Correlates of work-related boredom and technological changes at the workplace

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autorise, sans se prononcer sur les opinions de la candidate, l'impression de la thèse de Madame Cecilia TOSCANELLI, intitulée :

« Correlates of work-related boredom and technological changes at the workplace »

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Correlates of work-related boredom and technological changes at the workplace

Cecilia Toscanelli

Résumé

L'objectif de cette thèse est de contribuer à la recherche sur l'ennui et la sous-stimulation au travail, un sujet relativement peu exploré dans le domaine de la psychologie organisationnelle. Pour ce faire, ce travail proposera d'abord une revue de la littérature existante puis se concentrera sur deux parties principales.

La première partie se concentre sur l'étude de l'ennui au travail et de la sous-stimulation sous le prisme de la définition générale et du cadre théorique du bien-être psychologique au travail. Une première étude portant sur trois clusters composés de différentes combinaisons de caractéristiques professionnelles, et leur effet sur le bien-être sera présentée. Deuxièmement, cette recherche se concentrera sur une analyse plus approfondie, basée sur une étude transversale des caractéristiques professionnelles en interaction avec des variables individuelles, en tant qu'antécédents de l'ennui au travail. Troisièmement, une étude transversale du lien entre l'ennui au travail et l'épuisement sera présentée. La deuxième partie se concentrera sur les enjeux liés aux innovations technologiques rapides et continues au travail dans le contexte de ce que l'on appelle la *quatrième révolution industrielle*. Cette thèse présentera d'abord une étude théorique générale sur les effets de ces innovations technologiques sur le monde du travail et les travailleur·e·s. Finalement, cette thèse présentera une étude empirique sur l'impact de l'évaluation des technologies sur plusieurs indicateurs de bien-être, dont l'ennui au travail.

Les implications pratiques de ces résultats seront discutées principalement en termes d'implications possibles pour les organisations professionnelles et pour les pratiques et interventions en matière de ressources humaines. L'accent sera mis sur l'importance d'accroître les ressources professionnelles porteuses de stimulation et de sens car elles peuvent contribuer à promouvoir des environnements organisationnels sains et à améliorer les expériences des travailleur·euse·s au travail.

Abstract

The purpose of this dissertation is to contribute to the research on boredom and under-stimulation at work, a relatively unexplored topic in the field of organizational psychology. To do so, this work will first propose a review of the existing literature and then focus on two main parts.

The first part focuses on the study of boredom at work and understimulation under the lens of the general definition and theoretical framework of psychological well-being at work. First, one study on three profiles consisting of different combinations of job characteristics. and their effect on well-being will be presented. Secondly, this research will focus on a more in-depth analysis, based on a cross-sectional study of job characteristics, in interaction with trait-like variables, as antecedents of boredom at work. Thirdly, a cross-sectional study of the link between boredom at work and exhaustion will be presented. The second part will focus on the issues related to the fast and ongoing technological innovations at work, in the context of the so-called *Fourth industrial revolution.* This dissertation will first present a general theoretical study on the effects of these technological innovations on the world of work and workers. Then, this dissertation will introduce an empirical study on the impact of technology appraisal on several indicators of well-being, including boredom at work.

The practical implications of these findings will be discussed primarily in terms of their possible implications for professional organizations and Human Resources practices and interventions. Emphasis will be placed on the importance of increasing job resources conveying stimulation and meaning, as they can contribute to promoting healthy organizational environments and improve workers' experiences at work.

Samenvatting

Het doel van deze dissertatie is een bijdrage te leveren aan het onderzoek naar verveling en onderstimulering op het werk, een relatief onontgonnen onderwerp in de arbeidspsychologie. In het bijzonder richt dit werk zich op de antecedenten en gevolgen ervan. Daartoe wordt eerst een overzicht geven van de bestaande literatuur, waarna twee domeinen worden belicht.

Het eerste domein betreft de studie van verveling op het werk en onderstimulering in verband met het welzijn op het werk. Een eerste studie reveleert drie profielen die bestaan uit verschillende combinaties van jobkenmerken, en gaat na in hoeverre deze samenhangen met het welzijn. Een tweede studie spitst zich toe op een cross-sectionele studie van jobkenmerken als antecedenten van verveling op het werk, en analyseert tevens 'trait-like' variabelen in interactie met jobkenmerken. De derde cross-sectionele studie analyseert het verband tussen verveling op het werk en uitputting. In dit deel van de dissertatie worden variabelen introduceert die verwijzen naar zingeving. Ten eerste het sociale nut, geïntegreerd in het aspect hulpbronnen op het werk; ten tweede cynisme, dat beschouwd zal worden als een mediator in het verband tussen verveling op het werk en uitputting.

De resultaten dragen bij tot de literatuur door de verschillende combinaties van werkkenmerken te illustreren die in Zwitserland voorkomen, en tonen aan dat het noodzakelijk is om werkomgevingen met een tekort aan hulpbronnen te bestuderen, aangezien de langdurige blootstelling eraan schadelijk blijkt te zijn. Ten tweede tonen de gepresenteerde studies het belang aan van bepaalde variabelen voor de studie van verveling op het werk, zoals het kunnen benutten van vaardigheden. Wat individuele kenmerken betreft, toont deze dissertatie aan dat het belangrijk is om rekening te houden met de interactie tussen individuele variabelen en werkkenmerken bij de studie van verveling op het werk. Daarbij wordt gesuggereerd dat dispositionele kenmerken relevant zijn om beter te bepalen "wie" verveling ervaart en "onder welke omstandigheden". Dispositionele en contextuele variabelen moeten dus samen worden onderzocht om een beter begrip te krijgen van verveling op het werk. Onze resultaten dragen ook bij aan de literatuur door aan te tonen dat zingevingsgerelateerde variabelen belangrijk zijn voor de studie van verveling, door hun rol als antecedent (i.e. sociaal nut) en als uitkomstvariabele (cynisme) aan te tonen. Onze empirische studie naar de beoordeling van technologie liet slechts een marginaal effect op verveling op het werk optekenen. Tot slot bevat dit proefschrift nog de validatie voor de Franse versie van de Dutch Boredom Scale (DUBS; Reijseger et al., 2013) en de Boredom Proneness Scale Short-version (Struk et al., 2017).

De praktische implicaties van deze bevindingen voor professionele organisaties en HR worden belicht. Bijzondere nadruk wordt gelegd op het belang van het vergroten van hulpbronnen op het werk in termen van stimulatie en zingeving, omdat deze kunnen helpen bij het bevorderen en implementeren van interventies om gezonde organisatieomgevingen te bevorderen en de ervaringen van werknemers op het werk te verbeteren.

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Lausanne, Spring 2022

Cecilia Toscanelli

List of original publications

The original articles of the present dissertation are integrated and articulated throughout the manuscript and presented integrally in the central part of the manuscript.

Study 1: Urbanaviciute, I., Massoudi, K., Toscanelli, C., & De Witte, H. (2021). On the Dynamics of the Psychosocial Work Environment and Employee Well-Being: A Latent Transition Approach. *International Journal of Environmental Research and Public Health*, *18*(9), 47-44.

Study 2: Toscanelli, C., Udayar, S., Urbanaviciute, I. and Massoudi, K. (2022). The role of individual characteristics and working conditions in understanding boredom at work, *Personnel Review*, *51* (2), 480-500. https://doi.org/10.1108/PR-07-2020-0510

Study 3 : Toscanelli, C., Urbanaviciute, I., De Witte, H., & Massoudi, K. Better bored than burned-out? Cynicism as a Mediator between Boredom at Work and Exhaustion - Submitted in May 2021 to the British Journal of Guidance and Counseling.

Study 4 : Toscanelli, C., Fedrigo, L. Rossier, J. (2019). Promoting an ethical work context and access to sustainable careers in the framework of the fourth industrial revolution. In I. Potgieter, N. Ferreira. & M. Coetzee (Eds.), *Fit for the future: theory, research and dynamics of career wellbeing.* Springer.

Study 5 : Toscanelli, C., Udayar, S., Massoudi, K. (2022). Antecedents and consequences of technology appraisal: A person-centered approach. *Technology, Mind, and Behavior*.

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Overview and structure of the PhD dissertation

The main purpose of this dissertation is to study and analyze the correlates of boredom and understimulation[1] at work. To do this, this dissertation will adopt different perspectives, at macro and micro levels. After conducting an introductory section to define boredom at work and describe its antecedents and consequences, this dissertation will focus on understimulation and job boredom under the lens of the general definition and theoretical framework of psychological well-being at work, a concept that will guide us throughout this dissertation. This work will therefore broadly define well-being at work, its components, and antecedents. Then, this dissertation will focus on the link between well-being and job characteristics. This part will refer to the first paper introduced in this dissertation, studying the Swiss work context and its consequences based on a longitudinal and person-centered approach. This first paper will allow us to shed light on different combinations of job characteristics existing in the Swiss labor market and study the effects of a work environment characterized by low resources and average workloads – a work environment that hence might lead to the experience of boredom - from a longitudinal perspective. Then, this dissertation will concentrate on the antecedents of boredom at work, considering job characteristics as well as trait-like variables. This part will introduce a second paper that analyzes the contribution of well-established antecedents but also integrate meaning-related variables to examine their role in the experience of boredom at work. In addition, the role of individual characteristics will be considered in interaction with the job characteristics. Finally, this dissertation will concentrate on the link between boredom at work and exhaustion as well as its underlying processes. Indeed, based on the theoretical framework

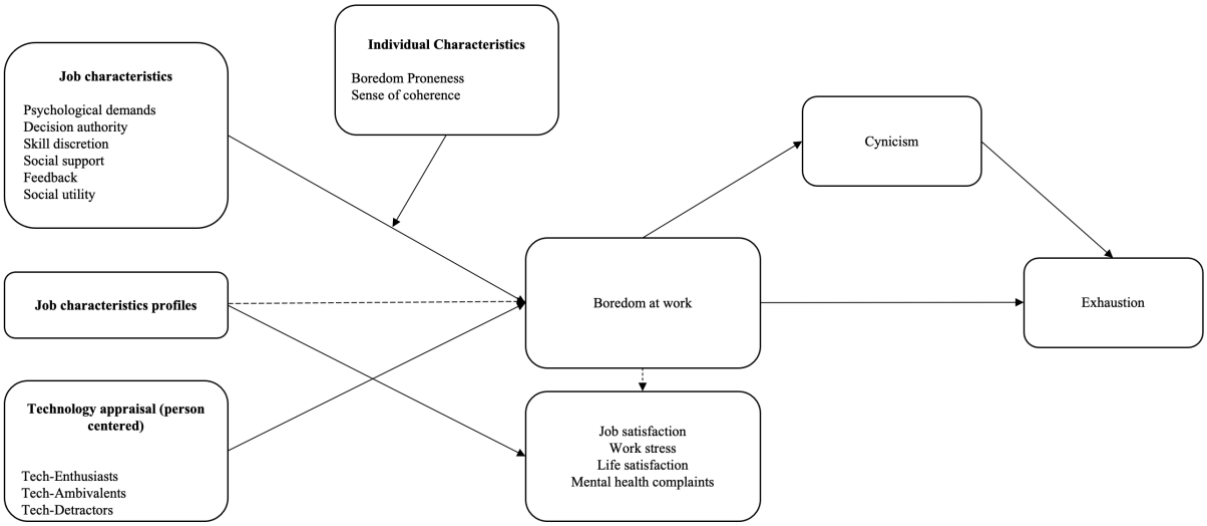
[1] In this dissertation, the term *understimulation* is employed to describe a work environment characterized by low levels of demands and resources. This is conceptually distinct from boredom at work, considered to be a state resulting from an understimulating work environment, which is further defined in section 1.1.

of well-being presented in this work, the third study composing this dissertation will focus on the link between boredom and exhaustion, including the meaning-related variable of cynicism.

Finally, this dissertation will focus on the relations between boredom at work, understimulation, and the current major transformations of the world of work through the intense use of technology. The concept of well-being at work will then be articulated with the second major framework of this dissertation which is that of the so-called *fourth industrial revolution* referring to the current major transformations of the world of work through the intense use of technology. In particular, the fourth paper included in this dissertation will highlight the characteristics of this new *revolution* and its effects on work and workers. Accordingly, this paper will highlight several issues about the impact of technological changes on the experience of understimulation and lack of meaning of work, both of which may contribute to the experience of boredom in the workplace. Finally, the fifth and last paper included in this dissertation will directly address the potential role of technology at work in the experience of boredom. To this end, this study will adopt a person-centered approach to identify different groups of technology appraisal as well as their differences in terms of positive (engagement) and negative (burnout and boredom) well-being indicators. Figure 1 illustrates the elements that will be considered in this dissertation.

Figure 1.

Overview of the contexts and variables considered for the empirical research in this PhD dissertation.



Note. The links illustrated by dashes have not been empirically tested but only considered from a theoretical/inferential point of view.

Finally, the results and contributions of these studies will be discussed, as well as their limitations and implications.

I. INTRODUCTION

1. Theoretical framework on boredom at work

This section proposes an overview of the existing literature on boredom at work. First, the experience of boredom at work and its cognitive, affective, and behavioral components will be defined. Boredom will also be illustrated from a trait-like perspective. The prevalence of boredom at work will be presented and a reflection on boredom as an under-researched topic will be formulated. Secondly, this theoretical framework will highlight the contextual and individual antecedents of boredom at work. Thirdly, this theoretical introduction will look at the consequences of boredom at work highlighted by the literature. Finally, this theoretical part will analyze the meaning of work (or rather the lack of meaning) as a central element to understand the experience of boredom, as an antecedent as well as a possible outcome. In this dissertation, the term *understimulation* will be employed to describe a work environment characterized by low levels of demand and resources. This is conceptually distinct from boredom at work, considered to be a state resulting from an understimulating work environment, which will be defined in the following section.

1.1. The experience of boredom at work

1.1.1. Boredom at work: definitions and affective, cognitive, and behavioral components

Work-related boredom is generally defined as a state-like response to the environment (e.g., Harju et al., 2014; Loukidou et al., 2009; Reijseger et al., 2013; Schaufeli

& Salanova, 2013; van Hooff & van Hooft, 2014), distinct from the trait-like propensity to experience boredom, namely boredom proneness (Farmer & Sundberg, 1986) which denotes individual differences in the propensity to experience boredom based on the need for stimulation (Farmer & Sundberg, 1986; Schaufeli & Salanova, 2013). At the moment, several definitions of boredom at work - understood as state boredom - exist, and unfortunately, there is still a lack of a univocal definition. From 1990 to 2000, different authors emphasized different elements of the definition of job boredom. For example, Fisher (1993) did put the accent on the affect and on the transient nature of job boredom, which he defined as "an unpleasant, transient affective state in which the individual feels a pervasive lack of interest in and difficulty concentrating on the current activity" (p. 396). Mikulas and Vodanovich (1993) described job boredom as "an unpleasant state of low arousal and dissatisfaction which is attributed to an inadequately stimulating situation" (p. 3), putting the accent on arousal and satisfaction as well as to an understimulating context.

Since the previously developed definitions in the academic literature do not seem to contradict but rather complement each other, as a result, recent research combines the different elements of these definitions to obtain a more complete picture of the experience of job boredom. Overall, over the last decade, a consensus has been reached around mainly three aspects. The first is the arousal axis, the second relates to negative affect, and the third includes meaning-related elements. First, concerning the arousal stimulation axis, the literature agrees on the definition of job boredom as low arousal/deactivated affect (Harju et al., 2014; Loukidou et al., 2009; Metin et al., 2017; Reijseger et al., 2013; Tsai, 2016; van Hooff & van Hooft, 2016; van Hooff & van Hooft, 2017). Some exceptional findings, however, highlight the peculiarity of boredom concerning arousal, since boredom has been shown to manifest either in low or high arousal (e.g., Fahlman et al., 2013). However, it is not clear if the high arousal reaction is a consequence of boredom rather than a component

of the phenomenon itself. In this regard, it is pertinent to remind that "boredom may be understood as an emotion that signals lack of progress towards goals" (van Hooft & van Hooff, 2018, p. 932). Hence, taking into account Carver's (2004) theory, it is possible to consider that boredom, as a negative emotion, would push the employee to try to escape from it or to try to reduce it. When the attempt to reduce the negative affect is not successful, the employee could perceive a chronic impossibility of achieving the desired goal. This could progressively provoke symptoms of psychological distress (with negative emotions of the order of frustration, irritability, and anger) and, in the longer term, feelings of depression and powerlessness (Carver, 2004). Hence, the activated affect (anger, frustration) could refer only to the first reaction to a situation of under-stimulation, and not generally to boredom itself. Moreover, in their study, van Hooft and van Hooff (2018) showed that low arousal or high arousal feelings associated with boredom at work depend on differences in job characteristics which trigger different regulatory processes (internalization vs externalization). These findings support the idea that this debate around arousal belongs to the feelings *associated* with boredom at work and not to the nature of the experience of boredom itself.

Second, concerning the negative affect (displeasure) defining job boredom, the literature is in agreement (Fisher, 1993; O' Hanlon, 1981; Reijseger et al., 2013; Van Hooff & van Hooft, 2014, Van Hooff & van Hooft, 2016; Metin et al., 2017). In fact, boredom is not only defined by the absence of pleasure-related elements in the workplace, but by the presence of displeasure-related elements. Indeed, Van Hooff and van Hooft (2017) include this aspect when defining job boredom as being "different from low intrinsic motivation because it indicates that an activity has negative rather than low intrinsic value" (p. 133).

Some research also highlighted a third element which is meaning-related, such as the fact that boredom is characterized by a lack of interest in work tasks (Fisher, 1993; Harju et al., 2014), that boredom is an experience that testifies to the difficulty of advancing towards goals (van Hooft & van Hooff, 2018), or that boredom at work distinguishes itself from "other negative affective states because it makes people (…) perceive the situation as meaningless" (van Hooff & van Hooft, 2016, p. 209). All these elements have been mentioned in a recent study conducted by van Tilburg and Igou (2017), in which boredom has been characterized as "mild in negative affective valence, relatively low in arousal, with little relevance to morality, associated with low perceived challenge, low perceived meaningfulness, and low attention." (p. 317).

In this dissertation, we will draw on the different elements presented previously, and broadly consider state boredom, from a conceptual standpoint, as *an unpleasant state of deactivation and displeasure – that results from an environment devoid of stimulation, challenge, and purpose*[2] *– which reflects the impression of not reaching any goals (in a broad sense) and is accompanied by a sense of meaninglessness*[3]. However, in accordance with the measure of boredom used in this dissertation, we define boredom as a "negative affective-motivational state that originates from inadequate stimulation" (Reijseger et al., 2013, p.511).

Beyond the previously described consensus on the negativity of the affect felt by employees experiencing boredom at work, it is worthwhile to try to disentangle different cognitive and behavioral components of this experience based on the existing literature. From a cognitive point of view, a "low internal arousal manifests itself cognitively in inattention and daydreaming" (Reijseger et al., 2013, p. 509). Moreover, biased perception

[2] This part referring to the work environment will be further developed in section 1.2
[3] The question of meaning in relation to boredom will be addressed in section 1.4

of time passing has been highlighted by the literature (Grubb, 1975; Harju & Hakanen, 2016). This is also confirmed by behavioral components, such as the tendency of the employees to do activities that are unrelated to work during work hours (Grubb, 1965; Reijseger et al., 2013). However, it is difficult to precisely highlight these components. One reason is that recent research suggests that elements that we have previously mainly considered as an integral part of the experience of boredom on the contrary need to be distinguished. In fact, immediate behavioral responses to boredom (i.e., bored-behavior, van Hooff & van Hooft, 2014), defined as "specific affect-based withdrawal behaviors of employees at work, which are not directly functional in obtaining one's work goals" (van Hooff & van Hooft, 2014, p. 350) have been shown to be empirically distinct from work-related boredom.

1.1.2. Boredom from a trait-like perspective

Although in our work we will focus on the characteristics and content of work as antecedents of boredom, it is important to also consider individual differences to distinguish the dispositional part of the experience of boredom. This subsection aims to distinguish between *state* boredom (Kass et al., 2001) and *trait* or dispositional boredom (Vodanovich et al., 1991). Individual differences in this area have been operationalized in terms of boredom susceptibility (Zuckerman et al., 1978) or boredom proneness (Farmer & Sundberg, 1986). Several studies have examined the link between personality and dispositional boredom, for example by highlighting positive links with negative affectivity and the tendency to feel frustration and hostility (Rupp & Vodanovich, 1997; Vodanovich et al., 1991). Other authors highlight the existence of negative correlations with personality traits such as Openness to Experience, Agreeableness, Extraversion, and Honesty/Humility (Culp, 2006). Finally, it appears that susceptibility to boredom differs as a function of the Sensation

Seeking trait, which relates to the individual need for internal or external stimuli (Schaufeli & Salanova, 2014). Even so, it appears that dispositional and situational approaches to boredom capture two different and moderately correlated facets of this emotional experience, and that consideration of individual tendencies alone does not accurately predict whether and how, the individual will experience this emotion in a specific situation (Kass et al., 2001).

1.1.3. Boredom at work as an understudied research topic and epidemiology of boredom at work

Compared to the strong and flourishing body of literature on the detrimental effects of overstimulation at work, studies on work-related understimulation and boredom in the field of organizational psychology are scarcer. A systematic literature review (Toscanelli et al., in preparation) found approximately 100 articles (primary and secondary, all disciplines/domains combined) in which job boredom has been considered from 1990 to March 2022. Despite the scarcity of existing studies, boredom at work is far from being a rare experience for employees. It is important to specify that, as is the case of work stress, episodic and momentary experiences of boredom can be considered normal experiences in any job and must thus be distinguished from long-lasting and chronic experiences of boredom. However, since surveys do not necessarily specify this difference, this work will present the existing data in the literature regarding the epidemiology of boredom at work. Guest and colleagues (1978), cited by Fisher (1993), through interviews in a sample of British employees in different work sectors, "found that 11-56% reported that they found their entire job boring, while 79-87% maintained that they sometimes felt bored on the job" (Fischer, 1993, p. 395). Rothlin and Werder (2008), cited by Reijseger and colleagues (2013) report that "it has been argued that no less than 15% of the workforce is actually bored when

working" (Reijseger et al.,2013, p. 508). Cummings and colleagues, in the UK, explained that 61% of the employees reported experiencing boredom at work due to a lack of a challenging job (Cummings et al., 2016), and specified that "those in administrative and manufacturing job reported the highest boredom, whereas health care workers and teachers reported the least boredom" (Cummings et al., 2016, p. 280). Finally, Loukidou and colleagues (2009), citing the DDI survey (DDI, 2004), state that "survey work has identified that a third of Britons claimed to be bored at work for most of the day (…). In the financial services sector, the proportion claiming to be bored was 50%" (p. 381). However, the reasons for such different proportions and prevalence are unclear. Even though it is possible that these different results could stem from different sampling techniques or specific measures employed in the studies, we lack sufficient information and details to explain these differences. Concerning professional sectors, Harju and colleagues (2014) highlighted the fact that boredom at work can affect employees in all professional sectors, with employees working in transportation, manufacturing, arts, recreation, and entertainment experiencing the most job boredom. Moreover, concerning demographics, Harju and colleagues' (2014) findings contributed to showing that younger, male employees seem to experience more boredom compared to older employees and women. These findings confirm several studies showing the influence of sociodemographic characteristics such as gender and age, on the intensity of boredom perceptions (Sundberg et al., 1991; Vodanovich & Kass, 1990b).

In the total sample gathered for this dissertation (without considering the sample of Study 1 in which boredom at work has not been measured), 5.6% of the respondents reported that they are bored always, very often, or often; 17.9% reported that they are bored sometimes, while the majority of the sample (76.5%) reported that they are rarely, almost never or never bored. No differences in boredom at work were found between education levels. Concerning occupational categories, when it was possible to compare subsamples

due to their size, a significant difference ($p < .05$) was found between the categories "executives and managers" ($M = 1.98$, SD = 1.04) and "administrative personnel" ($M = 2.58$, SD = 1.35), with managers experiencing less boredom than the administrative personnel.

1.1.4. Conclusions

As we have seen, the topic of boredom is somewhat under-researched and needs to be further investigated. On the one hand, the existing literature provides a rather complete general picture of the experience of boredom, based on a certain consensus around several central elements. To resume, this experience is characterized by low arousal, negative affect or displeasure, feelings of meaninglessness, and difficulties in attaining work goals. Accordingly, in this dissertation, we will consider state boredom, from a conceptual standpoint, as *an unpleasant state of deactivation and displeasure – that results from an environment devoid of stimulation, challenge, and purpose – which reflects the impression of not reaching any goals (in a broad sense) and is accompanied by a sense of meaninglessness.* However, in accordance with the measure of boredom used in this dissertation, we define boredom as a "negative affective-motivational state that originates from inadequate stimulation" (Reijseger et al., 2013, p.511). On the other hand, this subsection also highlighted the need to further investigate job boredom due to its complexity. In the next sections, this dissertation will present the literature on the antecedents and the consequences of boredom at work, to obtain a more complete picture of this topic.

1.2. Antecedents of boredom at work

1.2.1. Well-established job characteristics and understimulation

Even though the study of boredom at work initially focused on the monotony and repetitiveness of tasks and work (e.g., Branton, 1970; O'Hanlon 1981), the more recent body of literature agrees that boredom at work can exist in many different fields and occupations (Harju et al., 2014; Reijseger et al., 2013). To better understand the conditions under which boredom can occur, researchers have focused on the study of working conditions and their particularities. In this regard, research showed that boredom can occur in a context characterized by low job demands (i.e., workload, mental demands, and emotional demands) and low resources such as autonomy, colleagues, and supervisor support (e.g. Harju et al., 2014; Loukidou et al., 2009; Reijseger et al., 2013; van Hooff & van Hooft, 2014), or low opportunities for learning and development (Metin et al., 2016). More exceptional findings (Harju & Hakanen, 2016) stemming from a qualitative investigation in Finland also highlight a crucial element for the study of boredom which is the employment of capabilities. In their study (Harju & Hakanen, 2016), the authors highlighted three types of job boredom, each of which was triggered, among other elements, by an unsatisfactory utilization of employees' capabilities. Specifically, with reference to the traditional form of boredom at work defined above, also underemployment of capabilities was highlighted (Harju & Hakanen, 2016).

To take these elements and differences into account, we can try to understand the previously mentioned aspects linked with job boredom from a goal attainment perspective, assuming in general that "boredom may be understood as an emotion that signals lack of progress towards goals" (van Hooft & van Hooff, 2018, p. 932). In this sense, capabilities and skill utilization may have a crucial role as antecedents.

Marginally, from a theoretical point of view, a body of literature has also highlighted the impact of technology in the workplace as a risk factor for under-stimulation and boredom at work, particularly for its negative effects on the possibility to use skills (Cummings et al., 2016; Fisher, 2018). However, no empirical studies have examined the relationship between technology and boredom at this time.

It is important to note that understimulating working conditions, even if they can exist *per se,* could also be generated by the (mis-)match between the person and the job. In this sense, several authors pointed out that a misalignment between the skills of the employee exceeding the demands of a work environment (Fisher, 1987; Fisher, 1993; Sanchez-Cardona et al., 2020), or, on the opposite, more exceptional and counterintuitive findings highlighted a misalignment in which the employees perceive the tasks as too difficult to execute based on their skills (Fisher, 1987; Fisher, 1993) could also contribute to the experience of boredom in the workplace. Fisher (1993) pointed out the need to take into account not only quantitative underload but also qualitative underload. In this sense, the key concept to counteract boredom – in terms of job tasks and work environment – would be the concept of *challenge*, which would keep employees interested in their tasks and engaged in their work (Fisher, 1993). Based on the literature, *challenge* can be experienced in situations in which tasks are perceived as being "neither too difficult nor too easy" (Fisher, 1993, p.398), in a work environment allowing employees to fulfill their needs in terms of competence and autonomy.

1.2.2. Conclusions

This subsection aimed to present the existing literature on the antecedents of boredom at work. The elements cited above offer a very interesting framework for understanding the predictors of this experience. However, several questions remain

unanswered, and several research *niches* still need to be filled. The first *niche* that this dissertation will try to occupy is the understanding of the relative contribution of job characteristics and dispositional variables in the prediction of boredom at work (Study 2). Particularly, this dissertation will study how job characteristics interact with boredom proneness to predict boredom at work (Study 2).

1.3. Consequences of boredom at work

1.3.1. Review of the consequences highlighted in the literature

The existing literature highlights the negative consequences of boredom at work, both at the individual and organizational levels. Several studies have identified negative links with indicators of employee health and well-being, including stress, distress, and depressive symptoms (Game, 2007; Wiesner et al., 2005; Loukidou et al., 2009), low self-esteem and life satisfaction (O'Hanlon, 1980) and substance abuse (Loukidou et al., 2009). Other studies highlight the relationships between boredom and different indicators of quality and performance at work, such as dissatisfaction with the work environment (Kass et al., 2001; O ' Hanlon, 1981) the intention to leave one's job (Reijseger et al., 2013), low organizational commitment (Reijseger et al., 2013) absenteeism (Dyer-Smith & Wesson, 1995; Kass et al., 2001) low job satisfaction (Reijseger et al., 2013), turnover (Reijseger et al., 2013; Mann, 2007), prevalence of errors and work accidents, or counterproductive behaviors (Branton, 1970; Kass et al. 2001; Reijseger et al., 2013). Counterproductive behaviors are behaviors of aggression and/or sabotage of the organization, triggered by frustration and hostility resulting from boredom, and directed toward the hierarchy, colleagues, or customers (Bruursema et al., 2011). Spector and Fox (2005) explain that this type of behavior can occur explicitly and actively (interpersonal aggression and conflict) or passively and in a roundabout way (withdrawal of effort and sabotage of work goals and procedures). Finally,

it is important to pay attention to the processes by which boredom at work can lead to negative consequences. For instance, van Hooff & van Hooft (2014) studied the consequences of work-related boredom separating job boredom from its behavioral component (bored behavior) and found that the association between job boredom and depressive complaints, counterproductive behaviors, and distress was fully mediated by bored behaviors. Moreover, van Hooff and van Hooft (2016) showed the importance of taking into account variables such as work centrality and need satisfaction as they moderated the link between job boredom and depressed mood. In light of these results, it has become essential to distinguish, as the authors mention (Hooff & van Hooft, 2014), the proximal and distal consequences of this experience to be able to draw a precise picture of the processes underlying the consequences deriving from boredom at work.

1.3.2. Conclusions

This part of this dissertation aimed to illustrate the consequences of boredom at work and to clarify the negative impact of boredom at work on workers and organizations. The elements cited above offer an interesting framework for understanding the consequences of this experience. However, the processes by which these negative consequences develop remain to be clarified. Particularly, this dissertation will try to fill the gap by understanding the possible link between boredom and exhaustion, as well as the process underlying this association (Study 3).

1.4. Boredom at work and meaning

Several authors have highlighted the association between the experience of boredom and the perceived lack of meaning of work (Barbalet, 1999; Harju et al., 2014; van Tilburg & Igou, 2012). However, its precise role – as antecedents or as a consequence of

boredom at work – has not been determined yet. In other words, it is still not clear if boredom rises when the job characteristics fail to give meaning or, on the opposite, the experience of boredom makes the employee perceive a loss of meaning in their work. Even if meaning of work has not been consensually defined in the literature, there is consensus that a key ingredient to finding meaning at work or, to express it differently, to experience work as meaningful, is to perceive the impact that it can have on the organization, on people, society or even in the world (Arnoux-Nicolas et al., 2016; Morin & Aranha, 2007). In this regard, some authors have emphasized the link between boredom and the perceived lack of social utility of work and the feeling of being *useless* (Barbalet, 1999; Van Tilburg & Igou, 2012). Sanchez-Cardona and colleagues (2020) showed that the positive link between perceived overqualification and job boredom was moderated by meaning. In fact, high levels of meaning weakened the relation between perceived overqualification and boredom. In addition to the lack of social contribution, other studies have investigated the lack of meaning through the nature of the tasks performed and their level of stimulation and interest. It seems that an activity that does not allow the professional to deploy the full range of his or her skills, use his or her judgment, and solve problems, is an activity that is not experienced as meaningful (Gemmill & Oakley, 1992; Harju et al., 2014; Reijseger et al., 2013). As explained by Cummings and colleagues (2016), the "perception of the task at hand may lead to complacency and cognitive disengagement from the task if the task is perceived to be unimportant or uninteresting" (Cummings et al., 2016, p. 282).

Based on these findings, we can assume that the role of meaning (or rather the lack of it) is relevant both as a potential antecedent of the experience of boredom, as well as a potential consequence. Indeed, it is not absurd to think that the work environment can contribute to giving meaning to work, for example by its social utility or for the opportunities for learning that it offers as well as, on the contrary, be an obstacle to the perception of

meaning. At the same time, it also appears plausible that experiencing boredom in the workplace can lead to a sense of worthlessness and meaninglessness for the employee. For this reason, this dissertation will consider meaning as a possible predictor as well as a possible consequence of boredom at work and will be operationalized in different ways depending on its role in relation to boredom. Particularly, considering meaning as being related to the work environment, this PhD dissertation will consider the variable of perceived social utility, while lack of meaning as a possible outcome of boredom at work will be operationalized with the variable of cynicism.

1.4.1. Conclusions

This part of the dissertation aimed to try to illustrate the role of meaning in the experience of boredom at work. As explained, based on the existing literature we can assume that meaning could be considered as a potential antecedent of the experience of boredom, as well as a potential consequence. Depending on the place it is given, meaning can therefore take the form of different variables. Considering meaning as being related to the work environment, this PhD dissertation will hence consider the variable of perceived social utility as a job resource (Study 2). Moreover, an individual meaning-related variable will be studied together with job characteristics and in interaction with them to predict boredom at work. Considering meaning (or rather the lack of it) as a possible outcome of boredom at work, this PhD dissertation will consider the variable of cynicism (Study 3).

2. Overview of the presented studies, research questions, and theoretical framework

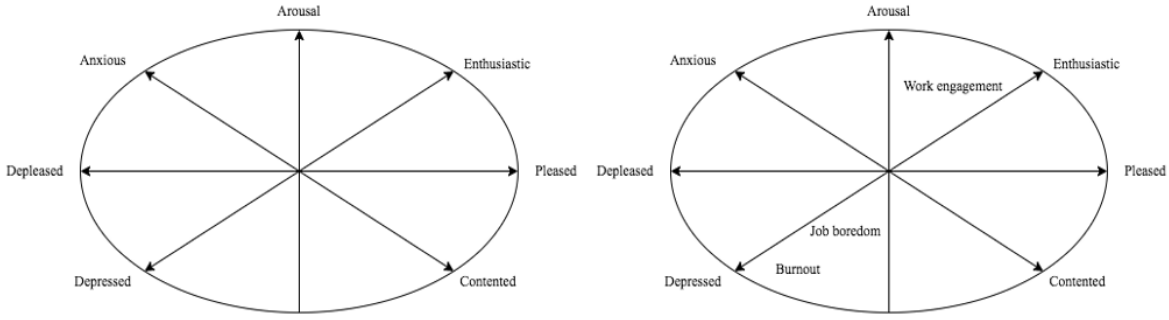
2.1. Well-being, job characteristics, and individual differences

2.1.1. Well-being at work and job characteristics

Workplace well-being has long been studied in the field of organizational psychology, focusing on elements that are potentially harmful to workers to find solutions to address them. However, in the last decades, currents such as positive psychology have brought a new perspective to the study of well-being in the workplace, considering not only those elements that may lead to negative outcomes but also those that contribute to the employee's experience of positive states and affects in the workplace (Linley et al., 2010). One particularly interesting model to study work well-being is the model developed by Warr (1990) displayed in Figure 1, composed of a horizontal and a vertical axis, namely arousal and pleasure, and two diagonal axes, namely the depressed-enthusiastic and the anxious-contented axis. Theoretically, there is the idea that well-being is based on the frequency of affects experienced at work, where well-being is grounded on a higher frequency of positive affects and a lower frequency of negative affects and vice-versa (Daniels, 2000; Daniels et al., 2004; Harju et al., 2014).

Figure 2.

Well-being model developed by Warr (1990) and its adaptation to integrate key organizational well-being concepts (Harju et al., 2014)



This model has been adapted by Harju and colleagues (2014) integrating contemporary key concepts in the field of organizational psychology and is reported in Figure 2 considering the key concepts of this dissertation. As mentioned, the frequency with which the employee is exposed to certain conditions is crucial to understanding well-being. Simply put, the well-being outcomes will be different if the employees experience occasionally or more frequently a negative situation of low pleasure and low activation (see Frese & Zapf, 1988).

The question that naturally arises at this point is which work environments are likely to predict the position of employees within the figure presented above, that is which work environments are likely to lead workers to experience pleasure and stimulation or their opposite, and thus to develop positive or negative well-being. The existing literature (JD-R, Bakker & Demerouti, 2007; Karasek, 1979) mostly describes work environments using two general elements: job demands and job resources. Job demands can generally refer to workload– which can be physical, psychological, social, and organizational – and can be determined as stressors. On the other side, resources can also be physical, psychological, social, and organizational, and help employees to deal with the demands they face in the workplace, are functional in achieving goals, and stimulate their growth and development. For instance, the literature documents the low-resources/high-demands environment as representing a risk to employee well-being (JDC, Karasek, 1979; JD-R, Schaufeli & Bakker,

2004, Bakker & Demerouti, 2007). Nevertheless, since job resources generally contribute to filling the basic needs of autonomy, competence, and relatedness (Deci & Ryan, 1985; Schaufeli & Bakker, 2004), a work environment characterized by low resources may represent a danger for employees. In fact, employees could be, on the one hand, unable to cope with the workload. On the other hand, since resources « may play either an intrinsic motivational role because they foster employees' growth, learning, and development, or they may play an extrinsic motivational role because they are instrumental in achieving work goals" (Schaufeli & Bakker, 2004, p. 298) employees could experience difficulties regarding the motivational dimension related to well-being at work (i.e., work engagement).

This dissertation will therefore consider the issue of well-being at work considering three main points. First, well-being at work considers the balance between positive and negative outcomes. Secondly, although this was only possible in the first study presented, the duration over time with which displeasing conditions are experienced is critical to understanding the occurrence of negative consequences. Thirdly, a lack of resources in the workplace can determine the experience of displeasure by a lack of means to cope with charges but also potentially lead to low arousal by lack of fulfillment of basic needs and hence an impairment on the motivational dimension related to well-being at work.

The first paper presented in this dissertation falls into this framework. It will deal with the issue of understanding how working conditions affect well-being over time with a longitudinal person-centered approach and considering positive (i.e., quality of life and job satisfaction) and negative (i.e., mental health complaints and work stress) individual and organizational outcomes. While not central to Study 1 *per se*, this study contributes to this dissertation by providing an exploratory overview of existing working conditions in Switzerland. Then, although this study does not focus on the topic of boredom, this dissertation will integrate it under the lens of understimulation. In fact, Study 1 highlights a

possible under-stimulating work environment – in which boredom could occur – characterized by average work demands and low resources in terms of decision-making authority, use of skills, and learning opportunities. The outcomes chosen are relevant to the study of boredom since, as previously mentioned, the latter has already been associated with stress, distress, and depressive symptoms (Game, 2007; Loukidou et al., 2009; Wiesner et al., 2005), life satisfaction (O'Hanlon, 1980) and dissatisfaction with the work environment (Kass et al., 2001; O' Hanlon, 1981; Reijseger et al., 2013). Moreover, Study 1 highlights the negative consequences of these resource-deprived/average-demand work environments. Firstly, this study shows that a low-resource and average demand work environment is associated with lower scores on positive indicators (i.e., job satisfaction and quality of life) as well as higher scores on negative indicators (i.e., work stress and mental health complaints) compared to more favorable profiles. Secondly, this work environment may also show an accumulation of ill-being between time one and time two in terms of job satisfaction.

2.1.2. Boredom at work, job characteristics, and individual differences

The elements cited above offer an interesting framework for understanding the predictors of this experience. However, several questions remain unanswered, and several research *niches* still need to be filled. First, as mentioned in the first part of this dissertation, the question of meaning as an antecedent of boredom at work remains unanswered. Paper 2 first proposes to integrate a meaning-related variable with job characteristics. This paper analyses the impact of perceived social utility – considered as a context-related meaning variable – on boredom at work, together with other well-established job characteristics. Beyond the study of job characteristics and their impact on boredom at work, this study will focus on how job characteristics and dispositional elements interact to predict boredom at work by taking into

account sociodemographic characteristics (i.e., age and gender). Specifically, the trait-like variables are boredom proneness as previously defined and contextualized, as well as the sense of coherence (SOC). Sense of coherence (SOC) is defined by Antonovsky (1979) as a general tendency to comprehend, manage and attribute meaning to the environment. Since, as we have mentioned, the perception of lack of meaning seems to be central in the experience of boredom, the meaning-related variable SOC could be interesting, particularly in interaction with perceived social utility. Moreover, SOC can contribute to making sense of adversities, as well as determining the necessary resources to face them (Rothmann et al., 2003). It is thus relevant to consider the role of SOC (as a vulnerability factor when it lacks as well as a resource when it is high) in the relationship between job characteristics and the experience of boredom at work.

The Job Demand-Control model and the Job Demands-Resources model are considered to study the antecedents of boredom at work since both are grounded in the idea that job characteristics can be studied by looking at job demands and job control/resources, which could lead to positive or negative well-being outcomes for workers.

The Job Demand-Control model takes into account the dimension of demands, which includes psychological job demands such as heavy mental workload as well as the dimension of job control, including the subdimension of skill discretion (i.e., the opportunity to use and develop skills, learn new things, etc.) and decision authority (which mostly refers to the control on decisions and processes) (Karasek, 1979; Karasek et al., 1998). Following this model, an at-risk work environment for strain is represented by a combination of high demands and low resources, whereas an optimal working context (in terms of stimulation and learning opportunities) is attained with a combination of high demands and high resources (Karasek, 1979; Karasek et al., 1998). This model is of interest in the study of boredom since it includes the particular variable of skill discretion. In light of the antecedents

highlighted in the previous subsection, skill discretion is particularly salient in the study of boredom at work since, by offering the possibility of applying one's skills and acquiring new ones, it can be responsible for creating a sense of challenge and adding meaning to the task and to the professional activity. Moreover, since working conditions are considered as a *combination* of job demands and resources, the JDC model employed from a person-centered perspective, offers the possibility to explore the main combinations of job demand/control existing in Switzerland. Hence, if low-demand/low-resource work environments will be highlighted by the analysis, this theoretical framework will allow the study of their effect on well-being.

