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GENERAL

Enter the English title of your research proposal.

Building personalized tools to model the interaction between job demands-resources and burnout symptoms and develop just-in-time interventions

Enter the Dutch title of your research proposal.

Het bouwen van gepersonaliseerde tools om de interactie tussen werkeisen, hulpbronnen en burnout symptomen te modelleren en just-in-time interventies te ontwikkelen

Complete the abstract of your research proposal - English version.

The number of burned-out employees keeps on rising and carries a considerable societal cost (RIZIV, 2023). The Job Demands-Resources model (Bakker & Demerouti, 2014) offers insights into the role of job characteristics (job demands and job resources) in the development of burnout. Studies building on this model have identified various job characteristics that predict which employee groups are at risk of developing burnout, leading to one-size-fits-all solutions for burnout prevention. Generally, we know which job demands and -resources are harmful ‘to most people most of the time’ (Bakker & Demerouti, 2016), but we are not yet able to specifically determine which ones are important for an individual to address their personal burnout triggers. The latter insight is essential to initiate the journey towards personalized treatment and prevention. Addressing this gap, we apply the GIMME-model (Beltz et al., 2016), which allows simultaneous examination of group-level (nomothetic) and individual-level (idiographic) relationships between job demands, -resources and burnout dimensions. Additionally, this model facilitates a dynamic systems approach, enabling us to study the unique role of job characteristics in individual burnout development. In doing so, this project and the resulting tool aims to enable a more precise monitoring of employees' risk factors and burnout development, and to contribute to the creation of tailor-made interventions and personalized burnout treatment.

Complete the abstract of your research proposal - Dutch version.

Het aantal werknemers met een burn-out stijgt en brengt aanzienlijke sociale kosten met zich mee (RIZIV, 2023). Het Job Demands-Resources model (Bakker & Demerouti, 2014) biedt inzichten in de rol van jobkenmerken (job demands en job resources) bij de ontwikkeling van burn-out. Studies die voortbouwen op dit model hebben verschillende jobkenmerken geïdentificeerd die voorspellen welke werknemers risico lopen op het ontwikkelen van burn-out, wat leidt tot algemene oplossingen voor burn-outpreventie. Op heden weten we welke jobkenmerken schadelijk zijn voor het generale publiek (Bakker & Demerouti, 2016), maar we zijn nog niet in staat om specifiek te bepalen welke belangrijk zijn voor de persoonlijke triggers van een individu. Dit inzicht is essentieel om de weg naar gepersonaliseerde behandeling en preventie in te slaan. We passen in dit project het GIMME-model toe (Beltz et al., 2016), dat zowel onderzoek naar groeps- als individueel niveau mogelijk maakt van de relaties tussen jobkenmerken en burn-outdimensies. Daarnaast faciliteert dit model een dynamische systeembenadering, waardoor we de unieke rol van deze kenmerken in de individuele ontwikkeling van burn-out kunnen bestuderen. Op deze manier beoogt dit project en het resulterende instrument een nauwkeurigere monitoring van de risicofactoren van werknemers en de ontwikkeling van burn-out mogelijk te maken, en bij te dragen aan de creatie van op maat gemaakte preventie-interventies en gepersonaliseerde behandelingen.

Select up to five scientific disciplines that best characterize the proposed research.
Health psychology

Work and organisational psychology

Enter up to three English free-text keywords or concepts that best characterize the proposed research.
These keywords allow reviewers to quickly understand the broad scope of your proposal.

Burnout development

Employee wellbeing

Job characteristics

Enter up to three Dutch free-text keywords or concepts that best characterize the proposed research.
These keywords allow reviewers to quickly understand the broad scope of your proposal.

Burn-out ontwikkeling

Welzijn van werknemers

Jobkenmerken

Position your proposal in terms of economic finality.
Ultimately (medium- to long-term), the proposed strategic research may lead to added value for one or more specific company(ies), or for a sector or group of enterprises. The application potential may as well be expressed in terms of socio-economic benefits, related to the Flemish transition areas and priorities in science, technology and innovation. You can highlight multiple options simultaneously but you need to select at least one. In the first two cases you have to specify which companies or sectors are targeted. Furthermore, you can select up to 2 transition areas, each with an associated priority. It is also possible to choose two priorities under the same transition area. What you mention in this section should be referred to, elaborated and explained in the Project description, section 'strategic dimension': Hence, do not just drop company names here, and be specific in referring to sectors (be more precise than e.g. 'manufacturing' or 'space industry').

Companies (optional)

Since almost every company is confronted with employee burnout, we are convinced that the insights (preventive and therapeutic perspective) from this proposal will be applicable to a wide range of organizations.

Sectors (optional)

Two groups of professionals can leverage our findings to benefit employee well-being in all sectors: those involved in safeguarding well-being within organizations (e.g. HR professionals) and healthcare professionals (e.g. psychologists).

Tick off the transition areas and their science, technology and innovation priorities. (optional)

<table>
<thead>
<tr>
<th>Transition Area Group</th>
<th>Transition Area</th>
</tr>
</thead>
</table>

211 / 240

240 / 240
Explain any career breaks.

Explain possible gaps in your CV in the input field below. Make sure your current position and previous appointments are well listed in the e-portal ‘Personal details’ section (‘Posts / Career’). If you have interrupted your academic career at any given point for at least three months (maternity leave, parental leave, full-time sickness leave, unconventional career paths such as leave because of activities in industry or other non-academic sectors, ...) provide details about this below (reason, start/end date). This will allow the reviewers to fairly assess your career stage.

NA

STUDY RESULTS (ACADEMIC EDUCATION)

This section will be used by the evaluators to assess your potential as a PhD researcher, based on your past academic trajectory.

Study narrative.

Show how your academic study trajectory has formed the ideal preparation for doing a PhD, in general and specifically on the topic of the proposed project. Where appropriate, refer to your grades of relevant courses, percentiles or relative ranking or other study results. You may also highlight specific programs or courses you took. If applicable, include additional information on your personal situation where you believe this may have affected your study results and should need to be taken into consideration during the evaluation.

During my bachelor studies in Psychology, my remarkable performance in statistics courses—reflected by scores of 17/20 and more—paved the way for an invitation to become a statistics tutor in 2020, an opportunity I eagerly embraced. For instance, I achieved a score of 17/20 for univariate statistics, 18/20 for programming and using statistical software, 17/20 for research methods for a study employing advanced statistical analysis techniques, and a perfect score of 20/20 in evidence-based management.

In June 2023, I completed my Master in Industrial and Organizational Psychology (IO) with great distinction, attaining a notable ranking in the 80th percentile. During my master studies, I was also selected for, and successfully completed the Honours Programme, which prepares students to become researchers. This program seeks to identify the top-performing students from both the Bachelor's and Master's programs in Psychology, offering them the chance to concurrently pursue a research internship alongside their studies. The selection process is highly competitive, involving different application rounds with CV and motivation letter submission, culminating in the final approval by a supervisor. Due to its rigorous selection process, the success rate is relatively low. Each year, 20 candidates can apply, with only 6 of them being selected. Only 4 honours programme students graduated in 2023, including myself. I was actively involved in research on authenticity within the Work and Organizational Psychology (WOPs) research group, for which I collected experience sampling data. Currently, we are preparing a scientific article about our study findings. In my master thesis, I explored supervisors’ experiences with creating a compassionate workplace for employees in times of grief. Upon the request of the WOPs research group, I had the privilege as a master student to present my master thesis research at the international EAWOP conference in Katowice (Poland, May 23-27, 2023). Currently, we are in the process of writing a scientific article about this study.

These notable achievements captured the attention of the professors, culminating in my appointment as a teaching assistant in statistics and the opportunity to participate in ongoing research within our faculty from October 2023. Since I started this position, I’ve had the opportunity to collaborate on a paper focusing on burnout symptom networks and chronic stress, which is currently under review.

