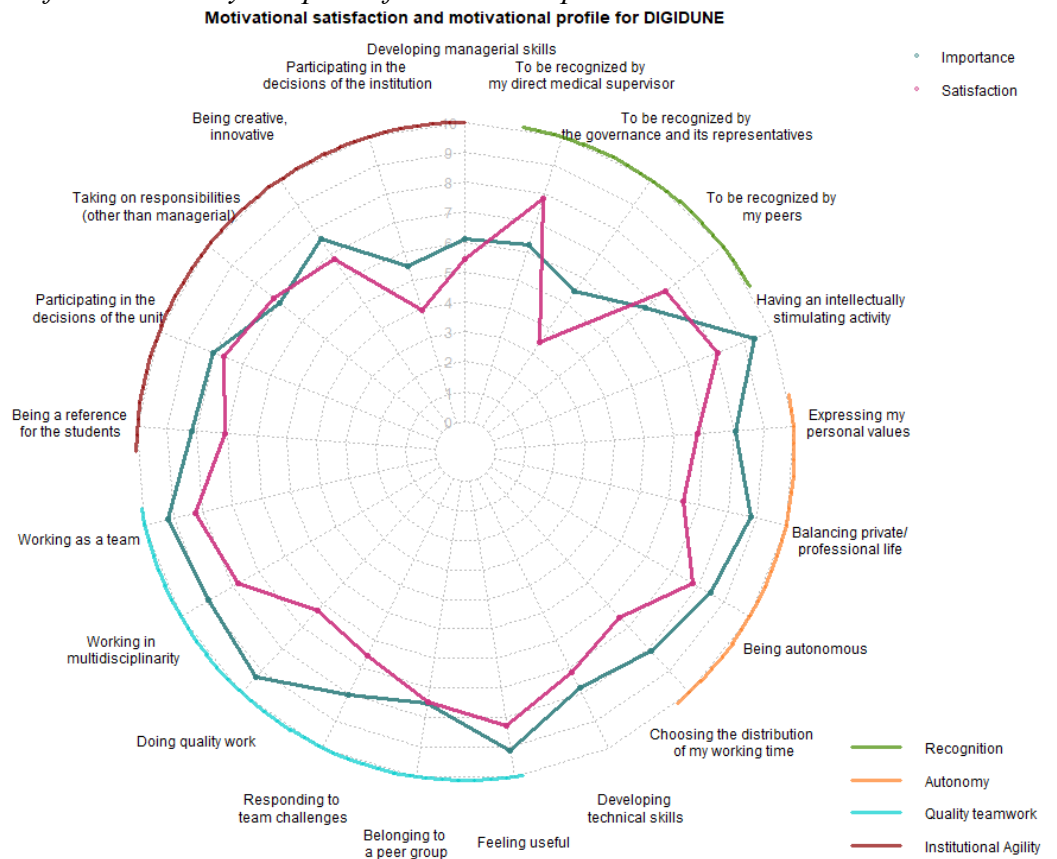




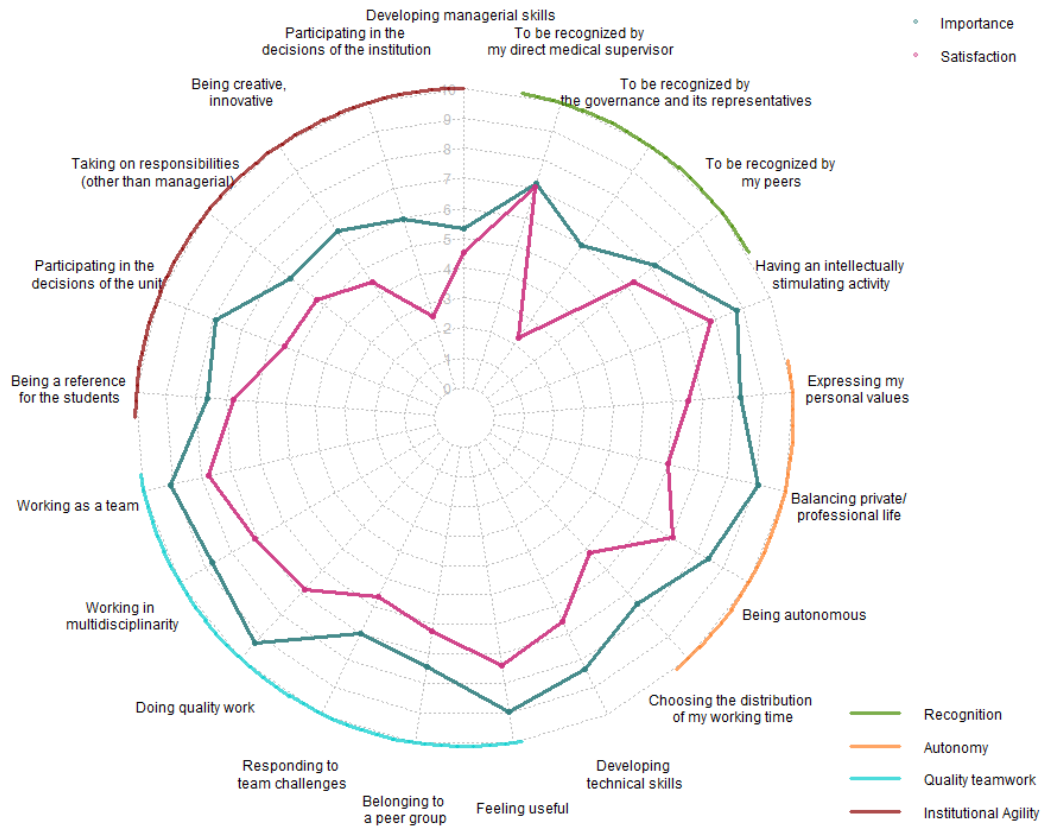
**Figure 6bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by the hospital or university status