The Job demands-resources model (Schaufeli & Bakker, 2004; Bakker & Demerouti, 2007) represents a recent and widely documented approach that relies on the interaction between the individual and the organizational environment to explain well-being at work (Bakker & Demerouti, 2017). The JD-R model states that any work organization system has two distinct categories of characteristics, which are demands and resources. Demands arise from physical, psychological, social, and organizational loads - also called stressors - that require significant effort on the part of the worker and therefore imply a physiological or psychological cost to the workers (Demerouti et al., 2001). Resources, on the other hand, refer to "those physical, psychological, social or organizational aspects of the job that may (. . .) (1) be functional in achieving work goals; (2) reduce job demands and the associated physiological and psychological costs; (3) stimulate personal growth and development" (Demerouti et al., 2001, p. 501). As described above, the negative effects of chronic stress, resulting from a combination of high workload and low resources, on workers' health have been widely documented, especially in relation to the development of burnout and its characteristic symptoms of exhaustion, cynicism, and a diminished sense of accomplishment (Bakker et al., 2004). In parallel to this negative process of health erosion,

the JD-R model reminds us of the need to also study the positive and motivational processes that are involved in order to develop a complete vision of well-being at work. In this sense, the concept of work engagement – deriving from a flourishing context of resources – has been introduced, considered as a positive psychological state characterized by vigor, absorption, and dedication (Schaufeli et al., 2002).

The advantage of this model and its appropriateness in the framework of this work is related to the particularities of job boredom. Since, as mentioned, this phenomenon has not been intensively studied in the recent literature, it is important to understand its known antecedents already studied in the context of stress, but also to be able to integrate types of demands and resources that are not considered in existing studies. The JD-R model offers a flexible framework in which new elements can be introduced, allows the study of the effect of particular resources (or lack of thereof) on job boredom, and is known to adapt very well to various work environments (Schaufeli & Bakker, 2004; Bakker & Demerouti, 2007).

2.1.3. Boredom at work and exhaustion

As illustrated in the previous subsection, the literature is exhaustive on the question of the harmfulness of boredom at work, and on the fact that understimulating working conditions could lead to adverse outcomes, to the point where the general literature began to highlight the existence of boredom-related work exhaustion, the so-called *Bore-out* (e.g., Bourion & Trebucq, 2011). This becomes even more important in light of the more recent literature. Precisely, several studies stressed the state of exhaustion, fatigue, and cynicism that bored employees may experience. For example, Cummings and colleagues (2016) point out the state of fatigue that could derive from under-stimulating and passive work. Similarly, O'Hanlon (1980) links boredom to exhaustion by explaining that when employees work below the minimal arousal level, they "must exert effort to maintain their arousal setpoint at

the task-optimal level" (p. 72). Schaufeli and Salanova (2014) suggest, that "the effects of overstimulation (e.g., burnout) and understimulation (e.g., boredom) seem to overlap to some extent since both are characterized by feeling worn out" (p. 298). Conceptually, this applies also to the well-being model presented in the first section of this PhD (i.e., Figure 1, Harju et al., 2014), considering boredom conceptually close to burnout in a situation of low arousal and displeasure. This topic will be precisely explored in the third study (Study 3) presented in this dissertation and will be based on the Tedium theory (Kafry & Pines, 1980).

The Tedium theory (Kafry & Pines, 1980) is relevant for understanding the negative consequences that can derive from a work environment depleted of demands and resources. In fact, this theory argues that both overstimulating but also understimulating work environments can lead to the experience of tedium. Tedium is defined as « a general experience of physical, emotional and mental exhaustion" (Kafry & Pines, 1980, p. 478), characterized by "feelings of strain and burn out, by emotional, as well as physical depletion, and by negative attitudes toward one's self, one's environment, and one's life" (Kafry & Pines, 1980, p. 478). This definition largely overlaps with that of exhaustion—generally considered burnout's core feature (Leiter & Schaufeli, 1996). This theory explains that beyond the external elements characterizing the workplace, two sources of pressure must be considered to understand negative workplace consequences. On the one hand, the authors highlight a pressure at the cognitive level, which can develop as much by excessive demands as by a lack of stimulation (Kafry & Pines, 1980). On the other hand, this theory evidences a pressure that derives from the constraints "imposed on one's sense of meaningfulness and achievement by lack of feelings of self-actualization and success" (Kafry & Pines, 1980, p. 479). As described previously, these two sources of pressure (i.e., cognitive pressure induced by lack of challenge and the pressure on the sense of achievement) apply to the state of boredom at work. In fact, the literature widely highlighted the pertinence of considering

cognitive pressure due to lack of adequate stimulation (Harju et al., 2014; Loukidou et al., 2009; van Hooff & van Hooft, 2014), as well as the lack of sense of achievement and purpose (Barbalet, 1999; Gemmill & Oakley, 1992; Harju et al., 2014; Reijseger et al., 2013, Van Tilburg & Igou, 2012). The tedium theory offers us the theoretical ground to study the potential link between job boredom and negative outcomes such as exhaustion, which has classically been linked with a context of overstimulation. Based on this corpus of literature, it is important to investigate the state of exhaustion that may occur in response to job boredom, as well as to disentangle its similarity and differences to the burnout process, in the framework of overstimulation.

Finally, also the conservation of resources theory (Hobfoll, 2011) allows us to understand the ill-being deriving from a work environment characterized by low resources and seems relevant to understanding and interpreting the negative consequences of understimulation at work. As previously mentioned, the question of the duration over time of the experience of certain working conditions, even though it was only empirically investigated in the first study presented, is crucial to understanding their effects on well-being. Moreover, another highlighted aspect is the importance of considering the processes that underlie the relationship between boredom at work and its outcomes. In this sense, in relation to the context of low resources characterizing understimulating working conditions, the conservation of resources theory offers an explanation of the process of erosion of resources over time which may be specific to work environments susceptible to producing boredom. Beyond the several corollaries composing the total corpus of this theory (see Hobfoll, 2011), what is particularly interesting in the context of under-stimulation and boredom is that this theory posits that "people must invest resources in order to protect against resource loss (…) and gain resources" (Hobfoll, 2011, p.3), and that "those with fewer resources are more vulnerable to resource loss and less capable of resource gain"

(Hobfoll, 2011, p.4). Based on this theory, the adverse context of low resources characterizing job boredom requires an effort to maintain resources, while being more at risk of losing – and having difficulty gaining– resources. Through this mechanism of resource erosion, this theory proves useful in explaining why it is difficult for bored employees to resolve the unpleasant state of boredom, as well as the erosion of resources and demotivation that could follow over time.

2.2. Technology-related issues

This sub-section will address studies conducted in the context of issues related to technology at work and will deal with a field of study emerging in the last decades, which is that of the effects of the rapid technological advance characterizing the so-called fourth industrial revolution on work and workers. Before focusing specifically on the link between technology and boredom, this PhD will propose a general overview of the effects of the so-called fourth industrial revolution on work, workers, and their well-being. Next, we will attempt to illustrate the relevance of this topic in relation to boredom. As we will see, this theme has been mentioned in relation to boredom at work, however, no empirical study has investigated this topic.

2.2.1. The impact of technological advances on work and well-being.

This sub-section will deal with a field of study emerging during the last decades, which is that of the effects of the rapid technological advance characterizing the so-called *fourth industrial revolution*, on work and workers. The concept of psychological well-being at work must be integrated with a fast-moving context: that of technological advances and their impact on the structure and the nature of work and on workers. Over-stimulation at work, stress, and burnout, and under-stimulation, boredom, or loss of meaning due to abstraction of tasks, are

examples of such problems. Concerning the technological impact on well-being at work, in the last decades, academic efforts have been focusing on the impact of technology on the increase in the pace of work and the stress that can result from it (Maier et al., 2015; Santuzzi & Barber, 2018; ten Brummelhuis et al., 2012). For example, ten Brummelhuis and colleagues (2012) focused on the detrimental and beneficial outcomes of New Ways of Working (NWW) enabled by intensive use of information and communication technologies (e.g., remote working). This study showed that in such working modalities, increased flexibility and control over communications were associated with higher engagement and lower exhaustion, while frequent interruptions were linked with exhaustion. The impact of techno-stressors (i.e., overload induced by technology, invasion of privacy, etc.) on exhaustion has also been highlighted (Maier et al., 2015). Moreover, at a between-person level, a longitudinal study conducted in 2018 highlighted the link between perceived pressure to be available/contactable through technologies at work (i.e., workplace telepressure) and higher levels of physical and cognitive exhaustion (Santuzzi & Barber, 2018). On the other side of the continuum (i.e., understimulation and boredom) empirical findings are lacking. However, research has shown that the impact of technology on the workplace is far from being only negative, but rather ambiguous and paradoxical, since while on the one hand, it can be responsible for an acceleration of work rhythms and communications, it can also facilitate the life of workers through, for example, better flexibility or increased perceived self-efficacy (e.g., Maier et al., 2015; ten Brummelhuis et al., 2012; Ter Hoeven et al., 2016). For this reason, it becomes essential to consider the subjective appraisal of technology to study its impact on well-being at work, rather than the predominance of technology in the workplace, and its major role in predicting well-being outcomes (Salanova & Schaufeli, 2000).

The changes and more generally the impact of the fourth industrial revolution on the world of work will be examined in the fourth study presented in this dissertation. This

theoretical paper explores the literature on the fourth industrial revolution and tries to connect the existing findings to understand how this revolution has transformed the world of work and the interactions between individuals and their environment. Hence, it analyzes this phenomenon in order to obtain a broader picture of the reality of the contemporary world of work as well as of the potential experiences of workers. This paper, also, raises specific questions related to technological advances and their impact on understimulation and boredom. In fact, despite warnings in the literature about the risk of technological advances on work and workers in terms of automation and understimulation, there are currently no studies that have examined the relationship between technology or technology appraisal and boredom.

2.2.2. Boredom at work and technology appraisal

Several authors stressed the potential impact of the new "era" called the *fourth industrial revolution* on understimulation and boredom at work. In fact, Cummings and colleagues (2016) warn that "with the increase in automation, boredom in the workplace will likely become a more prevalent issue for motivation and retention" (Cummings et al., 2016, p. 279). Particularly, Cummings and colleagues (2016) and other authors (Fisher, 2018) explain that the introduction of automation in certain sectors, in which direct manual work has been substituted by a machine, places the worker in a situation of *supervisor* of technology. This can be a harmful condition of understimulation. The author explains that "This increase in automation, however, has not alleviated the boredom associated with these tasks. In many cases, it has exacerbated it, a common phenomenon when more automation is inserted in any system. (…) So, the introduction of more automation in complex systems means that boredom once caused monotonous and repetitive tasks is now shifting to boredom caused by low task loading in the monitoring of such systems" (Cummings et al., 2016, p. 282). However, empirical studies on the effects of technology on job boredom are lacking.

As mentioned in the general introduction of this dissertation, the consequences – positive and negative – of technology in the workplace are to be considered in the context of the encounter between employees and their context including their respective characteristics, as the perception of technology in the workplace may vary according to other variables (e.g., socio-demographic characteristics, education level, professional occupation). Hence, given these differences as well as the documented ambiguous effect of technology in the workplace, it is crucial to take into account the subjective appraisal of technology – and not just the actual presence/absence of technology in the workplace – in the study of its impact on job boredom. This work will consider technology appraisals in terms of perceived utility, ease of use, and reduction of autonomy, following a person-centered perspective, to understand its potential effect on boredom and other well-being indicators (Study 5).

In this regard, the JD-R model also offers us an interesting perspective to consider the link between technology and boredom. The technology acceptance model (TAM, Davis et al., 1989; Venkatesh & Bala, 2008) is derived from the theory of reasoned action (Fishbein et al., 1975). The TAM has been widely used to study technology under the lens of the conditions that lead people to the deliberate *choice* of adopting and using technology. This *choice* of adopting technology is based on its perceived usefulness and ease of use (see King & He, 2006). However, since "New technology is often so powerful that organizations cannot afford to ignore or not to buy and use them" (Burke & Ng, 2006, p. 90), the presence of technology in the work setting is often largely driven by organizational or market-based constraints, and way beyond employees' individual choices. This implies that workers benefit more or less from the introduction of new technology, since they may vary in their ability to update their skills and adapt to novelty (Burke & Ng, 2006, p. 90). In this framework, as illustrated by Day and colleagues (2010) it is clear how a non-optimal relation to technology in terms of difficulties and perceived uselessness could represent a demand

for employees. Moreover, in this framework, it is also clear how a reduction of autonomy could represent a lack of resources and lead to adverse outcomes, on the one hand. On the other hand, a good relationship with technology could represent a resource that could help to cope with the demands and be functional in achieving the goals and hence, protect the employees against adverse outcomes. In this context, a dispositional variable that seems particularly useful to understanding relationships between job characteristics and boredom is self-efficacy. Self-efficacy has been defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (Wood & Bandura, 1989, p. 407). This individual variable has widely been studied in the field of work and organizational psychology and its role has been determined as being a protector against adverse well-being outcomes as well as facilitating positive outcomes such as performance or job satisfaction (see Schyns & Von Collani, 2002). Since its role as an individual resource to cope with adverse situations has been widely documented, we believe that this variable could be useful to understand its impact in interaction with other job characteristics.

3. Data collection

The collection of data for the studies presented in this dissertation was done in several stages. Table 1 illustrates the sample size and the type of sample used for each empirical study. Our total sample[4] (n = 692) is composed for 60% of women with a mean age of M=39.56 (SD = *12.45*). The level of education is distributed as follows: 33.7% reported Compulsory school and lower secondary education, 10.7% reported Upper secondary education, and 55.1%

[4] With the total sample, we mean the totality of the data collected by the candidate. Therefore, this does not take into account the data of Study 1.

reported Tertiary education. Concerning the occupational position, 17.6% were executives, 20.2% were academic and liberal professionals, 27.5 were administrative personnel, 11.7 did intermediate professions[5], 6.5% were sales personnel, 7.9 were blue-collar workers[6], and 9% did not report this information. The mean tenure was *M*=6.75 (SD =*7.67*)[7].

Table 1.

Description of the dataset for each empirical study

Study	Dataset	Representative vs convenience sample
Study 1	*n* = 959	Representative
Study 2	*n* = 363	Convenience
Study 3	*n* = 452	Convenience
Study 4	*n* = 692	Convenience

Note. Data for Study 1 have been collected within the framework of the National Centre of Competence in Research-LIVES, financed by the Swiss National Science Foundation. Some of the samples in the presented studies overlap. details on these overlaps can be found in the appendix of this PhD dissertation.

[5] Intermediate professions reflect such occupational categories as, for example, technicians, accountants, nurses, etc.
[6] Blue-collar workers reflect such occupational categories as, for example, craftspeople, machine operators, and unskilled workers.
[7] Concerning tenure, 14.2% of the participants did not report this information.

II. ARTICLES AND CHAPTERS

Study 1: On the Dynamics of the Psychosocial Work Environment and Employee Well-Being: A Latent Transition Approach.[8]

Study 2 : The role of individual characteristics and working conditions in understanding boredom at work[9]

Study 3 : Better bored than burned-out? Cynicism as a Mediator between Boredom at Work and Exhaustion [10]

Study 4 : Promoting an ethical work context and access to sustainable careers in the framework of the fourth industrial revolution. [11]

Study 5 : Antecedents and consequences of technology appraisal: A person-centered approach [12]

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8 Urbanaviciute, I., Massoudi, K., Toscanelli, C., & De Witte, H. (2021). On the Dynamics of the Psychosocial Work Environment and Employee Well-Being: A Latent Transition Approach. *International Journal of Environmental Research and Public Health*, *18*(9), 47-44.

9 Toscanelli, C., Udayar, S., Urbanaviciute, I. and Massoudi, K. (2022), The role of individual characteristics and working conditions in understanding boredom at work, *Personnel Review*, *51* (2), 480-500.

10 Toscanelli, C., Urbanaviciute, I., De Witte, H., & Massoudi, K.Better bored than burned-out? Cynicism as a Mediator between Boredom at Work and Exhaustion - Submitted in May 2021 to the British Journal of guidance and counseling

11 Toscanelli, C., Fedrigo, L. Rossier, J. (2019). Promoting an ethical work context and access to sustainable careers in the framework of the fourth industrial revolution. In I. Potgieter, N. Ferreira. & M. Coetzee (Eds.), *Fit for the future: theory, research and dynamics of career wellbeing.* Cham: Switzerland

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Study 1

On the Dynamics of the Psychosocial Work Environment and Employee Well-Being: A Latent Transition Approach

Abstract: The current study investigates employee well-being in stable versus changing psychosocial working conditions, using the Job Demand-Control theoretical framework. It thereby addresses a gap in the literature dealing with how the dynamics of the work environment may affect different aspects of well-being such as job satisfaction, work stress, mental health complaints, and overall quality of life. The study was carried out on a large heterogeneous sample of employees in Switzerland (N = 959) and was based on two measurement points. Latent profile and latent transition analyses were used to analyse the data. The findings revealed three commonly encountered and temporally quite stable patterns of job characteristics (i.e., latent profiles), defined by low, average, or high job control and average job demands. The average demand-low control combination was the most precarious, whereas a combination of average demands and high control was the most beneficial and it clearly outperformed the balanced average demands-average control pattern. Furthermore, our results partially supported the claim that employee well-being is contingent on the dynamics (i.e., transition scenarios) of the psychosocial work environment. They particularly highlight the central role of job resources in preventing the deleterious effects on well-being, which may occur even in relatively mild situations where job demands are not excessive.

Keywords: job characteristics; employee well-being; work stress; latent profiles

1. Introduction

Psychosocial working conditions refer to important job characteristics in terms of content and work organisation (Ardito et al., 2012). They may be classified into job demands, such as heavy workload, and job resources, such as autonomy or opportunities to develop and apply one's skills (de Lange et al., 2003; Karasek, 1979). Major theoretical models consider them the building blocks of employees' psychological experiences at work with lasting implications for health and well-being (Bakker & Demerouti, 2017; Häusser et al., 2010). Notably, job demands and resources do not act in isolation—they are thought to interact in creating a (un)favourable work environment. This leads to an implication that different *combinations* of job characteristics should be considered when investigating their role in employee outcomes (Häusser et al., 2010). Moreover, adopting a *temporal perspective* is crucial when assessing the work environment. Being persistently versus temporarily exposed to a certain set of conditions should produce different effects on employees (see Frese & Zapf), and these potentially differing effects are not yet fully understood. The majority of existing studies rely on a momentary estimation of working conditions that are then assumed to have long-term outcomes. Hence, even longitudinal investigations tend to overlook the changing nature of the work environment *per se*, ignoring whether a given combination of job demands and resources is persistent and how this may affect employee well-being.

In the current study, we aimed to address this gap by employing a longitudinal person-centred approach. First, we aimed to identify the most salient combinations of key job characteristics suggested in the Job Demand-Control model (i.e., job demands, decision authority (autonomy), and skill discretion) that are likely to be encountered by employees at work (Ardito et al., 2012; de Lange et al., 2003). As a result, this allowed us to classify employees into *latent profiles* in terms of their working conditions. Second, we tested the stability and change of latent profile membership over a one-year period. Ultimately, we

compared a set of health and well-being outcomes cross-sectionally across the profiles and longitudinally across the profile transition scenarios in order to investigate how exposure to a certain set of working conditions affects employee well-being.

2. Theoretical Background

2.1. Psychosocial Working Conditions

Most theoretical models define psychosocial work environment by job demands and job resources. The Job Demand-Control model (Karasek, 1979; Karasek & Theorell, 1990) is one such model and it offers several foundational assumptions about the nature and impact of working conditions on employee well-being. It posits that job demands and job control are the key characteristics of the work environment. Job demands pertain to psychological stressors that cause strain and include aspects such as workload, time pressure, role conflict, and the like (Karasek, 1979; Kain et al., 1979). Job control pertains to key job resources that help dealing with job demands. It consists of two separate dimensions referring to the possibility to use one's skills at work and the freedom to decide how to accomplish the tasks (Karasek & Theorell, 1990; Van der Doef & Maes, 1998). One important tenet of the JDC model is that psychological job demands and job control jointly predict employee well-being depending on how they are configured together (Karasek & Theorell, 1990; Beehr et al., 2001; Dawson et al., 2016; De Jonge et al., 1999). This suggests that a *combination* of demands and control rather than isolated job characteristics should be considered in order to understand how and when the psychosocial work environment affects employee outcomes. For instance, a combination of high demands and low control defines high-strain jobs and is considered conducive to ill-being (i.e., the stressor-strain hypothesis), whereas high demands accompanied by high control denote active jobs that are thought to result in more positive outcomes (Van der Doef & Maes, 1998; De Jonge et al., 2000; De Jonge er al., 2010). To date, the above-mentioned assumptions have been

mostly investigated focusing on *additive* and *multiplicative* effects. Additive effects refer to the main effects model, where job demand and job control variables autonomously predict employee outcomes cross-sectionally or over time. Multiplicative effects are tested in a moderation model. In this case, job control is set to buffer the effects of job demands, thereby inspecting high versus low control conditions (de Lange et al., 2003; Kain et al., 1979; Verhofstadt et al., 2017). Over the recent decades, studies testing the assumptions of the JDC model have produced abundant findings, also revealing several important shortcomings. The most notable criticism emerging from the literature is that empirical evidence about the joint impact of job demands and job control appears to be rather inconsistent. While there is quite some support for their additive effects on a range of well-being variables, the evidence about their multiplicative effects in reducing strain is much more scarce (Häusser et al., 2010; Beehr et al., 2001; Van der Doef et al., 1999). Hence, research still seems to fail to comprehensively depict the co-occurrence of job demand and control characteristics, which is a major setback in understanding their blended role in employee well-being. One reason for that may be that previous studies have either only partially managed to capture different *combinations* of job demands and job control or they have not aimed to do that at all. This also results in a lack of knowledge about the temporal stability of these combinations and the impact it may have on employee well-being. At this point, it may therefore be necessary to step beyond a cross-sectional and variable-centred approach in order to properly address these gaps.

2.2. A Person-Centred Methodological Approach to Job Characteristics

2.2.1. Exploring Job Demand-Control Combinations

Studies investigating the role of job characteristics in employee well-being have for the major part used a conventional variable-centred approach. A variable-centred approach focuses on isolating characteristics on which individuals differ and then studies the correlation

of these characteristics in a given sample. Hence, such analyses rely on the properties of separate variables. Whereas by adopting a person-centred approach, one gains the possibility of studying a *configuration* of multiple variables of interest within the person, which then becomes the centre of analysis (Mervielde & Asendorpf, 2000). As a result, an advantage of person-centred analytic methods, such as latent profile analysis (LPA), is that they allow for identifying unobserved subgroups of individuals based on the similarity of their scores (Hofmans et al., 2020), which represent qualitatively and quantitatively distinct configurations of input variables (Morin & Marsh, 2015). This is clearly beneficial for research on job characteristics, as it may help overcome some of its known issues and shortcomings. Notably, it helps to capture naturally emerging combinations (i.e., latent profiles) of job demands and control in the investigated sample, which is not easily done otherwise. By linking these profiles to well-being outcomes, such analyses then enable the researcher to test the combined effects of different job characteristics, thus offering a more holistic insight into the impact the work environment has on employees.

This line of investigation is gradually finding its way with quite promising results. For instance, Van den Broeck et al. (2012) have distinguished four job demands and resources profiles, demonstrating that employees in demanding jobs were more at risk of high burnout and low engagement. De Spiegelaere et al. (2017) succeeded in identifying five distinct job characteristics profiles in the electricity sector and showed that low-strain and active jobs were related to the best scores of work engagement and innovative work behaviour. Mäkikangas et al. (2018) adopted a multi-level LPA to identify healthy and unhealthy (i.e., high-strain) departments, whereas yet another study conducted by Keller et al. (2017) replicated a bipolar low stressors-high resources and low resources-high stressors profile solution across four samples and linked it to employee well-being. These and similar findings convey a very important message for further research on the topic. By pointing out the unobserved

heterogeneity among employees in terms of their job characteristics, they unequivocally suggest that such heterogeneity may exist in *any* sample and it is crucial to unravel it in order to understand how workplace ill- and well-being evolves.

This implication has laid the foundations for the current study, in which we adopted a person-centred approach to investigate the emerging patterns of key job characteristics in the general working adult population. Drawing on the JDC model's assumptions about different job types that are situated on a quadrant combining the job demand and job control axes (Karasek, 1979; Karaser & Theorell, 1990), we aimed to corroborate this theoretical distinction empirically. Encouraged by the above-mentioned findings on the existence of job characteristics profiles, we thus expected to identify more than one unobserved subpopulation displaying distinct patterns of job demands and both dimensions of job control as a starting point of our study. This led to our first hypothesis:

Hypothesis 1: Distinct patterns (i.e., latent profiles) of job demands, decision authority, and skill discretion should emerge denoting a differing degree of favourability of the psychosocial work environment, based on the JDC quadrant.

2.2.2. Adopting a Temporal Perspective

After establishing cross-sectional combinations of job demands and job control, we subsequently aimed to extend these analyses into a longitudinal framework. Despite a steep increase in longitudinal investigations over the recent years, they often have their primary focus on the dynamics of selected outcome measures rather than job characteristics as such. For instance, some studies have examined the development of employee well-being related processes over time (Mäkikangas et al., 2016; Chawla et al., 2020), unravelling their changes in light of various job demands or resources. On the flipside, the dynamic nature of the work

environment *per se* and the lasting impact it may have on the individual still needs to be better understood. Persistent exposure to (un)favourable work environment should have different implications on employee well-being compared to a temporary one (see Frese & Zapf, 1988), which is a sound reason to explore these aspects more in detail. The current study thus aims to test how *stability* and *change* in the constituent characteristics of the work environment occur and what role it may play in employee outcomes. In doing so, we join rare previous attempts to address similar questions. In this regard, Igic et al. (2017) have recently provided interesting evidence for the formation of different constellations of growth trends in job resources and demands over a period of 10 years. Whereas a study of Bujacz et al. (2018) explored psychosocial working conditions patterns among highly skilled workers and observed some fluctuations in their prevalence over six years. To advance on the topic, we aimed to examine the longitudinal development of such patterns within a general population over a one-year period, which is long enough to capture change versus non-change in the working conditions and yet short enough to spot its imminent implications for well-being. To do so, it was necessary to identify so-called transition scenarios that denote stability and change of employee membership in the identified job characteristics profiles from one time point to another in a second step of the current study. Although some shifts are likely to occur (Bujacz et al., 2018), based on the build-up logic of Karasek and Theorell (1990), one may expect the emergence of pretty much stable patterns as well, especially given quite a short time lag. The above authors claimed that strain tends to generate further strain, which then implies that stressful (or vice versa, resourceful) job experiences may reinforce themselves, embedding the person in the same type of work environment over time. Hence, whilst we considered both types of transition patterns plausible, we expected a different degree of salience in them.

Hypothesis 2: The most salient transition scenario will denote stability (i.e., staying in the same job characteristics profile), accompanied by less salient transition scenarios that denote moving from one profile to another one year later.

2.2.3. Linking Well-Being Outcomes

Ultimately, we sought to unravel how the different profiles of job demands, decision authority, and skill discretion relate to employee well-being concurrently and over time. Previous person-centred research has shown some evidence that less favourable work environment types (e.g., high-strain jobs) relate to lower well-being (Van den Broeck et al., 2012; De Spiegelaere et al., 2017; Keller et al., 2017). However, such findings provide only a partial picture examining one-time effects of a given work environment or focusing on rather specific outcome indicators, such as rumination or job satisfaction (Igic et al., 2017; Bujacz et al., 2018). To address this gap, we considered a broader set of balanced positive and negative aspects of employee well-being in the current study that cover both work and general life domains, are substantiated by the theory, and are suitable to be examined both as instant and as longer-term outcomes of the job characteristics profiles and transitions thereof. *Job satisfaction* denotes a positive emotional state resulting from the evaluation of one's job experience (Locke, 1969). It is one of the most important work-related outcomes frequently investigated within the JDC model. In the current study, we focused on global job satisfaction that refers to the evaluation of the job situation as a whole. *Work stress* refers to perceiving one's work environment as taxing (De Bruin et al., 2005) and it is another highly relevant outcome representing a negative aspect of work-related well-being. Furthermore, the inclusion of a health indicator was substantiated by a strong emphasis on *health outcomes* in the JCD research that includes aspects such as physical symptoms, subjective health, mental health, and unhealthy habits (de Lange et al., 2003). In the current study, we particularly focused on mental health that refers to anxiety and depressive symptoms among employees. The last outcome,

quality of life, is a positive indicator of general well-being (Felce & Perry, 1995). In the current study, it refers to an evaluation of the overall quality of one's life at present.

In theory, favourable work environments that include high levels of job resources, such as decision authority and skill discretion, promote positive outcomes such as job satisfaction. Whereas a deterioration in employee well-being is thought to occur in unfavourable settings where job demands are not compensated by job resources, thus causing psychological strain (De Jonge et al., 1999; 2000). Hence, we expected such effects to reflect in the levels of work stress and mental health complaints. Moreover, assuming that workplace experiences may spillover to non-work domains (Leiter & Durup, 1996), we also expected the quality of life to be related to the favourability of the work environment that one is exposed to. Based on the above, our hypothesized instant effects are as follows:

Hypothesis 3: Favourability of the work environment is concurrently linked to employee well-being: Unfavourable job characteristics profiles entail lower levels of well-being (in terms of job satisfaction, work stress, mental health, and quality of life) compared to more favourable profiles at any given time point.

Besides that, drawing on Frese and Zapf (1988), we expected corresponding longitudinal effects to occur. These authors have described several ways in which the stressor-strain relationships evolve over time. Remarkably, they maintain that the quality of employee functioning in the workplace (e.g., in terms of well-being) may not simply follow the presence or absence of a stressor—it may as well show accumulation effects, where ill-being increases over time due to a prolonged exposure to taxing work environment and may not instantly decline after the stressor (or unfavourable job characteristics) is removed. This served as the basis for our last set of hypotheses:

Hypothesis 4: The dynamics of employee well-being over a one-year period, as expressed in the levels of job satisfaction, work stress, mental health, and quality of life, are contingent upon the job characteristics profile transition scenario:

Hypothesis 4a: Stable exposure to an unfavourable work environment (i.e., staying in the same profile) results in the accumulation of ill-being, whereas stable exposure to a favourable work environment results in heightened well-being.

Hypothesis 4b: Changes in the work environment (i.e., transitioning to a different profile) have asymmetrical effects on employee well-being, so that moving into a less favourable profile relates to a decrease in well-being, whereas leaving an unfavourable profile does not necessarily result in instant positive effects.

3. Methods

3.1. Procedure

The present study was based on the data obtained from a longitudinal 'Professional Paths' survey conducted at the Swiss National Centre of Competence in Research—Overcoming Vulnerabilities: Life Course Perspectives (LIVES). This survey benefits from a large heterogeneous adult sample randomly drawn from the national register of inhabitants that is managed by the Swiss Federal Statistics Office (SFSO), for more details on samplicg strategy see Maggiori et al. (2016). Participant recruitment was handled by a polling institute. The participants were invited to complete the survey by means of the invitation letter sent by post. The participation was voluntary, and the data were collected anonymously, with a six-digit code identifying each participant. At the end of each wave, participants received a compensation of 20 CHF. They could choose to either donate it to a non-profit organization or to receive a gift card in this amount.

3.2. Sample

3.2.1. Sample characteristics

The data from two waves collected in 2016 and 2017 were used in the present study, with a one-year lag between the measurements. The final sample consisted of 959 employed adults (50.6% female; mean age at T1 = 46.67, *SD* = 8.21), reflecting the German- and French-speaking Swiss population in terms of age, gender, and linguistic region. With regard to education, 37% of participants held a higher education degree (*n* = 358), 47% had an upper secondary or vocational education diploma, or its equivalent (*n* = 448), 3% had compulsory education (*n* = 31), and the remaining sample indicated other type of education or did not respond to this question. Approximately 95% of participants were employed on a permanent basis in their main job (*n* = 917 at T1 and *n* = 914 at T2). Household income, measured as an ordinal variable, ranged from (1) less than 40,000 CHF to (8) over 160,000 CHF per year.

3.2.2. Selection criteria

To be included in the sample, the participants had to have participated in both waves of the study and have at least partially responded on the variables of interest. Furthermore, a criterion of being professionally active was applied when composing the final sample. Only data from participants who held a remunerated employment contract during both measurement occasions were included in the analyses. Holding the same job at both time points, however, was not a prerequisite. The majority of participants (*n* = 886) stayed with the same employer, whereas a small fraction (*n* = 73) changed their job.

3.2.3. Sample attrition

At Time 1, the initial valid sample consisted of 1172 employed adults. At Time 2, the valid sample decreased to 959 employed adults. Some participants were eliminated because they became unemployed or professionally inactive (*n* = 40), the rest dropped out from the study (*n* = 173). We compared the dropout and the final sample and found no significant

differences in participants' age, gender, or type of contract. However, the dropout sample reported lower household income, $\Delta M = 0.45$, $p = .010$ and showed a different distribution in the level of education, $\chi^2(2) = 6.56$, $p = .038$, containing a higher percentage of less educated participants than the main sample. With regard to psychological variables, no differences were detected, except for lower quality of life among the dropouts as measured at Time 1, $\Delta M = 0.20$, $p = .001$.

3.3. Measures

Job characteristics were assessed with 14 items from the Job Content Questionnaire (JCQ) (Karasek, 1985). The items were rated on a four-point scale (1 = *strongly disagree*, to 4 = *strongly agree*) and were subdivided into three subscales measuring decision authority (3 items, Cronbach's $\alpha_{T1} = .82$, $\alpha_{T2} = .83$), skill discretion (6 items, Cronbach's $\alpha_{T1} = .75$, $\alpha_{T2} = .72$), and psychological demands (5 items, Cronbach's $\alpha_{T1} = .61$, $\alpha_{T2} = .61$). Whilst the latter falls in the lowest acceptable range of reliability [35], it is comparable to a number of studies that showed similar psychometric properties of this subscale (Eum et al., 2007; MacDonald et al., 2001).

Job satisfaction. To evaluate job satisfaction, a one-item measure was used. It was developed for the aims of the Professional Paths survey and asked the participants to evaluate the overall satisfaction with their current job using a four-point response scale (1 = *not satisfied at all*, to 4 = *very satisfied*).

Work stress was assessed with the General Work Stress Scale (GWSS) (De Bruin et al., 2005). It consists of nine items measuring subjectively experienced work stress (e.g., 'Does your work make you so stressed that you wish you had a different job?'). The responses were recorded on a 5-point scale (1 = *never* to 4 = *always*). Cronbach's $\alpha_{T1} = .90$, $\alpha_{T2} = .91$.

Quality of life was measured with a one-item scale. The participants were asked to rate their health overall quality of life on a five-point response scale (1 = *very bad* to 5 = *very good*).

Mental health complaints were measured with a six-item subscale from the General Health Questionnaire (GHQ-12) (Goldberg & Williams, 1988). The participants had to rate depression and anxiety symptoms they had experienced recently (e.g., 'Have you recently lost sleep over worry?'). The items had to be rated on a four-point response scale (1 = *not at all*, to 4 = *much more than usual*), Cronbach's $\alpha_{T1} = .87$, $\alpha_{T2} = .88$.

Because this is a two-wave study, multi-item scales were checked for longitudinal invariance and satisfied the requirement of metric invariance across the two time points.

3.4. Data Analyses

3.4.1. Latent profiles and latent profile transition

The analyses were conducted in three steps. First, separate series of LPA (Lanza et al., 2012) were performed to examine unobserved subgroups of employees with regard to their job characteristics at Time 1 and Time 2. This was done as a prerequisite for the longitudinal LPA and latent transition analyses conducted in steps 2 and 3 and allowed for determining the optimal latent profile solution at each time point. The mean scores from the JCQ subscales of decision authority, skill discretion, and psychological demands were used as indicators for the LPA. In each series, we took the one-profile model as a baseline, increasing the number of profiles until the optimal solution was reached, as per guidelines in the literature (Nylund et al., 2007). Decision about which profile solution should be retained was based on their fit statistics as well as on the interpretability of profiles. The following fit statistics were inspected: the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the sample-adjusted BIC (SaBIC), Lo-Mendell-Rubin likelihood ratio test (LMR), the Bootstrap Likelihood Ratio Test (BLRT), and entropy. Lower values of the AIC, BIC and SABIC indicate a better fitting model. A non-significant value of the LMR and BLRT tests, obtained after comparing a *k*-profile model with a *k*-1 profile model, indicates that a more parsimonious model

should be kept. Entropy informs about the classification accuracy, values closer to one indicating a better solution.

In step two, we selected the most optimal set of latent profiles obtained at each time point and estimated them simultaneously without modelling a transition yet. In this step, we applied a sequential procedure aimed at testing the equivalence of Time 1 and Time 2 profile solutions with regard to their means and variances. To this end, we gradually imposed model constraints starting with an unconstrained model, then constraining the means in the corresponding profiles across the two time points, and ultimately adding variance constraints.

In step three, a latent transition analysis (LTA) (Nylund et al., 2007; Collins & Lanza, 2010) model was tested based on the best fitting model from step two. It is a longitudinal extension of latent profile analyses, which allows for the investigation of latent profile membership stability and change over time by regressing Time 2 profiles on Time 1 profiles. To account for occasional missing data, full-information maximum likelihood (FIML) estimation was used in both LPA and LTA.

3.4.2. Covariates and outcomes

Participants' background characteristics were modelled as covariates of latent profile membership in LPA using the auxiliary variable command. We used the R3STEP command in Mplus, allowing to directly examine the covariates without imposing bias to the profile solution (Asparouhov & Muthén, 2014). Furthermore, cross-sectional outcome analyses were conducted using the BCH command (Asparouhov & Muthén, 2014 ; Bakk & Vermunt, 2016). It yields a comparison of the mean levels of outcomes across the job characteristics profiles identified in LPA.

Finally, longitudinal analyses were carried out based on profile transition scenarios. To this end, transition scores from the LTA were saved to a data file. Based on these scores, a

change in employee well-being outcomes in each latent profile transition scenario was inspected using repeated measures analyses with two times points. To test the role of employer change in profile transitions, we combined their scenarios into two groups, the first group encompassing all employees who transitioned to a different profile and the second group encompassing all employees with stability scenarios. Then, a chi-square test of independence was used to inspect the frequency of job changers across these two groups.

4. Results

Descriptive statistics are provided in Table 1 and inform about the means, standard deviations and inter-correlations of the main study variables at both time points. Additionally, Table A1 in the Appendix displays correlations between backgound variables and latent profile indicators (i.e., job characteristics).

Table 1.

Descriptive statistics and correlations between the main study variables

Variables	M (*SD*)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. T1 JCD-skill	3.04 (0.46)													
2. T1 JCD-auto	3.10 (0.61)	.54***												
3. T1 JCD-dem	2.61 (0.44)	.18***	-.05											
4. T1 Jobsat	3.27 (0.58)	.26***	.31***	-.25***										
5. T1 Wstress	1.87 (0.62)	-.02	-.17***	.41***	-.47***									
6. T1 QL	4.28 (0.65)	.20***	.26***	-.11**	.24***	-.31***								
7. T1 MH	1.66 (0.57)	-.08*	-.14***	.26***	-.32***	.61***	-.40***							
8. T2 JCD-skill	3.05 (0.44)	.75***	.43***	.17***	.19***	-.02	.21***	-.09**						
9. T2 JCD-auto	3.10 (0.60)	.44***	.67***	-.04	.22***	-.19***	.23***	-.16***	.53***					
10. T2 JCD-dem	2.61 (0.42)	.17***	-.02	.62***	-.17***	.31***	-.10**	.22***	.19***	-.04				
11. T2 Jobsat	3.24 (0.59)	.21***	.29***	-.19***	.48***	-.35***	.24***	-.29***	.29***	.38***	-.23***			
12. T2 Wstress	1.87 (0.64)	<.01	-.15***	.32***	-.31***	.69***	-.27***	.49***	-.03	-.23***	.40***	-.49***		
13. T2 QL	4.25 (0.68)	.21***	.24***	-.06	.22***	-.26***	.61***	-.32***	.25***	.25***	-.13***	.35***	-.36***	
14. T2 MH	1.73 (0.64)	-.09**	-.14***	.16***	-.23***	.42***	-.29***	.56***	-.13***	-.21***	.23***	-.39***	.59***	-.45***

Note. T1 = Time 1. T2 = Time 2. JCD-skill = skill discretion. JCD-auto = decision authority. JDC-dem = psychological demands. Jobsat = job satisfaction. Wstress = work stress. QL = quality of life. MH = mental health complaints.
***$p < .001$, **$p < .01$, *$p < .05$.

4.1. LPA results

The results of job characteristics latent profile analyses conducted in the first step are summarized in the upper part of Table 2 and provide a comparison of the alternative latent profile solutions at Time 1 and Time 2.

As seen in Table 2, the three-, four-, and five-profile solutions had quite good fit statistics at both time points. The LMR and BLRT tests were significant in all cases. However, the most notable decrease in the information criteria, such as BIC and SABIC, was observed when switching from two to three profiles at Time 1 as well as Time 2 (see Figures A1 and A2 in the Appendix), suggesting a three-profile solution. Furthermore, despite that the four- and five-profile solutions (and a six-profile solution at Time 2) had slightly higher entropy than the three-profile solution, they contained a negligible profile at both time points that was not well interpretable. Based on these results, as well as on the interpretability of the profiles, the three-profile solution was chosen as the optimal one.