Relative positioning of your study results.
Provide the following information for the master’s degree on the basis of which the application is submitted (see PhD fellowship regulations article 7): the overall result you obtained for this master’s degree, expressed as a percentage; your relative ranking within your study group expressed as the percentile (referring to your university study group) or rank.

- If you have not yet obtained a master’s diploma, please enter the study results and percentile related to the relevant bachelor’s diploma.

- Regarding diplomas from non-Flemish universities, either a percentile score (if available), or at least your rank within your study group should be provided. If neither of these data is available, use the text field at the bottom to provide qualitative information on all your study results.

- Master-after-Master diplomas are not taken into account for percentile/rank information (but may be discussed above in the ‘study narrative’ section).

- More information on providing relative ranking information can be found on the programme webpages.

Please select the relevant diploma for percentile/rank information.

<table>
<thead>
<tr>
<th>Date</th>
<th>University</th>
<th>Degree</th>
<th>Grade</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/07/2023</td>
<td>Vrije Universiteit Brussel</td>
<td>Psychology</td>
<td>Master</td>
<td>BE</td>
</tr>
</tbody>
</table>

Upload the declaration on your percentile or rank within study group.

Note that this document is mandatory and an essential part of your application. However, exceptionally and when duly justified this document can be submitted within reasonable time after the submission deadline.

Attachment [Upload the declaration on your percentile or rank within study group.] [FWO 2024_study results_Femke .pdf] has been added below in the report.

Enter the study results of your diploma.

Enter the global percentage - up to 2 decimal places e.g. xxx.xx

78,00

Provide details about the positioning of your grade based on the percentile or study group ranking.

Percentile

Percentile e.g. P95, P90, P85 ...

80,00

Text field to provide additional information on your study results (the global percentage, percentile, rank in study group). (optional)

If you were not able to provide a global percentage and/or positioning in the study group, you can use this text field to present in a qualitative way the relative positioning of all your study results compared to your peers. You can also use this text field to provide additional information on your academic study results (Bachelor, Master, Advanced Master, ...), i.e. detailed course scores can be added or, if you have not yet obtained your master, you can marks obtained in the first master year. All evidence on study results should be uploaded in ‘Personal Details/studies’ section.

NA
MOTIVATION AND COMPETENCES

This section will be used by the evaluators to assess your potential as a PhD researcher, based on your motivation, acquired scientific competences and scientific mindset.

Write a motivation statement.

Elaborate on your motivation and research interests to pursue an individual PhD trajectory. Elaborate also on how your scientific background and competences will allow you to start the PhD project, and to grow into a strategically thinking and innovation-oriented expert. Provide a clear and substantiated overview on the skills you have already developed, and on the competences yet to be acquired and how you will acquire them.

1) Motivation for research, personal characteristics, and skills

I discovered my passion for research during my 2nd bachelor year while obtaining good grades for statistics and research methods, which led to a job offer as a statistics tutor. Additionally, I was selected for the VUB’s Honours Programme in Psychology, where I completed an internship as a student-researcher, further motivating me to become a successful PhD researcher and allowing me to develop research skills (e.g., analyzing ESM data) relevant for the research proposed in the current application.

I am a dedicated and ambitious person, always eager to learn and expand my knowledge. My academic assignments, especially my 6-month master internship as a researcher at the HR department of Siemens, helped me to further improve my research skills. For example, I wrote a scientific report addressing gender-based pay discrimination for the Work Council. I enjoy analyzing topics in depth and enjoy helping others acquire knowledge, what I am currently doing as a teaching assistant in statistics at VUB.

2) Interest in burnout research

Various courses in the VUB Psychology program and witnessing family members struggling with high job demands sparked my interest in burnout. The observation that certain individuals burn out, while others working in similar environments do not, awakened my curiosity. My interest in burnout grew even stronger during my internship at Siemens where I collaborated with employees facing stress and at risk of burning out. I aim to contribute to studying burnout development within individuals as it is a timely issue with significant practical implications for individuals and organizations.

3) Research experience & skills

I already developed good methodological skills during my Psychology studies (e.g., using qualitative methods and quantitative experience sampling designs). My research internship and teaching assistant role further enhanced these, allowing me to learn and apply advanced statistical techniques relevant to this project. I already completed 12 Datacamp courses, including courses on network analysis and programming with R Shiny. I still see several areas for improvement (e.g., academic writing) and I am eager to do so through following additional courses and on-the-job training.

I already collaborated closely with the two supervisors of this FWO proposal (Prof. Vantilborgh and Prof. De Gieter) during my research internship and master thesis, fostering an ongoing positive collaboration. In my final master year, I had the pleasure to present my master thesis research at the international EAWOP conference (May 2023), which strengthened my science communication skills. Currently, I am writing two scientific papers, including my honours project on authenticity (first author) and master thesis on compassionate behavior in organizations (first author). Additionally, I collaborated and co-authored a paper on burnout and chronic stress (under review).

Scientific activities, experiences and achievements.

In this input field you can further elaborate on first steps as a (potential) innovation-oriented scientist. List relevant activities, experiences and achievements that may be relevant for assessing your potential to start a PhD. For mobility and awards, other dedicated input fields are available below.

- For (ongoing or finished) master thesis or equivalent (as well as dissertation advanced master): mention title, promotor, research group and host institution. If the thesis is related to your PhD topic, also specify initial objective, methodology used and (intermediate) results.
- For (PhD) research already started, specify initial objective, methodology used and (intermediate) results. If applicable mention (up to 5) publications and other achievements. Mind, do mention for each achievement item (publications and other achievements) your share and its nature, and those of other
significant partners in the workload.

For publications: list all authors, title of publication and journal name (without abbreviations) with volume, start/end page and year. Mention whether the publication was peer reviewed or not. For book publications, give all necessary bibliographic information (author(s) or editor(s), book title, publisher, place, year, number of pages).

Make sure your complete publication list is up to date in the e-portal 'Personal details' section ("Publications").

For other achievements: provide a short description, when it was undertaken and finalised and list all the relevant participants involved in it.

• List any other distinct research output that does not fit in the bibliographic publication list and that is meaningful in a broad sense with respect to this fellowship application. It may be constituted by a data base, surveys, a technical diagram, software, objects (maquettes, prototypes...), any other type of activity or output you consider to be relevant. Date the output where appropriate.

• Mention any relevant, past or concrely planned, experiences (internships, presentations, collaborations, ...)

1) Presentations at international conferences


2) Presentations at local workshops


3) Working papers


4) Submitted papers


5) Master thesis (Vrije Universiteit Brussel)


Specify earlier mobility (research stays) in other organizations.

Indicate the research stays which have already been undertaken, prior to this project. If applicable, motivate shortly the added value of each stay to the project. Include details on the organization, type of organization, country, contact person, start/end date, function/activities.
During my HR internship at Siemens, I had the chance to work closely with CEOs, Presidents, and HR colleagues from various countries including Belgium, France, the Netherlands, Luxembourg, and Morocco. This international collaboration was part of my research project on gender-based pay discrimination, for which I had to write a report intended for the Work Councils in these countries. Through this collaboration, I gained experience in managing sensitive personal data, such as pay wages, from various departments within Siemens, a global organization with over 320,000 employees. I learned to conduct sensitive statistical analyses to generate comprehensive tables, including confidence intervals, while navigating diverse cultures and pay structures. In order to provide precise recommendations, I immersed myself in the diverse contexts and cultural nuances, prompting me to adapt my communication style, including learning languages such as German and French, to effectively engage with all stakeholders.

**Specify concrete mobility plans (research stays) within the FWO fellowship.**

I am eager to do a research stay abroad during my fellowship, as this will allow me to broaden my research horizon, to learn from and collaborate with international experts, and get acquainted with different research approaches. I would like to go on 2 research stays of 2-3 months each in the second and third year of my PhD research. I already identified several interesting scholars to visit, in function of their unique expertise and role within my research area: Prof. dr. Sabine Sonnentag (University of Mannheim; specialized in job stress and recovery), Prof. dr. Eiko Fried (Leiden University; proficiency in conceptualizing and measuring models related to mental health), Prof. dr. Sacha Epskamp (National University of Singapore; expertise in conducting longitudinal analyses and network modelling), and Prof. dr. Helen Hamaker (University of Utrecht; mastery of conducting intensive longitudinal research). Our WOPS research group already developed contacts with some of these scholars, so I am convinced that I will be able to successfully organize two research stays.