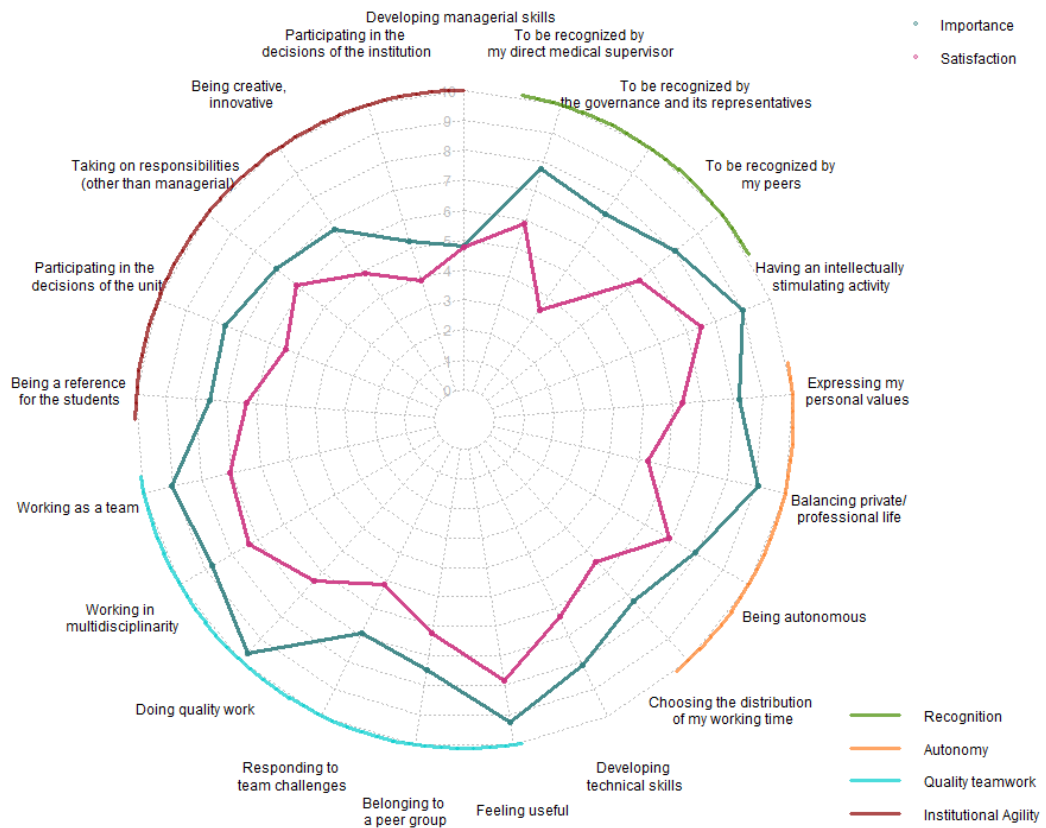
**Figure 7bis.** Radar-chart of motivational importance and satisfaction vectors for each motivators, by Poles of the University Hospital of Grenoble-Alpes



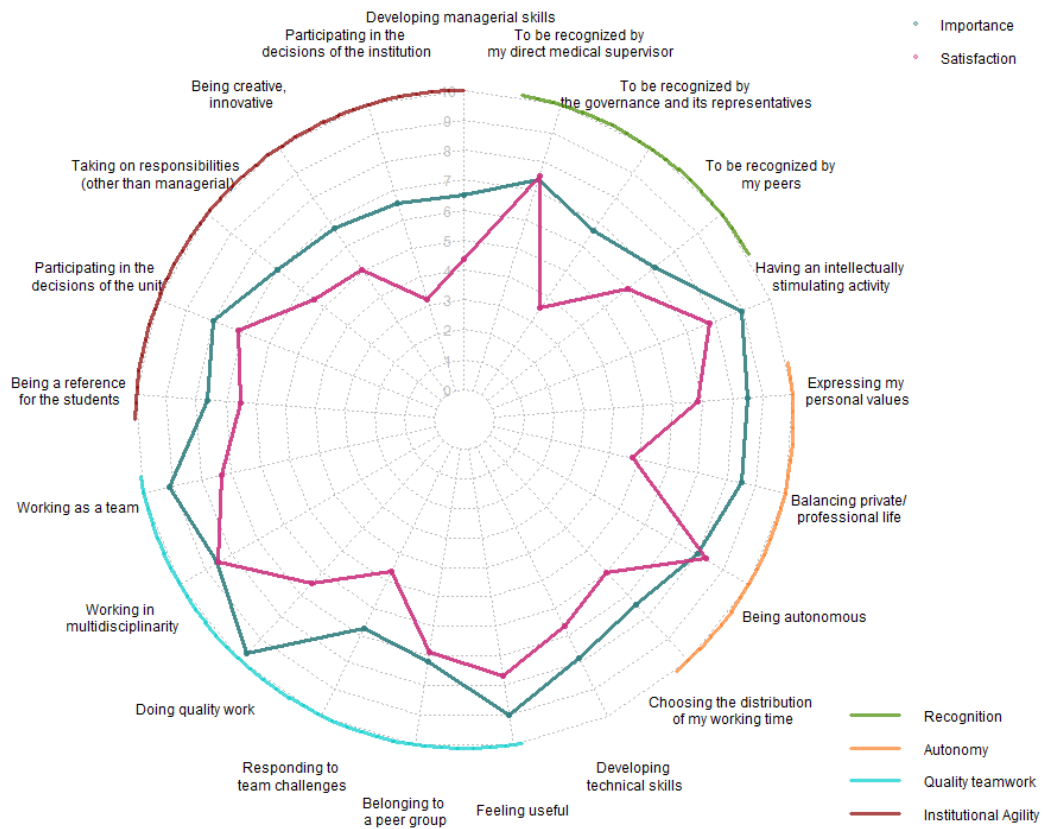
**Motivational satisfaction and motivational profile for PAR**



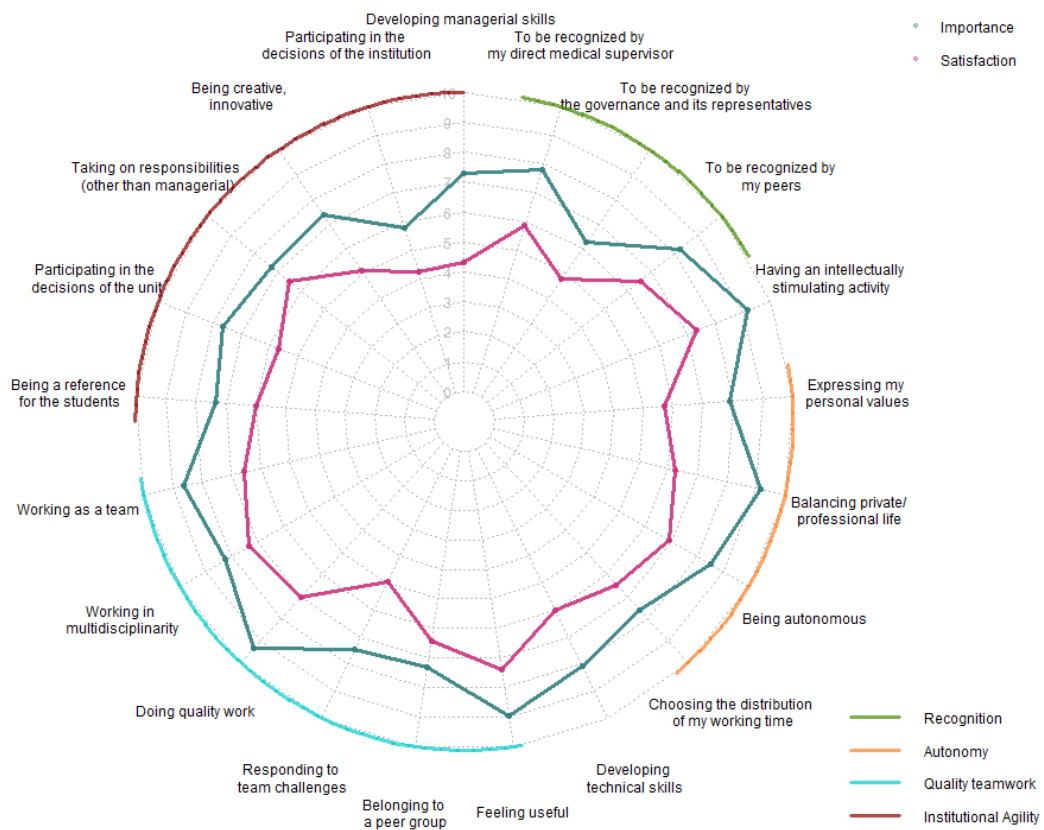
**Motivational satisfaction and motivational profile for PCE**