To inspect the comparability of the profiles, in the next step we gradually increased the constraints, beginning with a configural model with freely estimated means and variances across the two time points, proceeding to a model where profile means were constrained to equality over time, and ultimately, to a model where both means and variances were set to be equal over time. Mean equality refers to so-called structural similarity, whereas constraining the variances helps to establish the similarity of dispersion, thus increasing the comparability of Time 1 and Time 2 latent profile solutions (Morin et al., 2016). The results are provided in the lower section of Table 2 and show that the models did not differ considerably with regard to the information criteria and entropy. Hence, the most parsimonious three-profile model with constrained means and variances was retained for further analyses.

As shown in Figure 1, we labelled the first profile the 'low resources' profile. It characterizes employees with low decision authority (i.e., autonomy), low opportunities for skill utilization, and average psychological job demands. The 'average' profile refers to employees with average scores on all three job characteristics, whereas the 'high resources' profile consists of employees who reported high decision authority and skill discretion. Covariate analyses showed that age and contract type did not predict profile membership. Regarding gender, women had lower odds of being classified into the high resources profile (at Time 2 only) as compared with the low resources profile. Other advantageous background characteristics, such as higher level of education and higher household income, were associated with higher odds of being classified into a more favourable profile (see Tables A2-A3 in the Appendix for more details).

4.2. LTA results

Latent transition analysis was run based on the above-described constrained three-profile solution. In the current study, the LTA had nine possible transition scenarios. Detailed information on transition probabilities and final counts for each scenario is provided in the Appendix (see Tables A4-A5). According to the results, profile membership proved to be quite stable over time at ~80% rate and we found no evidence that employer change would play a role: The proportion of job changers was similar among those who stayed in the same profile and those who transitioned to a different one over time, $\chi^2(1)=.001$, $p = .980$. Three salient job characteristics stability scenarios were identified, denoting stable low resources ($n = 92$), stable average ($n = 463$), and stable high resources ($n = 219$) scenarios. Concerning latent profile change, four transition scenarios were retained for further analyses, denoting the average-to-high ($n = 50$), high-to-average ($n = 79$), low-to average ($n = 22$), and average-to-low ($n = 26$) transitions. Extreme transition scenarios (i.e., moving between the high and low resources profile) were very scarce and they were excluded from outcome analyses for this reason.

Table 2.

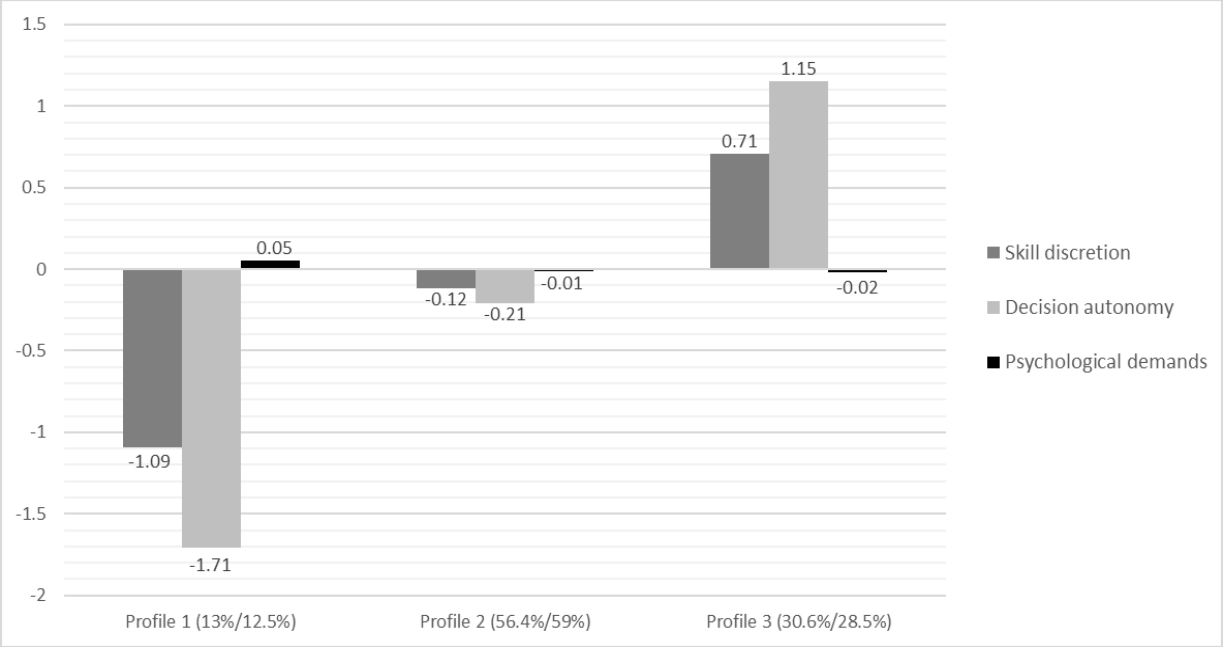
Latent profile solutions and their fit statistics

Model estimation steps	AIC	BIC	SaBIC	LMR (*p*)	BLRT (*p*)	Entropy	Smallest profile (%)
LPA Time 1							
1-profile solution	4117.309	4146.504	4127.448	-	-	1.000	100
2-profile solution	3882.880	3931.539	3899.779	.007	<.001	0.570	34.9
3-profile solution	3700.847	3768.969	3724.506	<.001	<.001	0.847	11.3
4-profile solution	3635.454	3723.040	3665.873	.031	<.001	0.901	1.8
5-profile solution	3603.149	3710.199	3640.328	.039	<.001	0.802	2.0
6-profile solution	3572.382	3698.895	3616.320	.162	<.001	0.802	1.0
LPA Time 2							
1-profile solution	3944.652	3973.847	3954.792	-	-	1.000	100
2-profile solution	3738.577	3787.236	3755.476	.007	<.001	0.509	43.2
3-profile solution	3514.577	3582.699	3538.235	<.001	<.001	0.882	12.5
4-profile solution	3423.185	3510.771	3453.604	<.001	<.001	0.932	1.2
5-profile solution	3374.967	3482.017	3412.146	<.001	<.001	0.930	1.0
6-profile solution	3330.157	3456.670	3374.095	.007	<.001	0.940	0.9
LPA Time 1-Time 2 tests of equivalence							
3-3 profile model unconstrained	7215.424	7351.669	7262.741	-	-	0.864	11.3-12.5
3-3 profile model means constrained	7208.188	7300.640	7240.297	-	-	0.863	12.3-11.9
3-3 profile model means and variances constrained	7205.127	7282.981	7232.166	-	-	0.863	12.4-11.8
LTA Time 1 -> Time 2							
3->3 model means and variances constrained	6741.817	6839.135	6775.616			0.865	13.0-12.5

Note. At each time point, the LPA solution chosen for further LTA analyses is marked in bold. LMR and BLRT are not available in models with two time points.

Figure 1.

The final three-profile solution after imposing invariance constraints over time in LTA.



Note. For easier interpretation, the graph is based on z scores. Profile 1 = Low resources profile. Profile 2 = Average profile. Profile 3 = High resources profile. Percentages before the slash indicate the size of the profiles at Time 1. Percentages after the slash indicate the size of the profiles at Time 2.

4.3. Outcome analyses results

Cross-sectional results are provided in Table 3 and show the mean levels of employee well-being across the latent profiles at any given time point.

Almost all pairwise-comparisons showed significant mean differences. The high resources profile was associated with the highest scores in positive well-being indicators (i.e., job satisfaction and quality of life) and the lowest scores on ill-being (i.e., work stress and mental health complaints). By way of contrast, employees with the most precarious low resources profile reported the lowest scores of well-being as compared with more favourable average or high resources profiles at both time points.

The results of repeated measures analyses are provided in Figure 2 and they inform about the change in employee well-being over time due to the transition scenario. Looking from a temporal perspective, our findings suggest that *staying in a favourable profile* was related to persistently higher levels of well-being but not to accumulation of it, as seen in the case of the stable high resources scenario. Some accumulation of ill-being may be implied in the stable low resources scenario, as we observed a significant decrease in job satisfaction and a significant increase in mental health complaints, even though the latter was slightly increasing in the entire sample, across all transition scenarios. Moreover, *transitioning to a different profile* was only related to changes in positive but not negative indicators of well-being. Job satisfaction was the most malleable outcome, with a significant decrease in its levels as employees transitioned to a less favourable profile (i.e., high-to-average and average-to-low transition scenarios) and an increase in its levels in the average-to-high transition scenario. The low-to-average transition did not result in a significant improvement of job satisfaction and even showed a slight decline. A significant decrease in the levels of quality of life, another positive outcome, was mostly associated with the high-to-average transition scenario. Other profile change scenarios, however, were not related to a corresponding change in this outcome over time.

Table 3.

Cross-sectional differences in employee well-being across the job characteristics profiles

Well-being indicators	Job characteristics profiles			
	Low resources	Average resources	High resources	Overall test
T1 Job satisfaction	2.95	3.19	3.52	88.98***
T2 Job satisfaction	2.82	3.17	3.58	153.46***
T1 Work stress	2.10	1.91	1.71	30.26***
T2 Work stress	2.13	1.91	1.67	42.10***
T1 Mental health complaints	1.82n	1.70n	1.54	18.13***
T2 Mental health complaints	1.96	1.78	1.54	37.87***
T1 Quality of life	3.90	4.25	4.47	48.87***
T2 Quality of life	3.84	4.24	4.45	49.23***

Note. The overall test assesses overall between-profile differences. It is based on a Chi-Square test with 2 degrees of freedom. All pairwise between-profile differences are significant ($p < .05$), except for the difference in mental health complaints between the low and average resources profiles, marked with 'n'.

5. Discussion

5.1. Interpretation of the Job Characteristics Profiles

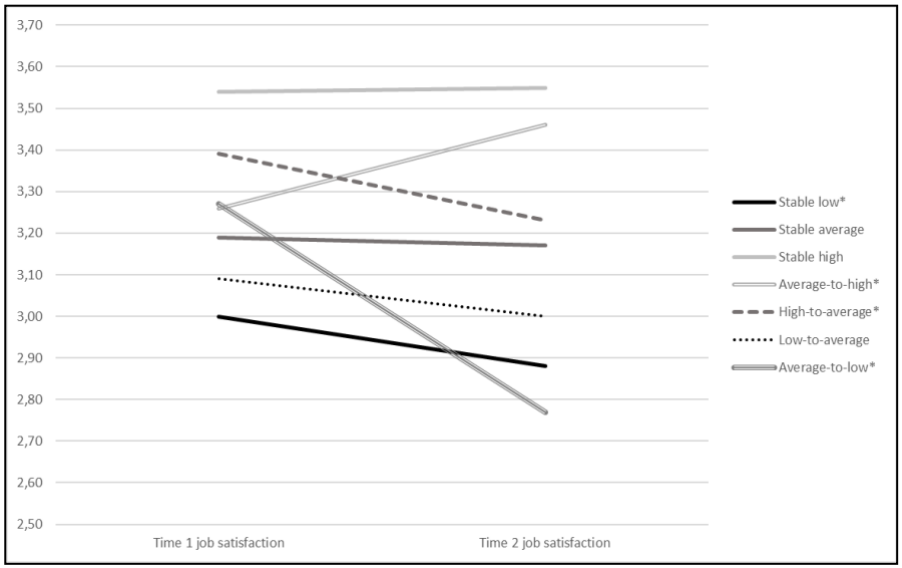
The current study provides an insight into the ways vulnerability and flourishing at work take place by unravelling the dynamic relationship between the work environment and employee well-being. In line with Hypothesis 1, the findings revealed three patterns of job characteristics characterized by high, average, and low job control resources and average job demands. This indicates sample heterogeneity with regard to their typical working conditions and could be expected both from a theoretical and from an empirical point of view. The JDC model adopts a typological approach towards the work environment, defining it by different combinations of job demands and job control. Our findings corroborate this approach in the sense that we did observe varying levels of key job characteristics—job control resources in particular—across the identified profiles. The observed set of profiles, however, did not exactly

match the four job types discussed in the JDC research (Karasek, 1979; Van der Doef & Maes, 1998; De Jonge er al., 2010), which may be due to the fact that some types of jobs are less prevalent in the world of work and may not always emerge (Kain et al., 1979). Such mismatch seems to be quite common: previous person-centred studies have identified anywhere from two (Keller et al., 2017) to five (De Spiegelaere et al., 2017) work environment profiles, and these variations are natural because latent profiles always reflect the characteristics and experiences of a specific sample.

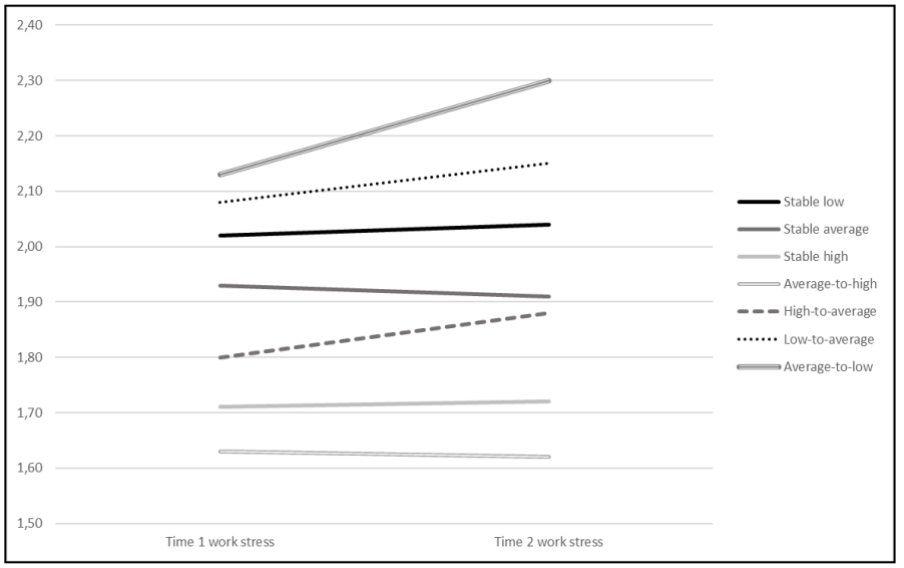
Notably, whilst we used a large and rather heterogeneous sample, descriptive statistics revealed the overall quality of their working conditions to be higher than average. This means that the emergence of a large enough sub-group with extreme vulnerabilities (i.e., high strain) was less likely among our participants. Such around-average trends show not only here but can be also found in large-scale European data. For example, the sixth European Working Conditions Survey indicated the Swiss work intensity index to be slightly below and skills and discretion index to be very close to the overall European average (Eurofound, 2017). This lends a useful explanation for the shape of the profiles obtained in the current study—they all had average levels of job demands and were mostly differentiated based on the levels of decision authority (i.e., autonomy) and skill discretion. In other words, we did not observe the typical 'high-strain' and 'active' combinations with a highly expressed demands dimension but rather see a milder variant of them in the low resources and high resources profiles correspondingly, whereas the largest 'average resources' profile seems to represent the above-mentioned Swiss standard with both job demands and job control expressed around the midpoint.

Figure 2.

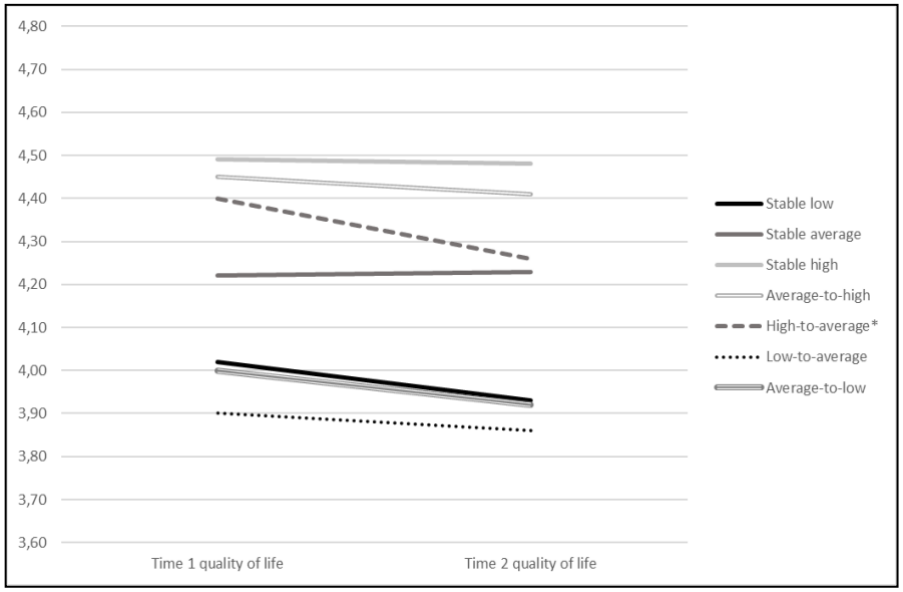
Change in employee well-being across profile transition scenarios. Asterisks in the legend indicate a significant change in a given aspect of well-being from Time 1 to Time 2 in the marked transition scenarios.



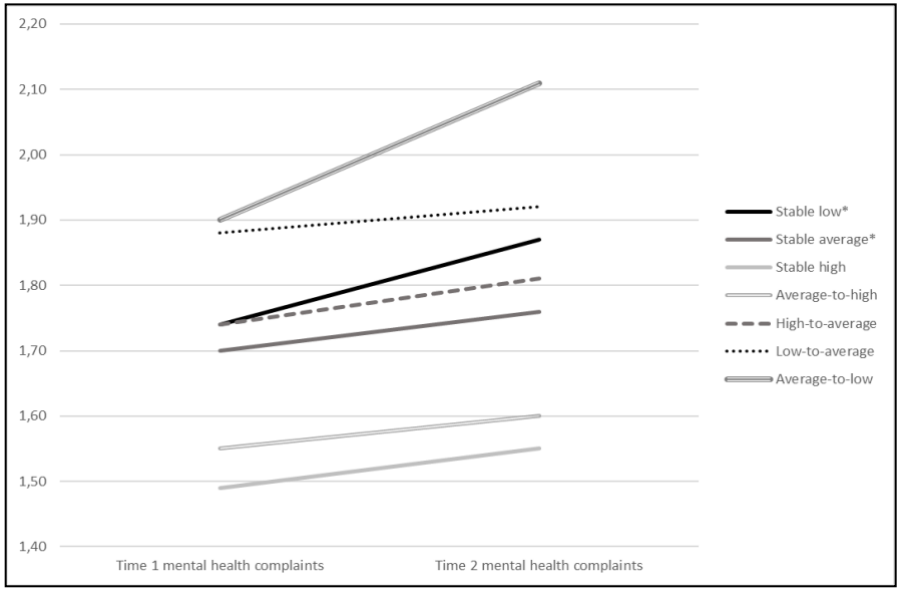
2a. Job satisfaction



2c. Work stress



2b. Quality of life



2d. Mental health complaints

As expected in Hypothesis 2, the majority of participants remained in the same working conditions over the studied period, with similar probability rates for staying in the most and least favourable profiles. This adds to existing findings (Bujacz et al., 2018) and is in line with theoretical assumptions suggesting that job types have an underlying dynamic that promotes the continuity of a given job pattern (Karaser & Theorell, 1990). Stated otherwise, for someone in a high-strain job (or low resources job in our case), a lack of resources may not allow for adequately meeting the job demands, which will further reinforce the resource-demand imbalance, thereby establishing a strain pattern. A similar rationale applies to so-called active jobs (or high resources jobs in our case): Resourceful employees get more activated, which fosters their job resources and increases the probability of maintaining a favourable working conditions pattern over time. Such reasoning closely approximates the principles of conservation of resources (Hobfoll, 2001), which maintain that resource dynamics are inherent in the stress experience. Resource depletion and elevated levels of stress are reciprocally interlinked, enclosing people in a loss cycle, which explains why they cannot easily switch from an unfavourable to a more favourable pattern. Whereas in the case of resource availability, the opposite dynamic should be promoted, making it easier to maintain favourable conditions over time.

At this point, it is notable that job change was unrelated to transitioning to a different working conditions pattern. However, background variables such as male gender, higher level of education, and higher initial financial status were all found to increase one's chances of having a more favourable type of job, such results implying that socio-economic status may play a role in determining the quality of one's job and, in a way, the quality of employment in general.

5.2. Interpretation of Findings on Well-Being Outcomes

The main contribution of the current study is that it unravels the impact that different patterns of job characteristics may have on employee outcomes. Our results have largely supported Hypothesis 3 showing that, from a cross-sectional perspective, the more resourceful the work environment, the more it relates to higher employee well-being with obvious differences across the profiles (see Table 3 for the summary of findings). The high resources job characteristics profile is particularly distinguishable as it was associated with significantly higher well-being on all aspects, at both times points, and as compared to both the low resources and the adjacent average resources profile. In turn, the low resources pattern showed stark differences from the opposite-end high resources pattern and, in most cases, from the average resources pattern. These findings, first of all, serve as a sound validation of the three-profile solution as such, showing that the profiles discriminate well between the outcomes. Second, they hint at the importance of increasing access to job resources, since such remarkable differences in employee well-being across the profiles seem to be due to variations in the job control dimension. Third, they suggest that even average job demands may create a precarious work environment if the resources are not sufficient.

Our longitudinal results bring more light to such considerations, addressing the call for more research on the temporal dynamics of stressor-strain reactions at work (Frese & Zapf, 1988; De Jonge er al., 2010; Garst et al., 2000; Taris & Feij, 2004). As summarized in Figure 2, most changes were found in job satisfaction, which provides an illustrative case of how degrading versus improving working conditions may trigger a corresponding change in well-being. Such findings can be thought to reflect the first phase of several exposure time models encompassing an increased initial reaction to the stressor. Although Frese and Zapf's work (1988) mostly concentrates on stressor-strain reactions, the current study provides some evidence of the reversed dynamic as well, linking resource increase to flourishing at work.

Remarkably, in addition to the changing scenarios, our results also showed a decline in job satisfaction in the stable and most unfavourable 'low resources' scenario, but we did not observe a corresponding accumulation of well-being in the favourably stable scenarios. It is an intriguing finding that conforms to Hypothesis 4 and suggests that positive and negative effects may be not symmetrical. From a theoretical point of view, it falls in line with Karasek and Theorell's (1990) reasoning that strain creates more strain, thus even stable but unfavourable working conditions can result in degrading well-being.

Such tendencies, however, do not apply universally to all investigated outcomes. Quality of life showed to be less malleable, which may be attributable to the nature of the construct. Compared to job satisfaction, which denotes an immediate reaction to existing psychosocial working conditions, it represents a more distal and static outcome covering multiple areas, not just work (Felce & Perry, 1995). Therefore, fluctuations in job control may have been not strong enough to cause significant changes in the overall quality of life or the time lag may have been too short to observe them.

Furthermore, the aspects of ill-being either were not subject to change (i.e., work stress) or their change seemed to make part of an overall growth trend observed within the population (i.e., mental health complaints). While somewhat unexpected, one explanation for such findings lies in the contents of our identified profiles. Notably, they varied in the levels of job control resources but not demands, and this variation in positive job characteristics possibly targets positive aspects of well-being in the first place. Whereas according to the JDC logic (Karasek, 1979; Kain et al., 1979), one would expect strain reactions to occur due to an increase in job demands, which remained virtually the same across different scenarios in our case. It is, however, important to note that degrading working conditions (i.e., average-to-low transition scenario) found some resonance in both aspects of ill-being, but this trend did not reach the significance level, likely due to the tiny fraction of the sample (n = 26) that was exposed to it.

5.3. Implications and Limitations

The current study gives an additional vantage point for discussing the makeup of an optimal work environment. While in theory the most beneficial active job profile is conceptualized by the combination of high resources and high demands, already Karasek and Theorell (1990) have noted that demand levels should be high but not excessive. Some empirical studies have even concluded that low-demands and high-control jobs may produce more desirable effects than high-demands and high-control jobs (Taris et al., 2003; Taris & Feij, 2004), thus launching a debate in the literature about which combination is the most favourable. In this context, our 'high resources' profile is particularly intriguing for it may indicate a perfect job demands-resources match, and the current findings on elevated well-being associated with it seem to point in that direction.

This further touches upon the role of job resources versus job demands in employee well-being. A lot of attention within the JCD literature has been given to high psychological demands that are inherent in high-strain jobs. While there is no doubt about the deleterious consequences of such work environments (Van der Doef et al., 1999; De Spiegelaere et al., 2017; McClenahan et al., 2017), they represent quite an extreme end. To elaborate on the very same inquiry, it may be crucial to examine various intermediate variants for they can inform about which job characteristics are indispensable for separating a favourable work environment from an unfavourable one. Given the rather schematic (i.e., high vs. low) approach towards the job characteristics, such questions have rarely been tested in the JDC literature. We had a unique opportunity to do it here, and our study adds to existing literature by showing that even milder variants of these theoretical job types can account for substantial differences in well-being.

From a practical point of view, the current findings have demonstrated that psychosocial work environment can be perceived as quite dynamic and it immediately affects

employee outcomes, especially job satisfaction. The fact that it can either deteriorate or improve over quite short periods of time, even when staying with the same employer, indicates the importance of preventive and reactive HR interventions in keeping the right balance between demanding and resourceful job characteristics on a regular basis. Our analyses have clearly shown that even a slight difference in job resources may matter much. It is remarkable that the average resources profile, which seems to be the most common in the population and overall is quite well-balanced, still does not produce sustainable well-being and was found to be significantly less optimal than the high resources profile. This particularly encourages investing in various job resources in organizations and teaching employees how to capitalize on them. In today's turbulent world of work, job demands that are determined by external labour market factors may be difficult to adjust or remove, whereas the advantage of psychosocial job resources is that they are often at organization's and supervisor's disposal and this can help make a difference in the way work environment is experienced and affects employees' well-being.

As in every study, our findings are not exempt from limitations that are important to note and address in future investigations. First, we consider it essential to expand and upgrade the measurement of psychosocial job characteristics. In the current study, the psychological job demands subscale performed quite poorly and it may have been one of the reasons why we did not observe much variation in job demands across the identified profiles. While using a well-known measure increases the comparability of findings, a few concerns have been raised in the literature with regard to inconsistent reliability of its scores (Karasek et al., 1998), as well as a lack of precision of the construct (Choi et al., 2008; Ostry et al., 2001). Future research should focus on these aspects to better capture the variety of job demands. It would be particularly useful to separate between hindrance and challenge demands as they are known to have a different impact on employee outcomes (Crawford et al., 2010). Additionally, one may be

interested in expanding the list of characteristics that are pertinent in today's organizations (e.g., management regimes, level of perceived responsibility, work/time arrangements, specialised skills) and consider integrating objective indicators among them, as self-report measures portray the reality from a subjective perspective only.

Second, although the current study identified several vulnerability scenarios (e.g., transition from average to low resources), they were encountered by a rather small proportion of the sample, which complicates their comparison with substantially larger non-vulnerable groups. Dropout analyses have also shown that the dropouts had somewhat lower quality of life compared to the remaining sample. This means that vulnerable participants tended to quit the study, lowering the chances of identifying big enough groups of employees with a vulnerability profile. Future studies may specifically address this issue by using targeted sampling procedures. This would allow for a better insight into the way vulnerabilities evolve among the most fragile members of the working population.

Third, there is room for advancement in the investigation of stability and change in the work environment. Whilst the present study revealed several interesting scenarios, we do not know the pre-history of the pattern observed at Time 1, that is, for how long the person had been exposed to it. This drawback may explain why our results on changes in well-being were quite inconsistent. To circumvent this issue and to further inspect the stressor-strain models delineated by Frese and Zapf (1988), future studies may consider using samples where change has an a priori set starting point, such as newcomers (Taris & Feij, 2004) or those whose organizations undergo a stressful period. It would be as well pertinent to focus on longer time lags as, for example, in Igic et al. (2017). Such investigations would offer an opportunity to explore the 'entrapment' patterns from a career development perspective that are of particular importance in turbulent times.

Finally, since the current study was focused on well-being outcomes, we only tested standard background characteristics as covariates of the job characteristics patterns encountered by our participants. A logical next step would be to go beyond the socio-demographic predictors by including personal and psychosocial context variables for they may better reveal personal and structural resources that help people escape precarious settings and have more satisfying working lives.

6. Conclusions

The current study has identified three patterns of job characteristics denoting salient low, average, and high job control resources and average job demands. While such combinations do not fully correspond to the job types described in the JDC model, they can be considered milder variants of them. According to the findings, people tended to stay embedded in their job type over time, irrespective of whether they had changed employer or not, only one fifth of the sample transitioning from one pattern to another. Cross-sectional comparisons clearly demonstrated the high resources pattern to be the most beneficial, whereas the low resources pattern showed detrimental effects. Longitudinal findings were less consistent, but they also suggest that an average demands-high resources (but not average resources) work environment may be the one leading to sustainable well-being. In contrast, both deteriorating working conditions and prolonged exposure to resource-deprived work environment showed harmful signs, especially touching upon job satisfaction. Such findings connect the dynamics of the work environment to the dynamics of well-being. Their key message is that vulnerability scenarios at work may be determined by the level of job control resources solely, and they seem to occur in relatively mild situations where job demands are not necessarily excessive.

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Ethics Statement: IRB approval is not required for non-medical research with human subjects in Switzerland. The study was conducted in compliance with the ethical guidelines and procedures of the University of Lausanne and following the Psychologists' Code of Conduct. Before each measurement wave, participants received an invitation letter detailing the aims and procedure of the research study, asking them to take part in the survey, and ensuring confidentiality and informing about their right to withdraw at any moment.

Informed Consent Statement: Not applicable (consent to participate is implied by participants' actions to undertake the survey).

Data Statement: The archiving of the Professional Paths survey data is currently in progress. The 2016 and 2017 datasets that were used in the current study are archived at FORSBASE repository https://forsbase.unil.ch/

Conflict of Interest: The authors declare no conflict of interest

Study 2

The role of individual characteristics and working conditions in understanding boredom at work

Abstract

Purpose. This study proposes an examination of (1) the psychometric properties of the French version of two boredom scales (i.e., the Dutch Boredom Scale and the Boredom Proneness Scale Short Version), (2) the antecedents of boredom at work, based on an integrative theoretical framework drawing on the Job Demand-Resources model (JD-R, Bakker & Demerouti, 2017), and (3) the moderating effects of individual characteristics on the relation between contextual antecedents and boredom at work.

Design. The present study was based on a cross-sectional design with a sample of 363 Swiss workers. First, the two boredom scales were validated through a Confirmatory Factor Analysis (CFA). Then, in order to study the relative strength of the predictors of boredom at work, a hierarchical regression model was tested. Finally, the interaction effects between individual characteristics and contextual antecedents of boredom at work were tested.

Findings. Factor analyses revealed a unidimensional structure for both instruments. Regression results showed that boredom proneness, job demands, job autonomy and social utility added a significant percentage of incremental variance to the model. Moreover, a significant interaction between contextual and individual characteristics in predicting boredom at work was observed

Practical implications. Our findings stress the importance of taking into account employees' experiences at work when developing job design interventions to promote well-balanced working conditions for all, as well as targeted solutions for specific populations, in order to adequately address the issue of boredom in the workplace.

Originality. The current study explores the relatively under-researched topic of boredom at work, known to be detrimental for individuals and organizations. To date, research on its antecedents has been quite fragmented and we particularly contribute to the literature by investigating this aspect.

Keywords: boredom at work, boredom proneness, working conditions, social utility

1. Introduction

Although the experience of boredom at work was initially linked to jobs with low qualifications consisting of repetitive tasks (e.g., Branton, 1970), more recently boredom has been shown to manifest itself in a broad range of professions and occupational categories (Fisher, 1993; Harju *et al.*, 2014; Reijseger *et al.*, 2013) and to affect a large proportion of the workforce (e.g., Loukidou *et al.*, 2009). While boredom at work is an experiential phenomenon (i.e., a psychological sensation), it has a salient contextual basis. That is, the prevalence of boredom may reflect certain trends and characteristics of contemporary labour markets and organizations, which may adversely affect employees' experiences and thus be detrimental to their well-being and performances. It appears then that, to fully understand the subjective experience of work, it is necessary to take into account employees' needs in terms of "purpose, autonomy and mastery, as well as meaning, trust, respect, feelings of worth and relationship that lead to greater innovation, engagement and retention." (Plaskoff, 2017, p. 138).

The literature highlights that boredom at work has negative consequences for individuals and organizations (Kass *et al.*, 2001; Schaufeli and Salanova, 2013; van Hooff and van Hooft, 2014), including, for example, stress symptoms (Harju *et al.*, 2014), depressive feelings and distress (van Hooff and van Hooft, 2014), counterproductive behaviors (Bruursema *et al.*, 2011; Spector and Fox, 2005; van Hooff and van Hooft, 2014), turnover intentions (Reijseger *et al.*, 2013), and absenteeism (Kass *et al.*, 2001). Despite these observations,

research on boredom resulting from a lack of challenge, stimulation, and meaning at work remains scarce relative to the abundant literature on the detrimental effects of job strain caused by work overload. As a result, the knowledge about its key antecedents is not particularly elaborate. For instance, even though the literature highlights the potential importance of work-related meaning in the study of boredom (e.g., Fahlman *et al.*, 2009; van Tilburg and Igou, 2012; Westgate and Wilson, 2018), no study to our knowledge has considered perceived social utility as a preventive factor against boredom. Moreover, some existing studies have primarily considered boredom at work as a consequence of adverse working conditions (Reijseger *et al.*, 2013), whereas other authors have identified the potential role of individual differences in the propensity to experience boredom (Farmer and Sundberg, 1986). One theoretical model took into account contextual as well as dispositional characteristics as predictors of the experience of boredom at work, although they focused mainly on its consequences (van Hoof and van Hooft, 2014). In another study, researchers used an experimental design to examine the interaction between the situation and the person on the experience of boredom (Mercer-Lynn *et al.*, 2014). However, to date, no study has simultaneously tested the contributions of contextual and individual characteristics when predicting work-related boredom. This is an important issue to address considering boredom a part of employees' work experience, as it is possible to properly manage or cope with boredom at work only after identifying its main antecedents.

To fill these gaps, the present study proposes an examination of different variables that may predict the experience of boredom at work. To do so, we first aimed to validate scales measuring situational (i.e., the Dutch Boredom Scale) and dispositional (i.e., the Boredom Proneness Scale Short Version) aspects of boredom that were not initially available in French. Moreover, we examined the antecedents of boredom at work, by proposing an integrative model based on the Job Demand-Resources theoretical framework (JD-R, Bakker and Demerouti,

2007; Bakker and Demerouti, 2017) and including an additional job resource (i.e. social utility). Finally, to better grasp the experience of boredom at work both from a situational and a dispositional perspective, we also took into account the interaction between individual and contextual characteristics in predicting boredom at work.

1.1. The Experience of Boredom

Boredom can be defined as a negative emotional state, characterized by low activation and displeasure with the activity undertaken, with significant effects at the cognitive, emotional, behavioral and motivational levels (Mikulas and Vodanovich, 1993; Reijseger *et al.*, 2013; van Tilburg and Igou, 2012). On the one hand, work-related boredom is generally defined as a state-like response to unpleasant and passive work environment, characterized by contextual antecedents such as a lack of challenge, stimulation, and meaning (e.g., Harju *et al.*, 2014; Loukidou *et al.*, 2009; Reijseger *et al.*, 2013; Schaufeli *et al.*, 2012; Schaufeli and Salanova, 2013; van Hooff and van Hooft, 2014). On the other hand, some authors have pointed out the potential role of individual dispositions as antecedents of the trait-like propensity to experience boredom, namely boredom proneness (Farmer and Sundberg, 1986; van Hooff and van Hooft, 2014). Boredom proneness denotes individual differences in the propensity to experience boredom based on the need for stimulation (Farmer and Sundberg, 1986, Schaufeli and Salanova, 2013). As a result, different instruments measure either situational or dispositional boredom (Vodanovich and Watt, 2020). For example, Lee's boredom scale (Lee, 1986) measures situational job boredom as a consequence of repetitive tasks. The more recent one-dimensional Dutch Boredom Scale (Reijseger *et al.*, 2013) was developed by adapting items from existing general boredom scales to specifically grasp "the experience and manifestation of work boredom" (Reijseger *et al.*, 2013, p. 511). Concerning dispositional boredom, Vodanovich and Watt (2020) report two main trait-like measures, namely the Boredom Susceptibility Scale (Zuckerman, 1979) and the aforementioned Boredom Proneness Scale

(Farmer and Sundberg, 1986), the latter being further synthetized into a one-dimensional short version (Struk *et al.*, 2017).

Arguably, trait-like and state-like conceptions of boredom capture two different and only moderately correlated aspects of this emotional experience, and individual and contextual antecedents must be considered to achieve an accurate understanding of who experiences boredom and under which circumstances (Kass *et al.*, 2001). To do so, in the first step of our study we will examine and clarify the concepts of situational and dispositional boredom through the validation of the French version of two corresponding measures, namely the Dutch Boredom Scale and the Boredom Proneness Scale – Short Version.

1.2. Job Boredom: An Integrative Model

The current study proposes an innovative and integrative conceptual model for a thorough examination of boredom at work (Figure 1). In order to understand the impact of contextual antecedents on boredom at work, our study refers to the Job Demands- Resources Model (JD-R; Bakker and Demerouti, 2007) applied in the context of the study of situational boredom (Reijseger et al., 2013). To do so, our analyses take into account (1) the role of job demands and resources as antecedents of boredom, and (2) the potential interaction effects of individual and contextual variables in the prediction of boredom at work. In the following sections, we will present arguments to support the rationale of our conceptual model.

1.2.1. Job Demands and Job Resources

In order to identify the contextual antecedents of boredom, the Job Demands- Resources Model (Bakker and Demerouti, 2007) offers a good framework, since it allows to study many professional settings and work contexts characterized by different demands and resources (Bakker and Demerouti, 2007), yet leaves enough flexibility for the inclusion of additional job characteristics that may be relevant. For these reasons, the JD-R model could also offer a

relatively broad understanding of the experience of workers as conceptualized by by Plaskoff (2017) in terms of employees "perceptions about their work, their workplace and their relationships" (p.138). In this framework, job demands are defined as "physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" (Demerouti *et al.*, 2001, p. 501). Job resources, in turn, are defined as "those physical, psychological, social or organizational aspects of the job that may (…) (a) be functional in achieving work goals; (b) reduce job demands and the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti *et al.*, 2001, p. 501).

With regard to job characteristics, boredom at work has been mostly studied as a response to an unpleasant and passive work environment, characterized by lack of challenge and insufficient stimulation (e.g., Harju *et al.*, 2014, Loukidou *et al.*, 2009; van Hooff and van Hooft, 2014). Based on the assumptions of the JD-R model and without excluding the role of individual differences, Reijseger and colleagues (2013) postulated that boredom at work results, first and foremost, from understimulating working conditions, characterized by the co-occurrence of low job demands and low job resources. More specifically, low job demands such as low workload and low cognitive demands, and low job resources such as lack of autonomy, lack of social support, and insufficient feedback from the supervisor may act as situational triggers of work-related boredom (Bakker *et al.*, 2014; Reijseger *et al.*, 2013).

Concerning autonomy, it is important to specify that it stems from two different components, namely "decision authority" which rises from opportunities to participate in the organizational processes, but also "skill discretion" which refers to opportunities to use different skills and be creative in one's job (Karasek, 1979). Based on the existing literature (e.g., Reijseger *et al.*, 2013, Harju *et al.,*2014), the latter component seems to represent a central job characteristic in the study of job boredom, since it may be informative of a potential lack

of variety and skill underutilization which contribute to understimulating working conditions. However, the authority to make decisions and to influence the course of events could help employees to actively cope with adverse working conditions. For instance, in a study conducted in Norway, both aspects of autonomy were found to predict organizational health-related outcomes – such as job stress, commitment and job satisfaction – when combined, while having specific different impact when separated (e.g., decision authority did not have an impact on subjective health while skill discretion did; see Mikkelsen *et al.*, 1999). To our knowledge, no previous scientific work has tested the effect of these two aspects of autonomy on boredom at work, we hence address the question of their impact in an exploratory way.

In addition to the well-documented role of lack of adequate demands and resources, some authors have also suggested that boredom stems from a lack of meaning or purpose of the work itself (Fahlman *et al.*, 2009; van Tilburg and Igou, 2012). More precisely, boredom has been shown to imply "thinking that the situation serves no purposes" (Van Tilburg and Igou, 2012, p. 186). Arguably, perceived lack of meaning of work can produce negative outcomes, such as low job satisfaction and absenteeism (Steger *et al.*, 2012), and accentuate the risk of experiencing boredom and a sense of worthlessness (Barbalet, 1999; van Tilburg and Igou, 2012), whereas employees who perceive meaning at work have a tendency toward engagement and cooperation (Isaksen, 2000). Individuals tend to find their work meaningful when they perceive it as having a positive impact on others, thus aiming at self-transcending goals that contribute to the society (Arnoux-Nicolas *et al.*, 2017) and the "greater good" (Steger et al., 2012, p. 325). Such a conceptualization identifies perceived social utility as an essential ingredient of meaningful work (Morin and Aranha, 2007) and hence, a potential resource against boredom at work. Based on the previously cited literature, social utility may be considered an additional resource since it represents a job attribute that serves goal achievement, personal development and a sense of purpose, thus reducing psychological costs.

However, despite the fact that "lack of meaning in work has also been recognized as a fundamental element in the experience of boredom" (Harju *et al.*, 2014, p. 911), no previous studies have focused on the relationship between the perceived social utility and boredom at work. In order to offer a holistic view of job resources, we therefore propose to integrate perceived social utility alongside other job resources as a potential protective factor against work-related boredom.

1.2.2. Individual Characteristics and Boredom

To better understand the experience of boredom at work, it is pertinent to consider the role of individual differences in addition to job characteristics (van Hooff & van Hooft, 2014). In particular, it is important to distinguish between situational boredom, which is a state-like construct (Kass et al., 2001), and boredom proneness, defined as a dispositional trait (Vodanovich *et al.*, 1991). As mentioned earlier, boredom proneness refers to the propensity to experience boredom and thus, boredom-prone individuals should need higher levels of stimulation and variety to avoid getting bored at work. Furthermore, boredom proneness has also been associated with negative affect experiences and behaviors (e.g., Lee and Zelman, 2019; Sommers and Vodanovich, 2000). Therefore, boredom proneness may have a moderator role in the relation between job characteristics and boredom. Specifically, we expect the negative link between job characteristics – represented by job demands and resources – and boredom at work to be weaker for boredom-prone individuals.