**List any scientific awards.**

While being a psychology student, I was invited to become a statistics tutor for other psychology students and I was selected for the Honours Programme. Immediately after finishing my master studies, I applied to become a teaching assistant in statistics and shortly after received a job offer (start date: October 1st, 2023).
3. (Optional) In case another co-promotor oversees your PhD project. Mention the organization he/she is affiliated to, and the corresponding co-promotor. It should be mentioned on level 3.

1. Main Flemish host institution

<table>
<thead>
<tr>
<th>Main Flemish host institution</th>
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<tbody>
<tr>
<td>Vrije Universiteit Brussel (VUB)</td>
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</table>

**Promotor**

Eligibility main promotor: check Art. 10§2 of the regulations

*The (main) promotor will be invited by FWO to submit a recommendation statement on the PhD fellowship application.*

In case of collaboration with other research units in the same or other host organizations, co-promotors should be mentioned. These will receive a notification by FWO. They will not be invited to submit a recommendation statement.

**Co-promotor(s) (optional)**

You may specify one or more co-promotors.

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>First name</td>
<td>Tim</td>
</tr>
<tr>
<td>Last name</td>
<td>Vantilborgh</td>
</tr>
<tr>
<td>Date of birth</td>
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</tr>
<tr>
<td>Current occupation</td>
<td>Full Professor</td>
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<tr>
<td>Employment rate</td>
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<tr>
<td>Research unit</td>
<td>WOPs</td>
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<td>Street and number</td>
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<tr>
<td>City</td>
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<tr>
<td>First name</td>
<td>Sara</td>
</tr>
<tr>
<td>Last name</td>
<td>De Gieter</td>
</tr>
<tr>
<td>Date of birth</td>
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<tr>
<td>Current occupation</td>
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<td>Research unit</td>
<td>WOPs</td>
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<td>City</td>
<td>anonymized</td>
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</table>
2. Other host institution(s) – Flemish or federal

If you will carry out your research in another host institution (Flemish or federal) according to Art 4 §1 of the regulations, please click "Add" to select an institution in the drop-down menu. If the institution is not mentioned in the picklist, select ‘Other’ and name the organization. FWO will consider whether this organization fulfills the requirements to act as a co-hosting institute.

3. Other organization(s)

PROJECT

Project description.

The project description should be structured following the template provided by FWO. The sequence of the different topics should be followed exactly as provided in the original template. The total project outline has a maximum of 12 A4 pages (Font Calibri 11, single line spacing, original template margins ...) herein included all tables, graphs, illustrations, etc.

Attachment [Project description.] [FWO SB_Femke Legroux_2024.pdf] has been added below in the report.

OTHER FUNDING

Have the content of this proposal and at least the main part of the proposed research actions, be it with literally the same text or in a varied form, already been submitted before AND was it funded or is the funding decision still pending (applications that finally did not result in funding should not be mentioned)?

No

Enter any additional remarks and the decision date(s) of pending funding decision(s) mentioned above.

- You are encouraged to use this field as an opportunity to point out potential overlap, complementarity, added value of current funding applied for or already obtained, ... related to the applications mentioned above.
- There can be good reason for applying or already having applied for funding at FWO or elsewhere. It is however important that the panel understands how pending applications for funding or obtained funding mentioned above relate to the current application.

State ‘NA’ if not applicable.

NA

PROJECT POSITIONING AND EMBEDDING

Explain how this project fits into the research activities of the involved host institution(s).

Elaborate on the positioning and embedding of your project in the research group(s), its scientific as well as strategic ambitions. If applicable, also position your own previous and current research to the proposed PhD fellowship project.

The proposed project fits within the expertise of the VUB Work & Organizational Psychology (WOPs) research group, that studies employee behavior and wellbeing from a dynamic perspective. WOPs is well-known for its temporal approach and the research group is internationally recognized for using advanced methods to investigate employee wellbeing. The research group is equipped with the tools and software necessary to perform the studies proposed in the current project (e.g., SEMA3 app).

The current proposal aligns with different ongoing studies within WOPs (e.g, the development of a burnout symptoms network). Prof. dr. Vantilborgh and Prof. dr. De Gieter—the supervisors involved in
Position the project in a national and international context.

Mention specific research collaborations planned in the course of this project, if appropriate, mention larger projects, programmes or networks your proposal may be part of.

Within WOPs, this project will not only involve collaboration with the supervisors mentioned above, but also with others PhD students (e.g., drs. Sagmeister), and postdocs studying burnout.

In Belgium, other research groups studying burnout apply a more traditional approach. Prof. dr. De Witte, dr. Desaert, and Prof. dr. Schaufeli from KU Leuven recently developed the Burnout Assessment Tool, whereas UGent scholars Prof. dr. Baert and Prof. dr. Derous focus on return-to-work after burnout.

Internationally, this project aligns with the work of other groups that apply a temporal approach to employee wellbeing—such as the department of Work and Social Psychology of Maastricht University (e.g., Prof. dr. Nübold) and the department of Psychology of Leiden University (e.g., Prof. dr. Fried), conceptualizing mental disorders such as burnout as complex dynamic systems. WOPs is already in touch with these groups, and future collaborations can definitely be explored. More recently, WOPS also participated in an interdisciplinary EU research consortium applying for Horizon Mindset funding to study employee well-being (grant not awarded).

Did you take the issues of gender/sex and diversity into account while designing your research plan (e.g. selection of human participants and/or animals in experiments, relevance of research questions and/or results with respect to gender differences, ...)?

This issue will be taken into account during the evaluation as part of your research methodology and work plan.

Yes

Justification.

During our research we will not specifically select our participants based on certain demographic variables, but we will pursue a diverse group of respondents. The reason for this is because we are primarily interested in the development of burnout within (a variety in) individuals.

Among other things, we will investigate the role of variables such as gender and age as covariates in our models, since some studies already linked them to burnout experiences and the perception of work characteristics. Sensitivity analyses can be used to explore if burnout dynamics differ depending on age, gender, or other socio-demographic variables.

Did you or will you work with societal actors other than research partners in the whole or parts of the research process (from design of the application up to the execution of the research)?

‘Societal actors’ consist of all kinds of groups in society (like patients and/or their organizations, other citizens, firms, ...) involved in or connected to the research in one way or another. There is no limitation to what kind of partners in society possibly can be included, nor is involving societal partners an obligation: whether such an involvement could be relevant or not is left to the judgment of the applicants of the research proposal. Take into account, however, that the evaluators may find that collaboration with societal actors is recommendable or even necessary; you may anticipate this by clarifying your position in the designated textbox. Please be aware that this question on societal actors does not concern science communication or valorization.

This issue will be taken into account during the evaluation as part of your research methodology and work plan.
Justification.

We will set up an advisory board with representatives of relevant stakeholder groups (e.g., HR manager, psychosocial safety advisor, clinical psychologist, occupational physician). We will organize an annual meeting during which we will present our research plans and preliminary results and ask feedback from the members of the advisory board. Special attention will be given to our project’s practical implications and how to address different stakeholder groups' needs.

SCIENCE COMMUNICATION

Indicate how the results of the proposed research will be communicated to a non-expert audience.

FWO encourages its fellows to disseminate the results of their research widely and valorise them where possible.

We aim to communicate the results of this project to a broad audience through various channels. First, we will create a webinar for interested individuals, like HR employees and prevention consultants. We will leverage the past experiences and expertise of WOPs to effectively communicate this webinar to as wide an audience as possible. Second, we will publish our results in popular magazines (e.g., HR Square, Zig Zag HR...), websites, and podcasts for HR professionals and prevention consultants.