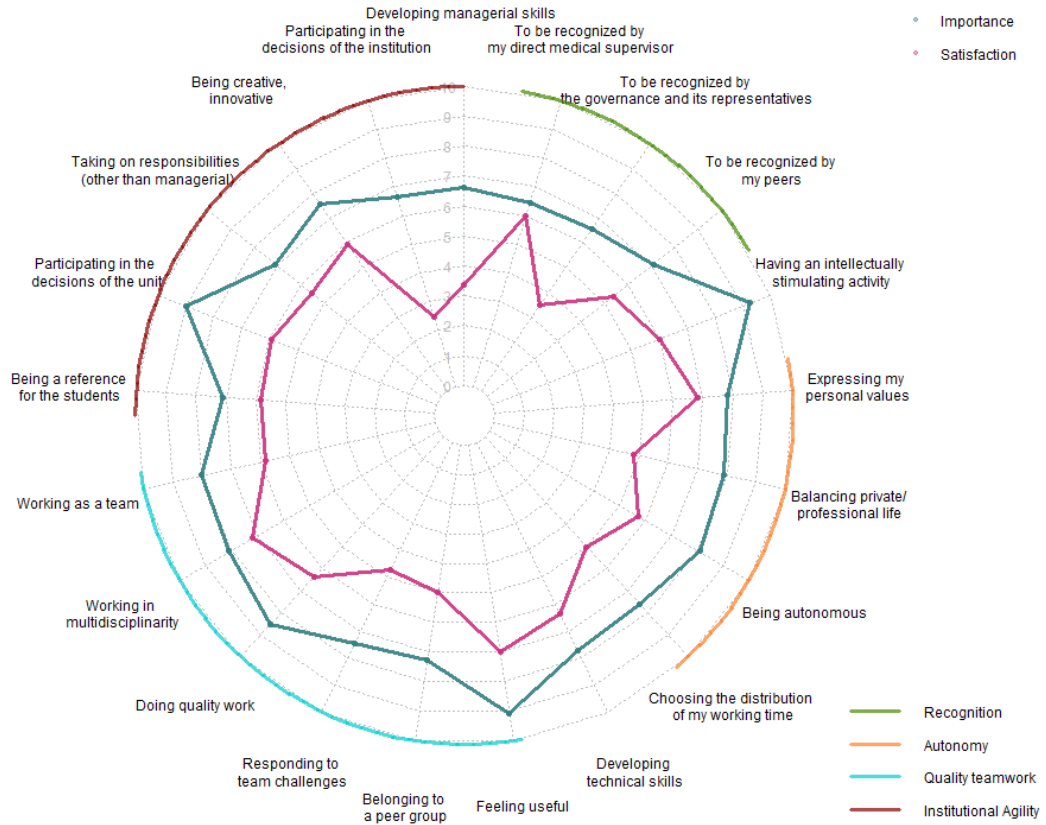
**Motivational satisfaction and motivational profile for PCMS**



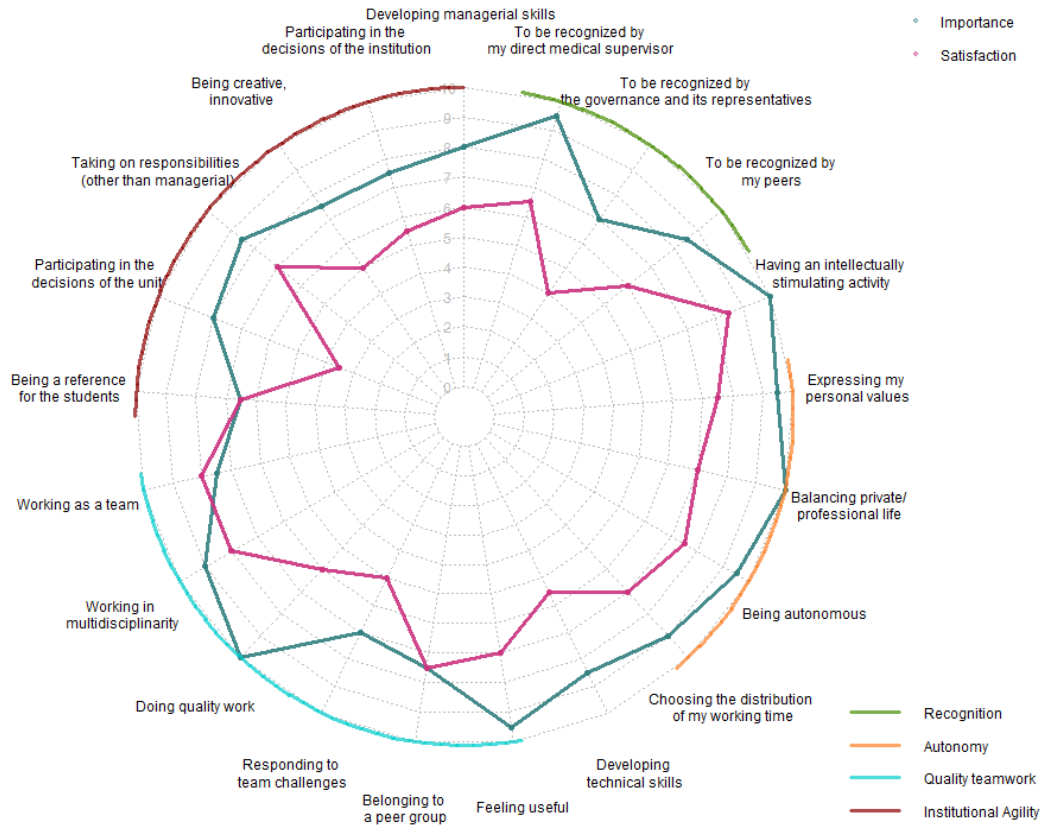
**Motivational satisfaction and motivational profile for Pôle Biologie et Pathologie**