In addition, as the experience of boredom also implies the perception of one's activities as being meaningless, it is necessary to consider meaning-related individual differences. Sense of coherence (SOC) is one such individual characteristic, defined as a general orientation to comprehend, manage, and attribute meaning to the environment (Antonovsky, 1979), as it can help people make sense of the demands they face, identify resources to cope with such demands,

and engage in meaningful activities (Rothmann *et al.*, 2003). SOC has been linked to positive well-being (Feldt, 1997), successful coping with adverse working conditions (Van der Colff and Rothmann, 2009), and reduced levels of burnout (Johnston *et al.*, 2013). It is thus pertinent to consider the role of SOC in the relationship between contextual characteristics and the experience of boredom at work. Specifically, we expect the link between unfavorable job characteristics and boredom at work to be weaker for individuals with higher scores on SOC.

As a result, in the current study, we investigate the role of boredom proneness and sense of coherence, respectively as individual vulnerabilities and protective factors in interaction with job demands and resources.

1.3. The Present Study

The present study had three aims. Firstly, two instruments assessing state-like and trait-like boredom, namely the Dutch Boredom Scale (DUBS; Reijseger *et al.*, 2013) and the Boredom Proneness Scale Short-version (Struk *et al.*, 2017), were validated in a French speaking context [1]. Secondly, the present study examined contextual antecedents of boredom within an integrative conceptual model, based on the JD-R framework (i.e., job demands, autonomy, support, feedback) with the addition of perceived social utility. Thirdly, the proposed model also took into account potential interactions between job characteristics and individual characteristics (i.e., boredom proneness and sense of coherence, see Figure 1), in order to examine the relative impact of individual and contextual antecedents in predicting boredom at work. Age and gender were introduced as control variables, since previous studies have found negative associations between age and boredom, while being a male was shown to be positively correlated with boredom (see Harju *et al.*, 2014; Harju *et al.*, 2016; Sundberg *et al.*, 1991; van Hooff and van Hooft, 2014; Vodanovich and Kass, 1990).

Based on our theoretical assumptions, we have raised the following hypotheses:

H1: The French versions of the Dutch Boredom Scale (DUBS; Reijseger *et al.*, 2013) and the Boredom Proneness Scale Short-version (Struk *et al.*, 2017) are valid measures, each presenting a clear unidimensional structure.

H2: After controlling for age, gender and individual characteristics, we expect a negative relation between job demands, resources, and boredom.

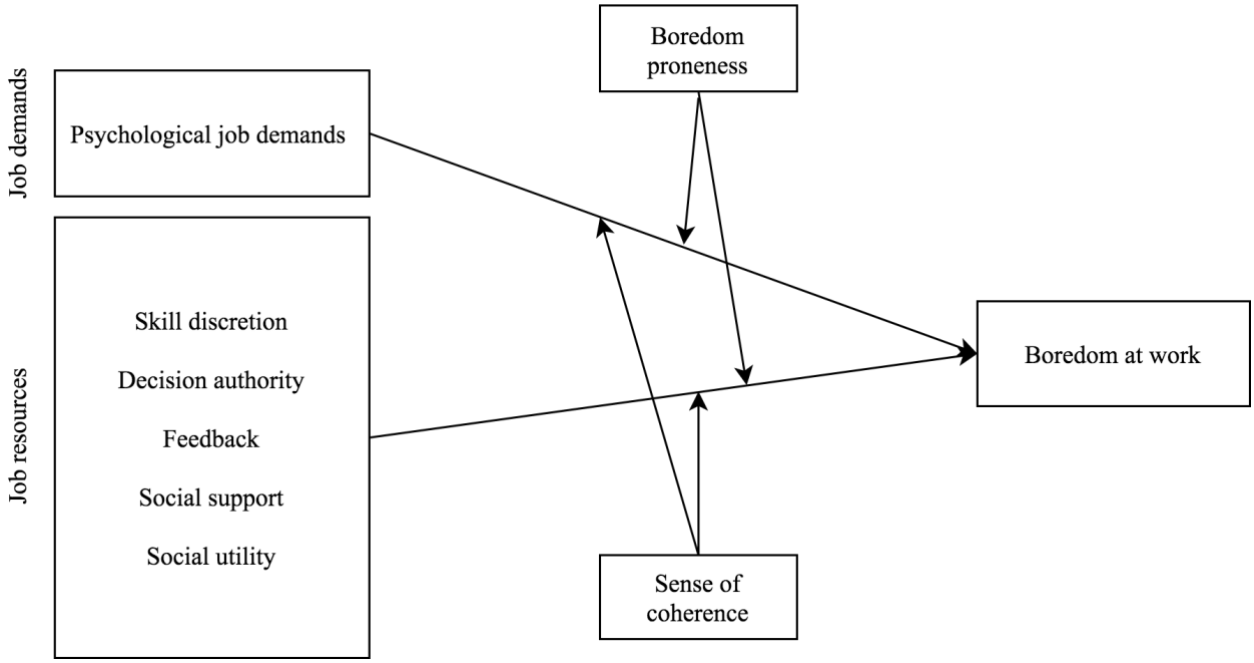
H3: We expect individual characteristics to interact with contextual characteristics when predicting boredom. Specifically, we formulate two sub-hypotheses as follows:

H3a: Boredom proneness will moderate the negative relationship between job characteristics and boredom so that the negative relationship between job demands and resources and boredom at work is weaker for individuals reporting higher levels of boredom proneness.

H3b: Sense of coherence will moderate the relationship between job characteristics and boredom, so that the negative relationship between job demands and resources and boredom is weaker for individuals reporting higher scores of SOC.

Figure 1.

Integrative model of boredom at work



2. Method

2.1. Participants

The study was based on a heterogeneous sample of employed individuals in the French-speaking part of Switzerland (N = 363), aged between 20 and 65 (M_{age} = 39.30, SD = 12.41). Female respondents represented 55.6% of the sample. Different professional domains and various education levels were represented, as 20.1% of respondents were executives, 21.5% were academic and liberal professionals, 24% were administrative personnel, 14.3% were active in intermediate professions [2], 11.8 % were sales personnel, and the rest were blue-collar workers, such as craftsperson, machine operators, and unskilled workers. One participant did not disclose their domain of activity. The data were collected online, using the Limesurvey

platform, and two different sources were used for participant recruitment. Part of the sample was recruited through a collaboration with the human resources department of a public organization, whereas the remaining sample was recruited in private organizations by third year bachelor students engaged in a methodology course. Participation in this study was voluntary and data were collected and analyzed in compliance with the ethical standards of the Swiss Psychological Society.

2.2. Measures

Boredom Proneness

Tendency to experience boredom was assessed using the French version of the 8-item Boredom Proneness Scale-Short Form (Struk *et al.*, 2017). It is a unidimensional measure of dispositional aspects of boredom (e.g., "It takes more stimulation to get me going than most people") that uses a 5-point Likert-type response scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale was translated into French using the forward and back translation procedure.

Sense of Coherence

Sense of coherence was measured with the 13-item French version of the Sense of Coherence Scale (Gana & Garnier, 2001). The questions consisted of incomplete sentences that the participants were required to answer using a 7-point Likert scale with various anchors. For example, the item "Doing the things you do every day is a source of" had to be rated on a scale ranging from 1 (*deep pleasure and satisfaction*) to 7 (*pain and boredom*).

Working Conditions

Perceived working conditions, in terms of job demands, autonomy, and social support were assessed using the French version of the Job Content Questionnaire (Karasek, 1979; Niedhammer *et al.*, 2006;). This instrument contains 26 items distributed across three subscales. The demand subscale measures psychological demands, (i.e., workload/time pressure,

cognitive demands, and work hassles) through nine items (e.g., “My job requires me to work very hard mentally”). The autonomy subscale encompasses skill discretion (six items, “My job involves learning new things”) and decision authority (three items, “I have the freedom to decide how I do my job”). Finally, the social support subscale includes both supervisor’s (e.g., “my superior pays attention to what I tell him") and colleagues’ support (e.g., "the people I work with are friendly”). Participants were asked to rate the items on a 4-point response scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

Feedback at Work

To assess supervisor feedback, two items were developed for the current study to inquire about the quality (“I have the necessary information to evaluate the progress of my work”) and the quantity (“I regularly receive feedback from my superiors about the quality of my work”) of the feedback received. Participants answered using a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*.).

Perceived Social Utility of Work

Perceived social utility was measured with a three-item subscale taken from the Meaning of Work Inventory (Arnoux-Nicolas *et al.*, 2017). This subscale evaluates the perceived general purpose of one’s work and its impact on others and on society (“I sometimes think my work is not very useful”), with a 7-point Likert-type response scale ranging from (*strongly disagree*) to 7 (*strongly agree*).

Boredom at Work

The Dutch boredom scale (DUBS; Reijseger *et al.*, 2013) was used to measure the experience of boredom. This unidimensional instrument is composed of six items (“I feel bored at my job”). Participants answered to this questionnaire using a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). The scale was translated into French following the procedure of forward and back translation.

In addition, standard demographic information was collected at the beginning of the questionnaire. Participant age and gender were assessed with one question, respectively asking to indicate their age in years as well as their gender (female = 1, male = 2).

2.3. Statistical Analyses

R statistical package was used to conduct the first part of the analyses. The data were analyzed in several steps. First, we examined the psychometric properties of the French versions of the DUBS and the Boredom Proneness Scale, which were translated from English for this study specifically. To this end, confirmatory factor analyses (CFA) were conducted using the maximum likelihood estimator, and unidimensional models were tested for each scale separately. The fit indices used to evaluate model fit were the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean residual (SRMR) and the root mean square error of approximation (RMSEA). The model was considered to have an acceptable fit if the CFI was ≥ .90, the TLI was > .95, and the SRMR and RMSEA were .08 or less (Cheung and Rensvold, 2002; Hu and Bentler, 1999).

Once the scales were validated, the subsequent analyses (namely, descriptive analyses and hierarchical regressions) were conducted using the SPSS statistical package (version 26.0). More precisely, we calculated the means, standard deviations, and bivariate correlations between all study variables. Then, to examine the relative impact of each group of variables, we tested a three-step hierarchical regression model, in which three groups of variables predicted boredom at work (i.e., demographic variables, dispositional variables, and contextual variables). In the first block of the model, we regressed boredom at work on the demographic variables (i.e., age and gender). In the second block, we added boredom proneness and sense of coherence. In the third and last block, we added psychological job demands, skill discretion, decision authority, social support, feedback, and social utility. R^2 change statistics were used to

inspect incremental model fit. Finally, the moderation effect of individual variables (i.e., boredom proneness and SOC on the link between job demands and resources and boredom at work, see Figure 1) was tested using Process version 3.5.3 (Hayes, 2020) while controlling for age and gender.

3. Results

3.1. Confirmatory Factor Analysis

Boredom at Work

The initially tested unidimensional 6-item model showed rather poor fit: $\chi^2(9) = 80.84$, $p < .001$, CFI = .933; TLI = .889; RMSEA = .148, SRMR = .059. Following model modification indices that were greater than 30, two error covariance terms were subsequently added to the model (between item 3 and item 5, and between item 5 and 6). The adjusted model fitted the data very well: $\chi^2(7) = 10.98$, $p = 0.139$, CFI = .996; TLI = .992; RMSEA = .040, SRMR = .019. As shown in Table 1, factor loadings varied between 0.55 and 0.91, suggesting that the French version of the DUBS is a valid unidimensional measure of boredom at work.

Boredom Proneness

The unidimensional 8-item model showed acceptable fit indices: $\chi^2(20) = 56.79$, $p < .001$, CFI = .952; TLI = .932; RMSEA = .071, SRMR = .044. As shown in Table 1, factor loadings varied between 0.51 and 0.83. These findings suggest that the French version of the Boredom Proneness Scale is a valid unidimensional measure of the tendency toward boredom.

Table 1.

Items and standardized factor loadings of the French version of the Dutch Boredom Scale and the Boredom Proneness Scale – Short Version

Dutch Boredom scale		
Label	Item	Loadings
Item 1	At work, time goes by very slowly	.861
Item 2	I feel bored at my job	.908
Item 3	During work time I daydream	.641
Item 4	It seems as if my working day never ends	.719
Item 5	I tend to do other things during my work	.550
Item 6	At my work, there is not so much to do	.600
Boredom Proneness Scale – Short Version		
Label	Item	Loadings
Item 1	I often find myself at "loose ends," not knowing what to do.	.517
Item 2	I find it hard to entertain myself.	.519
Item 3	Many things I have to do are repetitive and monotonous	.512
Item 4	It takes more stimulation to get me going than most people.	.610
Item 5	I don't feel motivated by most things that I do.	.632
Item 6	In most situations, it is hard for me to find something to do or see to keep me interested.	.830
Item 7	Much of the time, I just sit around doing nothing	.630
Item 8	Unless I am doing something exciting, even dangerous, I feel half-dead and dull.	.530

Note. Scales validated in French can be obtained from the corresponding author upon request.

3.2. Descriptive Statistics

Means, standard deviations, and bivariate correlations were calculated between all variables. The descriptive information, including Cronbach's α reliability scores, is provided in Table 2. It shows small to moderate correlations between boredom at work and the investigated predictors, in line with the theoretical framework.

Table 2.

Means, standard deviations and bivariate correlations between the variables.

	1	2	3	4	5	6	7	8	9	10	11
(1) Age	-										
(2) Gender	-.12*	-									
(3) Boredom proneness	-.20**	.08	**.81**								
(4) Sense of coherence	.18**	.09	-.57**	**.81**							
(5) Psychological job demands	.10	.03	-.06	-.02	**.76**						
(6) Skill discretion	.05	.15**	-.37**	.28**	.19**	**.80**					
(7) Decision authority	.02	.23**	-.28**	.29**	-.01	.63**	**.77**				
(8) Social support	-.07	.01	-.25**	.30**	-.13*	8**	.35**	**.86**			
(9) Feedback	.02	.07	-.12*	.28**	-.02	.26**	31**	.49**	**.76**		
(10) Social utility	.10	-.09	-.34**	.34**	-.07	.30**	.27**	.32**	.25**	**.76**	
(11) Boredom at work	-.33**	.09	.40**	-.35**	-.16**	-.35**	-.21**	-.21**	-.21**	-.44**	**.87**
M	39.30	1.44	1.89	4.74	2.64	3.07	2.87	2.98	4.58	5.68	2.45
SD	12.41	0.50	0.63	0.86	0.48	0.52	0.67	0.55	1.35	1.19	1.02

Note. Cronbach's alpha reliability coefficients are indicated in bold on the diagonal.
N= 363. ***p<0.001, **p<0.01, *p<0.05.

3.3. Hierarchical Regressions

The results of the three-step regression analyses[13] are provided in Table 3 and they showed a significant negative effect of age (β =-.33) on boredom at work. This effect remained significant across all three steps, after adding other predictors, while gender showed no significant effect. Concerning dispositional variables, both boredom proneness and sense of

[13] Before running regression, we tested the measurement model of job resources (i.e. skill discretion, decision authority, social support, feedback and social utility). Fit indexes for the measurement model were: TLI = .915; CFI = .928, RMSEA = .057; SRMR = .059

coherence had respectively a significant positive (β = .25) and negative (β = -.16) effect on boredom at work in the second step of the analysis, also increasing the amount of explained variance in a significant way. The introduction of the contextual variables in the third and final step of the model resulted in a significant increase of explained variance, up to 37% in total. At this stage, the variables that had a significant effect on boredom were age (β = -.24), boredom proneness (β = .14), job demands (β = -.12), skill discretion (β = -.18), and perceived social utility of work (β =-.29).

Table 3.

Standardized regression coefficients predicting boredom at work.

	Step 1	Step 2	Step 3
	Boredom at work	Boredom at work	Boredom at work
Age	-.33***	-.25***	-.24***
Gender	.05	.05	.05
Boredom Proneness	-	.25***	.14*
Sense of Coherence	-	-.16**	-.08
Psychological job demands	-	-	-.12**
Skills discretion	-	-	-.18**
Decision authority	-	-	.06
Social support	-	-	-.02
Feedback	-	-	-.06
Social utility			-.29***
R^2	.11	.24	.37
ΔR^2	-	.13***	.13***
F (2,355)	22.76***	-	-
F (4,353)	-	28.31***	-
F (10,347)	-	-	20.68***

Note. N= 363. ***p<0.001, **p<0.01, *p<0.05.

3.4. Moderation effects

Moderation analyses were conducted based on the model displayed in Figure 1, and controlling for age and gender. Concerning boredom proneness, results showed a significant interaction effect with job demands t(5,352) = 2.04, $p<.05$, as well as with feedback t(5,352) = -3.65, $p<.001$, while no significant interaction effect was found with skill discretion t(5,352) = .33, $p=.74$, decision authority t(5,352) = -.78, $p=.43$, social support t(5,352) = -1.35, $p=.18$, and social utility t(5,352) = .59, $p = .56$ in predicting boredom at work.

Concerning sense of coherence, results showed a significant interaction with social support t(5,352) = 2.08, $p <.05$ and feedback t(5,352) = 3.13, $p<.01$, while no significant interaction effect was found for job demands t(5,352) = -1.34, $p = .18$, skill discretion t(5, 352) = -.28, $p = .78$, decision authority t(5,352) = -.06, $p = .96$, and social utility t(5,352) = 1.30, $p = .20$ in predicting boredom at work.

For significant moderation results, details on the conditional effects of the predictors at different values of the moderator are displayed in Table 4, as well as graphically in Figure 2 (quadrants A, B,C,D).

Table 4.

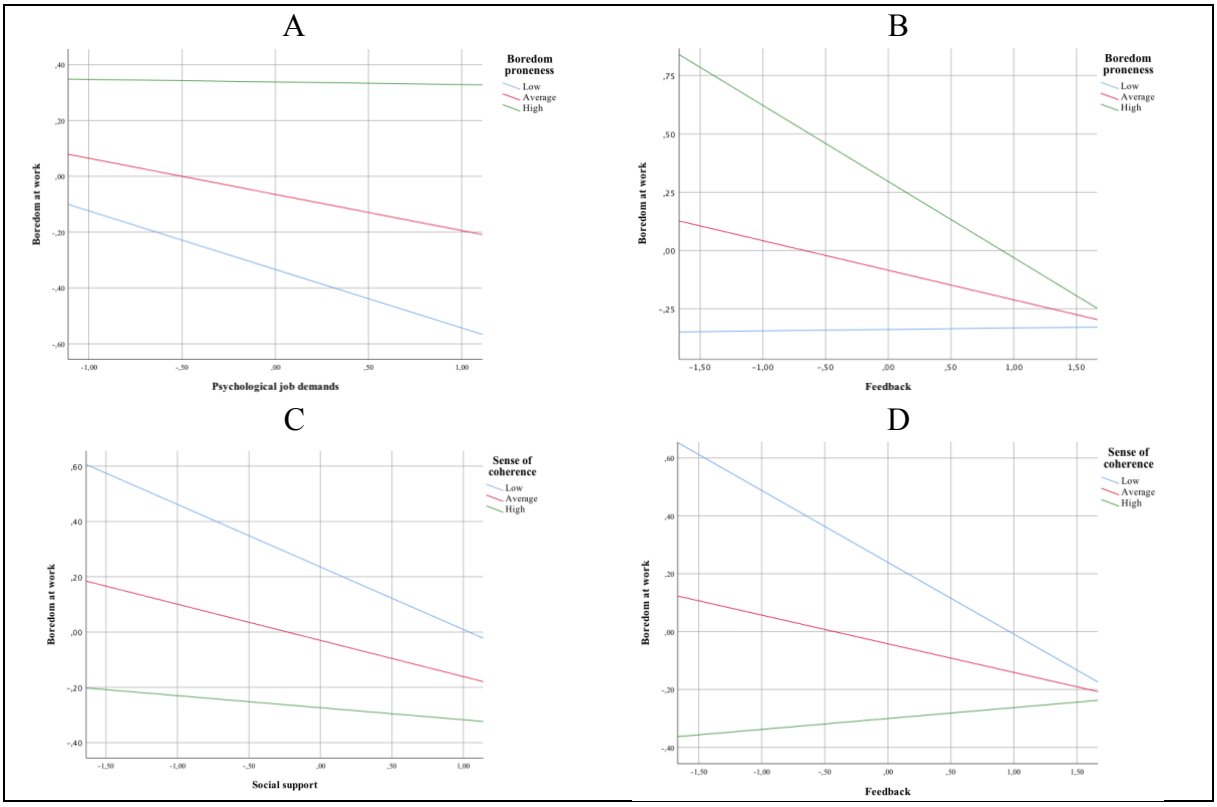
Conditional effects of the predictors at different values of the moderator

Predictor-outcome variables	Moderator levels	β	SE	*t*	*p*	95%CI [LL,UL]
Demands → boredom	Boredom proneness					
	Low (25%)	-.21	.07	-3.13	.002	[-.34, -.08]
	Average (50%)	-.13	.05	-2.73	.007	[-.22, -.04]
	High (75%)	-.01	.07	-.14	.892	[-.14, .13]
Feedback → boredom	Boredom proneness					
	Low (25%)	.01	.07	.10	.924	[-.12, .14]
	Average (50%)	-.13	.05	-2.70	.007	[-.22, -.04]
	High (75%)	-.33	.06	-5.14	.000	[-.45, -.20]
	Sense of coherence					
Social support → boredom	Low (25%)	-.23	.06	-3.73	.002	[-.35, -.11]
	Average (50%)	-.13	.05	-2.60	.010	[-.23, -.03]
	High (75%)	-.04	.07	-.61	.545	[-.19, .10]
Feedback → boredom	Sense of coherence					
	Low (25%)	-.25	.06	-4.06	.000	[-.37, -.13]
	Average (50%)	-.10	.05	-1.99	.047	[-.20, -.00]
	High (75%)	.04	.07	.52	.606	[-.11, .18]

Note. β refers to standardized regression coefficients. 95% CI refers to a 95% confidence interval, LL refers to the lower bound of the confidence interval, UL refers to upper bound of the confidence interval.

Figure 2.

Results (Z-scores) of the statistically significant interaction effects of individual and contextual variables



Concerning the moderating effect of boredom proneness, results showed that the link between job demands and boredom was weaker for individuals scoring higher on boredom proneness. In fact, results showed that individuals reporting higher scores of boredom proneness reported a similar level of boredom irrespective of the level of job demands, while it was not the case for individuals reporting average or low scores of boredom proneness (Figure 2, quadrant A). Moreover, our results showed that the link between feedback and boredom at work was stronger for individuals with average and high scores of boredom proneness, while for those having the lowest scores on boredom proneness, feedback did not have an effect on job boredom (Figure 2, quadrant B). Concerning the moderating effect of SOC, results showed

that the link between social support and boredom was stronger for individuals reporting average and low scores of sense of coherence, while this link was not significant for individuals with higher scores of sense of coherence (Figure 2, quadrant C). The same interaction effect was found between feedback and SOC (Figure 2, quadrant D).

4. Discussion

The aims of the current study were to (1) validate two measures of state and trait boredom, namely the Dutch Boredom Scale (Reijseger *et al.*, 2013) and the short version of the Boredom Proneness Scale (Struk *et al.*, 2017), (2) to investigate the antecedents of the experience of boredom at work based on the JD-R model while integrating perceived social utility, and (3) to test the interaction effects between contextual and individual characteristics in predicting boredom at work.

Firstly, our findings supplement the existing conceptual attempts to understand boredom (Farmer and Sundberg, 1986; Reijseger *et al.*, 2013). The results were in line with H1 highlighting the unidimensional structure of both measures of boredom. Indeed, the French version of the Dutch Boredom Scale was found to have a one-dimensional structure, as demonstrated not only in the original version tested in the Netherlands (Reijseger *et al.*, 2013) but also in other contexts such as South Africa (Van Wyk *et al.,* 2016). As previously mentioned, two error covariance terms were added to the model. This was the case for item 3 (i.e., “During work time I daydream”) and item 5 (i.e., “I tend to do other things during my work”), and for item 5 and 6 (i.e., “At my work, there is not so much to do”). An interpretation of these results could be that these items present some similarities in their meaning. In the first case, item 3 and item 5 are similar, since “to daydream” is an activity that could fit the description of “other things” of item 5. Concerning item 5 and 6, they seem to represent the two sides of the same coin, since if at work there is not a lot to do, employees will probably tend to

do “other things”. With regard to the French version of the Boredom Proneness Scale – Short Version, a one-dimensional structure was found, coherent with the original validation (Struk *et al.*, 2017).

4.1. Contextual Antecedents

Concerning working conditions, the results of the current study highlighted job demands and skill discretion as negative predictors of boredom at work, congruently with H2. These results are also in line with the existing literature (Reijseger *et al.*, 2013). Indeed, a sufficient level of job demands can be considered as a source of challenge and stimulation (Van den Broeck *et al.*, 2010). Moreover, skill discretion also contributes to cognitive stimulation by providing employees with opportunities to learn new things, develop their skills, and engage in creative problem solving (Ohly *et al.*, 2006), which demonstrates its crucial role as a resource to counteract job boredom. On the contrary, despite the significant negative correlation between decision authority and boredom, the former did not show a significant effect on boredom. This inconclusive result could be explained by the fact that this subdimension of autonomy may be less important compared to skill discretion in the framework of the study of the antecedents of boredom. If we consider that “boredom may be understood as an emotion that signals lack of progress towards goals” (Van Hooft & van Hooff, 2018, p. 932), skill discretion – including learning opportunity, the use of different skills and creativity – could be more functional than decision authority in contributing to the sensation of progressing, and hence be more effective against boredom than decision authority. Interestingly, van Hooft & van Hooff (2018) found that boredom can occur in presence of both high and low levels of task-autonomy – which is quite close to the decision authority component of autonomy used in this study– leading to differently activated affective responses (i.e., respectively depressed affect versus frustration). Hence, while decision authority is an important resource to deepen the study of affective differences in the experience of job boredom – and its role in understanding boredom at work

cannot be excluded – it is possible that its effects were overshadowed by that of skill discretion in our study.

Contrary to our expectations, social support and feedback did not contribute to the prediction of boredom at work. Regarding social support, these results may be explained by the somewhat ambiguous effect of social interactions on well-being at work. Indeed, in their study on workplace social support, Harris and colleagues (2007) highlighted the importance of distinguishing the role of different types of social support, since their effects on job satisfaction were different. Even though social support at the workplace is generally considered as a resource (Bakker & Demerouti, 2017), the search for particular types of social support, such as collegial support, defined as "sharing friendships, personal problems, and confidences" (Harris *et al.*, 2007, p. 151) may be triggered by the need to express dissatisfaction, and thus be negatively linked with well-being (Harris *et al.*, 2007). Such ambiguous results were also highlighted in other studies, showing for instance that technology-based social interactions positively contribute to learning and motivation if one can control them to avoid adverse side-effects, such as "abusing social interaction tools for "chitchat" (Shi *et al.*, 2014, p. 116) that could decrease motivation. In light of these results, since the measure used in our study includes different aspects of social support, we can presume that its positive role may be blurred by its negative side-effects. Concerning feedback, even though our results do not confirm its role as a general resource against boredom for all participants, further analyses suggest that it may benefit to employees with particular needs or profiles, as it is explained later in the discussion.

Finally, our results highlighted a strong negative contribution of perceived social utility of work in the prediction of boredom at work. Considered a central feature of meaningful work, social utility thus potentially represents an important resource against boredom at work and more generally against adverse effects of modern work on employees' health and well-being (Massoudi *et al.*, 2018; Morin and Aranha, 2007; Toscanelli *et al.*, 2019; Westgate and Wilson,

2018). Indeed, various authors have observed the recent proliferation of so-called "bullshit jobs," characterized by tasks devoid of social contribution and opportunities for personal accomplishment, which gradually plunge employees into a sense of alienation and uselessness (Graeber, 2018; Guichard, 2016). Therefore, from a practical point of view, the distinct and co-occurring effects of challenge-related and meaning-related characteristics of work may help foster and implement interventions to develop job resources, promote healthy organizational environments and improve workers' experiences at work. Accordingly, such interventions should not only take into account employees' needs, in terms of self-enhancement, stimulation and personal growth, but also consider their yearning for self-transcendence, social meaning, and a sense of connectedness (Massoudi *et al.*, 2018; Morin and Aranha, 2007).

4.2. Individual antecedents

Before discussing the role of boredom proneness and sense of coherence in predicting boredom at work, it is interesting to highlight the potential role of age in in the experience of boredom. Indeed, even though age was only used as a control variable, it was a significant predictor of boredom at work in our study, with younger employees showing a higher propensity to experience boredom at work than their older counterparts. Such results could be interpreted in light of some earlier findings. For example, the literature suggests that when entering the labor market, young workers might have higher expectations than older ones (Trevino, 2017), or their expectations regarding work and tasks could be somewhat misaligned (Loukidou et al., 2009). Younger employees may therefore react more strongly to the working conditions that do not correspond to the pre-defined image (Loughlin and Barling, 2001). On the other hand, gender did not predict boredom in a significant way, which is usually also the case for other work experiences such as engagement or burnout (Korunka *et al.*, 2009). The

literature on gender effects is inconclusive and there are some studies (e.g., van Hooff and van Hooft, 2018) that also did not observe gender differences in the experience of state boredom.

As expected in H3, boredom proneness positively predicted the experience of boredom at work, thereby adding to the results of previous studies (e.g., Kass *et al.*, 2001). This is not surprising, given the definition of boredom proneness as the degree of stimulation needed by the individual to not experience boredom (Farmer and Sundberg, 1986). However, this result highlights the importance of taking into account individual traits in the study of job boredom, as the contribution of boredom proneness exceeded that of contextual variables. On the other hand, the findings concerning the role of SOC were less clear. Indeed, when contextual characteristics were not considered, SOC appeared as a negative predictor of job boredom, which seems in line with its documented function as an individual resource to cope with adverse working conditions (Johnston *et al.*, 2013; Malinauskienė *et al.*, 2009). However, the fact that its significant contribution disappeared when considering contextual characteristics, may demonstrate the importance of context, over and above individual resources such as SOC, in the experience of work-related boredom.

Remarkably, the results of our study show that both dispositional and contextual variables should be included for a better understanding of boredom at work, suggesting that the contextual model of boredom (Reijseger *et al.*, 2013) may be enriched and improved by including sociodemographics and dispositional predictors.

4.3. Interaction effects

The analysis of interaction effects between individual characteristics and working conditions showed quite interesting results, which partially supported our hypotheses (H3a and H3b).

As expected, results showed a significant interaction between boredom proneness and job demands in predicting situational boredom. These results are congruent with the literature that suggests the role of boredom-proneness as a vulnerability factor in the face of work-related boredom (Farmer and Sundberg, 1986, Schaufeli and Salanova, 2013). Indeed, whereas they contribute to alleviating the experience of boredom for most employees by responding to their needs for stimulation, job demands *per se* seem insufficient for employees reporting high propensity to experience boredom who may thus need specific job resources. To this end, our findings highlighted a significant interaction between boredom proneness and feedback, pointing to the potential role of this job resource in counteracting boredom for boredom-prone employees. Feedback is considered as an important resource contributing to goal attainment and motivation (Sparr & Sonnentag, 2008), whereas boredom represents a state characterized by feelings of lack of progress towards significant personal goals (van Hooft &van Hooff, 2018). Hence, for employees with higher propensity to feel bored, clear and sufficient feedback may represent a crucial impetus to progress at work and focus on goal attainment, which presumably makes their tasks more meaningful and less boring.

Finally, our study also highlighted a negative relationship between two job resources, namely social support and feedback, and situational boredom for employees with average and low SOC. It seems that, for such employees, feeling cared for and supported through positive social interactions and constructive feedback at the workplace, represents a protective resource against boredom. In line with the literature, these results suggest that social support is particularly of use for people who lack a sense of coherence , as it helps them to make sense of the demands they face and to identify available resources in the environment to address them (Rothmann *et al.*, 2003).

4.4. Practical Implications

Our study contributes to the literature by examining the interactions between the contextual and individual characteristics in explaining boredom at work and suggests several practical implications to promote employees' positive work experiences. First, our findings highlight the importance of tailored job design interventions at the organizational level, targeting certain groups of employees with specific needs or characteristics (Udayar *et al.*, 2020). Second, our results remind that organizational interventions should focus on well-balanced working conditions in terms of demands and resources, not only to alleviate job strain, but also to prevent job boredom and its detrimental consequences. The experience of boredom, far from being reducible to underqualified and monotonous jobs, stems from several complex contextual characteristics that may hinder positive and meaningful work experiences in a wide array of work domains. In this regard, our study identifies the crucial role of skill discretion as a resource against boredom, as it may provide employees with opportunities to deploy and develop their skills and engage in creative problem solving. This finding seems particularly relevant in the current world of work, since recent and ongoing changes (e.g., intense pressure induced by market-based demands and insecurity, routinization brought by technological applications) may potentially thwart employees' efforts to experience self-growth and autonomy at the workplace (Burke and Ng, 2006; Cascio, 2003, ILO, 2019).

Moreover, our study also highlighted the potential contribution of perceived social utility in preventing the experience of boredom. This aspect may be particularly interesting from a human resources management perspective as in the current era of big organizations, numerous employees may feel as a *small cog in a big wheel*, thus losing their sense of purpose and utility. Hence, job design interventions may consider addressing this issue to enhance employees' perception of meaningfulness and usefulness of their work.

Overall, these findings emphasize the importance of integrating employees' experiences at the workplace to adopt a holistic approach to human resources, as suggested by Plaskoff (2017). Such an approach stresses the mutual and balanced contributions between employees and organizations, by recognizing employees' need for meaning and purpose, and by enabling their active participation and engagement. In a way, boredom at work reflects a dysfunctional job design, and thus restituting the balance between employees' needs and organizational demands would be beneficial to avoid a range of negative consequences for both parts (e.g., stress symptoms, counterproductive behavior, turnover, etc.).

Finally, our findings could also be informative when seeking to cope with the fast and dramatic changes brought by the Covid-19 pandemic to the work settings and methods. Indeed, it seems essential to re-examine the balance between contextual characteristics – demands and resources – that could be undermined and/or enhanced for certain employees when transitioning to remote working (Raišienė *et al.*, 2020). For example, specific groups could be particularly affected by the social isolation relative to remote work, as it may exacerbate their perceived lack of social support and feedback. Following this logic, targeted solutions and supports are of primary importance to help particular employees adapt to such disruptive and new ways of working and protect them against negative wok-related outcomes such as situational job boredom.

4.5. Limitations and Further Research

Our study has several shortcomings that are worthy of note. First, all variables were measured using a cross-sectional design which limits conclusions about causality. For this reason, future research should implement a longitudinal design to explicitly determine causality links between boredom at work and related job and personal characteristics. A second limitation stems from the limited sample size in the current study. Future research may consider using

larger heterogeneous samples, in terms of professional domain, activity sector and other labor market characteristics, to better understand the experiences and needs of the general workforce. Finally, the current study used an overall measure of psychological job demands. Further examination may be useful to distinguish between different types of job demands (e.g., mental, emotional, and physical) as well as between stimulating job demands (such as workload and cognitive demands) and work hassles (such as interruptions and contradictory demands), as they may have different implications for boredom.

5. Conclusion

First, this study provides a French validation of two useful instruments to measure situational and dispositional boredom. Second, our findings reveal the significant role of working conditions in the experience of boredom at work. Work context and conditions have the advantage of being manageable, which means that job re-design interventions may be useful in order to better balance different job demands and job resources, and thus prevent boredom at work.

Finally, the current study also has shown the salience of personal dispositions in the examination of situational boredom. Our findings suggest that dispositional characteristics should be considered to better determine "who" experiences boredom and "under which circumstances", thus highlighting the importance of tailored job design solutions and strategies targeting specific populations.

[1] Scales validated in French can be obtained by writing to the corresponding author.

[2] In the current study, intermediate professions reflect such occupational categories as, for example, technicians, accountants, nurses, etc.

Study 3

Better Bored Than Burned-Out? Cynicism as a Mediator Between Boredom at Work and Exhaustion

Abstract

Boredom at work occurs in the context of low demands and resources and can create negative consequences for the employees. However, the existing literature is lacunary concerning the processes underlying the link between boredom and its negative consequences. Based on the concept of tedium, this study examines the link between boredom at work and exhaustion, and the process that underlies it. Analyses were conducted on a sample of 452 adults working in Switzerland. Our study's results showed that the link between boredom at work and exhaustion was mediated by cynicism, representing a disengagement from work. These findings are discussed following the conservation of resources theory, and practical implications for organizations are highlighted.

Keywords: boredom, burnout, work environment, job resources, wellbeing at work

1. Introduction

In the last decades, there has been a scholarly effort to understand boredom at work, defined as a state of employee ill-being, which occurs as a reaction to situations or tasks that fail to stimulate individuals, and consequently to capture their interest and attention (Harju & Hakanen, 2016). Even though boredom at work was traditionally studied in relation to monotonous and repetitive activities, more recent research has revealed its prevalence in a large number of work contexts and organizations (e.g., Harju et al., 2014), which implies that a variety of jobs may trigger this state of mind to some extent.

Boredom at work manifests in a context of low job demands and low job resources and it is associated with performance-related negative outcomes, such as counterproductive behaviors (Bruursema et al., 2011; Spector & Fox, 2005; van Hooff & van Hooft, 2014); turnover intentions (Reijseger et al., 2013); and absenteeism (Kass et al., 2001), as well as ill health-related indicators, namely stress symptoms (Harju et al., 2014), depressive feelings and distress (van Hooff & van Hooft, 2014, 2016), and frustration (Van Tilburg & Igou, 2017; van Hooft & van Hooff, 2018). Therefore, such findings clearly suggest that boredom potentially leads to a host of negative consequences, both at an organizational and an individual level (Reijseger et al., 2013), and as such should be considered a serious threat in terms of work-related health and wellbeing.

Although the actual state of research is mainly focused on the definition and the correlates of boredom, the consequences mentioned above call for a better understanding of the psychological mechanisms linking boredom to its negative effects. To date, empirical investigations exclusively aimed at exploring the so-called passive dimension of work have been quite scarce. This line of research has been largely overshadowed by studies focusing on the effects of excessive demands and overload at work in terms of strain and burnout, thus considering overstimulating job conditions as the key source of health problems and ill-being. However, as Schaufeli and Salanova (2014) suggest, "the effects of overstimulation (e.g., burnout) and understimulation (e.g., boredom) seem to overlap to some extent since both are characterized by feeling worn out" (p. 298). Whilst this observation seems to point to two essential pillars of adverse work experiences, namely under- and overstimulation, to our knowledge no studies have tried to empirically investigate their different underlying processes that may lead to similar and overlapping outcomes.

The current study aims to explain this overlap by drawing on the concept of tedium (Kafry & Pines, 1980). This concept is particularly useful in disentangling the negative effects

of various and somewhat different work environments because it postulates that adverse working conditions (i.e., that they may be too much or demanding too little) can ultimately lead to experiencing tedium, defined as the depletion of mental, emotional, and physical energy and generally referred to as a state of exhaustion. Notably, tedium can be preceded by the absence of key motivating elements and opportunities to fulfill basic needs at work (e.g., the need for challenge, meaning, and opportunities for achievement; Kafry & Pines, 1980) that are usually catered for various job resources and/or challenge demands. As explained below, we regard boredom at work to stem from the lack of motivating and stimulating job characteristics, leading individuals to a state of detachment and cynicism, and ultimately to exhaustion.

In this paper, we thus contribute to the literature by disentangling the link between boredom at work and exhaustion, drawing on the concept of tedium and the literature on burnout, its subdimensions, and its processes. To do so, we introduce cynicism as a potential mediator of the process through which experiencing boredom unfolds and translates into exhaustion. In the following sections, we first present the concept of tedium and then explain how it applies to our investigated variables of boredom at work, cynicism, and exhaustion.

1.1. Tedium and Boredom at Work

The concept of tedium can be particularly useful to unravel the link between boredom at work and exhaustion. First, tedium is defined as "a general experience of physical, emotional and mental exhaustion" (Kafry & Pines, 1980, p. 478), characterized by "feelings of strain and burn out, by emotional, as well as physical depletion, and by negative attitudes toward one's self, one's environment, and one's life" (Kafry & Pines, 1980, p. 478). This definition largely overlaps with that of exhaustion—generally considered burnout's core feature (Leiter & Schaufeli, 1996). Furthermore, whereas tedium may represent similar symptoms to those of burnout, it differs somewhat in its occurring conditions. Particularly, tedium stems from

features characterized by two types of pressures. The first refers to the "pressures imposed on the cognitive capacity and decision-making mechanism either by excessive demands or by lack of challenge" (Kafry & Pines, 1980, p. 479). The second type of pressure takes into account the constraints "imposed on one's sense of meaningfulness and achievement by lack of feelings of self-actualization and success" (Kafry & Pines, 1980, p. 479), which may undermine the individual's basic needs for meaning, purpose, and achievement at work (Morin, 2007). In sum, the state of exhaustion can appear in a context characterized by the absence of satisfaction variables where challenge and cognitive demands are perceived as being insufficient.