In addition, we will present our findings at seminars for professionals (e.g., Prenne days by Prebes for prevention, study day VOCAP, HR Square seminar...) and release press communications about our integrated findings to the broader audience (targeting popular media channels), also mediated by the previous experiences and expertise of WOPs.

Lastly, we will set up a blog at a new website, which we will consistently update to communicate our findings.

INTERNAL PEER REVIEW

There are 24 thematic SB-panels. More info on these panels and their specific scopes can be found here. You should select the panel that fits best with your research project, in terms of research methodology (rather than the application field).

Specify the expert panel.

SBGM - Social sciences and humanities

Motivate your choice of expert panel.

Carefully read the scientific scope of the selected expert panel and motivate why your application fits the scope of this panel - i.e. why this panel has the most appropriate expertise to evaluate your proposal.

Our project focuses on the development of burnout on the individual, within-person level using a dynamic system approach. We will examine how perceptions of job characteristics and burnout co-develop over time. Research on the job characteristics-employee wellbeing relationship is one of the key disciplines in Work- and Organizational Psychology. Therefore, we are convinced that “Social Sciences and Humanities” (SBGM) is the most appropriate expert panel.

ETHICS

FWO Ethics Table
The table below lists questions about possible ethical aspects in research proposals. Please go through the main table and tick 'YES' for aspect(s) relevant to your proposal. Then answer any related sub-questions by clicking on the appropriate ethical topic that becomes listed under 'Ethical Issues'. You can return to the main table by clicking on 'Ethical issues'.

If you mark a 'yes' for the question, it follows that:

- **For the questions marked with *:** the applicant is legally or on the basis of institutional regulations obliged to ask for an ethical approval at the competent ethics committee of the host institution. Please do take into account that even when there is no obligation with regard to the research itself, for the publication of the results an approval may still be necessary and that no retroactive ethics committee approvals are provided.

If you have answered questions with an * positively, you must submit an ethics approval request with detailed documentation on e.g. study methodology, procedures, informed consent form, insurance, etc to the ethics committee **as soon as your application has been approved for funding**. Study-specific procedures cannot begin until this ethics approval has been formally given. Only if the approval relates to a work package planned at a later stage of the project, and if legislation allows, the host institution may decide to authorize the researcher to obtain ethical approval at a later stage, i.e. at the latest before the initiation of the relevant part of the research. Please keep in mind that this delayed application/permission is not possible for all research institutions. Also keep in mind that the ethics advisory procedure can take some time and that therefore you should submit your proposal to the ethics committee well in time.

- **For the questions that are not marked:** Perhaps no ethics approval may be needed for your research proposal. However, please do take into account that your host research institution might have a stricter policy towards ethics approval for certain research topics and methodology. Furthermore, even when there is no obligation with regard to the research itself, for the publication of the results an ethics approval may still be necessary. At any case, the applicant will have to reflect on those issues and take, if necessary, appropriate measures. If in doubt, it is advised to contact the supporting services of your host institution.  

For more information on each of the ethics issues and how to address them, check the FWO webpage on [research ethics](#) and the [Guidelines on FWO's ethics checklist](#).

### Ethical issues

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you using human embryos and/or human embryonic stem cells in your study?</td>
<td>No</td>
</tr>
<tr>
<td>Does your research involve human subjects?</td>
<td>Yes</td>
</tr>
<tr>
<td>Do you use human cells and/or tissues in your research?</td>
<td>No</td>
</tr>
<tr>
<td>Does your study require the processing of personal data?</td>
<td>Yes</td>
</tr>
<tr>
<td>Does your research involve animal testing?</td>
<td>No</td>
</tr>
<tr>
<td>Does your research use genetic resources and/or associated traditional knowledge covered by Access and Benefit Sharing legislation and/or the Nagoya Protocol?</td>
<td>No</td>
</tr>
<tr>
<td>Does your research involve international collaboration with non-EU countries?</td>
<td>No</td>
</tr>
<tr>
<td>Could your research potentially harm the environment and/or the health and safety of people involved?</td>
<td>No</td>
</tr>
</tbody>
</table>
No  

**Could your research have dual-use or military applications?**

No  

**Could your research be misused, compromise security and/or human rights?**

No  

**Does your research involve artificial intelligence?**

No  

Are there any other ethical considerations that need to be taken into account?

No  

**Human participants**

**Does your research involve human participants?**

Yes  

**Are they volunteers for non-medical studies (e.g. social/societal or human sciences research)?**

Please note that not every research involving human participants triggers the obligation to request ethical approval. However, it is important to keep in mind that the journal in which you want to publish the results of your research might ask you, nonetheless, to submit an ethical approval. For this reason, it might be advisable to request ethical approval anyway before the start of the project from the relevant ethics committee within your institution.

Yes  

**Are they persons unable to give informed consent (including children/minors)?** *

No  

**Are they potentially vulnerable individuals or groups?** *

Yes  

**Are they children/minors?** *

No  

**Are they patients for medical/clinical studies?** *

No  

**Are they healthy volunteers for medical/clinical studies?** *

No  

**Does your research involve interventions (physical, also including imaging technology, behavioral treatments, etc.) on the study participants?** *

No
Does this activity involve conducting a clinical study as defined by the Clinical Trial Regulation (EU 536/2014) i.e. using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products? *

No

Personal data

Personal data are defined as 'any information relating to an identified or identifiable natural person'. An 'identifiable natural person', or 'data subject', is 'one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person' (Article 4(1) GDPR).

Does your research involve collecting and/or processing of personal data?

The GDPR requires that all personal data processing activities are recorded. Please consult your host institution for the procedure to follow as soon as the project is granted.

Yes

Does it involve the collection and/or processing of special categories of personal data (e.g.: information on sexual orientation, ethnicity, genetic information, biometric and health data, political opinion, religion or philosophy of life)?

No

Does it involve profiling, systematic monitoring of individuals, or large-scale processing of special categories of data, or intrusive methods of data processing (such as, surveillance, geolocation tracking etc.)?

No

Does your research involve further processing of previously collected personal data (including use of pre-existing data sets or sources or merging existing data sets)?

Yes

Does it involve the processing of personal data related to criminal convictions or offences?

No

Does your research involve international import or export of personal data?

No

Details on ethically sensitive issues per work package (optional)

Give the number and description of the work packages for which you will submit an application to the relevant ethics committee(s).

<table>
<thead>
<tr>
<th>Number/description of work packages</th>
<th>For all of the work packages: work package 1,2 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start date</td>
<td>1/11/2024</td>
</tr>
<tr>
<td>Ethics committee category</td>
<td>Research centres</td>
</tr>
<tr>
<td>Ethics committee</td>
<td>Ethical Committee for Social Sciences and Humanities (ECHW) - VUB/UZ Brussel</td>
</tr>
</tbody>
</table>

I hereby acknowledge that an ethical approval is required for issues marked with an asterisk (*) as far as they apply to my project proposal. I will abide by the applicable regulatory framework, law and institutional policies regarding matters, with or without asterisk (*), that apply to my proposal. If an ethical approval is required, I will ensure to obtain this approval from the competent ethics committee of my host institution, at the latest before starting with the ethically sensitive activities.
DATA MANAGEMENT PLAN

Data management is an integral part of sound scientific research. It covers the description of data and metadata, their storage and long-term preservation, the designation of responsible persons, the handling of highly sensitive data, and the open access to and sharing of research data. The FWO has made data management a key element of its policy for all support channels provided by the FWO. The FWO expects researchers to pay due attention to this dimension before, during and for at least five years after their research.

For background information on data management and the procedures regarding the Data Management Plan (DMP), which FWO expects from its applicants when applying for research funding, please see our website. Please note that the answers to the questions below and the Data Management Plan should cover the full project, including all (inter)national partners involved in cross-institutional projects.

Describe the datatypes (surveys, sequences, manuscripts, objects ...) you will collect and/or generate and/or (re)use during your research project.