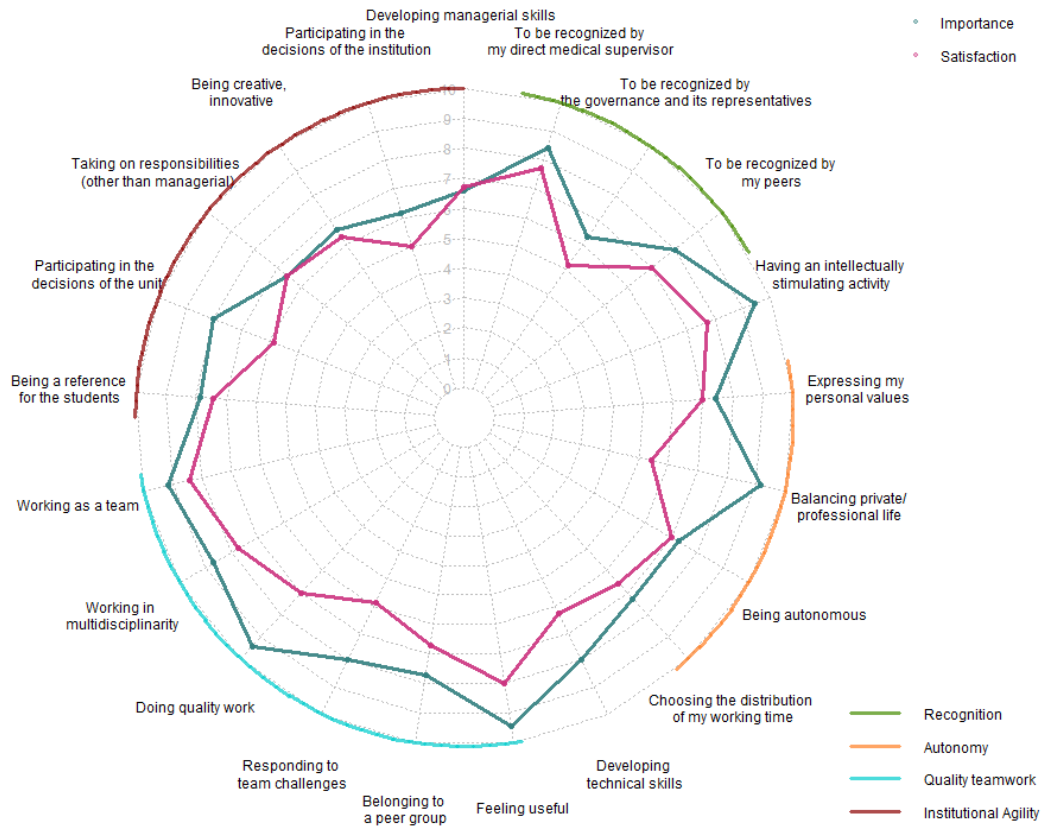
**Motivational satisfaction and motivational profile for Pôle Imagerie**



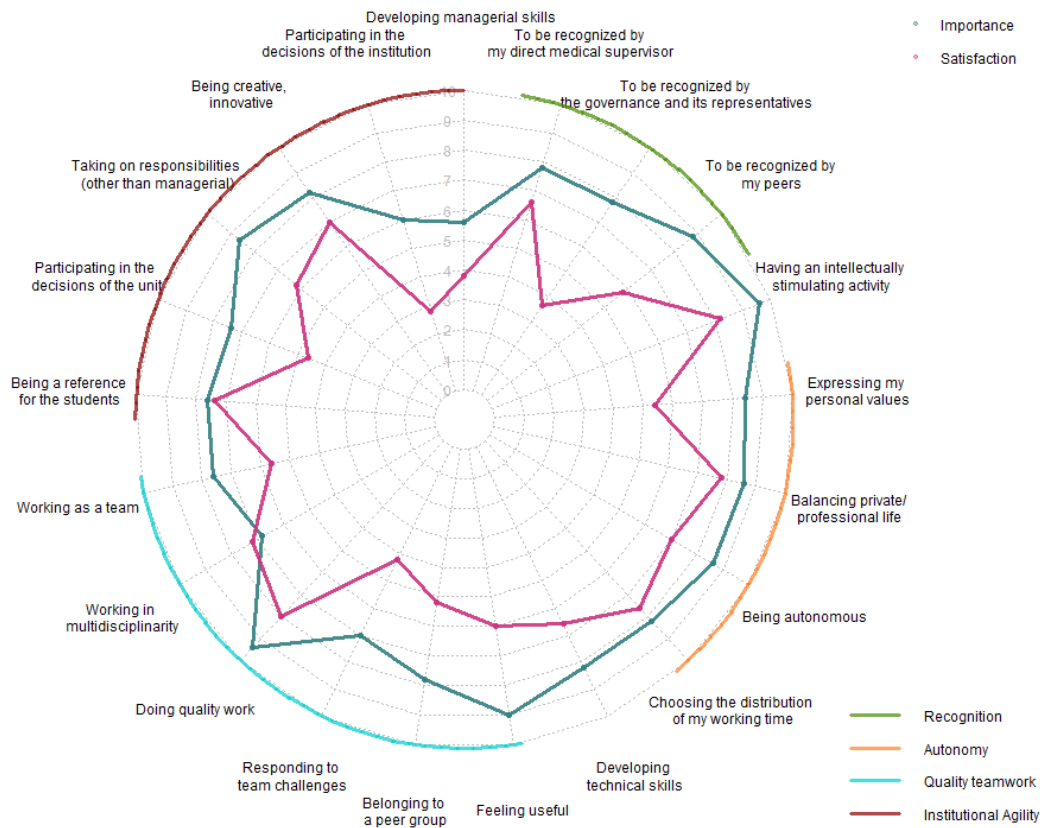
**Motivational satisfaction and motivational profile for Pôle Management**