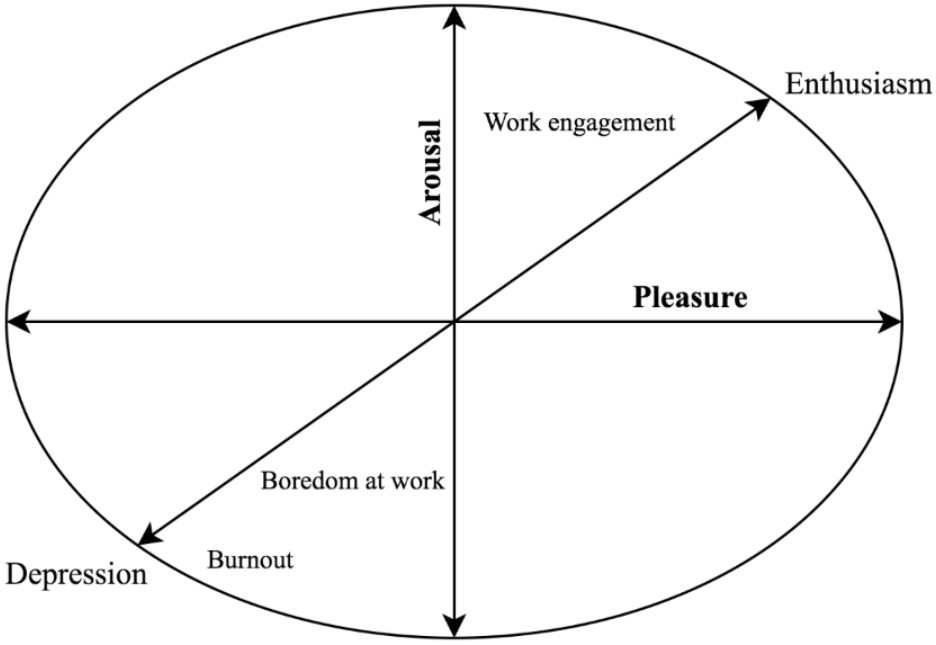
The experience of boredom in the workplace fits well in the tedium theory and encompasses both types of pressure described above. Concerning the first type, boredom at work occurs in a context of low demands and low resources resulting in a lack of challenge and variety (Harju et al., 2014; Loukidou et al., 2009; van Hooff & van Hooft, 2014). Moreover, concerning the second type of pressure, boredom occurs in conditions undermining the need for meaningfulness, achievement, and success at work, which bring employees to perceive their activities as lacking meaning (Gemmill & Oakley, 1992; Harju et al., 2014; Reijseger et al., 2013) and purpose (Barbalet, 1999; Van Tilburg & Igou, 2012).

We hence postulate that boredom, which occurs in working conditions characterized by a lack of stimulation and significance, may create the basis for experiencing tedium and exhaustion. This idea is also supported by the work of Harju et al. (2014), who consider boredom as an affective state characterized by low arousal and low pleasure, at the opposite of work engagement, and conceptually close to burnout (Figure 1). Similarly, O'Hanlon (1980) links boredom to exhaustion by explaining that when employees work below the minimal arousal level, they "must exert effort to maintain his arousal setpoint at the task-optimal level" (p. 72). As previously mentioned, the existing literature shows an overlap between the health-

related outcomes of over- and understimulation at work through similarities between symptoms (Schaufeli & Salanova, 2014). However, it is unclear whether the effects of strain and boredom on employees' health follow the same underlying processes. As argued in the next section, we expected cynicism to mediate the link between boredom at work and exhaustion since the latter specifically denotes detachment and loss of meaning in an individual's work that seem to be closely connected to the two types of pressures inherent in the boredom experience.

Figure 1.

Dimensions of affective well-being (adapted from Harju, 2014)

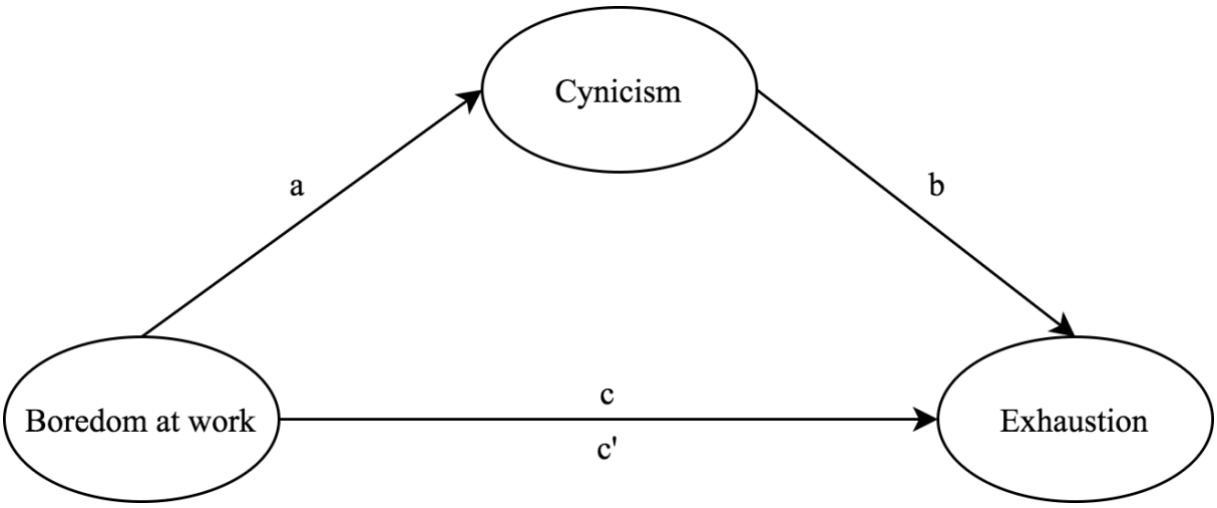


1.2. Boredom at Work, Cynicism, and Exhaustion: A Mediation Model

To translate the theoretical framework into measurable variables, and to represent the process explained above, our model takes into account three variables: boredom at work, cynicism, and exhaustion (Figure 2). Boredom is considered an experience related to a work context that lacks challenge and stimulation, whereas cynicism and exhaustion represent two dimensions of the burnout construct. These variables will be defined in the following sections.

Figure 2.

Mediation model between boredom at work, cynicism, and exhaustion



1.2.1. Boredom at Work and Cynicism

The first link in our model concerns the relation between boredom at work and one of the three dimensions of the burnout construct, namely cynicism (Leiter & Schaufeli, 1996). Note that this dimension—first labeled as depersonalization—was redefined in the General Survey version of the burnout model (MBI-GS, Leiter & Schaufeli, 1996). Whilst in the context of human services, depersonalization was defined as a "dysfunctional mode of coping with the emotional demands of service provision by distancing oneself emotionally from recipients" (Leiter & Schaufeli, 1996, p. 231), this dimension was relabeled in a new proposal as cynicism, reflecting "indifference or a distant attitude toward work" (p. 231). Cynicism is hence characterized by an individual's mental disengagement from their professional tasks, perceived as insignificant (Leiter & Schaufeli, 1996; Maslach et al., 1996).

Boredom at work implies feelings of uselessness in the face of underchallenging and meaningless tasks (Harju et al., 2016) and leads to employees' "distancing from engagement in the work itself" (Leiter & Schaufeli, 1996, p.231). Such a distant attitude toward work,

characterized by feelings of uselessness and disengagement, is well represented by the cynicism dimension (Cartwright & Holmes, 2006). We thus consider cynicism to be a particularly pertinent construct for the investigation of the proximal associations of boredom at work.

1.2.2. Cynicism and Exhaustion

The second link in our model questions the relation between cynicism and exhaustion and the sequence of their apparition in the burnout process. Here, it is important to consider that such (implied) sequence may be different in high-strain versus understimulating jobs. Indeed, cynicism is usually considered a strategy for coping with the depletion of energy and resources resulting from excessive job demands (Leiter & Schaufeli, 1996). In such a context, the sequence starts with exhaustion and leads to cynicism (Leiter, 1990, 1991). However, some authors note that the burnout features do not always follow the same sequence since its developmental process depends on certain characteristics of the work environment (Leiter, 1993). For instance, Golembiewski and Munzenrider (1988) distinguish between acute and chronic stressors, explaining that in a context characterized by less intense, yet chronic hassles, this sequence can be reversed, leading to the rise of cynicism followed by exhaustion.

Based on this reasoning, in our study, we expected such a reversed sequence to underlie the experience of boredom at work since understimulating working conditions could trigger it. Indeed, in such a case, underchallenging and meaningless tasks can be hypothesized to act as subacute and chronic stressors, resulting in disengagement and a cynical attitude toward work that in turn lead to exhaustion. As a result, and in compliance with former studies (Gkorezis et al., 2015; Wei et al., 2015), we can suppose cynicism to mediate the effects of boredom on employees' well-being, leading to exhaustion through a progressive loss of resources.

1.3. Current Study

This study aimed at understanding the underlying process that leads from boredom at work to exhaustion, considered the core feature of burnout. As described in the theoretical section, we expected the process through which boredom is linked to exhaustion to manifest differently from the classical burnout process. More specifically, we presumed cynicism to mediate the link between boredom and exhaustion, but not vice versa (Figure 2). Thus, we have articulated the following hypothesis:

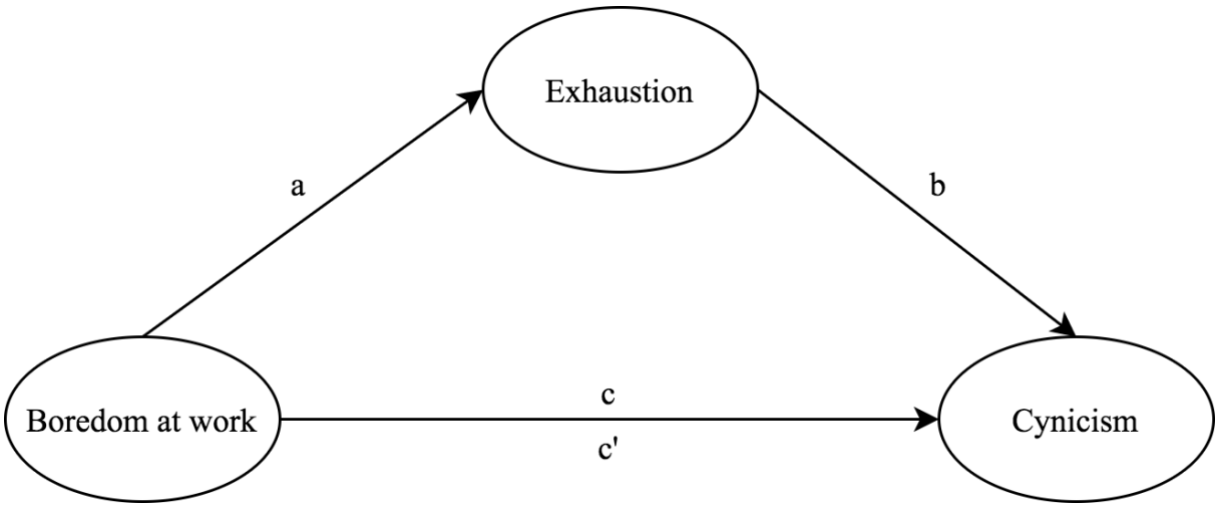
H1: Boredom at work is positively related to exhaustion through cynicism.

However, to support our model's pertinence in comparison to the predominantly formulated burnout process in the existing literature, we also tested an alternative model which posits that exhaustion mediates the effects of boredom on cynicism (Figure 3). We hence formulate a second hypothesis as follows:

H2: Exhaustion does not mediate the link between boredom at work and cynicism.

Figure 3.

Mediation model between boredom at work, exhaustion and cynicism



2. Method

2.1. Sample

The sample was composed of 452 active adults in the French-speaking part of Switzerland, 43.4% of whom worked in the private sector and 44% in the public sector, with 12.6% not reporting this information. Participants were 59.3% of women, with a mean age of 39.39 years (*SD* = 12.05). Moreover, the sample regrouped different professional and educational levels: 15% of the participants held executive positions, 29.2% were active in academic and liberal professionals, 12.8% were active in intermediate professions,[14] 27.4% were administrative personnel, 8.8% were sales personnel, and 6,7% were blue-collar workers, such as craftsperson, machine operators, and unskilled workers.

Data in the public sector were collected through an online questionnaire using the LimeSurvey platform, with the support of the human resource departments of two public institutions that agreed to participate. Data in the private sector were collected through an online questionnaire by undergraduate students as part of a methodology course. Table 1 shows descriptive characteristics of the sample and measures.

2.2. Measures

Boredom at Work

Situational boredom was measured with the DuTCH boredom scale (DUBS; Reijseger et al., 2013). We used a French version of the scale. This instrument is composed of six items ("I feel bored at my job"). Participants answered this questionnaire using a 5-point Likert-type scale ranging from 1 (never) to 5 (always). The scale scores showed good reliability (Cronbach's $\alpha = .86$)

[14] In the current study, intermediate professions reflect such occupational categories as, for example, technicians, accountants, nurses, etc.

Cynicism

The cynicism subscale of the Maslach Burnout Inventory – General Survey (MBI-GS; Schaufeli et al., 1996) was used to assess cynicism. This subscale includes five items (e.g., "I have become more cynical about whether my work contributes anything"), using a 7-point Likert-type scale ranging from 1 (never) to 7 (always). The scale scores showed good reliability (Cronbach's α = .86).

Exhaustion

The exhaustion subscale of the Maslach Burnout Inventory – General Survey (MBI-GS; Schaufeli et al., 1996) was used. This instrument measures exhaustion using five items (e.g., "I feel emotionally drained from my work") rated on a 7-point Likert-type scale ranging from 1 (never) to 7 (always). In the current study, Cronbach's α's for exhaustion was satisfying (α = .86).

2.3. Statistical Analyses

Before testing the hypothesized models, confirmatory factor analysis (CFA) was conducted to assess the structural validity of the measures used.

To test the hypotheses, mediation analyses were conducted, controlling for standard demographics, namely age, and gender when estimating the main predictor.

The mediation models were tested with SEM, using AMOS version 26 for SPSS. The criterion for mediation was the identification of a significant indirect effect as indicated by the 95% confidence interval not including the zero value.

3. Results

As shown by descriptive statistics in Table 1, the main variables correlated in an expected way. Boredom at work showed a moderately significant correlation with cynicism and

a weaker, yet significant correlation with exhaustion, whereas cynicism and exhaustion were strongly and significantly correlated.

Table 1.

Descriptive statistics of the study variables.

	M	*SD*	1	2	3	4
(1) Age	39.39	12.05				
(2) Gender	1.41	0.49	-.05			
(3) Boredom at work	2.41	1.04	-.32***	.05		
(4) Cynicism	2.72	1.34	.01	-.00	.42***	
(5) Exhaustion	3.04	1.29	-.03	-.03	.32***	.59***

N= 452. ***p<0.001, **p<0.01, *p<0.05

3.1. CFA Results

To test whether our investigated variables denoted separate and well-distinguishable constructs, a series of alternative factor models were run. Firstly, a one-factor model was tested. The analysis showed unsatisfactory results: χ^2 = 1983.074, df = 104, p < .001, CFI = .522, TLI = .449, RMSEA = .200. Then, a two-factor model, including one factor with 6 items (Boredom) and one factor with 10 items (cynicism and exhaustion), was tested because cynicism and exhaustion denote two sides of a broader construct. The analysis also showed unsatisfactory results: χ^2 = 1045.906, df = 103, p < .001, CFI = 760, TLI = .721, RMSEA = .142. Thirdly, we tested a three-factor solution in which all variables were treated as separate constructs, including boredom, the cynicism scale, and exhaustion as separate variables. This model showed the best fit compared to previous models; however, its fit statistics did not reach the recommended cutoff values with some quite low factor loadings. We therefore made two adjustments to the model. First, we removed the lowest loading items (i.e., one item for the DUBS scale, “I tend to do other things during my work”; one item for the cynicism subscale,

"I just want to do my job and not be bothered"; and one item for the exhaustion scale, "I feel emotionally drained by my work"). Second, following the suggestions in modification indices, several residual correlations were added (i.e., Items 4 and 5 of the cynicism subscale, namely "I have become more cynical about whether my work contributes anything" and "I doubt the significance of my work" as well as Items 7 and 8 of the exhaustion subscale, namely "I feel used up at the end of the workday" and "I feel tired when I get up in the morning and have to face another day on the job"). This resulted in a significant improvement in model fit, which was considered acceptable, $\chi^2 = 230.510$, $df = 60$, $p < .001$, CFI = .946, TLI = .930, RMSEA = .079.

3.2. Mediation Analyses

The fit indices of the hypothesized mediation model (i.e., boredom → cynicism → exhaustion) $\chi^2 = 300.172$, $df = 84$, $p < .001$ corresponded to the recommended cutoff values as suggested by Cheung and Rensvold (2002) and Hu and Bentler (1999). CFI and TLI were above .90 (.93 and .92, respectively), RMSEA below .08 (.076). The alternative reversed mediation model (i.e., boredom → exhaustion → cynicism) showed the same fit, as it was based on exactly the same variables and had the same number of parameters.

Results supported the two mediation models. Table 2 synthesizes the results of the hypothesized mediation model. As expected, results showed that the independent variable (i.e., boredom at work) directly predicted the outcome variable (exhaustion, path c) and also predicted the mediator (cynicism, path a). Moreover, cynicism predicted exhaustion (path b). Finally, once the mediator was added to the equation, the direct effect between boredom and exhaustion became nonsignificant, with a significant indirect effect (path c) indicating a total mediation.

Table 2.

Results of the mediation analysis by path – hypothesized model

	Mediator Cynicism	Outcome Exhaustion				
	Direct effect (*a*)	Total effect (C)	Direct effect (*c', b*)	Indirect effect (*ab*)	95 % CI indirect effect	
	β	β	β	β	LLCI	ULCI
Boredom at work	.46***	.32***	.09	.23	.360	.849
Cynicism (*b*)			.51***			
R^2	.21		.31			

Note. N= 452. β standardised coefficients ****p*<0.001, ***p*<0.01, *p<0.05, 95% CI indicates the lower limit and upper limit of 95% confidence interval;

Table 3 synthesizes the alternative mediation model's results. The analysis showed similar results to those of the preceding analysis, with one difference. Even though the indirect effect was significant after introducing exhaustion as a mediator, the direct effect remained significant, which indicates a partial mediation in this case.

Table 3.

Results of the mediation analysis by path – alternative model

	Mediator Exhaustion	Outcome Cynicism				
	Direct effect (*a*)	Total effect (C)	Direct effect (*c', b*)	Indirect effect (*ab*)	95 % CI indirect effect	
	β	β	β	β	LLCI	ULCI
Boredom at work	.32***	.46***	.31***	.15	.085	.226
Exhaustion (*b*)			.45***			
R^2	.10		.39			

Note. N= 452. β standardized coefficients ****p*<0.001, ***p*<0.01, *p<0.05, 95% CI indicates the lower limit and upper limit of 95% confidence interval

In both models, the standardized coefficients for age and gender modelled as covariates were respectively: $r = -.327$ $p < .001$ and $r = .039$, $p = .43$.

4. Discussion

This study aimed to contribute to the literature by proposing an explanation of the process through which boredom at work leads to work-related ill-being. In doing so, we aimed to deepen the understanding of potential psychological processes underlying the manifestation of boredom and its detrimental effects. Our first hypothesis posited that the link between boredom at work and exhaustion would be mediated by cynicism—referring to disengagement and perceiving work tasks as lacking purpose and significance. Results supported our hypothesis, showing that boredom was indeed indirectly linked to exhaustion through cynicism. Moreover, this study also aimed at investigating the underlying – and potentially specific – processes linking boredom to its negative effects, arguing that boredom could be associated with exhaustion through a different pathway. To explore this, our second hypothesis brought us to test an alternative model, based on the assumptions of the predominant burnout process in which exhaustion leads to cynicism. The alternative model's test results demonstrated a partial mediation, while our hypothesized model showed that the effect of boredom on exhaustion was totally mediated by cynicism. These findings lead to several considerations.

Firstly, these findings are congruent with the tedium concept (Kafry & Pines, 1980) and suggest that the perceived lack of challenge characterizing boredom at work (Harju et al., 2014; Loukidou et al., 2009; van Hooff & van Hooft, 2014) and the consequent disengagement from work tasks and work perceived as underchallenging, meaningless, and purposeless (Barbalet, 1999; van Tilburg & Igou, 2012; Harju et al., 2016) could create the basis for experiencing exhaustion.

Moreover, our findings also showed that cynicism mediated boredom's effects on exhaustion. This is particularly interesting because the latter may have a slightly different role depending on the context. As explained in the theoretical section, whilst in the case of overdemanding working conditions, cynicism represents a strategy to cope with fatigue and exhaustion (Leiter & Schaufeli, 1996), in the context of our study, cynicism could rather precede exhaustion and could be interpreted as a process of erosion of resources. Such an interpretation could be supported by the conservation of resources theory (COR; Hobfoll, 2011). Specifically, this theory focuses on the role of resource availability and maintenance as the foundation of human wellbeing, whilst also pointing to the stressful, detrimental consequences of resource depletion. Notably, it posits that resource loss has a more significant impact on wellbeing than resource gain since "people must invest resources in order to protect against resource loss, recover from losses, and gain resources" (Hobfoll, 2011, p. 3), and that "those with fewer resources are more vulnerable to resource loss and less capable of resource gain" (Hobfoll, 2011, p. 4). Applied to our study, this theory could imply that the experience of boredom at work demands particular efforts from individuals to pursue their tasks, whilst seeking to satisfy their need for stimulation and maintain a sense of purpose. These efforts, when undermined and hindered by an unfavorable context that is a priori low in resources (or both in resources and in demands), could then encumber fostering valuable aspects of the job (e.g., in terms of achieving mastery, self-esteem, or status that refer to personal and conditional resources in COR) and could lead to an erosion of employees' resources, represented by cynicism, and ultimately to their exhaustion.

Finally, these findings suggest that individuals who experience boredom at work are not exempt from developing signs of exhaustion, thereby highlighting the importance of considering boredom at work as a risk factor for employee health and wellbeing.

4.1. Practical Implications

In terms of practical implications, by showing that boredom at work can undermine well-being in different occupational domains, our results highlight the importance of job design strategies to promote positive working environments. Considering the possible adverse effects of boredom at work, organizations and HR managers should pay attention to a certain balance of job characteristics because both extremes (understimulation and overstimulation) could lead to detrimental outcomes. Their efforts should thus be twofold: aimed at preventing overload and strain and promoting opportunities for stimulation and growth. In this sense, job crafting interventions could support employees' proactive efforts to seek challenges and meaning, reduce the risk of cynicism and withdrawal, and thus reinforce their work engagement and wellbeing through the accumulation of their resources (Harju et al., 2016).

4.2. Limitations and Further Research

Our study has several limitations. The first stems from its cross-sectional design, which implies a certain caution in interpreting the results and does not allow for distinguishing causality. To this end, a longitudinal design should be used because it would yield better insight into the sequential effects of our investigated variables.

Moreover, our sample has a limited size and only includes participants from the French-speaking working population in Switzerland. Further studies should target a larger sample, but also allow differentiating between specific job domains and settings that are more at risk of experiencing boredom and its negative effects, to achieve better generalizability.

Thirdly, the concept of cynicism is conceptually close to a lack of meaning of work and the tedium theory also hints at the absence of meaning. Therefore, further research may consider paying more attention to meaning variables and inspect them more closely in relation to boredom, as for example in the MAC model (Westgate & Wilson, 2018), to gain a more

integrated and comprehensive approach to boredom, which could help to better understand the components of this experience.

Our current model exclusively concentrates on the "boredom path." To obtain a clearer view of the burnout processes and especially of the sequential development of its sub-dimensions, it would be important to test both the boredom and strain paths in the same study using a longitudinal design.

Finally, a recent study (van Hooft & van Hooff, 2018) showed that depending on work characteristics, the affect linked with boredom at work can be characterized by low or high arousal (depressed vs. frustrating feeling). As the affect linked with boredom at work could lead to different outcomes, it would be interesting to examine our model considering this difference.

5. Conclusion

Our study showed that boredom may be linked with exhaustion through cynicism. This finding is important because it posits cynicism as a potential reaction to boredom and one first step toward other detrimental outcomes. At the same time, it shows the need for a better understanding of the underlying processes that lead from boredom to ill-being at work.

Study 4

Promoting a decent work context and access to sustainable careers in the framework of the fourth industrial revolution.

Abstract

The fourth industrial revolution has transformed the world of work and the interactions between individuals and their social, political, and economic environment. This revolution exacerbated older problems and generated new ones. Over-stimulation at work, stress and burnout, and under-stimulation, boredom or loss of meaning due to increased abstraction of tasks, are examples of such problems. To analyze these changes and new challenges, we will describe the implications of this new revolution for the job market and for individuals. Thereafter, we will present various career counseling theories and models that acknowledge this new reality. These models aim to strengthen individuals' ability to manage their career paths, to promote access to decent work and decent lives, and to promote well-being. Finally, the life design intervention will be presented as an example of an intervention that aims at promoting access to sustainable careers. The current goals of technological advance could threaten the access to decent work and contradict a vision of society that puts the free-will of individuals in the first place. For this reason, lifelong career counseling will be crucial in helping individuals manage their career path in this dynamic world of the fourth industrial revolution.

Keywords: digitization, technology, well-being, sustainable career

1. Context and Definitions: The Fourth Industrial Revolution

The world of work evolves constantly, demanding a constant redefinition of the dialectical adaptation processes between individuals and their work environments. Following the work of Frey and Osborne (2013), Hirschi (2018) explains that changes in the world of work can be linked to three historical milestones. The first was the industrial revolution of the 18th century, the second involved the massive production of goods in the 19th century, and the third characterized by the advent of Internet and the dominance of computers in the second half of the 20th century. Other literature highlights the emergence of a more recent and important transformation, the Second Machine Age (Brynjolfsson & McAfee, 2014), Industry 4.0 (Schwab, 2016), or a fourth industrial revolution (Schwab, 2016). This new transformation is characterized by a *digital revolution* and power spreading technology in a wide variety of areas at high speed and low costs. Schwab (2016) defines this phenomenon as being related to three characteristics. The *velocity* referring to the speed of a phenomenon which, by opposition to previous revolutions, develops not linearly but exponentially. This results from the diffusion and the constant evolution of technology, creating an interconnected and technologically efficient context. The *breadth and depth* refer to societal, economic and individual paradigms in the digital sphere, as Schwab (2016) states: "It is not only changing the "what" and the "how" of doing things but also "who" we are" (p. 3). Finally, the concept of s*ystem's impacts* defines the macroscopic and the mesoscopic impacts of the fourth industrial revolution on and between societies, industry and nations.

Beyond the three abstract dimensions—velocity, breadth and depth and system's impacts—Schwab (2016) also describes the fourth industrial revolution as a concrete and tangible phenomenon, distinguishing three categories of products and innovations. The *physical* category includes self-driving cars, 3D printers, advanced robots in terms of *materials* that are and will be increasingly producible and available. The *digital* category includes the concept of

the *internet of things* that could play the role of a bridge between the digital sphere and physical application(s). Finally, the *biological* category in which the author notes the incredible progress in fields such as neuroscience and the health sciences. For example, in the domain of genetics, the speed and efficiency of technology could now enable genetic sequencing to be done quickly at very low cost. To illustrate the scope of this phenomenon, Schwab cites survey results of the World Economic Forum's predictions regarding the critical thresholds by 2025 for technological change and its diffusion. More than 80% of the respondents anticipate that we will have the first robotic pharmacist in the US, the first 3D-printed car in production, the first government to replace its census with big-data sources, and the first implantable mobile phone available commercially by 2025. More than 60% of respondents expect to see driverless cars replace 10% of all cars on US roads, the first collection of tax by a government via a blockchain, the first transplant of a 3D-printed liver and the first city with more than 50'000 people and no traffic light (World Economic Forum, 2015). From a capitalist perspective, where changes in the world of work are imposed on workers (Graeber, 2013), this analysis offers the ground for a simple but very important statement: the world of work is changing quickly, and societies and people are trying to face these changes.

2. Consequences and Effects of the Fourth Industrial Revolution

2.1. Implications for Work

With the intention to highlight the consequences of this fourth revolution, this section will analyze the implications for work, presenting the phenomenon of job polarization and its implications for the nature of work, both in form and content.

2.1.1. Job polarization.

In the framework of the diffusion of technology in the world of work, it is important to recall the "polarizing" effect generated by technological progress on the labor market, in

which some sectors are more likely to be affected by automation and digitization (Autor, 2015; Goos, Manning, & Salomons, 2014). Recently, Hirschi (2018) defined two aspects of the phenomenon of job polarization. On the one hand, the author explains that middle-skilled jobs (e.g. management, administration and services) are the most likely to be impacted by technology because their tasks "follow precise, predictable procedures" (Hirschi, 2018, p. 3), and can therefore become automated. This type of job indeed decreased in Switzerland by 12% between 1996 and 2015 (Soceco, Nathani, Hellnüller, Rieser, Hoff, & Nesarajah, 2017). On the other hand, low-skilled jobs, where automation seems unprofitable, such as care, cleaning or security, are harder to automate and are relatively easy for humans to execute. High-skilled jobs, such as technicians, educators or managers, which involve tasks linked to complex problem-solving and reasoning as well as to advanced social skills, are still difficult to automate. Although some have announced the end of these occupations and the disappearance of up to 50% of all current jobs (Frey & Osborne, 2013), most observers do not yet anticipate massive job loss or significant and structural increase of unemployment (Arntz, Gregory & Zierahn, 2016; Autor, 2015; Furman, 2016). To explain this contradiction, we can imagine that technology, while destroying some jobs, also creates new ones or plays a complementary role in jobs that already exist (Autor, 2015).

Automatization could also affect the distribution of wages. Hémous and Olsen (2014) explain that automation and innovation can exacerbate the salary gap: the will to invest in technology will diminish the labor share and the growth rate of low-skill incomes. In fact, these authors explain that "the growth rate of high-skill wages approaches 4%, while the growth rate of low-skill wages goes down to around 1%" (p. 26). Hong and Shell (2018) argue that automation could increase inequality "because it tends to displace the lowest-paid workers" (p. 2). These authors explain that the most probable scenario is that automation will affect low-skilled employees by a "20 percent pay cut on their original income" (p. 2), whereas the wages

of high skilled work continue to rise. This phenomenon is also accompanied by the dualization of the workforce, where employment status and career trajectories seem to differ in terms of security, perspectives, and social integration between the primary and the secondary market (Häusermann & Schwander, 2012).

2.1.2. Changes in the form and content of work.

Since the 1990s, the world of work has undergone intense and profound changes. Examples include globalization—of capital and labor—and its effects on intensifying the competition for job security and increasing requirements for flexibility and adaptation. The intense technological progress brought by the third industrial revolution had, through the digitization and automation of work, already significantly transformed the modes of production and the relation to work. Ellul (1988) described how the technical progress leading to separation between individuals and work has become more and more pronounced. The workload has been increasingly divided into definite and interchangeable units and functions, which leaves aside the global *know-how* of the human worker doing a task from the beginning to the end. As the work is divided into a series of small tasks, workers will no longer complete "end-to-end" work, but rather perform a series of tasks synthesized into a final result (Ellul, 1988). This phenomenon is amplified by the fourth industrial revolution.

As mentioned, the fourth industrial revolution has led to an increase in mechanization and automation. In the current era, technology has become an integral part of the world of work, not only as a physical auxiliary to human work, but maybe more importantly in simulation and substitution of the human workforce (Brynjolffsson & McAfee, 2014). Lasi, Fettke, Kemper, Feld, and Hoffmann (2014) explain that the labor market will face subsequent changes, under the influence of what they call *technology-push.* These authors mention in particular the *short development periods*, *individualization on demand*, *flexibility* in development and production,

and *decentralization*. They explain that because of the increase of the rhythm and changing demands, hierarchy and decision-making processes need to be shortened. For this reason, the work is changing in both form and content.

Regarding the form—types of employment—we can observe, since the beginning of the 21st century, the creation of new forms of employment. The Eurofound research report (2015) identified nine new forms of employment. For example, *employee* or *job sharing*, in which workers combine more than one job, or in which employers hire more than one employee to fill a full-time position. Other forms are *interim management* in which an external high-skilled employee is hired *pro tempore* in order to work on a specific task, and *casual work,* in which the worker has to work *on demand*, in a framework of availability and flexibility according to the needs of the employer. Finally, *ICT-based mobile work* is a new form of employment in which, aided by technology, an employee is able to work anytime, anywhere.

Regarding content of work, as mentioned above, job polarization might lead to the disappearance of jobs characterized by automatable tasks, but might also lead to the creation of new or complementary ones. As a result, we wonder what kind of jobs technology creates and how it changes the *old* jobs which survive. Some authors hypothesize that technology will free human beings from boring and repetitive tasks, letting them benefit from an occupation allowing the expression of creativity (Autor, 2015). Other authors have a more luddite opinion about the role of technology, stating that "It's as if someone were out there making up pointless jobs just for the sake of keeping us all working" (Graeber, 2013, p. 1). In fact, several phenomena have to be considered to understand the effect of technological progress on the content of modern work, which can in some cases be indirect and pernicious (Cassely, 2017; Brygo & Cyran, 2016; Graeber, 2013). Several authors focus their attention on the recent increase of roles with abstract titles and purposes in developed economies. These occupations consist of a set of redundant tasks whose social utility or personal interest are difficult to grasp

for those who perform them (Guichard, 2016; Cassely, 2017). Coutinho, Dam, and Blustein (2018) explain that "[…] it is likely that there are not enough intrinsically motivating jobs and meaningful work options available to the majority of people given the demands of free market capitalism and the infusion of technology, which is reducing the need for many types of workers" (p.14). The emblematic example of so-called *bullshit jobs* illustrates the idea of occupations with no obvious meaning and utility.

2.2. Implications for workers

In this section, we will examine some of the implications of the fourth industrial revolution for workers, analyzing the relationship between humans and technology at work, and then focusing on how technological developments impact the work context (loss of meaning, alienation, and boredom at work). Finally, we illustrate this issue with the representative examples of bullshit jobs (Graeber, 2013), *nasty jobs,* and *detrimental jobs*.

2.2.1. Implications of changing forms of work.

The new forms of employment could lead to some advantages, for example flexibility, diversification, or personal enrichment (Eurofound, 2015) especially for high-skilled professions. Nonetheless, they hide more than one danger. These new forms of jobs can increase stress, tear down boundaries between professional and private life, remove the security for the employee to benefit from (and the employer's responsibility to give) work and social protections (Eurofound, 2015). Moreover, the ILO (2019) points out that "[…] many of our societies are becoming more unequal. Millions of workers remain disenfranchised, deprived of fundamental rights and unable to make their voices heard" (p. 21). In addition, this context contributes to remove the sensation of continuity and stability in opposition to flexibility (Eurofound, 2015). Additionally, technological advances increase the vulnerability of low-skilled workers as many industries employ less workers, leaving them without local alternatives

(Coutinho, Dam, & Blustein, 2018). Coutinho and colleagues also notice that greater mobility of the labor force is expected, which means that workers must be ready to leave their country or travel great distances to work.

The ILO (2019) states that "A staggering 300 million workers live in extreme poverty. Millions of men, women and children are victims of modern slavery. Too many still work excessively long hours and millions still die of work-related accidents every year" (p. 18). This in particular concerns large number of workers of developing countries. These new forms of employment imply a new social contract that puts more responsibility on the individual and therefore seems more in favor of companies. The ILO (2019) explains that in fact, "wage growth has not kept pace with productivity growth and the share of national income going to workers has declined. The gap between the wealthy and everyone else is widening" (pp. 18-19).

2.2.2. Technology as an obligation rather than a choice.

Historically, literature has focused on technology as a tool that human could choose to use or not, with this choice depending on various factors. This approach led to numerous studies about the ergonomics of the workplace or about worker-machine relationships. For example, Davis (1989) and DeLone and McLean (1992) studied under which conditions an individual will choose to use specific technology or not. In the actual work context, many people do not have the freedom anymore to choose to use technology or not. The current context seems to follow an implicit logic that favors technological progress rather than human action at work (Ellul, 1977, 1988). The human being is sometimes conceived as the auxiliary of this valued technical progress. Sometimes, the technology become so pervasive that individuals have no choice but to adapt, which can lead to job dissatisfaction for some people. Several authors instead consider the human-technology relationship from a symbiotic point of view (Brangier & Hammes, 2007; Ellul, 1977, 1988). Brangier and Hammes (2007) explain that this

perspective considers technology as an extension of the human being, in a relationship of mutual influence. As an illustration, they use the metaphor of a symbiote of humans, in a logic of common life, as for example the warthog and the mongoose, or the remora and the shark, with one major difference: it is the human who develops the technology. Technology exists in an *ambivalent way* (Ellul, 1988) being able to pass from a state of symbiote to a parasite: in other words, technology would participate in facilitating human life as well as in alienating the human condition (Brangier & Hammes, 2007). Hence, in a systemic perspective, it is crucial to consider that the equilibrium of the technology-human symbiosis is delicate, and must not be considered a stable state.

2.2.3. Evolution of the content of work, both on quantity and quality.

The technological evolution has impacted the content of work, in terms of both quality and quantity. Concerning quality two aspects have to be considered: the effects of technology on the nature of work, and the increasing need for workers to actualize competence in order to adapt to this constant technological change. As mentioned above, the technological evolution has significantly changed the production systems with no choice for workers about adapting to this new context. As we mentioned above, the new systems of production, splitting the workload into tasks, can diminish feelings of gratification and achievement (Mann, 2007) instead increasing a sense of incoherence. The loss of autonomy and freedom to choose how to perform tasks, and non-stop connections with the digital world, can diminish variety, which can lead to a feeling of alienation and disconnection. This phenomenon seems especially true for high-skilled individuals who have the opportunity to think about reconversion. The need for concrete achievements is illustrated by Cassely (2017) when he presents the case of a former banker who became a grocer, or the case of an engineer with a master's degree in management who became a dairy woman. In fact, when individuals who have experienced such changes explain their choice, we can observe a common denominator related to technology (Cassely,

2017). Technology seems sometimes to cause feelings of abstraction, a gap between the "concrete" and a lack of variety in the activities (Brygo & Cyran 2016; Cassely, 2017). This illustrates that abstraction of tasks can become problematic for some workers and that being able to see the concrete results of work can counteract the feeling of alienation. However, as mentioned above, these careers changes are not the norm.

Another challenge regarding content of work is the need for constant actualization in terms of competences linked with technology. The ubiquity of technology in the professional system can become problematic in terms of adaptation. On one side, as the ILO (2019) points out, "Today's skills will not match the jobs of tomorrow and newly acquired skills may quickly become obsolete" (p. 10). On the other, individuals who have lost their job because it has been replaced by technical progress, are the same individuals that are at risk of not being "equipped to seize the new opportunities" (p. 10).

Concerning quantity, we need to consider over- and under-stimulation at work. Technical and technological progress contribute to a rising work rhythm, pressure and strain and the deleterious effects of occupational pressure on workers' health have been widely documented. The concept of *burnout* (Maslach & Jackson, 1986; Maslach, Schaufeli, & Leiter, 2001) might represent the effects of work overload characterizing modern societies (Weber & Jaekel-Reinhard, 2000). In terms of quantity, the fourth industrial revolution and the rise and expansion of technology also brought another phenomenon, more neglected in the scientific literature in comparison to the abundant reviews on overload and its effects (Reijseger, Schaufeli, Peeters, Taris, van Beek, & Ouweneel, 2013): the suffering from under-stimulation. Various studies report that large proportions of the workforce are affected by chronic boredom, from 15% in a general population (Rothlin & Werder, 2008) to more than 30% of employees in France (Bourion & Trebucq, 2011) or in England (DDI, 2004, cited by Mann, 2007), this

proportion rises to 50% in some sectors of activity such as financial services (Loukidou, Loan-Clarke, & Daniels, 2009).

2.2.4. Changes in the workplace threatening the meaning of work.

According to Rosso, Dekas, and Wrzesniewski (2010), the meaning of work can be considered from two different and complementary points of view. "Meaning" suggests the purpose or the role of work in the life of an individual. This conception questions socially constructed representations and their relation to culturally conditioned work, also called Ethos of Work (Mercure & Vultur, 2010) or Ethics of Duty (Méda & Vendramin, 2013). The term "meaningfulness" refers to the perception of the individual of the significance of his or her work; this approach therefore aims to capture the subjective feeling of well-being or dissatisfaction arising from the coherence between what the subject looks for in his or her work and in what work environment. We find it particularly interesting to consider this second definition. In this perspective, Méda (2016) further explains that beyond the instrumental dimension of work—earning a salary—expectations about work as a means of self-realization have increased. Indeed, people expect their work to be useful and to allow them to realize themselves. To define the meaningfulness of work, Morin (2008) considers six aspects: the usefulness of work defined around social utility, its moral rectitude, the possibility of learning and development within the framework of professional activity, autonomy defined as the ability to assert these skills and one's free will over the work done, the quality of the relationships and the recognition of the work done.

In conclusion, the combination of three contextual factors may underlie a loss of meaning and the prevalence of boredom at work. The rising level of required skills and the automation of work procedures, added to an increasingly insecure market and globalized competition, are pushing individuals to accept positions outside their skills and aspirations

(Loukidou, Loan-Clarke, & Daniels, 2009; Van der Heijden, Schepers, & Nijssen, 2012). Technology has a role here. In fact, as the ILO (2019) states, when technology is used in an economical profitable way, it can "render labor superfluous, ultimately alienating workers and stunting their development. Automation can reduce worker control and autonomy, as well as the richness of work content, resulting in a potential deskilling and decline in worker satisfaction" (p. 43).

2.2.5. Bullshit jobs, nasty jobs, and detrimental jobs.

The term bullshit job appeared for the first time in a 2013 article by David Graeber (2013) and published in *Strike!,* an online journal of the radical left. Such jobs are characterized by their lack of social utility and meaning, and are assumed to be created by the capitalist economic system in order to keep people working. Bullshit jobs are defined as "a form of paid employment that is so completely pointless, unnecessary, or pernicious that even the employee cannot justify its existence even though, as part of the conditions of employment, the employee feels obliged to pretend that this is not the case" (p. 10). Automation of work seems to have been sold to the individuals with the idea that it would decrease work hours, but, instead, in a society that is not ready to free humans from work hours, technological advancements have contributed to increase meaninglessness at both societal and individual levels. Cassely (2017) highlights that boredom has become an important issue in the expanding managerial, marketing, and administrative sectors in which—thanks to technology that has accelerated and automated the execution of a large number of tasks—people may work only 15 hours a week, spending the rest of the week performing non-work related tasks (Glaser, 2014). In this context, employees can have the feeling of having a bullshit job (Bourion & Trebucq, 2011) and carrying out activities they consider to be useless (Graeber, 2013). Graeber (2013) and other authors (Brygo & Cyran, 2016; Cassely, 2017) highlight the psychological and societal violence of this issue: "How can one even begin to speak of dignity in labor when one secretly feels one's job

should not exist?" (Graeber, 2013, p. 1). The author seems to have brought to light an issue. Indeed, his article achieved an unexpected success being approximately read 150,000 times during the first week, and was, the month after, translated into many different languages.