WP 1 involves the collection of longitudinal data via the Qualtrics tool. WP 2 involves the collection of high-intensity longitudinal data using an experience sampling method (ExpiWell tool). Likewise, WP 3 involves the collection of high-intensity longitudinal data (see WP2). All data will be stored as a .csv file. In addition, we will develop an online dashboard using RShiny in a secure environment (shinyapps.io) for participants and participating organizations to consult feedback reports. We anticipate that all data together will exceed 10 GB, which should not pose any issues for the specified applications.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research.

Motivate your answer.

- Designation of responsible person (If already designated, please fill in their name.)
- Storage capacity/repository
  - during the research
  - after the research

We will handle our data responsibly by storing it securely on a Pixiu server provided by VUB, which is specifically designed for storing personal and sensitive data, accessible only to the involved researchers. Data will be anonymized, ensuring participant privacy.

After our research is completed, data will be retained for 10 years per VUB policy. Femke will manage the data during the project, and Tim and Sara take over afterward. Following completion, we aim to make our data as openly accessible as possible, while ensuring necessary restrictions aligned with the principles of the VUB. To achieve this, we will utilize the OSF framework and platform to ensure transparency in our research.

What is the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years?

NA

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (optional)

As this project involves potentially vulnerable individuals, we will pursue ethical approval from the ECHW committee ("Ethische Commissie der Humane Wetenschappen") at VUB.

Which other issues related to the data management are relevant to mention?

NA
DECLARATION BY THE APPLICANT

General

In completing this application, the applicant confirms that to the best of their knowledge and belief, the information in this application is complete and correct.

The applicant will inform FWO immediately if the intended project cannot be carried out as foreseen or if a major change occurs that may hinder the planned implementation of the project.

The applicant declares that they have read and agree with the FWO regulations that form an integral part of the application documents published on the FWO website and that form the legal basis of the future contract. Furthermore, they take note that the FWO is committed to the principles of the European Charter for Researchers and the Code of Conduct for their Recruitment.

The applicant agrees that the data required for the application and follow-up are electronically stored and used by the FWO. The FWO will use the data provided by the applicant according to the legal requirements of data protection in Belgium, including the use of the anonymized data for statistical purposes and reports. As soon as the FWO has processed your application, you will receive a notification message. The FWO respects the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) in regards to the processing of your personal data. For more information concerning the privacy policy of the FWO, we redirect you to our website: https://www.fwo.be/en/the-fwo/organisation/processing-personal-data-privacy/.

The applicant agrees that the FWO will forward the full application form including their personal data to, as far as applicable, the members of the FWO expert panels and to experts involved in the evaluation of their proposal in Flanders and abroad (EU and outside EU) and to a partner organization. Any of these receiving parties must declare in advance that they will treat data confidentially and that they will not forward the data or the knowledge gained to anyone nor use it for their own purpose. FWO will take the necessary safety measures to assure this data transfer to the aforementioned organizations or persons will take place in a secure and correct way. More information and details, if available, are published on the FWO website.

The applicant agrees that FWO will forward their private e-mail-address, as provided in the personal data section of the FWO E-portal to their host institution, among other non-personal data regarding their application. The receiving host institution must declare in advance that they will treat data confidentially and that they will not forward the data or the knowledge gained to anyone nor use it for their own purpose. FWO will take the necessary safety measures to assure this data transfer to the aforementioned organizations will take place in a secure and correct way. More information and details are published on the FWO website or can be requested via dpo@fwo.be.

Furthermore, the applicant agrees that the following information may be included in lists published by the FWO: title/abstract; full name of the beneficiaries/supervisors; host institution(s); scientific domains/disciplines/key words; start date and end date, allocated funding of the project.

The applicant declares that all information provided in the personal data section of the FWO E-portal is accurate and up-to-date according to the instructions of the respective programme (i.e. only the items in the E-portal that are applicable to the type of support you apply for should be filled out).
The applicant declares that it fully meets the definition of a research and knowledge-dissemination organization’ as stated in Framework for State aid for research and development and innovation 2022/C 414/01 [1].

Research Integrity

The FWO watches over the scientific integrity from the moment research funding is applied for until the execution of the research and the publication of the research results. Therefore, researchers benefiting from FWO support as well as their host institutions, (co-)supervisors and other collaborators involved in FWO research are required to adhere to the scientific integrity at all times.

To this end, elementary rules of behaviour have been laid down in the Ethical Code for scientific research in Belgium and the European Code of Conduct for Research Integrity. Both documents are included in the call for research proposals. The FWO assumes that each researcher has acknowledged these codes from the moment the application is submitted and undertakes to comply with their provisions in all stages of the proposed research. This also applies to their host institutions, (co-)supervisors and collaborators involved in FWO research, for whom the applicant bears partial responsibility.

If there is any doubt about the applicability or implementation of a provision, the host institution and/or the researcher responsible for the project at hand will contact the FWO administration in order to clarify or make concrete arrangements about the relevant provision.

[1] an entity (such as universities or research institutes, technology transfer agencies, innovation intermediaries, research-oriented physical or virtual collaborative entities), irrespective of its legal status (organised under public or private law) or way of financing, whose primary goal is to independently conduct fundamental research, industrial research or experimental development or to widely disseminate the results of such activities by way of teaching, publication or knowledge transfer. Where such entity also pursues economic activities the financing, the costs and the revenues of those economic activities must be accounted for separately. Undertakings that can exert a decisive influence upon such an entity, in the quality of, for example, shareholders or members, may not enjoy preferential access to the results generated by it. (Definition of a ‘research and knowledge-dissemination organisation’).

I agree

Yes
## PHD FELLOWSHIP APPLICATION 2024
### study results and percentiles

### DECLARATION

More info here: NL / EN

<table>
<thead>
<tr>
<th>First and last name applicant</th>
<th>Femke Legroux</th>
</tr>
</thead>
</table>
| First and last name (main) promotor | Tim Vantilborgh  
Sara De Gieter |
| (Main) Host institute PhD fellowship | Vrije Universiteit Brussel |
| Official name relevant diploma | Msc Work- and organizational psychology |
| Institute where diploma was obtained | Vrije Universiteit Brussel |
| Academic year diploma was obtained | 2022-2023 |
| Study result (XX.xx %) | 78% |
| Number of students in study group | 198 |
| Percentile (PXX) | P80 |
| Rank in study group | OR |

**Additional remarks:**

NA

The applicant and the promotor hereby confirm that the information is correct and acknowledge that the application may be declared inadmissible if the information proves to be incorrect.

Signature applicant: [Signature]  
Signature promotor: [Signature]

*Upload this signed declaration as pdf in the application form (e-portal, application form, tab ‘personal data’)*

*If a diploma from a non-Flemish university is concerned: add the obtained info from that university to this document.*
Changes to previous project proposal

In 2023, we submitted this project under file number 1SH6I24N. The panel provided us with valuable feedback on potential optimizations, which we took to heart. Our adjustments primarily focus on a more detailed elaboration of our key variables (job demands and job resources), statistical techniques, and the project's temporal progression.

First, we conducted a scoping review to identify essential job demands and job resources. We also calculated the optimal time intervals between various measurements of these variables (which are necessary to conduct our longitudinal analysis). Our conclusions are based on a comprehensive scoping review of 40 longitudinal and experience sampling studies, allowing us to assert that our statements have a robust empirical and scientific foundation.

Second, we made changes to the project’s context, shifting the main focus to the individual employee rather than the interplay between the individual and the broader organizational context. In the project proposal below, we substantiate why we made this choice. By gathering and analyzing prior information, we also optimized the project's workload, making it realistic to complete within the specified time frame.

Rationale and positioning with regard to the state-of-the-art

According to recent figures for Belgium, the number of individuals with burnout increased by 39.2% over the past 4 years (RIZIV, 2021). This results in productivity loss and other costs for organizations (Veldhuis et al., 2020), and carries a societal cost of more than 1.6 billion euros spent on long-term disability allowances (due to burnout and depression) (RIZIV, 2021). Given the consequences for society, organizations, and the individuals who suffer from burnout, it is essential to prevent or halt the development of burnout.