**Motivational satisfaction and motivational profile for Pôle Pharmacie**

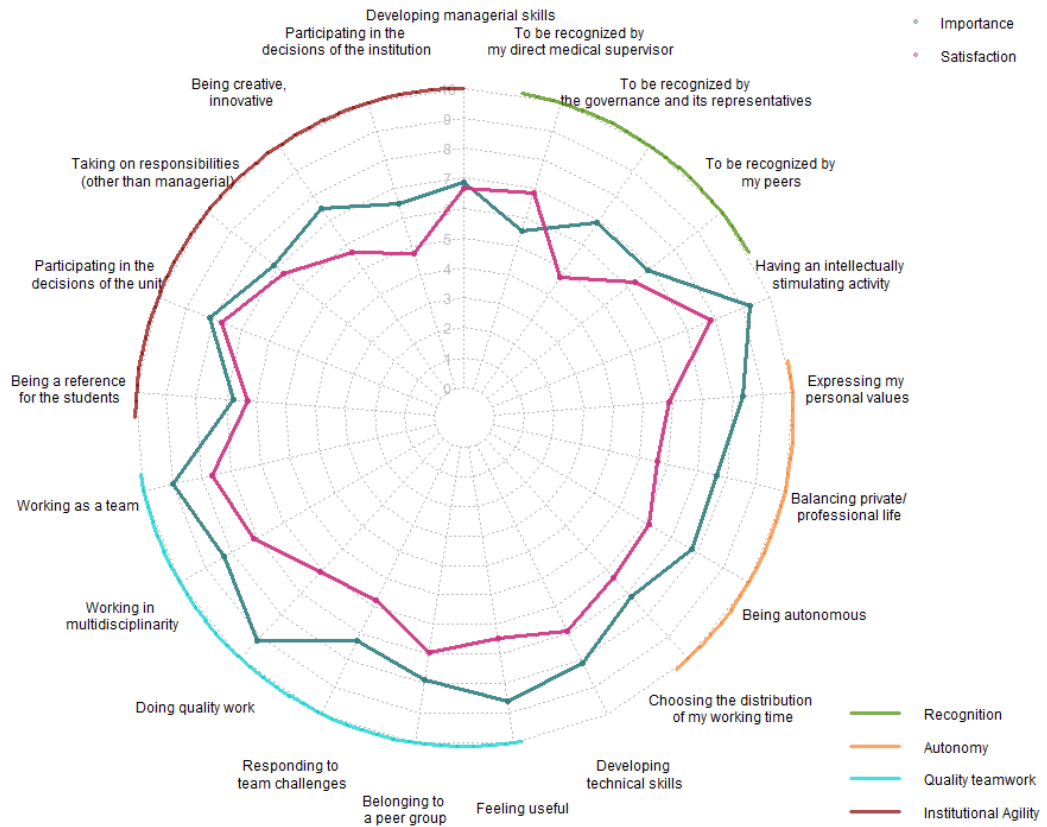


**Motivational satisfaction and motivational profile for Pôle Recherche**

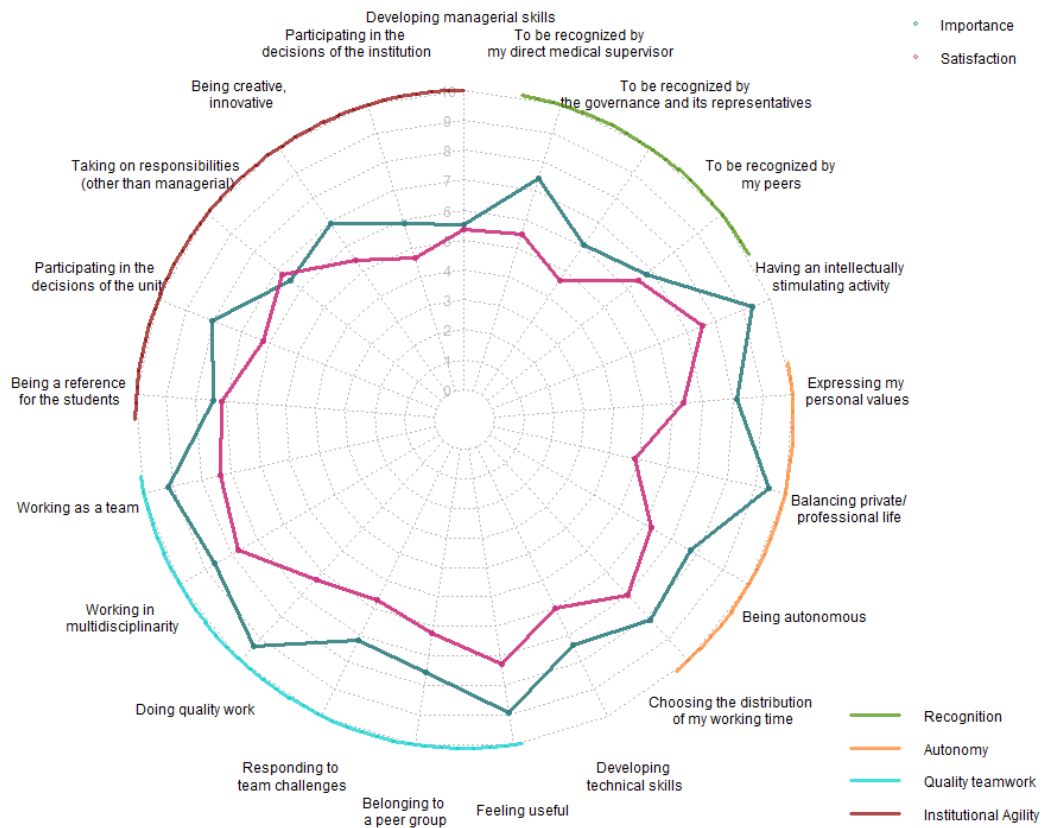




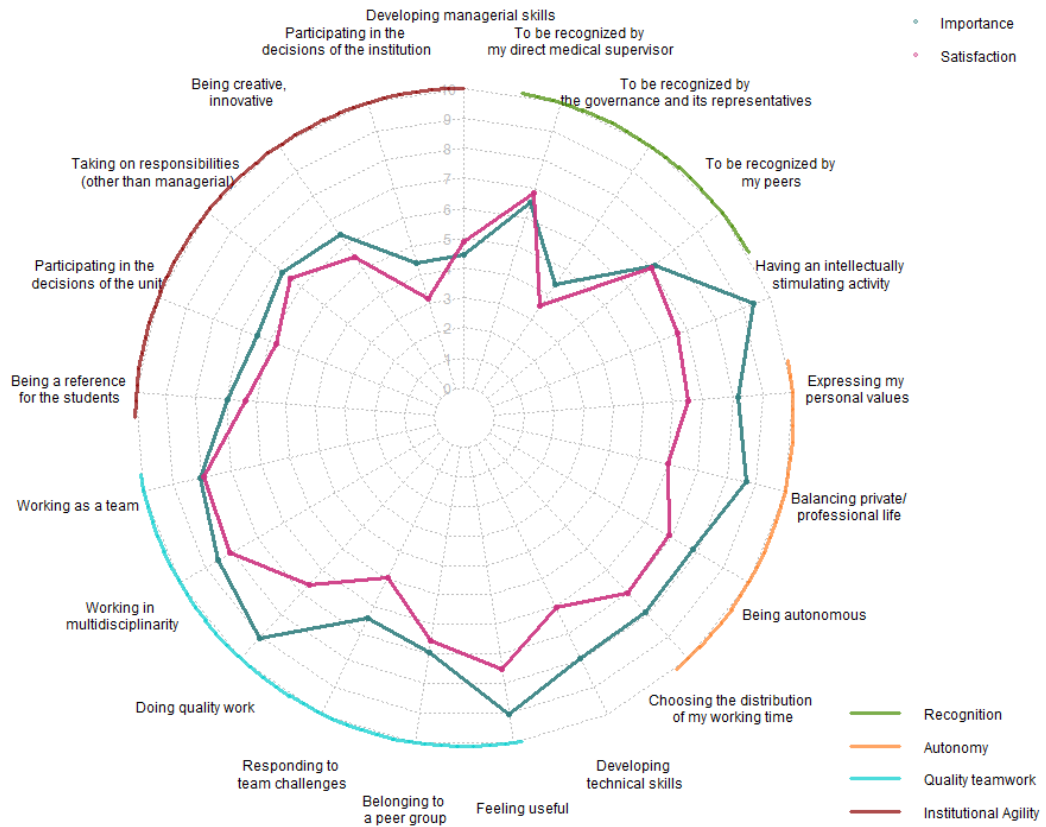
**Motivational satisfaction and motivational profile for Pôle Santé Publique**