Authors like Guichard (2016) and Cassely (2017) refer to the concept of bullshit jobs to highlight the increase of new jobs with obscure titles and abstract aims in developed economies. Two others type of jobs have also been associated with a lack of meaning, nasty and detrimental jobs. A nasty job is a professional occupation characterized by dangerous working conditions implying important physical effort, accident, risks, or occupational diseases (e.g., mining, slaughter-house work, harvesting labor etc.). Detrimental jobs are those "which, far from aiming to meet human needs, are explicitly intended to exploit and/or harm human beings, a characteristic that can hardly by ignored by those who perform them" (Guichard, 2016, p. 185). The author gives examples such as credit organizations which encourage employees to offer mortgages or loans to individuals who cannot afford them, or weapons industries. The reason behind the fact that people do these tasks, and find themselves in the situation of occupying a nasty workplace, is that workers in these contexts are usually individuals who have not the choice to have another occupation to earn their livelihoods.

Moreover, changes in the nature of work arising from the fourth industrial revolution threatens access to decent work. Several authors bring attention to the possible impact of technology (Masdonati, Schreiber, Marcionetti, & Rossier, 2019; Blustein, Kenny, Di Fabio, & Guichard, 2018) and argue that individuals without specialized skills and training may lack access to low- or middle-skilled jobs because they were replaced by machines. Decent work is considered a fundamental human right by the United Nations and the International Labour Organization, which conditions are "access to full and productive employment, benefitting from rights at work, having guarantees of social protection, and promoting social dialogue [… and its access represents] one of the main challenges the world is facing" (ILO, 2013, p. 12).

Blustein and colleagues (2018), citing a report of the National Academy of Sciences published in 2017, call for caution regarding changes that might lead to inequality and difficulties to find a stable job and remind us that consequences are not irrevocable. Moreover, there is still time to decide which impact technology should have on our societies.

3. Implications for Practice

3.1. New Concepts for New Career Trajectories

Traditionally, careers have been conceived as linear. The employee sought to gradually climb the ranks within the same organization (Sullivan & Baruch, 2009). The fourth industrial revolution has various implications both on work and humans. Given the extent of those impacts and how fast they have taken place in our daily lives along with the increase of various problematics, the question of the implications for our field is crucial. The protean (Hall, 1996, 2004) and the boundaryless (Arthur, 2014; Arthur & Rousseau, 1996; DeFillippi & Arthur, 1994) career models are illustrations of this need to describe new forms of careers. The protean career refers to "a career that is self-determined, driven by personal values rather than organizational rewards, and serving the whole person, family, and 'life purpose'" (Hall, 2004, p. 2). The term of "protean" refers to the Greek god Proteus whose characteristic was to change his shape as it pleased him (Sullivan & Baruch, 2009). In this vision, in addition to wages, satisfaction at work is achieved when internal expectations of psychological success are satisfied (Hall & Moss, 1998; Hall, 1996; 2004). The boundaryless career (DeFillippi & Arthur, 1994; Arthur & Rousseau, 1996) adds the notion of independence between the employee and its organization, by conceiving of careers as a "sequence of job opportunities that go beyond the boundaries of single employment settings" (1994, p. 307).

The two models highlight a new type of career in which the organization takes a secondary role and individuals are expected to take control and responsibility of their own

career path. While different on several points, the boundaryless and protean models were constructed in opposition to traditional development career models, as a new perspective to understand how people can deal with changes generated by modernity. Unfortunately, the current labor market does not always allow individuals to choose the direction of their blossoming trajectory. Moreover, constant individual responsibility in terms of competence can create stress, not to mention phenomena such as nasty jobs, exclusion, marginalization, and precarity. The labor market is further and rapidly evolving, and "whereas the basic notions of protean and boundaryless careers seem increasingly relevant in the future, the expected changes in the world of work might mean that the specific components of what constitutes a protean and boundaryless career might need to be somewhat adjusted to new realities" (Hirschi, 2018, p. 5).

This new social and economic context has two implications for our field. First, we must question the relevance of existing models in the current and future work context. For example, Hirschi (2018) pointed that the future might contain new platforms of digital matchmakers (Evans & Schmalensee, 2016) to match job seekers with potential employers or redirect employees to new opportunities within the same organization. He argues that this could introduce a situation where neither the person nor the organization leads career development, unlike in traditional or the protean/boundaryless career models. Career development models must thus consider the dynamic nature of social and economic structures. For this reason, it is important to ensure that our models and interventions are appropriately adapted to all population and especially to vulnerable and underserved ones across their entire career paths. So that the role of career counselors may also change to adapt to these new situations. Having a clear idea about the consequences of technological and economic developments in our societies and their implications should be a primary goal in terms of public policies, and should help us to "reinvigorate the social contract that gives working people a just share of economic progress, respect for their rights and protection against risk in return for their continuing

contribution to the economy" (ILO, 2019, p. 10). All these actions should contribute to help people access decent work. However, individual actions are not sufficient, and collective ones– at the state level or involving international organizations– are necessary in order to valorize the social function of work. In terms of shaping policies and practices, the ILO point out that fist, organizations should guarantee an "adequate living wage" (ILO, 2019, p. 12), as well as protection and safety at work. Furthermore, policies should respond to issue of life/work balance by increasing autonomy, in order to provide "time sovereignty" (p. 12) for workers. Also, organizations should adopt a "human-in-command approach to artificial intelligence" in order to ensure "that the final decisions affecting work are taken by human beings." (p. 13) Last but not least, the ILO points out the urgent need to implement precise policies "to address gender equality in the technology-enabled jobs of tomorrow" (p. 11).

3.2. Access to Decent Work for All

The modern work market can offer many opportunities for professional development. However, even if some perspectives consider the human in a protean optic, seizing new opportunities and adapting himself to a rapidly changing context, the work market can also constitute a thorny context to live, in which a healthy work life is moreover difficult to reach, and where the access to *decent work* still remains a challenge. Decent work is defined by the International Labour Organization as a professional occupation that "sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men" (ILO, 2019). The access of decent work in the context of the fourth industrial revolution is a challenging issue. In fact, technology should benefit most people and not only the economy, that often means to benefit a restrained number of people.

Technological evolution could help eliminating occupations that are harmfulness or participate in freeing human work from "from dirt, drudgery, danger and deprivation" (ILO, 2019, p. 43).

The Psychology of Working Framework (PWF, Blustein, 2013) offers a critique of Western conceptions of vocational choices, where we assume that individuals have the possibility to be "spoilt for choice" concerning their professional orientation. This framework focuses not only on contextual factors, but also on personal ones such as proactive personality, work volition, or career adaptability (Blustein, 2013; Duffy, Blustein, Diemer, & Autin, 2016). This implies that individuals can mobilize resources in order to "enhance individual control in navigating an uncertain and precarious work environment" (Blustein et al., 2018, p. 19). The PWF also integrates the concept of critical consciousness (Freire, 1973) as an "attribute that can help individuals shape their lives and deflect some of the negative effects of harsh economic conditions and marginalization" (Blustein et al., 2018, p. 19). This involves the possibility for individuals to question their work conditions and have an influence in shaping their work environment. In this sense, individuals can interact with their work environment and exert control on it. This framework might offer a relevant perspective for counseling individuals in the context of the fourth industrial revolution.

3.3. Promoting an Ethical and Human World of Work

Technological progress has brought positives consequences, for example in terms of working conditions, as well as negative ones, as for example, the disappearance of some occupations, the obsolescence of some knowledge, and also in some cases negative impact on social structures and the environmental. Helping people adapt to these developments is not sufficient: the issues characterizing the job market can add obstacles to attain a healthy job and a decent work context, a context where well-being and self-realization are possible in addition to building a world that is fair and sustainable both for people and the planet. Guichard (2016)

mentions that some organizations have very strong negative impact on humans and their environment. He strongly expresses the need for counseling practices to take these potential threats into consideration and to work actively for "the development of a good life, with and for others, in fair institutions, to ensure the sustainability of a genuine human life on earth" (p. 187). Bimrose, Kettunen and Goddard (2015) summarize Hughes view that career services seem to live under pressure to assume their role of "boosting economic productivity and competitiveness in the labor market and increasing employment, career progression and educational attainment" (p. 9). As the profession of counseling is at the crossroads between an individual-based and a politically-driven work, the reflection on this dilemma is ongoing. Many authors (Blustein et al., 2018; Massoudi et al., 2018; Blustein, Olle, Connors-Kellgren, & Diamonti, 2016; Pouyaud, 2016) highlight the need for a psychological approach to decent work. Indeed, counseling practices should also promote people well-being, access to decent work, and social justice. Technological development, economical growths, and people's well-being development or happiness should thus be reconnected.

Hirschi (2018) explains that "personal growth might be increasingly pursued in nonwork roles because more people might no longer be able to obtain work that promotes personal development in a meaningful way" (p. 5). Even if meaning of work still remains a personal issue, it is an issue of dignity to build a society in which professional occupations are decent, and technology should help us to achieve this goal. Guichard (2016) explains that if "working is central to most people's lives" it also "plays a core role in transformations of the world, in changes of humankind in general, and in the construction of an individual subjectivities" (p. 180). In the actual labor market, it can be seen as a paradox that wages are not associated with occupations' social utility. Some authors do not hesitate to say that "in our society, there seems a general rule that, the more obviously one's work benefits other people, the less one is likely to be paid for it" (Graeber, 2013, p.1). Lawlor, Beitler, Kersley, Steed, and

Cottingham (2009) assessed the social utility and nuisance of various jobs and observed that the social and financial value of occupation are not always closely linked. Over time this can lead some less useful job to become more desirable, discouraging people to do jobs that are in fact more socially useful (Graeber, 2013; Lawlor et al., 2009). Guichard (2016) favors the notion of "life design interventions"—rather than the term career counseling—to point out the evolution and changes of work and societies and underline the importance of work in the construction of identity. The contextual factors—political, social, and economic—cannot be ignored in the intervention process, which seek to help counselees to deal with those current changes. Guichard (2016) explains that "Such life design interventions would concentrate on counselees' reflections concerning not their inclusion into the world of work as it is, but rather their contribution to transforming it by their decent human(e) work" (p. 189). In this context, it is really important for practitioners to be in the front line by rethinking the content of interventions in order to support individuals not only in the construction of themselves but also of our world in a sustainable way, as work is a way to build on our society (Guichard, 2016). The point is that the society we create through work or new forms of social implications, only make sense if it serves humans and the world in which we live: If it is not the case, we have the right and the responsibility to rethink it.

4. Conclusion

Technological progress has brought positive as well as negative aspects in individual's work life. The reaction of individuals to the technical and technological progress is far from new, citing for instance the revolt against "the machine" as symbol of the industrial revolution of English textile workers in the early 19th century, or the Manifesto of the Unabomber-Theodore Kaczynski (1995) against industrial society. However, the current implications in terms of human dignity, the right to decent work and ecological issues impose criticism on the advancement of technology in the world of work. The current logic seems to rely on the

valorization of the technical progress, and consequently on the human adaptation to the latter, focal point of the progress. It is therefore not surprising that it is indeed the human who pays the consequences, because "le progrès technique ne sait pas où il va. […] du fait de sa croissance causale et non finaliste. Et c'est pourquoi il est imprévisible, et provoque dans la société une imprévisibilité générale" [the technical progress does not know where it goes […] because its growth is causal and not finalist. And that is why it is unpredictable, and provokes in society a general unpredictability] (Ellul, 1988, p. 97). This is the reason why societies need to critically manage the impact of technical progress so that progress can serve people first, beyond the economic profit. Guichard (2016) draws attention to the importance for people "to develop a reflection on work and its individual and collective consequences in order to prevent the "invisible hand" (Smith, 1776)" (p. 186). The ambivalent nature of technical progress and the potential irreversibility of its consequences implies that these developments need our full attention and have to be regulated. It is an important issue to use the potential of this new era for, and not against, people (ILO, 2019). Technological progress should not marginalize the contribution of humans, who should remain the center of our collective actions. Career interventions may have to be rethought to promote sustainable careers, sustainable societies, and a sustainable world.

Study 5

Antecedents and consequences of technology appraisal: A person-centered approach

Abstract

In line with the recent literature, the aim of this paper is to adopt a psychological approach to understand how technology is subjectively perceived and experienced at work, where the use of technology is seldom an individual choice, as well as its effects on employee's well-being. This study aims to adopt a person-centered approach to create clusters of technology appraisal, explain such clusters membership through socio-demographics and use these clusters to predict work-related well-being outcomes. In a sample of 692 Swiss working adults (Mage= 39.56, *SD* = 12.45, 60% female) active in both private and public sectors, this study firstly analyzed clusters of technology appraisal taking into account perceived usefulness, ease to use and limitation of autonomy using a TwoStep cluster analysis. Then, these clusters membership was predicted by sociodemographic and individual characteristics (i.e., Age, sex, education level and generalized self-efficacy) using a multinomial logistic regression. Finally, differences in burnout, work engagement and job boredom between clusters were examined using ANOVAs. Three different clusters of technology appraisal were found: The *Tech-Enthusiasts*, the *Tech-Ambivalents*, and the *Tech-Detractors*. Age, sex, educational level and self-efficacy predicted clusters membership. Differences in burnout and work engagement were found between the clusters. No difference was found in boredom between the clusters. These findings highlight the importance of developing relevant and inclusive interventions to promote well-being and equality at work.

Keywords: technology appraisal, demographics, boredom, burnout, work engagement, wellbeing at work

1. Introduction

Fast and ongoing technological innovations have brought profound changes to the world of work, both at the structural level, by affecting the labor market's structure and organization, and at the content level, by modifying the nature of the tasks and the demands faced by employees (ILO, 2019, Toscanelli et al., 2019). These changes have equivocal and unequal consequences on people's employment opportunities. On the one hand, technological innovation has created new forms of work, thus leading to flexible and facilitated employment opportunities for independent high-skilled workers (Eurofound, 2015). On the other hand, authors have also argued that unequal access to technology may undermine access to decent working conditions for vulnerable groups and hinder their efforts to attain job stability and security (Blustein et al., 2018; Masdonati et al., 2019; Massoudi et al., 2018; ILO, 2019).

Moreover, these changes have also ambivalent effects on employees' work-related well-being. While some authors recognize the beneficial effects of technological innovation in terms of increased flexibility and communication effectiveness at the workplace (Chesley, 2010), others have highlighted its detrimental effects on work and workers (ILO, 2019). For example, technological applications have led to the automation of a large proportion of tasks, exposing certain employees to insufficient workload and understimulation, with adverse effects in terms of chronic boredom at the workplace, perceived lack of meaning and work disengagement (Glaser, 2014). For others, on the contrary, these changes have led to increased workload and pace, frequent interruptions, and constant unpredictability, associated with high levels of stress and burnout (Ter Hoeven et al., 2016; Thomas et al., 2006). It appears thus that technological applications at the workplace can either represent a resource – by facilitating accessibility and efficiency – or a hindrance – by increasing mental demands or decreasing opportunities for growth and self-accomplishment (Ter Hoeven et al., 2016). Indeed, as brought

by Brangier and Hammes (2007), technology at the workplace can act in two different ways: as a symbiote, resulting in mutual benefits for workers and organizations, or as a parasite, contributing to the human alienation of workers. Although a few studies have examined the effects of exposure to technology, more research is needed to disentangle such ambivalent relations between the use of technology and well-being at the workplace. In order to do so, the focus of new studies must move from mere exposure to technology to the way it is appraised by employees (Salanova & Schaufeli, 2000) to better understand the underlying psychological processes.

1.1. Technology Appraisal, Job demands and Resources

A large body of literature on the relationship between humans and technology highlights the conditions that lead people to the deliberate *choice* of adopting and using technology. In this regard, several authors refer to the Technology Acceptance Model (TAM) (Davis et al.,1989) – derived from the theory of reasoned action (Fishbein et al., 1975)– and its consequent models (e.g. Venkatesh & Bala, 2008). This approach aims at understanding the behavioral intention of using a technological application based on its perceived usefulness and ease of use (see King & He, 2006). Needless to say, both these choice criteria – perceived usefulness and perceived ease of use – may vary according to diverse factors, namely individual differences like subjective norms, computer self-efficacy or anxiety level (Venkatesh & Bala, 2008), contextual variables such as task-technology fit (Goodhue & Thompson, 1995) or job relevance (Venkatesh & Bala, 2008), as well as sociodemographic characteristics, such as gender or age (King & He, 2006; Venkatesh & Bala, 2008).

Considering that "New technology is often so powerful that organizations cannot afford to ignore or not to buy and use them." (Burke & Ng, 2006, p. 90), the presence of technology in the work setting is often largely driven by organizational or market-based

constraints, and way beyond employees' individual choices. In this regard, Brangier and Hammes (2007) propose to approach the relationship between people and technology as based on a strong and constant contiguity, maintained by a mutual contribution. Accordingly, the relation between employees and technology could be of a symbiotic nature, in which technology contributes to or facilitates work or, in contrary, of a parasite nature, where technology represents a hindrance to employees' autonomy and adds to discomfort and difficulties (ILO, 2019). This implies that workers benefit more or less from the introduction of a new technology, since they may vary in their ability to update their skills and adapt to novelty (Burke & Ng, 2006, p. 90). Consequently, their inability – or unwillingness - to adapt to technological changes may put certain employees at risk of adverse outcomes in terms of reduced employability, high job insecurity and low work-related well-being.

Since modern work is characterized by fast and frequent technological changes and applications, it appears important to take into account the subjective appraisal of technology and its major role in predicting well-being outcomes (Salanova & Schaufeli, 2000). In this study, elements from the TAM, namely perceived usefulness and perceived ease to use, have been retained to evaluate technology appraisal. Moreover, since the literature also highlights that technological applications, through automation of tasks and processes, may reduce opportunities to freely choose one's work tasks or methods (e.g. ILO, 2019; Toscanelli et al., 2019), this study will also take into account the perceived impact of technology on employees' autonomy.

To study the potential links between technology appraisal and work-related well-being, this study will draw on the Job Demands-Resources model (JD-R, Demerouti et al., 2001) and its integration within the technology appraisal context (Day et al., 2010). The JD-R model (Demerouti et al., 2001) posits that the core characteristics of a given work environment can be resumed in terms of job demands and resources. Demands are defined as "those physical,

social, or organizational aspects of job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" (Demerouti et al., 2001, p. 501), while resources "refer to those physical, social, or organizational aspects of job that may do any of the following : (a) be functional in achieving work goals; (b) reduce job demands at the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti et al., 2001, p. 501). Drawing on this framework and its application to workplace technology (Day et al., 2010), it is pertinent to consider that technology, when perceived as difficult to use or useless for task performance, may represent a demand for employees, whereas perceived reduction of autonomy may position technology as a threat to their resources. On the opposite, a positive appraisal may translate employees' perception of technology as a resource, hence leading to positive outcomes.

Based on the above-mentioned variables and adopting an exploratory person-centered approach, we thus seek to identify different profiles of employees regarding their appraisal of work-based technology. For example, we expect some employees to present a positive appraisal of each variable, perceiving technology as easy to use, useful and contributing to free them from difficult or cumbersome tasks. At the opposite, it seems also logical to imagine that other employees may experience technology as difficult, devoid of utility and somewhat imposed to them, and thus a threat to their autonomy. Moreover, we can also assume to find at least a mixed or average cluster, presenting more moderate combinations of these variables. Finally, given the documented positive associations between perceived ease to use and perceived usefulness (Venkatesh & Bala, 2008), we do not expect to find a combination in which these two variables are opposed to each other. Despite these *a priori* expectations, we formulate our first hypothesis in an exploratory fashion as follows:

H1. Distinct patterns (i.e., clusters) of perceived ease of use, usefulness, and impact on autonomy should emerge denoting a differing degree of positive or negative technology appraisal.

1.2. Sociodemographic characteristics, Social Inequality and Individual differences in Technology Appraisal

The current literature shows socio-demographic differences in individual appraisal and attitudes toward technology (e.g. Rojas-Méndez et al., 2017). For example, examining differences in the attitudes toward internet, Porter and Donthu (2006) found that age was negatively related with perceived ease to use internet and positively related with perceived barriers, whereas educational level was positively related to perceived ease to use internet. Previous research has shown in this regard that, when compared to their younger counterparts, older employees report less experience and more anxiety in the use of technology (Porter & Donthu, 2006). In the framework of technology readiness, Rojas-Méndez and colleagues (2017) found similar results, confirming that younger people with higher education have a more positive attitude toward technology. These differences can be explained by the idea that older participants could appraise technology more negatively than their younger counterparts, because they may experience higher effort expectancy when facing technological innovations (Venkatesh et al., 2003). Indeed, since age "has been shown to be associated with difficulty in processing complex stimuli" (Venkatesh et al., 2003, p. 450), older employees could face more difficulties when aiming to acquire and update their so-called digital skills. Furthermore, it also appears that the observed differences may in fact stem from generational, rather than age-related characteristics. Indeed, authors highlight the timing effect of the exposure to and training in technology proficiency, since learning is more efficient when it occurs in early stages of life, as it can be the case for younger generations (Apella et al., 2020), and thus positively impact further performance and appraisals (Hurwitz &Schmitt, 2020). Finally, the existing literature

points out that age alone is not a comprehensive predictor of technology appraisal, since other variables such as education and gender may be more determinant (Dodel, 2021).

Similarly, previous results on educational level have been explained by the associations between lower education and lower technology competency and knowledge as well as lower perceived ease to use (see Porter & Donthu, 2006). These results can be interpreted based on the analysis offered by Dodel (2021), who explains that "inequalities in digital skills tend to arise when their development is left to incidental learning" (p. 8). Therefore, it is possible that when compared with people with lower levels of education, those with higher levels of education had access to more life-long opportunities to learn new skills, namely those necessary to master technological tools and applications.

Rojas-Méndez and colleagues (2017) also examined the role of gender-related differences in attitudes toward technology, finding that, compared to men, women perceived more discomfort – defined as "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Rojas-Méndez et al., 2017, p. 21) – as well as more insecurity – defined as "distrust of technology and skepticism about its ability to work properly" (Rojas-Méndez et al., 2017, p. 21). These results are in line with previous research, some studies reporting for example that, when confronted to new technologies, men experience less discomfort and insecurity (Tsikriktsis, 2004) and feel more self-confident (Elliott & Hall, 2005) than women. Other authors (e.g. Aguirre-Urreta & Marakas, 2010) have highlighted other gender-related attitudinal differences which may affect the relationship to technology, with women reporting lower levels of computer self-efficacy and risk-taking intentions, and higher levels of computer anxiety. In order to understand the gender-related differences in technology appraisal, it is important to consider gender within a societal context, referring to "the characteristics of women, men, girls and boys that are socially constructed" (World Health Organization, 2022). In this regard, authors suggest that differences in technology appraisal are

grounded in a strong psychological basis stemming from male-dominant systems (Venkatesh et al., 2000, 2003), in which systemic norms and barriers lead to several differences, such as a higher susceptibility of women to experience anxiety when facing technology or higher susceptibility to learned-helplessness (Venkatesh et al., 2000), which may affect perceived behavioral control and self-efficacy of women, and thus negatively affect their attitudes toward technology. This is consistent with the idea that "gender affects perceptions about digital competence more than the competence itself" (Dodel, 2021, p. 6), research showing that women tend to underestimate their self-perceived skills as compared to their observed skills (Hargittai & Shafer, 2006). Accordingly, in our study, gender-based differences and disparities in technology appraisal will be approached as the consequences of social inequality mechanisms and role stereotypes, rather than deriving from traits or dispositions inherent to women.

In addition to the above-mentioned interpretations, it is also important to remind the role of the occupational positions and work environments occupied by more vulnerable employees (women, older or less educated employees). In fact, disparities in the labor market or at the workplace could also contribute to differences in terms of digital skills. As highlighted by Day and colleagues (2010), variables such as organizational support can facilitate updating and developing one's skills, and thus counter the potential difficulties posed by technology at work. On the contrary, in an unsupportive or unfavorable work environment, some employees may experience more difficulties to keep up with technological developments at work. Therefore, one could assume that a negative technology appraisal reported by female, older or less educated employees, could derive from an accumulation of vulnerabilities due to their limited access to job resources – in terms of opportunities for skill learning and career development when compared to male, younger or highly educated employees (Slack & Jensen, 2008; Krajňáková & Vojtovič, 2017; SECO, 2019; ILO, 2019; Roberson et al., 2020; Eurostat, 2018; FSO, 2020; Masdonati et al., 2019).

Following this reasoning, an individual characteristic that seems particularly important in understanding the appraisal of technology, and which emerged several times in relation to the previously mentioned variables, is self-efficacy. Generalized self-efficacy has been defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (Wood & Bandura, p. 407). This individual characteristic has been widely studied in the field of work and organizational psychology and studies have highlighted its role as protector against adverse well-being outcomes as well as facilitating positive outcomes such as performance or job satisfaction (see Schyns & Von Collani, 2002). Moreover, generalized self-efficacy has been shown to play a role concerning the perception of control over difficulties, and hence play a moderator role between the stressors and their outcomes (Jex & Bliese, 1999). Generalized self-efficacy can therefore be considered in the framework of TAM (Venkatesh & Bala, 2008) as an individual characteristic which could be useful in promoting better technology appraisal especially for vulnerable groups since it "can influence individuals' perceptions of perceived usefulness and perceived ease of use." (Venkatesh & Bala, 2008, p. 276). For this reason, generalized self-efficacy will be taken into account in this study as well as its interactions with demographic variables.

Based on these findings, we thus expect our participants to differ in their technology appraisal based on their sex, age, level of education, and generalized self-efficacy. We thus formulate our second hypothesis as follows:

H2a. Men, will have a higher chance of falling into the positive appraisal cluster, while women will have a higher chance of falling into the negative technology appraisal cluster.

H2b. Younger workers will have a higher chance of falling into the positive appraisal cluster while older workers will have a higher chance of falling into the negative technology appraisal cluster.

H2c. Workers with high educational level will have a higher chance of falling into the positive appraisal cluster while workers with lower educational level will have a higher chance of falling into the negative technology appraisal cluster.

H2d. Generalized self-efficacy will interact with demographic variables increasing opportunities for women, older workers and workers with low educational level of falling into a positive cluster instead of a negative one.

1.3. Technology appraisal and well being

As previously discussed, the link between technology appraisal and well-being can be theorized by taking into account the JD-R model (Demerouti et al., 2001, Day et al., 2010). Job demands and resources, comprising of factors that are work-related (e.g., workload, autonomy, social support) or individual-related (e.g., sense of coherence, optimism), lead to processes that negatively (i.e. health impairment processes) or positively (i.e. motivational processes) affect work-related health and well-being. For our study, three outcomes were taken into account: boredom at work, burnout and engagement.

1.3.1. Potential outcomes of technology appraisal: Boredom, Burnout and Engagement

To study the potential outcomes of technology appraisal, we will retain three indicators that are particularly representative of well-being at the workplace, namely job boredom, burnout and work engagement (see Schaufeli & Salanova, 2014). These three measures empirically represent three distinct constructs (Reijseger et al., 2013). Indeed, engagement is a well-established positive indicator of work-related well-being (Leiter & Bakker, 2010; Schaufeli & Salanova, 2014). On the opposite pole, burnout and boredom represent negative

experiences in response to unfavorable working conditions, in terms of overstimulation (i.e. burnout) and understimulation (i.e. boredom) (Harju et al., 2014, Schaufeli & Salanova, 2014).

Boredom at work can be defined as a state of ill-being, characterized by low arousal and displeasure, occurring in an understimulating work context (Loukidou et al., 2009; Schaufeli & Salanova, 2014). The literature points to the potential role of technology in the experience of boredom, since it can thwart employees' needs for autonomy, stimulation and skill utilization through the automation and routinization of work tasks and procedures. For example, Loukidou et al., (2009) explain that "the use of technology to routinize working practices has meant that the skills of workers, even in many white-collar jobs, exceed the requirement of their jobs" (p. 382). However, the impact of technology on boredom can be controversial, since it can also offer possibilities to employees to cope effectively with boredom through activities such as cyberloafing (Pindek et al., 2018). Moreover, Mael and Jex (2015) explain that heavy users of information technology outside the workplace may present high needs for stimulation, and thus be more prone to experiencing boredom at the workplace. It is also useful to remind that, even though job boredom has traditionally been studied as resulting from and understimulating work environment characterized by trivial and underchallenging tasks, it may also occur when employees are faced with overly demanding and complex tasks to perform (Westgate, 2020).

Following this rationale, we propose to retain boredom as a potential adverse outcome of negative technology appraisal for employees who experience technology use as taxing and difficult, especially when they fail to perceive its usefulness, as well as for those who perceive technology as a hindrance to skill utilization or autonomy in their work environment. In contrast, we expect that a positive appraisal of technology would be negatively linked to job boredom.

Burnout is defined as a triadic syndrome conceptualized by three main dimensions (Schaufeli & Salanova, 2014). The first dimension, namely exhaustion, refers to a state of fatigue and emotional depletion. The second dimension, cynicism, represents an indifferent and distant attitude toward one's work. Finally, the third dimension labeled lack of efficiency, represents feelings of lack of capability and achievement. At the opposite pole on the activation-deactivation continuum, work engagement is defined as "a positive, fulfilling, work-related state of mind"(Bakker & Demerouti, 2008, p. 209) characterized by three dimensions: (1)*Vigor*, which represents the energetic and resilient approach of one's work, (2) *Dedication,* reflecting a sense of meaning, challenge and pride experienced at work, and (3) *Absorption* which refers to a state of concentration and immersion in one's work (Schaufeli & Salanova, 2014). Even though it is possible to view these concepts as unidimensional, authors still recommend measuring their constitutive dimension separately (Maslach, 1993; Maslach & Jackson, 1986; De Bruin & Henn, 2013).

Work engagement has been linked with several positive effects such as creativity, productivity, positive emotions, good health and ability to mobilize resources (Bakker & Demerouti, 2008) while burnout has been linked to low job satisfaction, poor performance and turnover intentions (e.g. Fogarty et al., 2000). In a study focusing on the relation between technology and work-related well-being, Ter Hoeven and colleagues (2016) found that the use of communication technology had a positive impact on employees' engagement through increased accessibility and efficiency, while contributing to burnout through increased interruptions and unpredictability. These results corroborate the findings of a study conducted in 2012 (ten Brummelhuis et al., 2012) on the detrimental and beneficial outcomes of New Ways of Working (NWW) enabled by intensive use of information and communication technologies (e.g. remote working). This study showed that in such working modalities, increased flexibility and control over communications were associated with higher engagement

and lower exhaustion, while frequent interruptions were linked with exhaustion. An impact of techno-stressors (i.e. overload induced by technology, invasion of privacy, etc.) on exhaustion has also been highlighted (Maier et al., 2015). Moreover, at a between-person level, a longitudinal study conducted in 2018 highlighted the link between perceived pressure to be attainable through technologies at work (i.e. workplace telepressure) and higher levels of physical and cognitive exhaustion (Santuzzi & Barber, 2018).

Hence, we expect a positive technology appraisal to be linked positively to work engagement and negatively to burnout, and a negative technology appraisal to be linked positively with burnout and negatively to work engagement.

Based on the abovementioned results and literature, we hypothesize the relations between technology appraisal and well-being as follows:

H3a: Negative technology appraisal patterns entail higher levels of job boredom when compared to positive technology appraisal patterns.

H3b: Negative technology appraisal patterns entail higher levels of Burnout when compared to positive technology appraisal patterns.

H3c: Negative technology appraisal patterns entail lower levels of work engagement when compared to positive technology appraisal patterns.

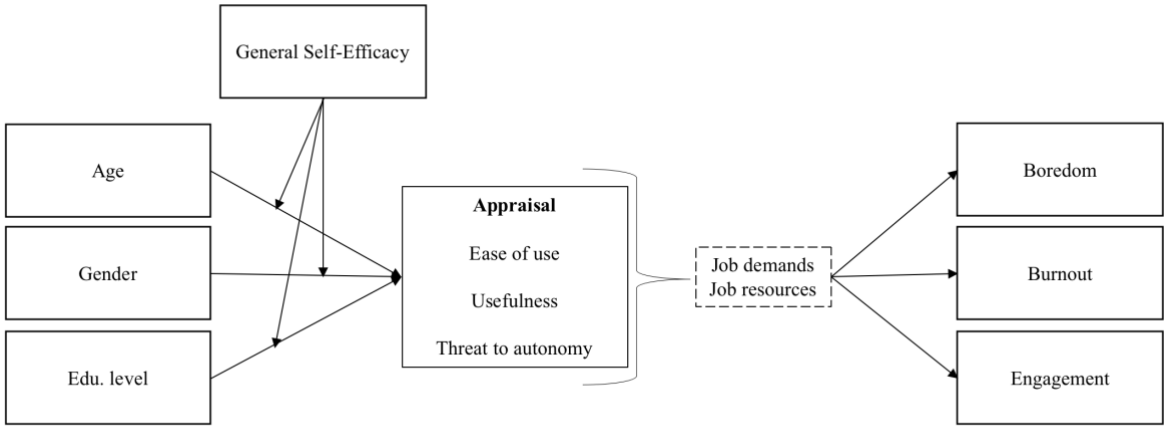
1.4. Present study

In the present study, in line with the recent literature, we adopt a psychological approach to the relation between human and technology to better understand the subjective perceptions and experiences of technology by employees, and their effects on their sustained well-being, especially in an evolving work context where recourse to technology is seldom an

individual choice. More precisely, in line with the paradigms proposed by Landers and Marin (2021), the present study aims at understanding purely psychological process, thus adopting a *Technology-as*-context approach. Indeed, our study focuses mainly on participants' appraisal of technology by taking into account technology in the background, while not specifically considering the type of technology itself, its characteristics or potential evolutions. This study will contribute to the literature by (1) adopting a person-centered approach to identify different patterns of technology appraisal, (2) explaining such patterns through individual and socio-demographic differences and (3) using these patterns to predict outcomes in terms of work-related well-being. Figure 1 illustrates the conceptual model of the present study.

Figure 1.

Conceptual model of the present study



Note. The variables enclosed by dashes were not measured in our study

2. Method

2.1. Sample

The sample was composed of participants working in different work sectors. A first subsample was collected in early 2019 in two public institutions in the French speaking part of

Switzerland, in collaboration with the respective HR departments (n =203). Data on a second subsample, comprised of participants working in public and private sectors, was collected in late 2019 (n = 198) and late 2020 (n = 234) by students enrolled in a 3-credit methodology course at the University of Lausanne. Finally, a smaller third subsample was collected using a snowball sampling technique (n = 57). As a result, the total sample for this study was composed of 692 Swiss working adults (M_{age}= 39.56, SD = 12.45, 60% female) [1]. Concerning their activity domain, 17.6% of the respondents were executives, 20.2% were academic and liberal professionals, 27.5% were administrative personnel, 11.7% were active in intermediate professions [2], 6.5 % were sales personnel, and the remaining participants were blue-collar workers, such as craftsperson, machine operators, and unskilled workers. 9% of participants did not report their domain of activity. The average tenure of the sample was around 7 years (M_{tenure} = 6.75, SD = 7.67), with 14.2% not reporting this information. Finally, by rating the item on the presence of work-related technology (i.e. “technology is very present in my work” on a 5-pont likert scale going from “strongly disagree” to “strongly agree”), 70.7% of the sample agreed (rather or strongly) that technology was present in their work. Our study complied with APA ethical standards.

2.2. Procedure

Participants filled an online questionnaire transmitted with a clickable link. At the beginning of the survey, the questionnaire thanked for agreeing to participate in this study and stated that responses would be treated as strictly anonymous, confidential and in accordance with the ethical rules of the Swiss Psychological Society.

2.3. Measures

Demographics

Several demographic and sociodemographic data were collected. The age of the participants was measured with an item, asking to indicate the age in a blank space. Concerning sex, participants had the option to choose the male or female answer (Female = 1; Male = 2). Educational level has been assessed with a multiple choice of 14 options (from 1 = compulsory school, to 14 = PhD). Then, for this study, education level was categorized into three different categories (i.e. 1 = compulsory school and lower secondary education; 2 = upper secondary education; 3 = tertiary education).

Generalized self-efficacy

The level of generalized self-efficacy was measured using the General Self Efficacy Scale (GSES, Schwarzer & Jerusalem, 1995), which consisted of 10 items that participants were asked to answer on a Likert scale ranging from 1 (not at all true) to 4 (completely true). The scale scores showed good reliability (Cronbach's $\alpha = .88$).

Technology appraisal

Based on the previously cited theoretical framework, technology appraisal has been measured with 3 items developed by the authors referring to different aspects (perceived ease of use, usefulness, and impact on autonomy) of technology in the workplace, with a 5-point Likert-scale going from 1(strongly disagree) to 5 (totally agree). The first item referred to technology in the workplace in relation to task-related perceived usefulness (“technology has improved the execution of my daily tasks”). The second item concerned the ease of use (“it is

easy for me to use the technology"). Item 3 referred to the general impact on autonomy ("technology, in the context of my work, has limited my autonomy").

Job boredom

Job boredom was measured with the DuTCH boredom scale (DUBS) (Reijseger et al., 2013) in its French version. This instrument is composed of six items (e.g. "I feel bored at my job"). Participants answered to this questionnaire using a five-point Likert- type scale ranging from 1(never) to 5 (always). The scale scores showed good reliability (Cronbach's $\alpha = .87$).

Burnout

Burnout and its subdimensions were measured with the Maslach Burnout Inventory – General Survey (MBI-GS, Schaufeli et al., 1996). This measure includes the subscale of exhaustion with five items (ex. "I feel emotionally drained from my work"), the subscale of cynicism with five items (e.g., "I have become more cynical about whether my work contributes anything") and the subscale of lack of efficiency with six items (e.g. "I can effectively solve problems that arise in my work") to be rated on a seven-point Likert-type scale ranging from 1 (never) to 7 (always). In the current study, Cronbach's α's for the three subscales indicated good reliability (respectively $\alpha = .87$; $\alpha = .83$; $\alpha = .84$).

Work Engagement

Engagement and its subdimensions were measured with the Utrecht Work Engagement Scale (UWES, Schaufeli et al., 2006) in its French validation (Zecca et al., 2015). This scale includes 9 total items. 3 items measure vigor (e.g. "At my job, I feel strong and vigorous"), 3 items measure dedication (e.g. "I am proud on the work that I do"), and 3 items measure absorption (e.g. "I am immersed in my work"), to be rated on a 7-point likert scale

going from 1 (never) to 7 (always). In the current study, Cronbach's α's for the three subscales indicated good reliability (respectively α = .80; α = .90; α = .80)

2.4. Statistical Analysis

The analyses were conducted in three steps. First, a TwoStep cluster analysis was carried out using IBM SPSS Version 26. The log-likelihood was used. This analysis was based on the assumption that all items were independent and not highly correlated (Tkaczynski et al., 2017, Bacher et al., 2004) and that items used followed a normal distribution (Tkaczynski et al., 2017, Bacher et al., 2004). Normality was assessed using skewness and kurtosis analyses. As we used a sample larger than 300 participants, either absolute skew values larger than 2 or absolute kurtosis values larger than 7 were used as reference values to determine non-normality (Kim, 2013). The best-fitting model was selected and validated based on several statistical fit criteria: Bayesian information criterion (BIC), the Silhouette Measure of Cohesion and separation that should be equal or above 0.2 (Tkaczynski et al., 2017), the size of the smaller cluster, and the ratio of cluster sizes (larger cluster to smaller cluster) that should be below or around 2.0 (Tkaczynski et al., 2017). In order to validate our clusters, we have verified that no item had low ratings, and we ran an ANOVA to ensure that all items within a cluster were significantly different. Finally, we randomly separated the sample into two samples, ran again the cluster analysis and compared the news results with our previous cluster solution in order to validate our initial cluster solution (Tkaczynski et al., 2017).

In the second step, we ran a series of multinomial logistic regressions to test hypothesis H2. Multinomial logistic regression models describe who is most likely to fall into a particular cluster rather than another. Hence, sex, age, education level, and generalized self-efficacy were used as exploratory factors. In order to obtain a complete and nuanced view of the association between these variables and the different clusters, we alternated the reference group and all the

cluster were compared. This resulted in a model in which generalized self-efficacy, all sociodemographics and their interaction with self-efficacy were included as predictors of cluster membership.

In the last step, we ran a series of one-way ANOVAs to test hypothesis H3, namely the associations between on one hand, technology appraisal clusters and, on the other, burnout, engagement, and job boredom. All the groups were compared. ANOVAs were followed by multiple comparisons using Bonferroni post-hoc t-tests. Moreover, homogeneity of variances was assessed using Levene's test (homogeneity is determined with a nonsignificant p-value above .05) and normality was assessed using skewness and kurtosis analyses. Again, as we used a sample larger than 300 participants, either absolute skew values larger than 2 or absolute kurtosis values larger than 7 were used as reference values to determine non-normality (Kim, 2013).

3. Results

3.1. Technology appraisal profiles

Results for normality test indicated a normal distribution for each item. Table 1 indicates results concerning clusters indicators and criterion of validation. By letting the statistical software free to determine the number of clusters, we obtained a six clusters solution of technology appraisal. Even though presenting a fair Silhouette coefficient of 0.4, this solution was problematic due to the poor interpretability of the clusters, as well as the small number of participants in some of them, with a ratio of sizes (larger cluster to smaller cluster) of 3.09. Hence, we proceeded to investigate reduced cluster solutions. A 3-cluster solution, with a silhouette coefficient of 0.4 and a ratio of sizes of 2.39 was retained in order to (1) obtain interpretable clusters and (2) obtain sufficient participants per cluster to allow subsequent analyses based on significant differentiation between item means in each cluster. The

importance of predictors in this three profiles clustering was (1) item 3 (i.e. “technology, in the context of my work, has limited my autonomy”; importance = 1), (2) item 2 (“it is easy for me to use the technology”, importance = 0.89) and (3) item 1 (i.e. “technology has improved the execution of my daily tasks”, importance = 0.66).