Burnout is described as a psychological syndrome that is triggered by chronic work-related stress and entails three dimensions: exhaustion, cynicism, and a reduced sense of personal accomplishment (Maslach et al., 2001). The more recent conceptualization by Schaufeli et al. (2020) makes a further distinction between core symptoms of burnout (i.e., exhaustion, mental distance, cognitive- and emotional impairment) and secondary symptoms, being psychological, depressive and psychosomatic complaints (Schaufeli et al., 2020). The Job Demands-Resources model (Bakker & Demerouti, 2014) provides important insights on how the work context triggers burnout, by focusing on two defining characteristics of work: job demands and job resources. Job demands (e.g., work load, emotional demands) are work characteristics that require a physical, cognitive or emotional effort (Demerouti et al., 2001), whereas job resources (e.g., autonomy, social support) are different elements within the work context or job that elicit the achievement of work goals, reduce job demands and the (physiological, psychological) costs associated with them, and stimulate personal growth, learning and development (Crawford et al., 2010; Bakker et al., 2023). A large body of research has already established the general relationships between job demands, job resources and burnout, showing that job demands relate positively to burnout, while job resources relate negatively to burnout and also mitigate the effect of job demands on burnout (Guthier et al., 2020). Generally, we know which job demands and job resources are harmful ‘to most people most of the time’ (Bakker & Demerouti, 2016), but we are not yet able to specifically determine which ones are important for an individual to address their personal burnout triggers.
The latter insight is essential to initiate the journey towards personalized treatment and prevention. So far, the prevailing strategy for preventing/dealing with burnout has been to strengthen the individual employee at risk while simultaneously addressing the potential risk factors/work environment (e.g., workload, work-life imbalance; Houkes et al., 2008; Hu et al., 2017; between-persons level). Nevertheless, to tailor interventions for individuals, understanding their specific burnout triggers is essential. To prevent the development of burnout, it is necessary to intervene in the work context by either reducing job demands or strengthening job resources. Yet, the relevance of specific job demands/resources may vary between individuals and from one work context to another, which makes a one-size-fits-all approach ineffective (Hamaker, 2012; Beltz et al., 2016; Basinska & Gruszczynska, 2020). A recent study by Blanchard et al. (2021) emphasized that within-person changes in burnout and the unfolding of the individual burnout processes over time received scarce attention, indicating the need for a personalized, individual approach. It is therefore important to approach this idiographic aspect (on an individual level), as these factors within one person may also have a different impact at different points in time and the development of burnout in general, which is crucial information in order to prevent the individual from burning out.

Our goal is to tackle these limitations in burnout research by applying a dynamic systems approach, which examines the unfolding relationships between various job demands, job resources and burnout over time (see Epskamp, 2020). This enables us to jointly study between- and within-person processes and offers unique insights (which are currently lacking) into the individual burnout development processes (Epskamp, 2020). In doing so, we will model short-term dynamics by building on existing theoretical frameworks on burnout and the Job-Demands-Resources model (Bakker & Demerouti, 2014), while introducing idiographic and temporal insights from Dynamic Systems Theory (Langley et al., 2013; Vullinghs & Doci, 2020; see Figure 1).

Our research has both scientific and practical implications for individuals, organizations and health-care professionals. At the scientific level, we make three main contributions. First, this project will help us to better understand the specific role of work characteristics (job demands and job resources) and their interactions with burnout within individual employees during their burnout development process. Second, we will be able to distinguish work characteristics that are crucial from those that are only occasionally relevant (both on a collective and individual level). Third, we will improve our understanding of the role of time in the development of burnout. Turning to the practical implications, we will make two main contributions. First, we will develop a tool, based on the dynamic systems theory and different network models, that allows for the identification of relevant job demands/resources to counteract burnout development at both the individual (idiographic) and broader work context levels (team/organization). Second, this tool will allow organizations to gain insights into the work characteristics over time that impact burnout development in particular employee categories or departments, allowing them to design just-in-time interventions that are customized and tailored to the needs of their employees.

**Scientific research objective(s)**

The following research objectives will be implemented building on a dynamic systems perspective, in which we examine job demands, job resources, and burnout as elements of a system that interact with each other over time (Driver & Voelkle, 2018). This approach allows us to study between- and within-person processes in burnout development simultaneously. By focusing both on the nomothetic (i.e., relationships at the team/organizational level) and idiographic approach (i.e., relationships at the individual employee level), we can map the individual variations in burnout.
symptoms over time and understand more in depth the developmental processes of burnout within an individual (Beltz et al., 2016; Epskamp, 2020; see Figure 1).

**Figure 1**
*Overview of the studies*

![Diagram of the studies](image)

*Note. This figure represents a simplified model. Each block represents one specific job demand (JD), job resource (JR) or burnout dimension (BU).*

**Research objective 1: Examine job demands, job resources and burnout dimensions as a dynamic system**

Our first research objective aims to build the first temporal dynamic network models of job demands, job resources and burnout dimensions. Previous studies already described a large variety of job demands and job resources and their relationship with burnout. We performed a scoping review including 40 longitudinal and experience sampling studies to identify the most prevalent job demands and resources linked to burnout to include in our studies. Key job demands are *workload*, *work-family interference*, *authority (job control)*, *interpersonal conflict (emotional demands)*, and *organizational pressure* (e.g., Hagen et al., 2022), whereas key job resources are *social support* (by supervisor and colleagues), *learning opportunities*, *autonomy* and *feedback* (e.g., Rogala et al., 2016). These longitudinal studies furthermore indicated that the previously mentioned variables are primarily associated with the burnout dimensions *exhaustion*, *mental distance*, *impaired emotional and cognitive control* (recently identified as core burnout dimensions by the Burnout...
Assessment Tool; e.g., Schaufeli et al., 2020). Therefore, our research specifically will be focusing on these dimensions of burnout.

We will use psychometric networks to test how these job demands, job resources and burnout dimensions relate to each other as elements in a dynamic system (Borsboom et al., 2021). This will offer several new insights that will greatly contribute to our understanding of the interactions between the defined job demands/resources and burnout. First, it allows us to examine which job demands and resources are directly related to (which) burnout dimensions, and which are more distal and indirectly related to these dimensions. For example, supervisor support (a job resource) may have both direct and indirect effects (e.g., via reduced workload and learning opportunities) on exhaustion. Knowledge on which job demands/resources are proximally related to burnout dimensions also reveals which of them are crucial to burnout development. Second, it allows us to examine reciprocal relationships. For example, while a job demand may increase exhaustion (burnout dimension), exhaustion in turn may change our perception of that job demand. Understanding these reciprocal relationships is crucial as they explain the presence of, for example, vicious cycles in which job demands and burnout dimensions reinforce each other. Third, centrality measures in relative importance networks can be used to gain a better understanding of the importance (connectedness/impact with/on other system elements) of each variable in the dynamic system (Bringmann et al., 2019), helping us to distinguish important from less important job demands-resources for burnout/wellbeing. To examine these dynamic systems, we will use longitudinal data to estimate Gaussian Graphical Models (Epskamp, 2020). This will offer us insights into between-person relationships between job demands, job resources and burnout dimensions, and will elucidate these relationships. In sum, achieving this objective will reveal a dynamic system of jobs demands, job resources and burnout dimensions, providing crucial insights for understanding burnout and guiding potential interventions.

Whereas the Job Demands-Resources Model also identified personal resources (e.g., stress resilience) that might mitigate the relationships between job demands and burnout, we decided to not include these personal resources in the current study, as our primary objective is to gain relevant insights on how to redesign and strengthen the work situation instead of strengthening employees in order to prevent burnout, as the potential gains for organizations and employees are larger in the short- and long run.