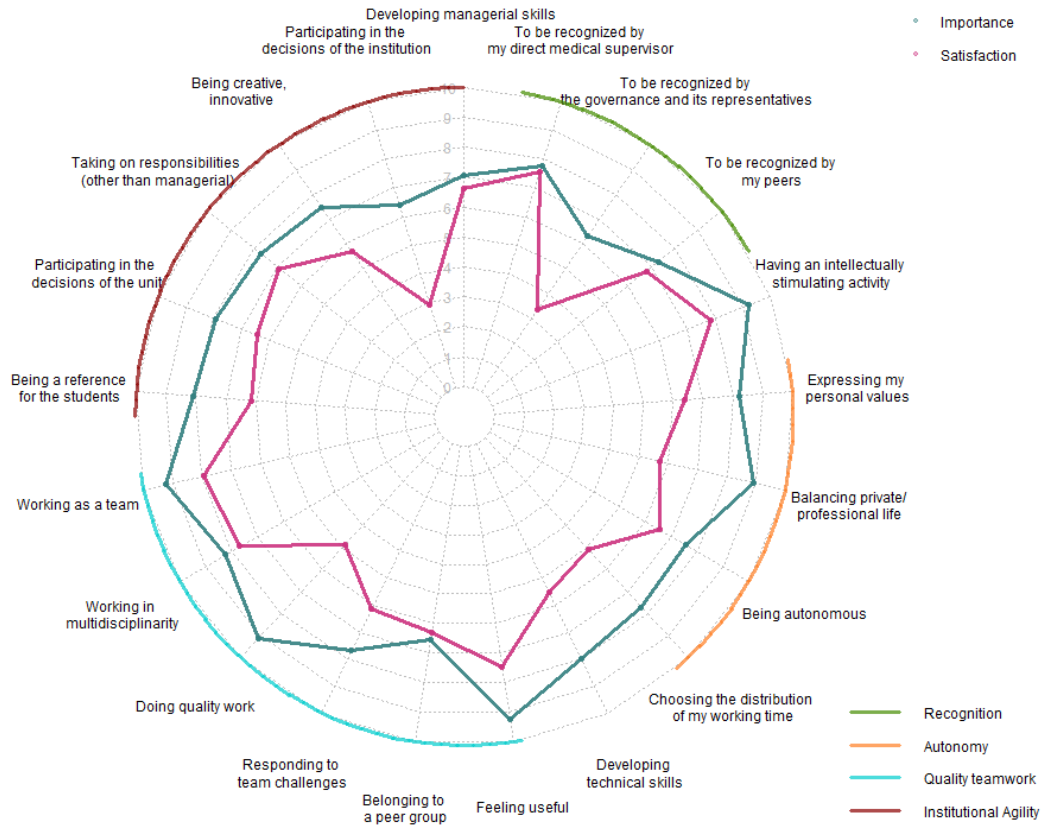
**Motivational satisfaction and motivational profile for PPMGC**



**Motivational satisfaction and motivational profile for PRéNeL**



**Motivational satisfaction and motivational profile for PUMA**





## Serment d'Hippocrate

# **L**e serment d'Hippocrate

Texte revu par l'Ordre des médecins en 2012

**“** Au moment d'être admis(e) à exercer la médecine, je promets et je jure d'être fidèle aux lois de l'honneur et de la probité.

Mon premier souci sera de rétablir, de préserver ou de promouvoir la santé dans tous ses éléments, physiques et mentaux, individuels et sociaux.

Je respecterai toutes les personnes, leur autonomie et leur volonté, sans aucune discrimination selon leur état ou leurs convictions. J'interviendrai pour les protéger si elles sont affaiblies, vulnérables ou menacées dans leur intégrité ou leur dignité. Même sous la contrainte, je ne ferai pas usage de mes connaissances contre les lois de l'humanité.

J'informerai les patients des décisions envisagées, de leurs raisons et de leurs conséquences.

Je ne tromperai jamais leur confiance et n'exploiterai pas le pouvoir hérité des circonstances pour forcer les consciences.

Je donnerai mes soins à l'indigent et à quiconque me les demandera. Je ne me laisserai pas influencer par la soif du gain ou la recherche de la gloire.

Admis(e) dans l'intimité des personnes, je tairai les secrets qui me seront confiés. Reçu(e) à l'intérieur des maisons, je respecterai les secrets des foyers et ma conduite ne servira pas à corrompre les mœurs.

Je ferai tout pour soulager les souffrances. Je ne prolongerai pas abusivement les agonies. Je ne provoquerai jamais la mort délibérément.

Je préserverai l'indépendance nécessaire à l'accomplissement de ma mission. Je n'entreprendrai rien qui dépasse mes compétences. Je les entretiendrai et les perfectionnerai pour assurer au mieux les services qui me seront demandés.

J'apporterai mon aide à mes confrères ainsi qu'à leurs familles dans l'adversité. Que les hommes et mes confrères m'accordent leur estime si je suis fidèle à mes promesses ; que je sois déshonoré(e) et méprisé(e) si j'y manque.

**”**

## Serment de Genève

Adopté par l'assemblée générale de l'Association médicale mondiale en 1948, dont la dernière révision en date d'octobre 2017 est annexée du code de déontologie médicale.

EN QUALITÉ DE MEMBRE DE LA PROFESSION MÉDICALE

JE PRENDS L'ENGAGEMENT SOLENNEL de consacrer ma vie au service de l'humanité ;

JE CONSIDÉRERAI la santé et le bien-être de mon patient comme ma priorité ;

JE RESPECTERAI l'autonomie et la dignité de mon patient ;

JE VEILLERAI au respect absolu de la vie humaine ;

JE NE PERMETTRAI PAS que des considérations d'âge, de maladie ou d'infirmité, de croyance, d'origine ethnique, de genre, de nationalité, d'affiliation politique, de race, d'orientation sexuelle, de statut social ou tout autre facteur s'interposent entre mon devoir et mon patient ;

JE RESPECTERAI les secrets qui me seront confiés, même après la mort de mon patient ;

J'EXERCERAI ma profession avec conscience et dignité, dans le respect des bonnes pratiques médicales ;

JE PERPÉTUERAI l'honneur et les nobles traditions de la profession médicale ;

JE TÉMOIGNERAI à mes professeurs, à mes collègues et à mes étudiants le respect et la reconnaissance qui leur sont dus ;

JE PARTAGERAI mes connaissances médicales au bénéfice du patient et pour les progrès des soins de santé ;

JE VEILLERAI à ma propre santé, à mon bien-être et au maintien de ma formation afin de prodiguer des soins irréprochables ;

JE N'UTILISERAI PAS mes connaissances médicales pour enfreindre les droits humains et les libertés civiques, même sous la contrainte ;

JE FAIS CES PROMESSES sur mon honneur, solennellement, librement.

## **Remerciements**

### **Aux membres du jury**

Au Pr Mircea Polosan, tout d'abord, je vous remercie d'avoir accepté d'être président de jury. Je me souviens, lors de mon premier stage, de vos interventions dans le bureau des internes : nous vous écoutions de toute notre attention avec mes co-internes Véra et Fanny mais dès votre départ, on ne faisait que constater qu'aucun de nous n'avait compris votre exposé. Votre niveau d'excellence n'a d'égal que votre bienveillance.

Au Pr Vincent Bonneterre, merci d'avoir accepté d'encadrer cette thèse et de la marque de confiance que vous me faites dans nos collaborations. Merci de m'avoir accueilli dès mon externat, puis encore au cours de l'internat, d'avoir su entendre mon projet et de le soutenir en ces temps difficiles. Merci pour vos enseignements, votre expérience de la transversalité et pour ces échanges toujours aussi instructifs bien que parfois conflictuels. J'espère avoir la chance de continuer à évoluer professionnellement à vos côtés.

Au Dr Aurélie Gauchet, merci d'avoir accepté de codiriger cette thèse. Notre collaboration est récente mais votre approche nous incite à repousser les limites de chacune de nos disciplines, de favoriser les collaborations, de s'enrichir des expériences croisées (bien qu'on ne soit pas obligé d'échanger par mail après 23h le soir, et encore plus le dimanche !)