Table 1

Model fit summary of the cluster analysis for technology appraisal.

Model	N. clusters	BIC	SC	Sm %	LS ratio	ItemDiff
4	3	992.537	0.4	20.1	2.39	yes
3	4	905.865	0.5	10.7%	4.36	no
2	5	848.618	0.4	9.5%	3.02	no
1	6	798.956	0.4	7.9%	3.09	no

Note. BIC = Bayesian information criterion, SC = Silhouette coefficient. Sm % = percentage smaller cluster. LSratio = ratio between the effective of the largest and the smallest cluster. ItemDiff = Mean differentiation of each items in each cluster based on ANOVA, Post Hoc Bonferroni.

The three-profile solution is composed as follows. The largest profile (48%) presents high scores on item 1 (M= 4.30, sd = .56). and item 2 (M = 4.47, sd = .54) and low scores on item 3 (M = 1,51, sd = .50). Hence, this group is composed by workers for whom technology is useful, easy to use, without reducing their autonomy. This cluster was labeled *Tech-Enthusiasts*. The second cluster (31.9%) includes high-average scores on item 1 (M = 3.59, sd = .88), high scores on item 2 (M = 4.30, sd = .53), and high-average scores on item 3 (M = 3.20, sd = .76). This group is characterized by workers who perceive technology as limiting their autonomy, but still improving the execution of their tasks and easy to use. This cluster was labeled *Tech-Ambivalents*. The last and smallest group, Cluster 3 (20.1%), includes low-

average scores on item 1 (M = 2.65, sd = 1.14), low-average scores on item 2 (M = 2.86, sd = 1.00), and low scores on item 3 (m = 2.20, sd = 1.04). This third group is characterized by people reporting that technology, even though not a threat to their autonomy, is not very easy to use, nor really helpful. This cluster was labeled *Tech-Detractors*.

3.2. Descriptive analyses

Means, standard deviations and Pearson's bivariate correlations are reported in Table 2. The results of the correlation analysis showed small correlations between demographics, small correlations between demographics and items of technology appraisal, as well as small correlations between demographics and clusters, in line with the theoretical framework.

Concerning their correlation with demographics, *Tech-Enthusiasts* positively correlated with sex, educational level, and generalized self-efficacy, and negatively correlated with the three dimensions of burnout and positively with two dimensions of engagement, namely vigor and dedication. The cluster *Tech-Ambivalents* correlated negatively with age, educational level and generalized self-efficacy, and positively with the three dimensions of burnout and negatively with two dimensions of engagement (vigor and dedication). Finally, the third cluster, *Tech-Detractors*, correlated positively with age and negatively with sex and generalized self-efficacy, as well as positively with the two dimensions of burnout, namely cynicism and lack of efficiency, and negatively with two dimensions of engagement, namely dedication and absorption. The three clusters were negatively correlated with each other.

Table 2.

Bivariate Pearson's Correlations of all variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(1) Age																	
(2) Sex	.00																
(3) Edu. Level	.01	.12**															
(4) Self-Efficacy	.07	.13**	.16**														
(5) Technology 1	.00	.12**	-.05	.03													
(6) Technology 2	-.23**	.13**	.07	.25**	.31**												
(7) Technology 3	.01	-.01	-.12**	-.14**	-.08*	-.18**											
(8) Cluster 1	-.03	.09*	.13**	.15**	.52**	.40**	-.63**										
(9) Cluster 2	-.08*	-.02	-.10*	-.08*	-.10**	.16**	.67**	-.66**									
(10) Cluster 3	.13**	-.09*	-.05	-.10**	-.53**	-.68**	.01	-.48**	-.34**								
(11) Job boredom	-.28**	.05	.02	-.19**	-.07	.03	.07	-.06	.05	.02							
(12) Exhaustion	-.07	-.06	.02	-.22**	-.14**	-.12**	.20**	-.18**	.14**	.05	.32**						
(13) Cynicism	-.02	.00	.02	-.25**	-.20**	-.12**	.27**	-.24**	.16**	.12**	.44**	.59**					
(14) Lack of Eff.	-.09*	-.08*	-.06	-.46**	-.10**	-.18**	.18**	-.20**	.09*	.15**	33**	.26**	.46**				
(15) Vigor	.16**	-.03	-.06	.35**	.11**	.08*	-.10**	.12**	-.08*	-.06	-.53**	-.48**	-.53**	-.51**			
(16) Dedication	.09*	.02	.04	.30**	.16**	.08*	-.16**	.17**	-.12**	-.08*	-.48**	-.36**	-.57**	-.57**	.76**		
(17) Absorption	.13**	-.00	-.00	.22**	.16**	.06	-.02	.07	-.00	-.09*	-.50**	-.20**	-.37**	-.45**	.68**	.72**	
M	39.56	1.40	2.22	3.22	3.74	4.09	2.19	0.48	0.32	0.20	2.40	3.20	2.91	2.94	4.98	5.22	5.08
SD	12.45	0.49	0.92	0.47	1.03	0.90	1.03	0.50	0.47	0.40	1.01	1.26	1.25	0.90	1.02	1.25	1.09

Note. Sex: 1 = Female; 2 = Male; Technology 1= "technology has improved the execution of my daily tasks"); Technology 2 = "it is easy for me to use the technology"; Technology 3 = "technology, in the context of my work, has limited my autonomy"; Cluster 1 = Tech-Enthusiasts; Cluster 2 = Tech-Ambivalents; Cluster 3 = Tech-Detractors; N=692. ***p<0.001, **p<0.01, *p<0.05.

3.3. Explaining cluster membership: Logistic regressions

Table 3 shows the results for the logistic regression. Concerning Age, the significant odd ratio below 1 for *Tech-Detractors* compared to *Tech-Enthusiasts*, indicated that younger participants are more likely to belong to *Tech-Enthusiasts* than to *Tech-Detractors*. Concerning the comparison to *Tech-Ambivalents*, odds ratios below 1 indicated that younger participants are more likely to belong to *Tech-Ambivalents* than to *Tech-Detractors*. Concerning sex, the comparison between *Tech-Detractors* and *Tech-Enthusiasts* showed an odd ratio above 1, indicating that women are more likely to belong to *Tech-Detractors*, than to *Tech-Enthusiasts*. Concerning educational level, the comparison of *Tech-Enthusiasts* and *Tech-Ambivalents* to *Tech-Detractors* showed an odd ratio above 1 for the lowest educational level, indicating that participants with the lowest educational level are more likely to belong to *Tech-Ambivalents* and to *Tech-Detractors*, than to *Tech-Enthusiasts*. Moreover, results showed that people with an average level of education are more likely to belong to *Tech-Ambivalents* than to *Tech-Detractors*. Finally, the interaction between sex and generalized self-efficacy was significant when comparing *Tech-Ambivalents* to *Tech-Enthusiasts*. Figure 2 enables us to graphically interpret this result, which indicates that middle and higher levels of generalized self-efficacy in women increases the probability to belong to *Tech-Enthusiasts* rather than to *Tech-Ambivalents*.

Table 3

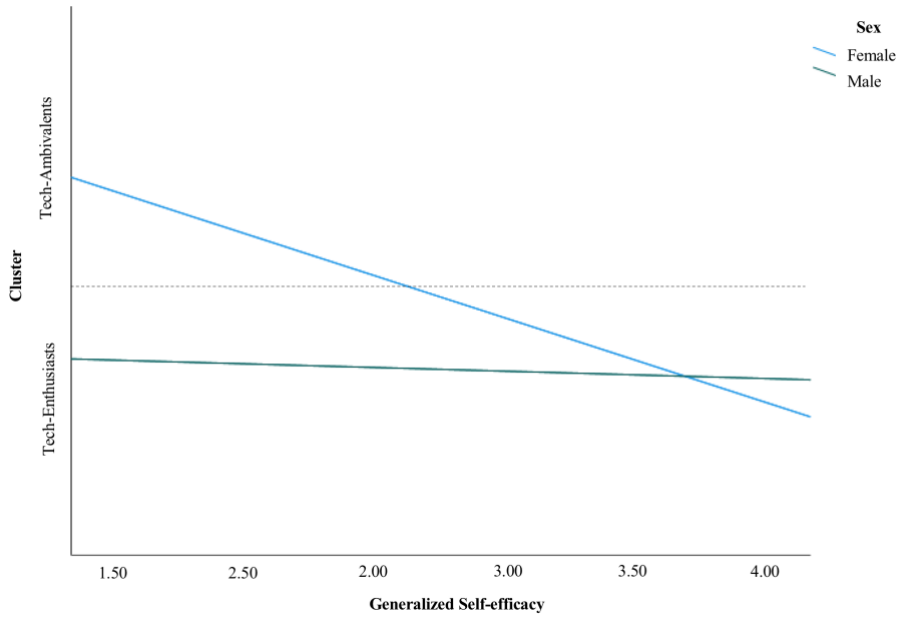
Multinomial Logistic regression analyses of the type of technology appraisal clusters: Odds ratios.

Predictor variables	Coef.	Compared clusters	Odds ratios	95%CI
Age	.027	3 vs. **1**	1.03**	[1.009; 1.045]
	.029	3 vs. **2**	1.03**	[1.011; 1.048]
Sex (female)	.524	3 vs. **1**	1.69*	[1.078; 2.648]
Educational level 1	.510	2 vs. **1**	1.66**	[1.127; 2.459]
	-.866	3 vs. **2**	.42*	[.178 ; .992]
2 3 (ref.)				
Self-Efficacy	-.536	2 vs. **1**	.59**	[.396; .865]
	-.653	3 vs. **1**	.52**	[.324; .836]
Self-Efficacy*Sex	.301	2 vs. **1**	1.35**	[1.071; 1.704]

Note. Cluster 1 = Tech-Enthusiasts; Cluster 2 = Tech-Ambivalents; Cluster 3 = Tech-Detractors; Reference cluster is indicated in bold. Only significant results are summarized, based on higher odds of belonging to a certain cluster over the reference cluster. Non-significant results can be obtained by writing to the corresponding author. N=692. ***p<0.001, **p<0.01, *p<0.05. Coef. = logit coefficient, Lower bound and upper bound of the 95% confidence interval are indicated in brackets as follows [Lower bound; upper bound]; Self-Efficacy*Sex = interaction between self-efficacy and sex.

Figure 2.

Interaction effect between Self-Efficacy and Sex in predicting clusters membership



3.4. Differences in well-being at work: ANOVAs

Results for normality test indicated a normal distribution of the data, and variances were homogeneous. Results of the ANOVAs are reported in table 4. Concerning the three dimensions of burnout, namely exhaustion, cynicism and lack of efficiency, results showed a significant difference between the scores obtained by participants in cluster 1 and those in the other two clusters.

Table 4.

Anova for each cluster for burnout, engagement and job boredom

	Job boredom			
	Mean (SD)	N	F	Difference
Cluster 1	2.335	85	1.317	ns
Cluster 2	2.468	388		
Cluster 3	2.444	219		

	Burnout											
	Exhaustion				Cynicism				Lack of efficiency			
	Mean (SD)	N	F	Difference	Mean (SD)	N	F	Difference	Mean (SD)	N	F	Difference
Cluster 1	2.969	85	11.719***	C1<C2***	2.592	85	21.836***	C1<C2***	2.758	85	15.205***	C1<C2***
Cluster 2	3.466	388			3.205	388			3.054	388		
Cluster 3	3.337	219		C3>C1**	3.194	219		C3>C1***	3.201	219		C3>C1***

	Work engagement											
	Vigor				Dedication				Absorption			
	Mean (SD)	N	F	Difference	Mean (SD)	N	F	Difference	Mean (SD)	N	F	Difference
Cluster 1	5.103	85	5.030**	C1>C2*	5.443	85	10.092***	C1>C2***	5.168	85	3.132**	C1>C3*
Cluster 2	4.858	388			5.012	388			5.080	388		
Cluster 3	4.861	219		C3<C1*	5.034	219		C3<C1***	4.892	219		

Note. Df for each ANOVA were (2, 689). n=692. ***p<0.001, **p<0.01, *p<0.05, ns = not significant. In the Difference column, only significant differences are reported.

Indeed, cluster 1 presents significantly lower scores on all three dimensions of burnout when compared to clusters 2 and 3. Concerning work engagement, participants in cluster 1 showed significantly higher scores of vigor and dedication compared to scores reported by participants in clusters 2 and 3. Concerning Absorption, participants in cluster 1 showed significantly higher scores compared to those reported by participants in cluster 3. Finally, concerning job boredom, no significant difference between the three groups was found.

4. Discussion

The first aim of this study was to adopt a psychological and person-centered approach to identify different patterns of technology appraisal. Our first exploratory hypothesis was supported by our results, allowing us to identify three clusters that represent sensibly different perceptions of technology at the workplace. The first cluster, labeled *Tech-Enthusiasts* gathers employees who present a general positive appraisal, by appraising technology as user-friendly, useful, and not threatening their autonomy. Furthermore, two other profiles, presenting moderate levels and mixed combinations of our variables were found. A second cluster, labeled *Tech-Ambivalents,* regrouped employees reporting somewhat mixed feelings about technology, perceiving its limiting impact on their autonomy, but still recognizing its ease of use and its contributions to facilitate their work. Finally, a third cluster named *Tech-Detractors* brought together employees who did not perceive technology as hindering their autonomy, but still doubted their capacities to use it and its useful contribution to their professional tasks.

The second aim of this study was to predict and explain membership in these clusters based on participants' socio-demographic characteristics. As formulated by our second hypothesis, we expected that men, younger employees and employees with higher educational level and higher generalized self-efficacy would have higher chances of falling into a positive appraisal cluster, while women, older participants and participants with lower educational level

would more likely fall into the negative technology appraisal clusters. Results confirmed our hypothesis. Concerning Age, when compared to older employees, youngest ones were indeed more likely to belong to the *Tech-Enthusiasts* than the *Tech-Detractors* cluster, and also had higher chances of being *Tech-Ambivalents* rather than *Tech-Detractors*. The middle-aged group had a higher chance to fall into the *Tech-Ambivalents* than the *Tech-Detractors* cluster. In sum and as indicated by previous research (Porter & Donthu, 2006; Rojas-Méndez et al., 2017), age does seem to matter when it comes to the employees' relations to technology and their appraisal of its practicality and purpose. Concerning sex, results also confirmed our hypothesis, women being more likely to belong to *Tech-Detractors* than to *Tech-Enthusiasts*, indicating a less positive appraisal of technology and more concerns regarding the abilities to efficiently use it to pursue their work goals. Concerning educational level, workers with a low educational level were more likely to belong to *Tech-Ambivalents* and *Tech-Detractors* than to *Tech-Enthusiasts*, compared to highly qualified workers, while workers with average educational level (i.e. upper secondary education) were more likely to be *Tech-Ambivalents* than *Tech-Detractors*. Finally, the interaction between sex and self-efficacy was significant when comparing *Tech-Ambivalents* to *Tech-Enthusiasts,* indicating that women with medium and higher levels of generalized self-efficacy are more likely to belong to the positive appraisal cluster than to *Tech-Ambivalents*, while for men the effect of self-efficacy was not found (i.e. men having higher chances to fall into the positive cluster regardless of their level of self-efficacy). To sum, and in line with our expectations, it appears that younger, male, most educated employees, and interestingly women with medium and high self-efficacy are indeed those who are most likely to experience a *symbiotic relation* (Brangier & Hammes, 2007) with technology, feeling confident in their ability to use it to optimize their work, without feeling restrained or controlled by it. Our findings may also point to the fact that, due to certain sociodemographic characteristics (i.e., being a woman, older of age or less educated), certain employees may

experience difficulties to keep up with technological developments at work. Hence, as it will be explained later, it is important to develop appropriate interventions in order to help vulnerable employees in acquiring the necessary resources to cope with difficulties linked with technology in the workplace.

Beyond identifying these differences in technology appraisal at the workplace, the third aim of our study was to investigate their associations with well-being outcome for employees. In this regard, we expected people with a positive appraisal of technology to report less job boredom, lower levels of burnout and higher levels of engagement than their counterparts with a more mitigated or negative appraisal of technology. Results partially confirmed our hypothesis. First, when compared to both *Tech-Ambivalents* and *Tech-Detractors*, *Tech-Enthusiasts* reported lower levels on all three dimensions of burnout, as well as higher levels on two dimensions of engagement, namely vigor and dedication. Moreover, *Tech-Enthusiasts* showed higher levels of absorption than *Tech-Detractors*. In line with the existing literature (Ter Hoeven et al., 2016), we can interpret these results through the lens of the double role of technology as a symbiote - a mean for positive performance and engagement for workers equipped with the necessary skills to most benefit from it - or a parasite – adding to the stress and demands experienced by less comfortable workers while hindering their autonomy. Moreover, it is important to stress that the introduction of novel technological solutions and applications (e.g. Smart Technology, Artificial intelligence Robotics and Algorythm, STARA) can lead certain employees, especially whose with a negative appraisal of technology, to experience feelings of distress, insecurity, reduced self-efficacy and sense of purpose, and to develop distant and cynical attitudes towards their work, thinking “why bother for my job, once the robot is programmed I will be given root” (Oosthuizen, 2019, p. 32). Concerning job boredom, our analyses did not show significant differences between the three clusters. Nevertheless, this inconclusive result can be explained by the fact that none of the

identified clusters seem to face working conditions (i.e., low demand but especially low resources) that are recognized as predictors of boredom (Reijseger et al., 2013). For instance, while *Tech-Detractors* might experience difficulties using technology and making sense of its utility, they still preserve their autonomy, which is a core resource to cope with adverse working conditions (Mikkelsen et al., 1999) and especially job boredom (Reijseger *et al.*, 2013, Harju *et al.,*2014). On the other hand, although threatened in their autonomy, *Tech-Ambivalents* still report abilities to efficiently use technology to pursue their work goals, which may in turn satisfy their need for stimulation and accomplishment and preserve them from boredom (van Hooft & van Hooff, 2018). Job boredom could hence characterize a totally negative appraisal pattern, in which neither autonomy nor technology-relevant skills are present.

These findings lead us to several considerations. First, from a methodological point of view, this study contributes to the literature on the TAM model – which has mainly been studied following a variable-centered approach – using a person-centered approach to propose a group-based point of view on technology appraisal. Then, by highlighting different patterns of technology appraisal, our results point to different needs of employees, which may in turn contribute to the identification and implementation of different types of actions and interventions that could help them cope with technological change and innovation. Thirdly, results may point to barriers and inequalities faced by some employees– namely older, less qualified or women in the workplace. As mentioned in the theoretical part of this study, the work environment occupied by more vulnerable populations (women, older employees and less educated employees) and the work-disparities that may result from it could also contribute to the development of disparities in terms of digital skills. These results confirm other findings on precariousness and vulnerabilities encountered by older, less qualified and female workers in the labor market. Indeed, previous studies have reported higher risks of underemployment an unemployment for older workers (above 55 years) when compared to their middle-aged

counterparts (Slack & Jensen, 2008). Moreover, research has also highlighted the need for policies to support older workforce to maintain durable inclusion and develop sustainable careers (Krajňáková & Vojtovič, 2017), since they experience more difficulties to find a new job when losing theirs and thus are more at-risk of long unemployment (SECO, 2019). Concerning gender inequalities, it is also well documented that women face specific risks and barriers in the labor market. For instance, women were found to have an inferior mean salary compared to men (20% less in 2019), while facing higher risks of violence and harassment in the workplace (ILO, 2019), and more difficulties to develop their careers and gain access to leadership positions (Roberson et al., 2020). Finally, it also appears that lower level of education and qualification are associated with lower employment rates and higher risks of unemployment (Eurostat, 2018; FSO, 2020). Even though these inequalities are well documented in the literature, our findings contribute to the latter several ways. First, by linking cluster membership to sociodemographic characteristics, results suggest that part of the inequalities at work may be reinforced by the way employees appraise technology at the workplace. Second, by also considering well-being indicators, results also show that different appraisal patterns could correspond to differences in terms of work-related well-being.

4.1. Practical implications

In line with ILO's (2019), recommendations, the practical implications of this study point to tailored interventions to improve the appraisal, acceptance and incorporation of work-based technology. At an organizational level, it seems indeed important to take into account employees' needs, skills and perceptions when introducing technological applications, in order to enhance their contribution potential and minimize their hindering effects. The appraisal patterns identified in our study could guide such interventions. For instance, when dealing with *Tech-Ambivalents,* it appears more important to anticipate and alleviate possible limiting impacts on their autonomy, rather than put emphasis on training. In this sense, interventions

aiming at autonomy improvement (e.g., job crafting and autonomy support, see Slemp et al., 2015) might be useful. On the other hand, *Tech-Detractors* could need to reinforce their skills to adapt to technological innovations, but also better understand its potential purpose. Accordingly, organizations should provide the necessary resources (awareness-raising measures, continuous training, gender and age-equitable management) to help employees overcome disadvantages and develop the necessary skills to cope with technological demands.

4.2. Limits and further research

Our study has several limitations. First, the unequal distribution of participants across socio-demographic categories did not allow to test the interactions between these categories. Future research could therefore use larger samples to test interactions between socio-demographic variables for logistic regression. Then, the non-random nature of our sample implies precautions in the interpretation of the results, since the effects found for the different demographic factors may be partly due to the specific occupations/organizations studied. Moreover, the items used to measure technology appraisal have been developed by the authors and hence have not been validated. Future research should use existing validated scales or better investigate psychometric properties of these items. In addition, it should be reminded that our study is based on a cross-sectional design and evaluates the differences in outcomes through ANOVAs. Hence, causality cannot be established. Following this reasoning, it could be possible that employees who experience burnout tend to appraise technology negatively (i.e. emotional exhaustion and cynicism lead to negative attitudes), rather than the reverse. In order to better establish the causal links between clusters and outcomes, a longitudinal design is recommended. Moreover, our study considered demographics and generalized self-efficacy as predictors of clusters. Based on the TAM theory, future studies should integrate other predictors of perceived ease to use and usefulness at an individual level,

such as computer anxiety or computer self-efficacy, in order to better understand technology appraisal. Then, based on the analysis of Landers and Marin (2021), the framework applied in this study (i.e. *technology-as-context*) does not allow for identifying tailored solutions to address issues and needs rising from the utilization of specific types of technology. Future research should then adopt a *technology-as-designed* paradigm to study different technological applications and tools "in terms of their specific design characteristics, users, intended users, and how each of these might change in the future as the technology is redesigned and redeveloped over time" (Landers & Marin, 2021, p. 241). Such an approach will contribute to a better understanding of the way technology may impact and influence employees' daily experiences at work, by offering "accuracy in describing and predicting real-world phenomena" (Landers & Marin, 2021, p. 254). Finally, our study was conducted before the COVID-19 pandemics and during October 2020. Further research should investigate more thoroughly the impact of the pandemic in terms of the fast and massive technological mobilization required from employees.

5. Conclusion

This study highlights the importance of adopting a psychological perspective to better understand the relationship between workers and technology and identify its antecedents and consequences. Moreover, this study highlights the need for a more sensible and supportive introduction of technology developments in the workplace, in order to avoid technology-related inequalities and their consequent adverse outcomes on well-being and performance.

[1] The majority of Data (N = 458) for this study was collected before the pandemics. However, 234 surveys were collected during the pandemic, between October 7 and 21, 2020. In Switzerland, during that period there was no lockdown (full lockdown was applied from early March to early May 2020). The analyses presented in this paper were also performed on this subsample. In terms of results, no important differences were found between the two subsamples.

[2] In the current study, intermediate professions reflect occupational categories such as technicians, accountants, nurses, etc.

III. GENERAL DISCUSSION AND CONCLUSION

To discuss the content of this PhD dissertation, it is useful to remind the reader of the broad conceptual standpoint on boredom at work presented in the first section of this work, which considers state boredom as *an unpleasant state of deactivation and displeasure –that results from an environment devoid of stimulation, challenge and purpose – which reflects the impression of not reaching any goals (in a broad sense) and is accompanied by a sense of meaninglessness*. In this first subsection, we will highlight the main findings of the presented studies relevant to the study of boredom and understimulation at work. Theoretical and methodological implications will be discussed. Then, this discussion will highlight the practical implications of our findings, their limits as well as perspectives for future research.

1. Summary of findings

1.1. Well-established Job characteristics, understimulation, and boredom at work

Concerning job characteristics, Study 1 illustrates what types of combinations of work characteristics exist in Switzerland, and inferentially informs us about the need to study under-stimulating work environments. This was important since the Swiss working context has already been demonstrated to be particular due to its favorable work environments. Study 1 also contributes to highlighting the potential threat to well-being of a resource-deprived work environment. As explained, the findings of Study 1 connect the dynamics of the work

environment to the dynamics of well-being. Their key message is that vulnerability scenarios at work may be determined by the level of job resources solely, and they seem to occur in relatively mild situations where job demands are not necessarily excessive. Even if Study 1 mostly describes the danger of the low resources category in terms of not having the resources to counteract average demands (thus resulting in a strain condition), this profile could also be interpreted differently. In particular, in this study, the resources taken into account refer to *skill discretion* and relate to the possibility of learning new things, being creative, and solving problems. This variable seems to be central for the study of boredom at work because it is linked with stimulation, but also with the meaning of the activity undertaken. An average demand-low resources profile could hence be interpreted as being near to the "passive" category described by Karasek (1979) and seems to represent an understimulated profile. This work environment characterized by average work demands combined with low skill discretion could constitute a fertile ground for the experience of boredom.

The results of Study 2 contributed to reinforcing this reasoning around the centrality of skill discretion, as it highlighted this resource, together with job demands, as a negative predictor of boredom at work. Indeed, skill discretion seems to be a crucial variable to consider for the study of boredom at work, since it contributes to cognitive stimulation by providing employees with opportunities to learn new things, develop their skills, and engage in creative problem solving (Ohly et al., 2006). If we consider that "boredom may be understood as an emotion that signals lack of progress towards goals" (Van Hooft & van Hooff, 2018, p. 932), skill discretion could be also functional in contributing to the sensation of progression.

As mentioned, decision authority, social support, and feedback did not show a significant association with boredom. Interestingly, van Hooft & van Hooff (2018) found that boredom can occur in the presence of both high and low levels of task autonomy – which is quite close to the decision authority component of autonomy used in this study– leading to

differently activated affective responses (i.e., respectively depressed affect versus frustration). Hence, while decision authority is an important resource to deepen the study of affective differences in the experience of job boredom, it is possible that its effects were overshadowed by the effect of skill discretion. Concerning social support and feedback, the results may be explained, on one side, by the somewhat ambiguous effect of social interactions on well-being at work. As mentioned, our measure of social support included different types of social support that might need to be distinguished, since their effects could be different (Harris et al., 2007). Even if social support at the workplace is generally considered a resource (Bakker & Demerouti, 2017), the search for particular types of social support, such as collegial support, defined as "sharing friendships, personal problems, and confidences" (Harris *et al.*, 2007, p. 151) may be triggered by the need to express dissatisfaction, and thus be negatively linked with well-being (Harris et al., 2007). Concerning feedback, even though our results do not confirm its role as a general resource against boredom for all participants, further analyses suggested that it may benefit employees with particular needs or profiles, as explained later in the discussion.

As a preliminary conclusion to this sub-section, we can therefore propose the following points. First, Study 1 contributes to the literature by showing the potential threat to well-being of a resource-deprived work environment combined with average demands. Then, the second study highlighted the centrality and the importance of skill discretion in the study of the antecedents of boredom at work. The second study has also contributed to highlighting the possible differential importance of job resources in the study of boredom at work. Specifically, resources related to the need for competence (job demands and skill discretion), stimulation, and challenge had an effect on boredom at work, while resources related to social support did not show a main direct effect.

1.2. Boredom at work and individual characteristics

Study 2 also has shown the salience of considering the interaction between individual variables and job characteristics in the study of boredom at work, suggesting that dispositional characteristics should be considered to also determine "who" experiences boredom and "under which circumstances". Specifically, boredom proneness positively predicted the experience of boredom at work over and above job characteristics (e.g., Kass et al., 2001). However, results demonstrate the importance of context, over and above SOC, in the experience of work-related boredom. Concerning the analysis of interaction effects between individual characteristics and working conditions, Study 2 showed some quite interesting results. A significant interaction between boredom proneness and job demands was found in predicting boredom at work. These results are congruent with the literature that suggests the role of boredom-proneness as a vulnerability factor in the face of work-related boredom (Farmer & Sundberg, 1986, Schaufeli & Salanova, 2013). Indeed, job demands *per se* seem insufficient for employees reporting a high propensity to experience boredom who may thus need specific job resources. Congruently, our findings highlighted a significant interaction between boredom proneness and feedback, pointing to the potential role of this job resource in counteracting boredom for boredom-prone employees. Feedback is considered an important resource contributing to goal attainment and motivation (Sparr & Sonnentag, 2008), whereas boredom represents a state characterized by feelings of lack of progress towards significant personal goals (van Hooft & van Hooff, 2018). Hence, for employees with a higher propensity to feel bored, clear, and sufficient feedback may represent a crucial impetus to progress at work and focus on goal attainment, which presumably makes their tasks more meaningful and less boring.

Concerning employees reporting average scores of SOC, finally, Study 2 also highlighted the importance of social support and feedback. It seems that, for such employees,

feeling cared for and supported through positive social interactions and constructive feedback at the workplace, represents a protective resource against boredom. In line with the literature, these results suggest that social support is particularly of use for people who lack a sense of coherence, as it helps them to make sense of the demands they face and to identify available resources in the environment to address them (Rothmann et al., 2003).

It is important to highlight that, except for the moderation effect of boredom proneness on the link between job demands and boredom, the hypotheses on moderation have not been supported. Study 2 hypothesized that higher scores on boredom proneness and SOC would weaken the relationship between job characteristics and boredom at work. The main idea behind these hypotheses was that boredom proneness, as a vulnerability characteristic, would have prevented favorable contextual characteristics from being effective in countering boredom. Concerning SOC, the main rationale assumed that, as a protective characteristic, SOC would have diminished the impact of potentially boredom-inducing characteristics on boredom at work.

However, the results showed that the link between feedback and boredom was strengthened by boredom proneness. Furthermore, the links between social support, feedback, and boredom at work were strengthened by SOC. These findings are important from a theoretical point of view and will be discussed in the second section of this general discussion.

As a preliminary conclusion to this sub-section, it is important to highlight the following points. First, Study 2 showed the main effect, over and above job characteristics, of boredom proneness. Moreover, this study highlighted the importance of considering vulnerabilities in terms of high boredom proneness and low sense of coherence, to understand the antecedents of boredom at work. In fact, variables that did not show a main effect (i.e., feedback and social support) may be instead helpful for helping vulnerable employees to overcome boredom at

work. Finally, the results of Study 2 inherent to the tested moderations imply a revision of the mentioned hypotheses from a theoretical point of view: the link between job characteristics and boredom being strengthened by the moderators (except for the moderation of boredom proneness on the link between job demands and boredom at work) and not weakened as hypothesized.

1.3. Boredom at work and technology

Study 4 contributed to this dissertation by giving to the reader an overview of the effects of the fourth industrial revolution in terms of work-related issues relevant to the study of boredom (i.e., understimulation, reduction in autonomy, lack of meaning). In general, this paper has been valuable in better understanding this global context before looking specifically at the relationship between boredom and technology. The aim of Study 5 was to enrich the study of technology-related antecedents of job boredom. The main idea was that different ways to appraise technology in the workplace would lead to different levels of boredom at work, with people with a positive appraisal of technology reporting lower levels of boredom at work compared to the negative appraisal counterpart. Concerning job boredom, our analyses did not show significant differences between the three clusters. Nevertheless, this result can be explained by the fact that none of the identified clusters seem to face working conditions (i.e., low demand but especially low resources) that are recognized as predictors of boredom (Reijseger et al., 2013). In fact, beyond the favorable cluster, the other two maintained at least one positive aspect related to technology. Specifically, *Tech-Detractors* experienced difficulties using technology and making sense of its utility, but they preserved their autonomy, whereas *Tech-Ambivalents,* although threatened in their autonomy, reported abilities to use technology to pursue their work goals. Job boredom could hence characterize a total negative appraisal pattern, in which neither autonomy nor technology-relevant skills are present.

As a preliminary conclusion of this subsection, it is important to highlight the following points. First, the fourth study composing this dissertation help to raise issues that cannot be ignored for the study of boredom at work. In fact, the issues of the role of technology in relation to boredom and understimulation, as well as its impact on the perceived meaning of work remain central. Then and finally, the last study included in this dissertation tried to examine at least part of these issues, by investigating technology appraisal in the workplace and its link with boredom at work. However, non-significant results were found. This leads to theoretical reflections and considerations that will be addressed in the second subsection of this introduction.

1.4. Boredom at work, understimulation, and outcomes

Concerning the outcomes of understimulation and boredom at work, the studies presented in this dissertation also showed interesting results. Concerning Study 1, results clearly demonstrated the high resources pattern to be the most beneficial, whereas the low resources pattern showed detrimental effects. Since Study 1 is based on a longitudinal design, it allows us to demonstrate that prolonged exposure to a resource-deprived work environment combined with average demands showed a decrease in terms of job satisfaction and an increase in mental health complaints. Such reasoning closely approximates the principles of conservation of resources (Hobfoll, 2001) and could be pertinent in interpreting the consequences of understimulation. Since the latter also refers to an environment of resource depletion, it could enclose people in a loss cycle, which explains why they cannot easily switch from an unfavorable to a more favorable profile. The results of Study 1 have largely supported the idea that the more resourceful the work environment, the more it relates to higher employee well-being. The high resources job characteristics profile is particularly distinguishable as it was associated with significantly higher well-being in all aspects, at both time points, and as

compared to both the low resources and the adjacent average resources profile. In turn, the low resources pattern showed clear differences from the opposite-end high resources pattern and, in most cases, from the average resources pattern.

Study 3 aimed to contribute to the literature on the outcomes of boredom at work by proposing an explanation of the process through which boredom at work may lead to work-related ill-being. In doing so, we aimed to deepen the understanding of potential psychological processes underlying the manifestation of boredom and its detrimental effects. The results of Study 3 suggest that the link between boredom at work and exhaustion may be mediated by cynicism—referring to disengagement and perceiving work tasks as lacking purpose and significance. These findings are in line with the tedium theory (Kafry & Pines, 1980) and suggest that the perceived lack of challenge characterizing boredom at work (Harju et al., 2014; Loukidou et al., 2009; van Hooff & van Hooft, 2014) and the consequent disengagement from work tasks and work perceived as underchallenging, meaningless, and purposeless (Barbalet, 1999; Harju et al., 2016; van Tilburg & Igou, 2012) could create the basis for experiencing exhaustion. Whereas in the case of overdemanding job conditions, cynicism represents a strategy to cope with fatigue and exhaustion (Leiter & Schaufeli, 1996), in the context of our study, cynicism may precede exhaustion and could be interpreted as a process of erosion of resources. Such an interpretation could also be supported by the conservation of resources theory (COR, Hobfoll, 2011). Specifically, this theory posits that resource loss has a more significant impact on wellbeing than resource gain since "people must invest resources in order to protect against resource loss, recover from losses, and gain resources" (Hobfoll, 2011, p. 3), and that "those with fewer resources are more vulnerable to resource loss and less capable of resource gain" (Hobfoll, 2011, p. 4). Applied to our study, this theory may imply that the experience of boredom at work demands particular efforts from individuals to pursue their tasks, whilst seeking to satisfy their need for stimulation and maintain a sense of purpose. These

efforts, when undermined and hindered by an unfavorable context that is a priori low in resources (or both in resources and in demands), could then encumber fostering valuable aspects of the job and could lead to an erosion of employees' resources, represented by cynicism, and ultimately to exhaustion. Generally, these findings suggest that individuals who experience boredom at work may not be exempt from developing signs of exhaustion, thereby highlighting the importance of considering boredom at work as a risk factor for employee health and wellbeing.

To sum up, Study 1 allowed the demonstration, with a longitudinal design, that employees in the stable condition of resource deprivation and average demands – thus on the edge between Karasek's high-strain and passive category – experience a decrease in job satisfaction and an increase in mental health complaints, which can be explained by the conservation of resources theory. Then, Study 3, contributes to the literature by showing a link between boredom at work and exhaustion. Finally, the results of Study 3 contribute to the literature by suggesting a different pattern of sequences (i.e., boredom – cynicism – exhaustion) that may be specific to the link between boredom at work and exhaustion.

1.5. Boredom at work and meaning

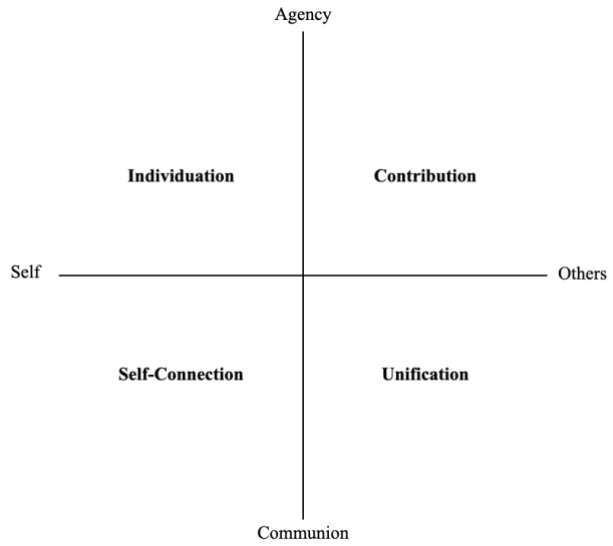
In this dissertation, we considered the role of meaning both as a possible antecedent and as a possible outcome of boredom at work. Concerning meaning-related resources, the results of Study 2 highlighted a strong negative contribution of perceived social utility of work in the prediction of boredom at work. Considered a central feature of meaningful work, social utility thus potentially represents an important resource against boredom at work and more generally against adverse effects of modern work on employees' health and well-being (Massoudi et al., 2018; Morin & Aranha, 2007; Toscanelli et al., 2019; Westgate & Wilson, 2018). Study 3 referred to the lack of meaning through the variable of cynicism. The results of

Study 3 showed the link of cynicism with boredom at work, as well as its mediator role in the link between boredom and exhaustion. As previously mentioned, these findings are consistent with the tedium theory (Kafry & Pines, 1980) and contribute to highlighting the risk linked with the perception of a work environment as being meaningless and purposeless.

To sum up, these findings support the idea that meaning can be either created by the work environment or may also stem from the unpleasant experience of boredom at work. However, as mentioned, theoretical approaches around the meaning of work are diverse and include different dimensions that go beyond those considered in this dissertation. Rosso and colleagues (2010) have proposed a valuable theoretical and overarching framework that depicts various sources of meaning of work, as presented in Figure 1.

Figure 1.

Theoretical framework of pathways to meaningful work developed by Rosso et al. (2010).



This theoretical framework shows different pathways to meaningful work and is composed of two axes, namely the communion-agency axis and the self-others axis. The first axis considers two types of underlying *drives* namely *communion,* which refers to the "drive to contact, attach, connect, and unite (thus pursuing communion)" (Rosso et al., 2010, p. 114), and

agency, which refers to the "drive to differentiate, separate, assert, expand, master, and create (thus pursuing agency)" (Rosso et al., 2010, p. 114). The second axis further differentiates between two types of goals or targets, according to whether they are directed toward the individual or towards others, including "other individuals, groups, collectives, organizations, and higher powers" (Rosso et al., 2010, p. 114). By combining the two axes and in reference to Figure 1, four dimensions - which are not to be considered as being mutually exclusive - can compose the experience of doing meaningful work. *Individuation* refers to the experience of meaning in relation to "the actions that define and distinguish the self as valuable and worthy" (Rosso et al., 2010, p. 115). *Contribution* refers to the experience of doing actions "perceived as significant and/or done in service of something greater than the self" (Rosso et al., 2010, p. 115). *Self-connection* refers to the experience of meaning deriving from that actions that "bring individuals closer into alignment with the way they see themselves." (Rosso et al., 2010, p. 115). Finally, *Unification* refers to meaning in relation to "actions that bring individuals into harmony with other beings or principles" (Rosso et al., 2010, p. 115).

Following Rosso and colleagues (2010) work, it is appropriate to specify that the operationalization of the concept of meaning of work used in this dissertation was based on the perceived impact on others (organization, people, society, world). Thus, this operationalization of meaning mainly reflects the *contribution* category proposed by Rosso and colleagues (2010) and not the others. Moreover, it remains essential to disentangle the relationship of meaning with boredom as an antecedent, outcome, or integral part of its experience. These points will be discussed in the limitations section of this dissertation.

1.6. Other contributions

One last contribution of this dissertation stems from the second study presented. Study 2 validates two measures of state and trait boredom, namely the Dutch Boredom Scale

(Reijseger et al., 2013) and the short version of the Boredom Proneness Scale (Struk et al., 2017). The results showed the unidimensional structure of both measures of boredom. Indeed, the French version of the Dutch Boredom Scale was found to have a one-dimensional structure, as demonstrated not only in the original version tested in The Netherlands (Reijseger et al., 2013) but also in other contexts such as South Africa (Van Wyk et al., 2016). As previously mentioned, two error covariance terms were added to the model. This was the case for item 3 (i.e., "During work time I daydream") and item 5 (i.e., "I tend to do other things during my work"), and for items 5 and 6 (i.e., "At my work, there is not so much to do"). An interpretation of these results could be that these items are somewhat similar in meaning. In the first case, item 3 and item 5 are similar, since "to daydream" is an activity that could fit the description of "other things" of item 5. Concerning items 5 and 6, they seem to represent the two sides of the same coin, since if at work there is not a lot to do, employees will probably tend to do "other things". With regard to the French version of the Boredom Proneness Scale – Short Version, a one-dimensional structure was also found, coherent with the original validation (Struk et al., 2017).