Research objective 2: Bridge the gap between idiographic and nomothetic approaches to a dynamic system of job demands, job resources and burnout dimensions

While our first research objective aims to demonstrate the feasibility and meaningfulness of studying job demands, job resources and burnout dimensions as a dynamic system, it focuses on the nomothetic (group) level. However, the dynamic system might be different on the ideographic (individual) level. As every employee operates in a unique work context, the structure of the dynamic system and the strength of relationships between the system’s elements may vary substantially between employees. For example, while workload may be a strong predictor of exhaustion for employee A, it may be weakly or even negatively associated with exhaustion for employee B, because the former views workload as a hindering demand while the latter perceives it as a challenging demand.

With our second research objective, we aim to examine group-level (nomothetic) relationships as well as individual-level (idiographic) relationships between job demands, job resources and burnout dimensions simultaneously, by using the Group Iterative Multiple Model Estimation (GIMME) technique on high-intensity longitudinal data (Beltz et al., 2016). Doing so will enable us to estimate...
general patterns in the relationships between job demands, job resources and burnout dimensions at the group-level, but also estimate these relationships for each individual, thus offering insight into the unique nature of burnout development for each individual employee. This allows us to identify the job demands and job resources that are most crucial to target with personalized interventions, aligning with our goal to develop interventions tailored to the unique needs of each employee.

Research objective 3: Leverage the dynamic systems approach to develop tailor-made interventions

Our third research objective aims to leverage the dynamic systems model from the previous research objective to inform employees, supervisors, and organizations about the drivers of burnout in their unique work context. We aim to develop a practical tool (using the “Shiny app” in R software) that has the potential to set up interventions for individual employees or groups of employees. To test the potential of such a tool, we will collect ESM data from employees within several organizations. Our purpose here is to recruit a sufficient number of participants within different organizations (75-125 participants), with a possibility to broaden this research objective within teams in an organization (not our initial goal, but might become possible when we collect data from sufficient participants within a team). Our main objective is to study employees across various organizations at both the individual and group level. There is an opportunity to enhance the depth of our research by not only studying the organization as a whole but also delving into the dynamics of individual employees within their respective teams. Examining individual results offers us valuable insights into the interconnections among various dimensions of burnout, as well as the relationships between job demands and resources, and burnout. On the other hand, group results shed light on the same relationships, but with the distinction that these reflect the collective experience of all members within the group (organization or—when we collect sufficient data—team).

We will create an online tool (using the free software Shiny in R) to gather the data and provide automated feedback to employees based on the GIMME analysis. Hence, individual employees will be able to learn about the particular job demands and job resources that are crucial for them in the development of burnout. At the organization level, the tool will automatically generate group-level (meaning the entire organization, or team if possible) reports on the relationships between job demands, job resources and burnout dimensions. These group-level reports show which job demands and resources are important at the aggregated level for most employees and should be tackled or strengthened by interventions to prevent burnouts.

Overall, the goal of this research objective is more practical in nature. This tool will stand out as the first of its kind, offering reports and feedback to both the organization and individual employees. It will be particularly beneficial for individual employees, as it forms the basis of a new form of psychoeducation offering unique insights into one’s own personal network of burnout dimensions, job demands, and job resources. However, the tool also holds advantages for the organization at the group level. For instance, if the tool indicates that many employees are grappling with similar job demands, an organization or supervisor could interpret these findings and implement targeted interventions for the entire team or organization. To test the usefulness of this tool, we will use surveys to assess user experience and we will examine how the automated feedback influences trajectories of burnout dimensions. Broadly speaking, we predict that—in line with biofeedback principles (Gaume et al., 2016)—receiving accurate feedback about job demands-resources and burnout dimension relationships will decrease scores on the burnout dimensions themselves.
Research methodology and work plan

Work package 1: Examine job demands, job resources and burnout dimensions as a dynamic system

**Aim:** Study 1 focuses on the following research question: “How does the interaction between job demands, job resources and burnout dimensions evolve over time?”. To answer this research question, we will estimate a network model of job demands, job resources and burnout dimensions using longitudinal data.

**Design and sample:** We will use a survey design to collect longitudinal data, which aligns with a dynamic systems approach since it allows us to observe phenomena over time; and thus makes it possible to capture the development of individual burnout processes over a longer period of time. We will ask 250 participants (sample size may vary depending on power analysis; see further) to complete a survey on 5 measurement moments, yielding an effective sample size of at least 1000 observations which has been recommended for this type of analysis (Epskamp, 2020). We will recruit participants over a 2-year period to mitigate the risk of insufficient participant enrollment. In preparation for this study, we already performed a scoping review and optimal time-lag analysis (cfr. Dormann & Griffin, 2015) involving 40 longitudinal and experience sampling studies, which indicates that the optimal time interval between measurement points is between 9 days (experience sampling) and 13 months (longitudinal), depending on the type of study (e.g., Hagen et al., 2022; Rogala et al., 2016; Dubois et al., 2014). In our research and for this research question, we aim to utilize the 9-day time interval provided by experience sampling studies. This approach combined with measuring at different moments in time (each time with an interval of 9 days between the measurement moments), incorporates both the benefits of longitudinal and experience sampling analysis. By doing so, we can capture individual differences over time with greater specificity. We will assess the previously mentioned job demands (workload, work-family conflict, authority, interpersonal conflict, and organizational pressure), job resources (supervisor and colleague support, learning opportunities, autonomy, and feedback), and burnout dimensions (exhaustion, mental distance, impaired emotional and cognitive control) over the specified 9-day intervals, with at least 5 measurement points per participant.

To recruit participants, we will contact organizations in the network of our research group. Participants (between 18-67 years old) need to be active as a paid employee. To improve response rates, we will ensure that the survey is as short as possible, and we will offer incentives such as a personalized feedback report.

**Analysis:** The longitudinal data will be analyzed using the Gaussian Graphical Model (GMM) (Epskamp, 2020). We will use a multivariate Bayesian multilevel estimation method, which deals well with missing values. To answer our research question, we will examine the between-person, contemporaneous within-person, and temporal within-person networks obtained through the longitudinal data analysis.

**Risks:** We identified a few risks for this study. Predominantly, it may be difficult to obtain the required sample size and participants may drop out during the study. If we notice that response rates are low, we may opt for a paid sample (e.g., Prolific). Moreover, we could offer a small financial incentive to participants, upon completing a minimum number of surveys (e.g., 3/4/5 measurement moments completed). Moreover, our estimation technique is well equipped to deal with missing data, meaning that participants who miss one or more measurement moments can still be retained in the dataset for the analysis. Nevertheless, we will examine if the assumption of data missing at random is plausible. Should it become apparent that the dropout rate is quite high, it is possible to use a novel analysis approach called dynamic time warping (Hebbrecht et al., 2020),
a network modeling technique that can effectively run with just as few as 5 observations per participant. This ensures ample statistical power of ESM and longitudinal time-lags in our analyses. Finally, we have pinpointed the most prevalent job demands, job resources, and dimensions of burnout for this study, not all previously examined job characteristics and dimensions are included. However, we can expand the set of characteristics and dimensions later on in WP3 when we conceptualize our tool.

**Work package 2: Bridge the gap between idiographic and nomothetic approaches to a dynamic system of job demands, job resources and burnout dimensions**

**Aim:** Study 2 aims to investigate the dynamic system consisting of job demands, job resources and burnout dimensions both at the nomothetic group-level and the idiographic individual-level. This allows us to move in the direction of personalized interventions (link with research objective 3), by truly understanding the unique relationships between the elements in the dynamic system of each employee. To achieve this goal, we will use the GIMME-model (Beltz et al., 2016).

**Design and sample:** We will use a survey experience sampling design with high-intensity longitudinal data. Similar to Beltz et al. (2016), we will recruit a minimum of 50 participants for this study. As proposed in study 1, we will recruit over a 2-years time-period, so we can minimize the risk of not finding a sufficient number of participants. Each participant will complete a very short questionnaire on 100 consecutive measurement moments (10 measurement moments per day with fixed intervals; 20 consecutive workdays). Even with participants missing measurement moments, we anticipate that we will still have sufficient (minimum 50 per participant) observations to robustly estimate the idiographic network. Surveys will be short (less than 1 minute to complete survey) to reduce participant burden. To that end, we will use single-item measures (e.g., “I had too many demands on me during work today”, Butler et al., 2005; Vantilborgh et al., 2016; De Gieter, Hofmans, & Bakker, 2018) for the focal variables in our study, focusing on job demands and job resources that demonstrated strong, proximal effects on burnout dimensions in Study 1. The experience sampling survey will be administered using the ExpiWell app. Participants will receive a thorough personal briefing to learn how to work with the app, and we will stay in touch with participants to encourage them to comply to the study protocol. Participants will receive a financial incentive at the end of the study, based on the number of surveys they completed.