Au Pr Marie-Thérèse Leccia et au Pr Athan Baillet, merci d'avoir accepté d'être membres de ce jury. Notre rencontre autour de l'accompagnement des internes témoigne de votre implication pour notre profession, et toutes nos professions de santé en général. Ce travail n'aura jamais pu voir le jour sans votre soutien, sans votre participation. Vous maintenez l'espoir d'un hôpital public d'excellence tout en étant un lieu où il est agréable de travailler.

### **A mes "chefs"**

Au Pr Thierry Bougerol, merci de soutenir les enseignements et la formation de notre discipline. Merci d'avoir accepté la dérision que nous vous avons porté, les séances de corrections d'orthographe, "le raisonnement clinique avant le DSM-V", les critiques acerbes du mercredi matin. Derrière cette exigence, il n'existe aucun doute sur votre bienveillance auprès des internes de psychiatrie, de toutes les disciplines et de l'ensemble des étudiants en santé.

Au Dr Zohra Gaoua, comment oublierais-je mes premiers pas d'interne en psychiatrie à vos côtés ! La psychiatrie en plein déménagement, rien de tel pour découvrir le retentissement d'un fonctionnement d'équipe sur les symptômes de nos patients. Votre empathie, votre écoute et votre engagement auprès de ceux-ci ont été et seront un modèle pour ma vie professionnelle.

Au Dr Pauline Bacoup, merci de m'avoir initié au parcours scabreux d'un interne et d'un assistant hospitalier.

Au Dr Giovanna Venturi, merci de m'avoir fait découvrir la première la psychiatrie. Les temps étaient déjà difficiles, et pourtant vous avez pris le temps de m'accueillir et de me faire rencontrer le trouble psychique. Je vous remercie pour vos encouragements dans mon projet professionnel et votre implication pour défendre notre discipline et nos collègues.

Au Dr Jérôme Holtzmann, merci d'avoir toléré la théière et le chocolat post-prandiaux dans le bureau des internes. Mais surtout merci pour votre expertise en pharmacologie et votre exigence sémiologique.

Au Dr Calin Barna et au Dr Anaïs Colin-Madan, qui m'ont transmis leur passion du soin institutionnel et de la clinique de l'adolescent. "Soigner avec ce qu'on est" n'aura jamais pris autant de sens.

Au Dr Isabelle Pagnier, merci de m'avoir fait découvrir la pédopsychiatrie mais surtout comment naît l'humanité dans les yeux d'un enfant à travers le regard d'un parent. Quelle belle preuve que l'humanité est l'essence de nos missions !

Au Dr Guillemette Vidal, qui derrière son franc-parler, m'a remis le pied à l'étrier de la psychiatrie adulte et de la gestion de l'urgence. Je te remercie pour ta franchise, tes conseils avisés et surtout la grande confiance dont tu m'as fait part. Je n'oublie pas les bières que je te dois.

Aux Dr Christelle Prost-Lehman et Dr Céline Dufresne, merci de m'avoir permis d'avancer en sécurité dans la complexité de l'urgence pédopsychiatrique entre services sociaux, pédiatres mais surtout enfants en quête d'affection.

Au Dr Sylvain Leignier, un énorme merci de m'avoir considéré déjà comme un pair. Tes conseils, ton expérience, tes questionnements sont d'un enseignement exceptionnel lorsqu'ils sont distillés comme tu le fais.

Au Dr Aurélie Chardronnet, merci d'avoir compris toutes mes absences, mais surtout toutes mes prises de position, parfois un peu sévères en réunion clinique. Merci de tenir bon dans la tourmente qui bouleverse notre discipline. Et merci pour la bière, limite hors-la-loi !

Au Dr Camille Queneau, merci de m'avoir, en si peu de temps, familiarisé à la rencontre culturelle ! Tes qualités et tes valeurs redonnent vie à ces patients au parcours déshumanisant.

Au Dr Delphine Jenny, co-interne de formation mais également chef des dernières heures, ton engagement et tes convictions sont une grande source d'espoir et d'inspiration.

Au Dr Patrice Baro, merci de la confiance que vous me portez en me confiant nombreuses de vos missions, que vous avez fondé, développé et défendu depuis tant d'années. Votre attitude de compagnonnage est une source d'inspiration.

A tous ces "CHEFS" que sont les équipes des services qui m'ont accueilli et qui accueillent des patients chaque jour : vous êtes les premiers auprès de nos patients, vous êtes le cœur même de notre métier et du sens du soin. Alors un grand MERCI ! "La clinique d'abord" nous dit Pr Bougerol.

### **Au-delà du soin...**

A toutes les secrétaires (désolé, ce n'était que des femmes dans tous mes stages), merci d'avoir accepté mes retards de compte-rendus, de rédactions d'observations, de remplissage de codes CIM...

A Mme Lilia Maamar, un grand merci pour ta disponibilité, ta réactivité et du souci que tu as pour notre formation d'interne.

A Mme Marie-Angèle Scarpitta, merci d'avoir toléré mes coups de gueule, mon obsessionnalité (pour ne pas dire ma psychorigidité et mon envie de tout contrôler). Merci d'être la "mère" de l'internat grenoblois, avec tes humeurs, tes angoisses maternelles mais surtout l'amour que tu nous portes !

A l'équipe administrative du CHU de Grenoble: Mme Nadine Lucet, malgré la tourmente, je ne vous remercierai jamais assez de rester à l'écoute et disponible (parfois à vos dépens). A Mme Elodie Ancillon, et Mme Hélène Sabbah, merci de nous avoir reçu lorsque j'étais vice-président puis président de l'AIMG; malgré les enjeux, j'espère que le travail que nous avons débuté pour les internes mais aussi pour l'ensemble des professionnels de notre établissement se prolongera.

A mon professeur de statistiques d'Économie-Gestion, qui a su me titiller pour que j'apprenne à aller plus loin.

Aux enseignants-chercheurs du M2R, votre ouverture d'esprit et votre passion à faire évoluer nos pensées sont une source d'inspiration pour ma future pratique.

Aux Pr Galam, Pr Soulat, Dr Ormières, Dr Jullian et à tous mes camarades du DIU SLS, merci pour vos échanges, votre écoute et tout ce que vous faites pour nos beaux métiers de soignants.

### **A mes co-internes**

A mes tous premiers co-internes : Greg et Anaïs, vous étiez les “vieux” qui encadraient le “jeune”, mais je n’oublierai jamais les coups de pied dans la chaise roulante ou les concours de pets ! Comment mieux débiter qu’un internat que comme cela !

A la team DV RDC 4 EVER, bien qu’arrivé en cours de route, vous m’avez tout de suite accepté ! Le thé après manger, l’écoute active du Pr Polosan ! Et sinon Fanny, apathie ? Aboulie ? Anhédonie ? Mais surtout, nos petits repas, la naissance de bébé... le mariage... (et je tairai l’intitulé de vos mecs respectifs dans vos contacts téléphoniques ❤️👉🐕)

A Hélène et notre refuge dans les sous-sols glauques du pavillon de Neurologie !

A l’équipe de co-interne du Grésivaudan (Marine, Laura, Hélène) et nos “on descend à l’internat” pour s’échapper entre midi et 2.

A Alice, et nos “Bon, on fait quoi ! Elles arrivent ou on va voir des patients !”

A Céline, à nos petites séances débriefs autour d’un thé, d’une rando ou un soir de garde pour apprendre à danser (dur-dur ces gardes de psy !)

A mes co-internes de promo, surtout les solides des week-ends promo : Juanito, Audrey, Layla !

### **A mes potes**

A Jérémie, on ne s’est pas vu depuis plus de 15 ans, et pourtant... Mon adolescence n’aura pu être cela sans toi. Je pense que tu étais un repère (malgré toi) dans une période où les choses auraient pu bien mal tourner... Un jour, peut-être, nos chemins se croiseront à nouveau. J’associe également une pensée à Florian, Mehdi, Thomas (les 5 Mousquetaires).

A Laura, aux apéros improvisés à 17h ou après une bonne séance de sport, à ton gabarit source intarissable de taquinerie mais surtout à ton sourire qui nous égaye.

A Farouk, coach sportif de façade mais le cœur sur le main et le sourire permanent, mon internat n’aurait pas eu cette saveur (ni ce poids) sans toutes tes conseils, tes encouragements, tes critiques acides (un jour, moi aussi je sécréterai aussi de la testostérone).

À mes poulettes, Cécile et Fanny, pour les séances de révision mais surtout pour les commérages ! Vivement qu'on fasse la mise à jour !

A mes co-externes "dinosaurés", Math-milde (et Chouchou) (et le petit sac de transport des biberons pour l'étude) (et les petits chats), Aurélien, Anne-Sophie.

A Etienne, A Tibal, A Adeline, merci !

### **A mes amis**

A Guigui, t'es celui qui me connaît depuis le plus longtemps, t'as tout connu de mes péripéties ! La licence, le changement d'études, le mariage, le divorce, les séparations... Tu es toujours de bons conseils. Nos échanges, nos débats, nos râleries, parfois (et même souvent) interminables, agrémentés de sport, de Kinect, de bouffe et d'apéro me sont indispensables. Notre relation n'est pas trop portée sur l'expression de nos sentiments ("accolade embarrassante ou une poignée de main ridicule de mecs cools ?") mais j'en profite pour te le dire : je te porte au fond de mon cœur !

A Fabien, et notre rencontre presque improbable. Merci d'avoir cru en moi, et surtout d'avoir toléré toutes mes pitreries et conneries en cours. Le destin t'a placé sur ma route et mon histoire n'aura pas été celle-là sans toi. Mon côté "cash" te violente un peu mais nos discussions me manquent terriblement !

A Rémi, d'une rencontre "hasardeuse" via un ami commun à nos sorties de course à pied, ta zenitude et ta patience sont une réelle inspiration.

A Lulu, ta franchise secoue souvent, mais parfois un bon coup de pied dans le cocotier, ça remet les idées en place !

### **A mes ex !**

Plus d'un trouveront cela étrange et déplacé, mais le pied de nez m'amuse. Une pensée à mes ex sans qui, finalement, je ne serai pas l'homme que je suis aujourd'hui. A cause de



moi, elles en ont vu des vertes et des pas mûres, l'une a été achevée par mon comportement en P1, l'autre par la D4 (comme quoi les études de médecine ça fait des dégâts !).

### **A ma famille**

A Mamie Cocotte, je te suis reconnaissant d'avoir su mettre de côté tes rancœurs familiales en ma présence pour m'autoriser à vivre dans la légèreté de l'enfance (et surtout les pains aux chocolats du vendredi soir !) Merci pour avoir toujours joué le jeu de dire "chaussures - chaussettes" après avoir enlevé ton dentier !

A Papi Marcel, merci pour tous ces petits moments simples, à l'atelier, au garage, au pré où tu m'as appris les choses essentielles de la vie, le rapport à la terre, mais aussi comment ne pas perdre patience quand mamie te criait "Marcel !" 20 fois par jour de l'autre bout de la maison.

A Mamie Lyon, discrète, peu bavarde, tu aurais tout donné pour tes petits-enfants et je crois avoir entendu la confiance que tu avais en moi.

A Papi Lyon, derrière tes airs bien rangés, bien organisés, et tes récits théâtraux, je crois avoir entendu une déclaration d'amour au bonheur, aux petites choses de la vie et surtout à la vie : peut-être ne trouvais-tu pas d'autres manières de parler de sentiments ! Merci pour les crêpes et les matefaims bien évidemment !

A mon frangin, je brille bien trop par mon absence et ma distance dans notre relation mais je te suis reconnaissant d'avoir inscrit en moi ce sentiment que tu seras toujours là pour moi et que comme tu as déjà su me le montrer, tu répondras présent si je t'appelles : merci !

A mes parents, derrière mes airs sarcastiques (voire caustiques ;) ), je ne vous remercierai jamais assez de m'avoir donné la vie. Je vous en ai fait voir de toutes les couleurs, j'ai pas vraiment suivi les règles, j'aurai pu filer du mauvais coton, mais je crois que vous avez réussi à me transmettre de vraies valeurs de vie pour tenir le cap. Je ne suis pas sûr que vous ayez encore compris mes études ou mon futur métier mais votre confiance me suffit à

avancer sereinement. Vous m'avez soutenu malgré mes dérapages, mes "changements de carrière" et la carapace que j'entretiens, alors merci.

A ma mère, pour qui je serai probablement toujours un peu "trop psy", merci d'avoir eu confiance dans mes capacités quand j'ai souhaité quitter le nid, de me soutenir (même dans mes conneries)

A mon père, pour ton sens de l'excellence et de l'expertise, ta curiosité et toutes les connaissances que tu as pris le temps de me transmettre.

A ma tatie/mamie/maman (parce que tu es tellement pour moi), qui m'a toujours considéré comme son fils, comme sa famille, qui m'a transmis la persévérance, la tolérance, l'exigence mais surtout l'amour ! A tonton, je ne pourrai jamais faire le deuil : les trajets à vélo, les insultes en arabe, la sangria à Lidl, les olives au piment, les clés perdus au fond de la Méditerranée, tu me manques !

### **A Coralie**

J'espère ne pas t'avoir trop vexée avec le paragraphe sur mes ex, mais blague à part, c'est peut-être un peu grâce à elle que j'ai été "formaté" pour être un peu plus supportable aujourd'hui.

Merci de supporter mes râleries (pas toujours bien fondées), mes obsessions, mon besoin d'indépendance mais aussi de dépendance et de reconnaissance

Merci de m'accepter dans ta vie et de vouloir partager un bout de chemin avec toi (le plus longtemps possible je l'espère).

### **A mes patients**

A tous mes patients, passés, présents et futurs, merci de me laisser entrevoir une petite partie de votre vie, de vos sentiments, de vos émotions, de vos douleurs, de vous livrer alors

que je ne suis qu'un inconnu. Merci pour toutes les leçons que vous m'apprenez par vos récits!

### **Au lecteur et aux autres**

Merci à toi lecteur de cette thèse, qui a tenu le coup de lire jusqu'ici !

A tous ceux que j'ai oublié dans ce document, parce que je suis beaucoup trop en retard dans le rendu de cette thèse !