**Analysis:** Data will be analyzed using the (GIMME) model (Beltz et al., 2016). This model allows us to simultaneously estimate the nomothetic group-level relationships between variables and the idiographic individual-level relationships. Put differently, we will be able to estimate each participant’s unique network of relationships between job demands, job resources, and burnout dimensions (individual-level), as well as report the relationships between these variables at the group-level.

**Risks:** The main risk for this study pertains to the high-intensity nature of the data. While our sample size is feasible, it is important for participants to adhere to the study protocol and complete as many surveys as possible. High levels of attrition may lead to less robust estimates of network parameters at the individual level. To further improve response rates, we will offer participants individual feedback through an online dashboard, in which they can monitor their evolution over time. Moreover, we will invite participants who complete at least 70 surveys to a training session based on their individual results. For this training session, we will collaborate with clinical psychologists in our network specialized in burnout treatment.
Work package 3: Leverage the dynamic systems approach to develop tailor-made interventions

Aim: Study 3 builds on the results from Study 2 but is more applied in nature. Our aim here is to demonstrate that a practical tool can be developed using the GIMME model, that enables employees, managers, and organizations to develop insights into the developmental process of burnout and creates the necessary conditions for setting up effective interventions targeting job demands and job resources.

Design and sample: Similar to Study 2, we will use a survey experience sampling design with high-intensity longitudinal data. We aim to recruit 3 to 5 organizations that are willing to participate in this study with 25 participating employees for each organization. We will approach organizations in sectors that are known to encounter high rates of burnout (e.g., healthcare, education). Participants will be asked to complete the same short questionnaire as in Study 2, 5 times per day for 20 workdays. During the study, participants can log into an online dashboard containing their personal data. This dashboard will be updated real-time to show the evolution in job demands, job resources and burnout dimensions, their personal network of job demands, job resources and burnout dimensions, and automatically generated text to explain how their idiographic network should be interpreted (e.g., which particular job demand is crucial for the employee according to the network). Simultaneously, managers will be able to log into an online dashboard that contains anonymized information on the group-level nomothetic network for the participating organization. At the end of the study, participating employees and managers will receive a survey to probe the perceived usefulness of the tool (e.g., How useful is the tool in managing wellbeing of employees? Did you learn anything about yourself thanks to the tool?). To gain an in-depth understanding of the user experience related to our tool, we will organize focus groups in which we invite participants to share their experiences (e.g., How did you experience this tool? How could it be improved?).

Analysis: As in Study 2, we will use the GIMME-model to analyze the data (Beltz et al., 2016). In addition, we will also examine if receiving feedback through the personal dashboard changes the reported levels of job demands, job resources, and burnout dimensions, as well as the relationships between these variables. We will be able to test this, as participants will need to complete 25 observations (1 week of observations) before they gain access to the dashboard. In contrast to Study 2, we will have the ability to analyze changes in reported variable levels by comparing the initial week (baseline period) with the following three weeks (feedback period). To detect changes in levels of variables, we will use a discontinuous random coefficient model (Bliese & Lang, 2016). To examine changes in relationships between variables, we will estimate and compare network models based on the baseline period data and the feedback period data. Network models will be compared in terms of edge strength and node centrality indices. An additional advantage of this study is that we can already start with the recruitment process of the different organizations while the data collection of study 2 is ongoing, as both studies are based on the same survey and analysis technique, the GIMME model (Beltz et al., 2016).

Risks: Similar to Study 2, it may prove difficult to engage participants (and organizations) for 4 weeks. However, we expect that the personal feedback obtained via the online dashboard will motivate participants to continue. Another challenge is that we need to recruit multiple organizations, in which ideally as many employees as possible are willing to participate. We will only allow organizations of a certain size (e.g., organizations with at least 500 employees) to participate in this study, so that a minimum of 25 employees can participate per organization. The reason for this is that it ensures us that small cell issues do not threaten confidentiality when reporting aggregated results at the organization level. Taking into account possible dropouts, we will aim for larger samples at the organizational level (e.g., try and recruit 60 participants per organization). Another risk is that we rely on the outcomes of Study 2 to develop the tool. However, the allocated 2-year timeframe should enable us to recruit enough participants, thereby granting...
us sufficient statistical power to yield robust and reliable findings, forming a solid foundation for initiating the tool’s development. A final risk pertains to the fact that setting up this online dashboard requires knowledge of specific applications such as RShiny and an RShiny server (since RShiny itself is limited in number of hours in use). Knowledge on these applications is already present in our research group, and I successfully completed (December 2023) different training courses in Datacamp regarding RShiney myself. The RShiny application will allow us to automatically analyze and visualize the data obtained, and the participants can easily access these tools to see their own data. It has the advantage of being user-friendly for both participants and researchers, while being simple enough for us to develop. Ultimately, our tool will pave the way for a more sophisticated application, which can subsequently be developed by software engineers to enhance the tool’s usability (note that the development of a commercial application is beyond the scope of this project).

Work plan

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Strategic dimension and application potential

As shown by RIZIV data (2022) the number of individuals absent from work for more than a year due to burnout and/or depression increased with 46,35% between 2016 and 2021. 9% of the employees in Flanders are at higher risk of developing burnout and another 7% already experience burnout symptoms while still at work (De Witte, 2021). Short and long-term absenteeism due to stress and burnout comes with a price for both organizations and the national health care system, investing more that 1.6 million euro in 2020 alone in social security benefits for employees absent due to burnout and depression (RIZIV, 2021). Countering the rising trend in burnout cases is
essential and gains attention in policy plans of governments and organizations. Our project aligns with the Health and Well-Being goals of Flanders in transition 2025, and more specifically with the objective's greater focus on prevention and early detection, and breakthrough of personalized medicine. Our tool will help to tackle the huge societal challenge of burnout.

The tool that we aim to develop can be used to (a) increase awareness and psychoeducation in employees about their personal triggers (i.e., job demands) and buffers (i.e., job resources) in the burnout development process, (b) monitor the work characteristics (job demands and job resources) that matter in teams and organizations in the burnout development process, and (c) develop tailor-made interventions that target particular individual employees and/or teams that are relevant in the burnout development process. We believe that such a tool is timely and necessary, and can benefit individuals, organizations, and society at large.

At the individual level, our main goal is to develop insights into an individual’s own sources of stress and their impact, raising awareness in individuals concerning alarm signals and creating an opportunity for early detection and self-correction when a possible development of burnout is perceived.

At the organizational level, we aim to develop a new tool to continuously monitor burnout risks and risk factors, with a possibility for aggregating to a team/department level. This allows organizations to engage in primary and secondary prevention interventions (Murphy, 1988; Schaufeli & Enzmann, 1998), thus reducing burnout-related absence in the long run. This would result in a cost-reduction for organizations (e.g., decreasing the first month secured income cost, productivity loss, replacement cost). As employee burnout is occurring in every type of organization and sector, our project findings will potentially benefit every organization that is willing to invest in burnout prevention.

At the societal level, this tool forms a first step towards individualized burnout treatment. Most interventions to date are based on research that looks at group-level processes, and hence fail to take into account the unique context of each individual. This tool hence contributes to the further development of individualized healthcare in society. Reducing long-term absence due to burnout has clear benefits for the economy and welfare costs.

We identify different professional groups that can use the tool to realize the abovementioned benefits at the individual, organizational, and societal level like HR-professionals, prevention advisors, (occupational) physicians, external services, psychologists and psychiatrists.

References