2. Theoretical and methodological implications

The presented findings allow us to highlight several theoretical and methodological implications. First, Study 1 contributes to the literature by highlighting that a profile that could be close to the "passive" category described by Karasek (1979) can be a source of strain from a cross-sectional point of view (comparing profiles) as well as from a longitudinal point of view, since job satisfaction decreased from time 1 to time 2 and mental health complaints increased from time 1 to time two. Moreover, Study 1 shows the importance of looking at the

whole, diversified picture of well-being, by assessing both positive and negative aspects, when studying this topic.

Study 2 leads to several theoretical implications. First, the results show that some job characteristics may be more important than others for studying boredom at work. In fact, variables related to challenge and the need for competence (job demands and skill discretion) showed significant main effects. Moreover, the results of Study 2 suggest that both dispositional variables and job characteristics should be included for a better understanding of boredom at work, suggesting that the contextual model of boredom (Reijseger et al., 2013) may be enriched and improved by including dispositional predictors, such as boredom proneness. The results of Study 2, however, suggest that relationships are potentially context-specific to the antecedents of boredom at work. On the one hand, the interaction between job demands and boredom proneness is consistent with the existing literature. Indeed, the moderator variable weakened the strength of the link between job demands and boredom. On the other hand, as mentioned above, the direct effect of some variables and boredom at work was non-significant, however, this link was reinforced by the moderators. Specifically, the results showed that the link between feedback and boredom was *strengthened* by boredom proneness. Furthermore, also the links between social support feedback and boredom at work were *strengthened* by SOC.

The main implication of Study 3 concerns the relation between cynicism and exhaustion and the sequence of their apparition in the burnout process. Indeed, some authors noted that the developmental process of burnout depends on certain characteristics of the work environment (Leiter, 1993). The findings of Study 3 seem to support the view of Golembiewski and Munzenrider (1988), which posit that cynicism can precede exhaustion in a context characterized by less intense, yet chronic hassles, thus potentially consistent with an understimulating work context in which boredom can occur. Finally, Study 3 contributed to showing the relevance of the somewhat forgotten tedium theory for the study of boredom at

work. In fact, our results pointed to the association between boredom at work and exhaustion. Moreover, our results are in line with the tedium theory suggesting that the pressure at the cognitive level (Kafry & Pines, 1980), as well as the pressure which derives from the constraints "imposed on one's sense of meaningfulness and achievement" (Kafry & Pines, 1980, p. 479), can also develop by a lack of stimulation and may be relevant for the study of boredom and its negative consequences.

Another theoretical implication stems from the results of our studies concerning meaning. In fact, the variable of social utility showed its importance as an antecedent of boredom at work, as well as the concept of cynicism used in Study 3, which is conceptually close to a lack of meaning of work. Hence, it is theoretically important to consider meaning variables and inspect them more closely in relation to boredom, as for example in the MAC model (Westgate & Wilson, 2018), to gain a more integrated and comprehensive approach to boredom, which could help to better understand the components of this experience. Particularly concerning social utility, study two might also show the theoretical relevance of integrating it as a job resource, especially considering the technology scenario and its effects on the perception of meaning in the workplace explained in Study 4.

The theoretical implications of the fifth study in this dissertation and in general of the two studies on the topic of technology, mostly concern the fact that the theoretical background on technology appraisals may not be pertinent in studying the potential effects of the technological advance on boredom at work. In fact, as shown in Study 4, the advances and therefore the changes related to technology are situated at several levels, and it is possible that the one that most concerns understimulation and lack of meaning is situated at the edge between the macro and meso levels, concerning the changes in the form and content of work.

3. Practical Implications

The studies presented in this dissertation lead to several practical implications, especially for organizations.

First, the findings of Study 1 hint at the importance of increasing access to job resources since such remarkable differences in employee well-being across the profiles seem to be due to variations in the job control dimension (including skill discretion and decision authority). From a practical point of view, the current findings have demonstrated that the psychosocial work environment can be perceived as quite dynamic and it immediately affects employee outcomes, especially job satisfaction. The fact that it can either deteriorate or improve over quite short periods of time, even when staying with the same employer, indicates the importance of preventive and reactive HR interventions in keeping the right balance between demanding and resourceful job characteristics on a regular basis. Our analyses have clearly shown that even a slight difference in job resources may matter much. This particularly encourages investing in various job resources in organizations and teaching employees how to capitalize on them. In today's turbulent world of work, job demands that are determined by external labor market factors, also determined by the fast and moving context of the fourth industrial revolution, may be difficult to adjust or remove. The advantage of psychosocial job resources is that they are often at organizations' and supervisors' disposal and this can help make a difference in the way the work environment is experienced and affects employees' well-being.

Moreover, the findings of Study 2 imply that, from a practical point of view, the distinct and co-occurring effects of challenge-related and meaning-related characteristics of work may help foster and implement interventions to develop job resources, promote healthy

organizational environments and improve workers' experiences at work. Accordingly, such interventions should not only consider employees' needs, in terms of self-enhancement, stimulation, and personal growth, but also consider their yearning for self-transcendence, social meaning, and a sense of connectedness (Massoudi et al., 2018; Morin & Aranha, 2007). In this regard, our study identifies the crucial role of skill discretion as a resource against boredom, as it may provide employees with opportunities to deploy and develop their skills and engage in creative problem-solving. This finding seems particularly relevant in the current world of work, since recent and ongoing changes (e.g., intense pressure induced by market-based demands and insecurity, routinization brought by technological applications) may potentially thwart employees' efforts to experience self-growth and autonomy at the workplace (Burke & Ng, 2006; Cascio, 2003; ILO, 2019). Moreover, Study 2 highlighted the potential contribution of perceived social utility in preventing the experience of boredom. This aspect may be particularly interesting from a human resources management perspective as in the current era of big organizations, numerous employees may feel like a *small cog in a big wheel*, thus losing their sense of purpose and utility. Hence, job design interventions may consider addressing this issue to enhance employees' perception of the meaningfulness and usefulness of their work, for example, through community-based interventions within organizations.

Study 2 suggests several practical implications to promote employees' positive work experiences, especially for vulnerable workers. In fact, our findings highlight the importance of tailored job design interventions at the organizational level, targeting certain groups of employees with specific needs or characteristics (Udayar et al., 2020).

Findings of Study 3 suggest that the efforts of organizations and HR managers should thus be aimed at promoting opportunities for stimulation and growth. In this sense, job crafting or playful work design interventions (Bakker et al., 2020a; 2020b) could support employees' proactive efforts to seek challenges and meaning, and could reduce the risk of cynicism and

withdrawal, and thus reinforce their work engagement and well-being through the accumulation of their resources (Harju et al., 2016).

Overall, these findings emphasize the importance of integrating employees' experiences at the workplace to adopt a holistic approach to human resources, as suggested by Plaskoff (2017). Such an approach emphasizes the mutual and balanced contributions between employees and organizations, by recognizing employees' need for meaning and purpose, and by enabling their active participation and engagement. In this respect, the concept of Public Service Motivation (PMS, see Giauque et al., 2012; Giauque et al., 2013; Perry & Wise, 1990), could offer a new and complementary angle to study boredom and more generally well-being at work within models such as the JD-R (Giauque et al., 2013). In fact, this concept considers the fulfillment of employees' needs within their work in response to their support for the values and actions of the public organization (Giauque et al., 2012), and, by focusing on employees' motivations to move beyond self-interest to serve the collective interest and their commitment to public values and missions, PSM allows to "reanimate or even reintroduce the dimension of values when studying the motivational processes taking place in public organizations" (Giauque et al., 2012, p.178). In a way, boredom at work reflects a dysfunctional job design, and thus restituting the balance between employees' needs and values and organizational demands and missions would be beneficial to avoid a range of negative consequences for both parties.

Finally, our findings could also be informative when seeking to cope with the fast and dramatic changes, regarding work settings and methods, accelerated by the Covid-19 pandemic. Indeed, it seems essential to re-examine the balance between job characteristics – demands and resources – that could be undermined and/or enhanced for certain employees when transitioning to remote working (Raišienė et al., 2020). For example, specific groups could be particularly affected by social isolation relative to remote work, as it may exacerbate their perceived lack of social support and feedback. Following this logic, targeted solutions and supports are of

primary importance to help particular employees adapt to such disruptive and new ways of working and protect them against negative work-related outcomes such as situational job boredom.

4. Contextualization of the findings in Switzerland and in Europe

The results discussed above should also be considered in a broader context. Indeed, it is important to contextualize the findings presented in this dissertation in the general context of the Swiss and European markets. Globally, data available from periodic surveys on working conditions in Switzerland (SECO, 2017) show a decrease in several job characteristics mentioned above. For example, between 2005 and 2015, Swiss employees' perception of being able to influence their work and working conditions decreased. In particular, the perception of being able to decide how to perform tasks has decreased (respectively from 80.3% in 2005 to 72.1% in 2015), as well as the perception of being able to develop one's own ideas in the work environment (respectively from 61.9% in 2005 to 48.8% in 2015). In terms of skill use, SECO (2017) highlights a decrease in Swiss employees' perception of performing complex tasks (from 72.0% in 2005 to 64.3 in 2015), as well as in the perception of solving unexpected problems (from 87.9% in 2005 to; 81.7% in 2015) or learning new things (from 85.5% in 2005 to 69.7% in 2015). Moreover, the percentage of employees who report having to perform monotonous tasks has increased from 22.4% in 2005 to 32.9% in 2015 (SECO, 2017), although these results remain below the European average (48.4%). Regarding the meaning of work, this survey (SECO, 2017) highlights a decrease in Switzerland in the perception of usefulness in work and in the tasks associated with it, from 92.3% in 2005 to 85.8% in 2015 (SECO, 2017). When contextualizing these changes in Europe, the survey (SECO, 2017) highlights an alignment of

these data with the European average, Swiss workers thus seeming to lose their once privileged position amongst their counterparts in surrounding labor markets (SECO, 2017). According to SECO (2017), this data become even more important to consider in these times of increasing digitalization and automation.

The available data also highlight sectorial differences allowing to identify favorable working conditions depending on different occupational domains. In this regard, SECO (2017) highlights that in Switzerland the "Trade, hotels and restaurants, transport" industry group has the smallest proportion of employees with a certain degree of autonomy in terms of choice of tasks and work methods. In comparison, employees in the "public administration and education" industry group have a large degree of freedom in this area. Moreover, the proportion of employees who find their work often or always useful is higher in the occupational sectors of "public administration and education" (95.9%) and "human resources and social work" (93.3%), than in the other sectors (e.g., industry and construction: 80.8%). These data do not differ from the European average.

The observed trends towards a certain deterioration of working conditions in Switzerland support the relevance of studying boredom at work, especially in relation to the findings of Studies 2 and 3. In fact, the results of these two studies stress the important role of job resources such as social utility and skill discretion – including the possibility of using its competence and learning new things – to counteract boredom at work, but also the importance of finding meaning in one's work to counteract the potential negative consequences of boredom at work, whereas surveys on working conditions specifically show a decrease of these resources, potentially pointing to boredom at work as a rising threat to work-related well-being.

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5. Limitations and further research

The studies presented in this dissertation have several shortcomings that are worthy of note. The first limitation concerns the design of the presented studies. Except for Study 1, they are based on a cross-sectional design. This limits conclusions about causality. For this reason, future research should implement a longitudinal design to explicitly determine causality links between the employed variables. Another limitation concerns the person-centered based studies (Study 1 and Study 5). Although they identified several vulnerability profiles, they may have been unable to capture the most vulnerable populations as a minority. This could have happened because these vulnerable populations are represented by a too-small number of participants, which may not be easily detected by person-centered approaches or might not have been functional in terms of analysis of data. Future studies may specifically address this issue by using targeted sampling procedures, in order, for example, to obtain a sufficient sample to be studied. This would allow for a better insight into the way vulnerabilities evolve among the most fragile members of the working population.

The second limitation concerns specifically Study 1: our conclusions are limited since job boredom has not been studied. In further research, it would be interesting to measure this variable as an outcome of combinations of job characteristics, measured longitudinally. As mentioned in the theoretical implications subsection, Study 1 contributes to the plea to look at the different aspects (positive and negative) of well-being in order to obtain a more complete and diversified picture of it. Further research should consider the integration of boredom at work with negative aspects of well-being.

The third limitation concerns the validation of the scales in Study 2. This study only analyzed the validity of the construct of the two scales and hence the validation is rather limited.

Future research should deepen the validation of the instruments by measuring other validity aspects such as measurement invariance.

The fourth limitation concerns the measures[15] and concepts employed in our studies. Concerning job demands, the measures used in Study 1 and Study 2 only assess psychological job demands as a whole. Future research should aim at better capturing the complexity of job demands by discriminating between hindrance and challenge demands, as these are known to have a different impact on employee outcomes (Crawford et al., 2010; Van den Broeck et al., 2012). More particularly, to better understand their implications for boredom, more complete and differentiated measures are needed to distinguish different types of job demands (e.g., mental, emotional, and physical) as well as to distinguish stimulating job demands (such as workload and cognitive demands) from work hassles (such as interruptions and contradictory demands). Moreover, our measure of social support also brings limitations, since it combines different types of support that have shown to have opposite effects in terms of well-being (Harris et al., 2007). For example, the search for particular types of social support, such as collegial support allowing for "sharing friendships, personal problems, and confidences" (Harris et al., 2007, p. 151), may be triggered by the need to express dissatisfaction, and thus be negatively linked with well-being (Harris et al., 2007). Considering these results, further research should measure the dimensions of social support in a more differentiated manner. Concerning Study 5, the items used to measure technology appraisal have been developed by the authors without being subject to prior validation. Future research should use existing validated scales or better investigate the psychometric properties of these items. Moreover, since one of the conditions for applying the clustering method is to avoid the use of excessively similar variables and high correlation (above .90) between them (Sarstedt & Mooi, 2014), only three items were retained to apply to the core theory. Further research could take into account

[15] See appendix for more information

more aspects related to the appraisal of technology as well as better measure its negative aspects. Finally, recent research suggests that elements that we have previously considered as an integral part of the experience of boredom, such as behavioral elements (i.e., bored behavior, van Hooff & van Hooft, 2014) on the contrary need to be distinguished. Hence, another limitation stems from the instrument used to measure boredom at work, which includes both aspects.

The fifth limitation concerns the selection of job characteristics. In fact, it may be interesting to expand the list of characteristics to other pertinent variables at an organizational level (e.g., management regimes, level of perceived responsibility, organizational climate) and consider the integration of objective indicators (e.g., turnover, absenteeism, in role performance), as self-report measures portray the context from a subjective perspective only. Furthermore, the results of our studies hint at the absence of meaning. Therefore, further research may consider measuring meaning variables and inspect them more closely in relation to boredom, as for example in the MAC model (Westgate & Wilson, 2018), to develop a more integrated and comprehensive approach to the experience of boredom and its meaning-related components. Moreover, Study 5 considered demographics and generalized self-efficacy as predictors of technology appraisal clusters. Based on the TAM theory, future studies should integrate other predictors of perceived ease to use and usefulness at an individual level, such as computer anxiety or computer self-efficacy, in order to better understand the way employees approach, adopt and adapt to technological innovation. However, based on the analysis of Landers and Marin (2021), the framework applied in this study (i.e., *technology-as-context*) does not allow for identifying tailored solutions to address issues and needs arising from the utilization of specific types of technology. Future research should then adopt a *technology-as-designed* paradigm to study different technological applications and tools "in terms of their specific design characteristics, users, intended users, and how each of these might change in the

future as the technology is redesigned and redeveloped over time" (Landers & Marin, 2021, p. 241). Such an approach will contribute to a better understanding of the way technology may impact and influence employees' daily experiences at work, by offering "accuracy in describing and predicting real-world phenomena" (Landers & Marin, 2021, p. 254).

The sixth limitation mainly concerns Study 3. Our model exclusively concentrates on the "boredom path." To obtain a clearer answer about burnout processes and especially about the sequence of its dimensions of cynicism and exhaustion, it would be important to test both the boredom and strain paths in the same study. Moreover, a recent study (van Hooft & van Hooff, 2018) showed that depending on work characteristics, the affect linked with boredom at work can be characterized by low or high arousal (depressed vs. feeling frustrated). As the affect linked with boredom at work could lead to different outcomes, it would be interesting to examine our model considering this difference.

The seventh limitation concerns the choice of considering meaning based on the scholarly consensus on the perceived impact that work can have on others (organization, people, society, world). As mentioned, theories around the meaning of work are diverse and include different elements than those considered in this dissertation (see Rosso et al., 2010). Further studies should focus on different aspects of meaning (distinguishing, for example, the meaning of work in relation to the self and to others, responding to agency or community drives, see Rosso et al., 2010) to study their different roles in relation to boredom. In this regard, it becomes essential to investigate the role of meaning – as an antecedent, an outcome, or an integral part of the experience of boredom – according to its different possible operationalizations.

The eighth limitation stems from the samples used (especially for Study 2, Study 3, and Study 5) which were limited to the French-speaking part of Switzerland. Our samples are not representative of the French-speaking population, nor of the population working in

Switzerland. Moreover, the non-random nature of our samples (except for Study 1) implies precautions in the interpretation of the results, since the effects found for the different demographic factors may be partly due to the specific occupations/organizations studied. Future research may consider using larger heterogeneous samples, in terms of professional domain, activity sector, and other labor market characteristics, to better understand the experiences and needs of the general workforce. In Study 5, the unequal distribution of participants across socio-demographic categories did not allow to test the interactions between these categories. Future research could therefore use larger samples to test interactions between socio-demographic variables in logistic regression.

IV. GENERAL CONCLUSION

This PhD dissertation considered and discussed state boredom, from a broad conceptual standpoint, as *an unpleasant state of deactivation and displeasure –that results from an environment devoid of stimulation, challenge, and purpose – which reflects the impression of not reaching any goals (in a broad sense) and is accompanied by a sense of meaninglessness*. Some of the results and contributions of the presented studies tended to support the constitutive elements of this broad conceptual standpoint on boredom at work. In summary and to conclude, even if much remains to be done, the studies presented in this dissertation have contributed to the literature on boredom at work and more generally on work-related well-being in several ways.

Globally, this dissertation contributed to the literature on the correlates of boredom at work in three ways. First, the presented studies contribute to distinguishing the possible differential effects of well-established job characteristics, as well as integrating new ones. In addition, the presented studies contributed to determining the role of individual characteristics as antecedents of the boredom experience. Secondly, this dissertation highlighted the possible negative effects of an understimulating work context using positive and negative indicators of well-being and investigated the link between boredom at work and exhaustion. The question of the role of the meaning of work in relation to boredom at work was also examined. Finally, this dissertation investigated and explored the issue of technological innovations and applications and their effect on the world of work and on workers.

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Appendix

Table A1

Description of the phases and techniques of data collection

n	**Time of collection**	**Sampling technique**	**Reference to the study in which the sample was used**
959	2016 and 2017	A random sampling list was realized by the Swiss Federal Statistic Office (SFSO) and the Swiss State Secretariat for Economy (SECO).	Study 1
108	2018	Data were collected in collaboration with an organization's human resources department.	Study 2, Study 3, Study 5
95	2019	Data were collected in collaboration with an organization's human resources department.	Study 3, Study 5
25	2019	Snowball technique.	Study 2, Study 3, Study 5
6	2019	The link to the questionnaire was posted on the web page of a professional consulting service organization.	Study 2, Study 5
26	2019	Snowball technique.	Study 2, Study 3, Study 5
198	2019	Data were collected by students enrolled in the Experimental Methodology course in exchange for three credits-course.	Study 2, Study 3, Study 5
234	2020	Data were collected by students enrolled in the Experimental Methodology course in exchange for three credits- course.	Study 5

Note. Data for study 1 have been collected within the framework of the National Centre of Competence in Research-LIVES, financed by the Swiss National Science Foundation.

Figure A1.

BIC and SABIC plots based on Time 1 LPA (Study 1)

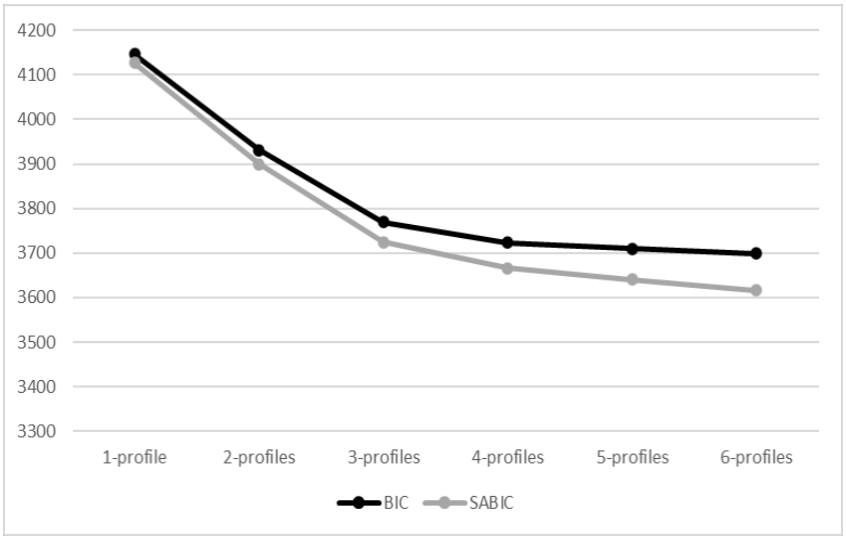

Figure A2.

BIC and SABIC plots based on Time 2 LPA (Study 1)

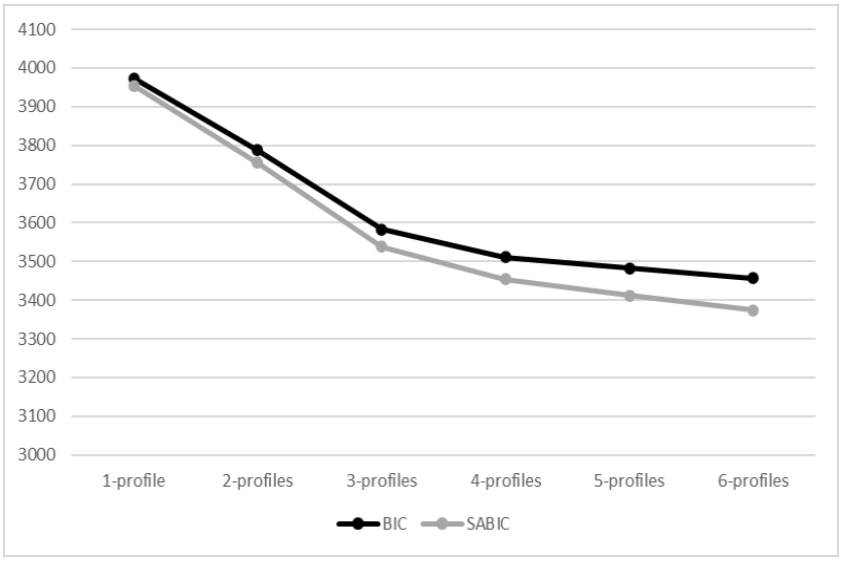

Table A2.

Correlations between demographic variables and latent profile indicators (Study 1)

Variables	T1 Latent profile indicators			T2 Latent profile indicators		
	JCD-skill	JCD-auto	JCD-dem	JCD-skill	JCD-auto	JCD-dem
Age	.04	.08*	-.05	.05	.06	-.05
Gender	-.04	-.08**	-.06	-.05	-.07*	-.04
Education	.36***	.19***	.08*	.34***	.20***	.09*
T1 Contract type	-.02	.06	.02	.01	.06	.08*
T1 Household income	.25***	.19***	.11**	.25***	.14***	.10**
T2 Contract type	-.01	.05	-.03	.01	.06	.07*
T2 Household income	.28***	.18***	.12***	.28***	.15***	.10**

Notes. T1 = Time 1. T2 = Time 2. JCD-skill = skill discretion. JCD-auto = decision authority. JDC-dem = psychological demands. Gender: 0 = male; 1 = female. Contract type: 0 = temporary; 1 = permanent. Education and household income measured in an increasing order. ***$p < .001$, **$p < .01$, *$p < .05$.

Table A3.

Covariates of the latent profile membership at Time 1 (Study 1)

Covariates	Compared profiles	Odds ratio	95%CI
Age	ns	ns	ns
Gender (female)	ns	ns	ns
Education (high)	2 vs. 1	2.55	[1.646;3.963]
	3 vs. 1	4.44	[2.726;7.238]
	3 vs. 2	1.74	[1.243;2.434]
Contract type (permanent)	ns	ns	ns
Household income (high)	2 vs. 1	1.39	[1.213;1.587]
	3 vs. 1	1.50	[1.305;1.730]

Notes. Profile 1 = low resources; Profile 2 = average resources; Profile 3 = high resources. ns = no significant results observed. Gender: 1 = male; 2 = female. Contract type: 1 = temporary; 2 = permanent. Education and household income measured in an increasing order. Only significant results indicating higher odds (i.e., OR > 1) of a given covariate in one profile versus another are shown, when the 95%CI do not include 1.

Table A4.

Covariates of the latent profile membership at Time 2 (Study 1)

Covariates	Compared profiles	Odds ratio	95%CI
Age	ns	ns	ns
Gender (female)	1 vs. 3	1.70	[1.059;2.713]
Education (high)	2 vs. 1	1.78	[1.187;2.662]
	3 vs. 1	3.67	[2.347;5.734]
	3 vs. 2	2.06	[1.499;2.840]
Contract type (permanent)	ns	ns	ns
Household income (high)	2 vs. 1	1.17	[1.053;1.299]
	3 vs. 1	1.30	[1.160;1.462]
	3 vs. 2	1.11	[1.025;1.209]

Notes. Profile 1 = low resources; Profile 2 = average resources; Profile 3 = high resources. ns = no significant results observed. Gender: 1 = male; 2 = female. Contract type: 1 = temporary; 2 = permanent. Education and household income measured in an increasing order. Only significant results indicating higher odds (i.e., OR > 1) of a given covariate in one profile versus another are shown, when the 95%CI do not include 1.

Table A5.

Transition probabilities (Study 1)

Time 2: Time 1:	Profile 1	Profile 2	Profile 3
Profile 1	.736	.223	.041
Profile 2	.048	.860	.092
Profile 3	.006	.249	.745

Note. Profile 1 = Low resources. Profile 2 = Average. Profile 3 = High resources.

Table A6.

Final counts for each profile transition scenario (Study 1)

Time 2: Time 1:	Profile 1	Profile 2	Profile 3
Profile 1	92	22	6
Profile 2	26	463	50
Profile 3	2	79	219

Note. Profile 1 = Low resources. Profile 2 = Average. Profile 3 = High resources.

Table A7.

Thesis survey questionnaire - French/English

Informations /*Information*		
Merci d'avoir accepté de participer à cette étude. Vos réponses seront traitées de manière strictement anonyme, confidentielle et en accord avec les règles déontologiques de la Société Suisse de Psychologie. *Thank you for agreeing to participate in this study. Your responses will be treated as strictly anonymous, confidential and in accordance with the ethical rules of the Swiss Psychological Society.*		
Instructions/*Instructions*		
Dans le questionnaire qui suit, d'une durée approximative de 15 minutes, nous vous poserons des questions sur vos conditions objectives de travail et sur vos besoins et vos motivations au travail. Nous vous remercions de répondre à toutes les questions, sans trop réfléchir à des réponses "politiquement correctes". *In the following questionnaire, which will take approximately 15 minutes, we will ask you questions about your objective working conditions and your needs and motivations at work. Please answer all the questions, without thinking too much about "politically correct" answers.*		
Informations générales/General information		
Les questions suivantes visent à mieux connaitre vos caractéristiques sociodémographiques. *The following questions aim to better understand your socio-demographic characteristics.*		
Code	Variables	Modalities
AGE	Quel est votre âge? *What is your age?*	Reponse libre Free answer
SEX	Quel est votre genre? *Which is your gender?*	1 = Féminin/ *Female* 2 = Masculin/*Male*
NAT	Quelle est votre nationalité? *What is your nationality?*	1 = Suisse/*Swiss* 2 = Autre (Spécifier)/*Other (Specify)*
LMat	Quelle est votre langue maternelle? *What is your native language?*	1 = Français/*French* 2 = Allemand/*German* 3 = Italien/*Italian*

		4 = Autre (Spécifier)/*Other (Specify)*
Nedu	Quel est votre niveau d'éducation? *What is your education level?*	1 = Ecole obligatoire/ *Compulsory School* 2 = Attestation Fédérale de Formation Professionnelle (AFP)/*Federal Certificate of Vocational Education and Training* 3 = Certificat Fédéral de Capacité (CFC)/*Federal Diploma of Vocational Education and Training* 4 = Maturité professionnelle/*Federal Vocational Baccalaureate* 5 = Brevet/Diplôme Fédéral/*Professional Educational Training (PET)* 6 = Diplôme de culture générale/*General culture diploma* 7 = Maturité gymnasiale/fédérale/*General baccalaureate* 8 = Diplôme de Haute Ecole Spécialisée ou Pédagogique (HES ou HEP)/*Advanced Federal Diploma of Higher Education* 9 = Bachelor(demi- licence universitaire)/*Bachelor* 10 = Master (licence universitaire)/*Master* 11 = Doctorat/*Doctorate* 12 = Certificates of Advanced Studies (CAS) /*Certificates of Advanced Studies* 13 = Masters of Advanced Studies (MAS)/*Masters of Advanced Studies* 14 = Master et formation post-grade/*Master and post-graduate training*

Mena	Quelle est votre situation familiale? / *What is your family situation?*	1 = Célibataire/*Single* 2 = Marié·e/*Married* 3 = Divorcé·e/*Divorced* 4 = Séparé·e/*Separated* 5= Concubinage/*Cohabitation* 6 = Veuf·ve/*Widowed*
Prof_cat	Quelle est votre profession actuelle ? *What is your current profession?*	1 = Dirigeant.e.s, cadres supérieurs, cadres de direction/*Executives* 2= Professions intellectuelles, libérales et scientifiques (Exemples : médecin, ingénieur.e, professeur.e, avocat.e, etc.)/ *Academic and liberal professionals* 3 = Professions intermédiaires (Exemples : technicien.ne, infirmier.ère, comptable, inspecteur.trice de police, etc.)/ *Intermediate professions* 4 = Professions de type administratif (Exemples : secrétaire, employé.e de bureau, assistant.e de direction, etc.)/ *Administrative personnel* 5 = Personnel des services et de la vente (Exemples : cuisinier.ère, serveur.euse, coiffeur.euse, pompier.ère, vendeur.se, agent.e d'assurances)/ *Sales personnel* 6 = Agriculteur.trices, pêcheur.euses, etc./*Farmers, Fishermen, etc.* 7 = Artisan.e.s et ouvrier.ère.s (Exemples : maçon.ne, charpentier.ère, boulanger.ère, orfèvre, ébéniste, etc.)/ *Craftspeople* 8 = Conducteur.trice.s de machines et de robots industriels (grutier.ère, chauffeur.euse de taxi, pilote de locomotive, etc.)/ *Operator of industrial machines and robots*

		9 = Ouvrier.ère.s et employé.e.s non qualifié.e.s (Exemples : manutentionnaire, éboueur.euse, livreur.euse, aides ménage, vendeur.euse ambulant.e, etc.)/ *Unskilled workers and employees* 10 = Autre (spécifier)/ *Other (specify)*
Prof_poste	Quel est l'intitulé de votre poste? /*What is your position title ?*	Réponse libre/*Free answer*
Pourcent	Quel est votre taux d'activité (%) ? /*What is your employment rate (%) ?*	Réponse libre/*Free answer*
Temps_O	Depuis combien de temps occupez-vous votre emploi actuel? /*How long have you been in your current job?*	Réponse libre/*Free answer*
Rev_P	Quel est votre revenu (brut) annuel personnel ? *What is your personal annual (gross) income?*	1 = Moins de 20,000.- 2 = Entre 20,000-. et 39,000.- 3 = Entre 40,000.- et 59,000.- 4 = Entre 60,000.- et 79,000.- 5 = Entre 80,000.- et 99,000.- 6 = Entre 100,000.- et 119,000.- 7 = Entre 120,000.- et 139,000.- 8 = Entre 140,000.- et 159,000.- 9 = 160,000.- et plus
Sect	Dans quel secteur travaillez-vous? / *In which sector do you work?*	1 =Privé/ *Private* 2 = Public/*Public* 3 = Autre (spécifier)/*Other (specify)*
Characteristiques individuelles/ *Individual characteristics*		
Sens de coherence/*Sense of Coherence*		

Sense of coherence scale (Antonovsky, 1987, Gana & Garnier, 2001) Instructions Voici une série d'énoncés sur différents aspects de votre quotidien. Lisez attentivement chaque énoncé et indiquez, selon la forme de réponse qui vous est proposée, votre degré d'accord avec ce dernier. *Here are a series of statements about different aspects of your daily life. Read carefully and indicate, according to the form of response proposed to you, your degree of agreement with the statement.* Echelle de reponse /*Response scale* 1 = très rarement ou jamais 7 = très souvent (Aucune indication pour les points intermédiaires 2-6/ *No indication for intermediate points*)	
SOC_1	Avez-vous le sentiment que ce qui se passe autour de vous ne vous concerne pas? / *Do you have the feeling that you don't really care about what goes on around you?*
SOC_2	Vous est-il déjà arrivé dans le passé d'être surpris·e par le comportement de personnes que vous pensiez bien connaître ? /*Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?*
SOC_3	Vous est-il déjà arrivé que des personnes sur lesquelles vous comptiez vous aient déçu·e ? /*Has it happened that people whom you counted on disappointed you?*
SOC_4	Jusqu'ici, votre vie a eu des objectifs et un sens très clairs (vs. N'a eu aucun objectif ou sens clair du tout). / *Until now your life has had very clear goals and purpose (vs. no clear goals or purpose at all).*
SOC_5	Avez-vous le sentiment d'être traité(e) de façon injuste? /*Do you have the feeling that you're being treated unfairly?*
SOC_6	Avez-vous la sensation d'être dans une situation inhabituelle et de ne pas savoir quoi faire ? /*Do you have the feeling that you are in an unfamiliar situation and don't know what to do?*
SOC_7	Faire ce que vous faites chaque jour est-il une source de déplaisir et d'ennui (vs. De grand satisfaction)/ *Doing the things you do every day is a source of pain and boredom (vs. a source of deep pleasure and satisfaction)*

SOC_8	Cela vous arrive-t-il d'avoir des sentiments et des idées confus et embrouillés? /*Do you have very mixed-up feelings and ideas?*
SOC_9	Vous arrive-t-il d'éprouver des sentiments que vous préféreriez ne pas ressentir? /*Does it happen that you have feelings inside you would rather not feel?*
SOC_10	Même des personnes ayant du caractère se sentent parfois impuissantes, perdantes, dans certaines situations. Avez-vous déjà ressenti cela?/ *Many people sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?*
SOC_11	Quand quelque chose vous arrive, vous avez tendance à évaluer son importance correctement (vs. Surestimer ou sous-estimer son importance) / *When something happened, have you generally found that you saw things in the right proportion (vs. you overestimated or underestimate its importance)*
SOC_12	Vous arrive-t-il de penser que les choses que vous faites quotidiennement n'ont pas beaucoup de sens, pas beaucoup d'intérêt? / *How often do you have the feeling that there's little meaning in the things you do in your daily life?*
SOC_13	Vous arrive-t-il d'avoir des sentiments que vous n'êtes pas sûr(e) de pouvoir contrôler ? / *Do you have feelings that you're not sure you can keep under control?*

Prédisposition à l'ennui/*Boredom proneness*

Boredom Proneness-Short version (Struk et al., 2015)

Instructions

Voici une série d'énoncés sur différents aspects de votre quotidien. Lisez attentivement chaque énoncé et indiquez, selon la forme de réponse qui vous est proposée, votre degré d'accord avec ce dernier.

Here are a series of statements about different aspects of your daily life. Read carefully and indicate, according to the form of response proposed to you, your degree of agreement with the statement.

Échelle de reponse/*Response scale*

1 = Pas du tout en accord/*Strongly disagree*

2 = Un peu en accord

3 = Moyennement en accord

4 = En accord 5 = Tout à fait en accord/ *Strongly agree*	
Pron_1	Je me retrouve souvent désoeuvré·e ne sachant que faire. / *I often find myself at "loose ends," not knowing what to do.*
Pron_2	Il m'est difficile de m'amuser. / *I find it hard to entertain myself.*
Pron_3	Beaucoup de choses que j'ai à faire sont répétitives et monotones. / *Many things I have to do are repetitive and monotonous.*
Pron_4	J'ai besoin d'être plus stimulé·e que les autres pour me lancer dans quelque chose. / *It takes more stimulation to get me going than most people.*
Pron_5	Je ne me sens pas motivé·e par la majorité des choses que je fais. / *I don't feel motivated by most things that I do.*
Pron_6	Dans la plupart des situations, il m'est difficile de trouver quelque chose d'intéressant à faire ou à voir. / *In most situations, it is hard for me to find something to do or see to keep me interested.*
Pron_7	La plupart du temps, je reste assis(e) à ne rien faire. / *Much of the time, I just sit around doing nothing.*
Pron_8	À moins de faire quelque chose d'excitant, voire même dangereux, je me sens amorphe et maussade. / *Unless I am doing something exciting, even dangerous, I feel half-dead and dull.*

Sentiment d'efficacité personnelle/ *Generalized Self efficacy*

Generalized Self-Efficacy scale (Schwarzer, & Jerusalem, 1995) French adaptation (Dumont et al., 2000)

Instructions

Lisez attentivement chaque énoncé et indiquez, selon la forme qui vous est proposée, votre degré d'accord avec l'énoncé.

Read each statement carefully and indicate, in the form provided, your level of agreement with the statement.

Échelle de réponse/*Response scale*

1 = pas du tout vrai/ *not at all true*

2 = à peine vrai

3 = moyennement vrai 4 = totalement vrai/ *Exaclty true*	
GSES_1	Je peux toujours arriver à résoudre mes difficultés si j'essaie assez fort. / *I can always manage to solve difficult problems if I try hard enough.*
GSES_2	Si quelqu'un s'oppose à moi, je peux trouver un moyen pour obtenir ce que je veux. / *If someone opposes me, I can find the means and ways to get what I want.*
GSES_3	C'est facile pour moi de maintenir mon attention sur mes objectifs et d'accomplir mes buts. / *It is easy for me to stick to my aims and accomplish my goals.*
GSES_4	J'ai confiance en mes capacités à faire face efficacement aux événements inattendus./ *I am confident that I could deal efficiently with unexpected events.*
GSES_5	Grâce à ma débrouillardise, je sais comment faire face aux situations imprévues. / *Thanks to my resourcefulness, I know how to handle unforeseen situations.*
GSES_6	Je peux resoudre la plupart de mes problèmes si je fais les efforts nécessaires. / *I can solve most problems if I invest the necessary effort.*
GSES_7	Je peux rester calme lorsque je suis confronté(e) à des difficultés car je peux me fier à mes capacités pour faire face aux problèmes. / *I can remain calm when facing difficulties because I can rely on my coping abilities.*
GSES_8	Lorsque je suis confronté·e à un problème, je trouve habituellement plusieurs solutions. / *When I am confronted with a problem, I can usually find several solutions.*
GSES_9	Lorsque je suis « coincé·e » je peux habituellement trouver ce que je pourrais faire. / *If I am in trouble, I can usually think of a solution.*
GSES_10	Peu importe ce qui arrive, je suis généralement capable d'y faire face. / *I can usually handle whatever comes my way.*
Échelles relatives au travail/*Work-related scales*	
L'importance du travail/ *The importance of work*	
Multidimensional questionnaire on the relationship to work (RWQ) (Fournier er al., 2020) Échelle de réponse/ *Response scale*	

1 = Pas du tout en accord/ *Strongly disagree* 2 = Un peu en accord 3 = Moyennement en accord 4 = En accord 5 = Tout à fait en accord/*Strongly agree*	
Valeur idéologique/ *Ideological value*	
Instructions Pour nous aider à comprendre ce que signifie pour vous le travail, voici une série d'énoncés qui présentent différentes façons de voir ce qu'est le travail pour les êtres humains en général. Indiquez votre degré d'accord avec chacun d'eux à l'aide de l'échelle ci-dessous. *To help us understand what Work means to you, here are a series of statements that present different ways of seeing what Work is for human beings in general. Indicate your level of agreement with each of them using the scale below.*	
VI_1	Le travail permet à l'être humain de devenir maître de sa vie. / *Work allows human beings to become the masters of their own lives.*
VI_2	Le travail contribue à la dignité de l'être humain. / *Work contributes to human dignity.*
VI_3	Le travail est essentiel à l'être humain pour avoir une place dans la société. / *Human beings need work to find their place in society.*
VI_4	Le travail est au coeur du fonctionnement de la société. / *Work is at the heart of a well-functioning society.*
Valeur existentielle/ *Existential value*	
Instructions Voici une deuxième série d'énoncés qui peuvent représenter cette fois la valeur que vous accordez personnellement au travail en général dans votre vie. Indiquez votre degré d'accord avec chacun d'eux à l'aide de l'échelle ci-dessous *Here is a second set of statements that may represent the value you personally attach to work in general in your life. Indicate your level of agreement with each of them using the scale below*	
VE_1	Sans le travail, ma vie a peu d'intérêt. / *Without work, my life is not very interesting.*

VE_2	Sans le travail, ma vie n'a pas de sens. / *Without work, my life has no meaning.*
VE_3	Je me définis par le travail. / *My work defines me.*
VE_4	Le travail est au coeur de ma vie. / *Work is at the centre of my life.*

Vos conditions de travail/ *Your working conditions*

Validation française du « Job Content Questionnaire » de Karasek (Niedhammer et al., 2006)

Instructions

Veuillez répondre en cochant la réponse qui convient le mieux à votre situation de travail actuelle. Parfois aucune réponse ne convient parfaitement, dans ce cas, veuillez choisir la réponse qui se rapproche le plus de ce que vous pensez.

Please respond by checking the answer that best fits your current work situation. Sometimes no answer fits perfectly, in which case, please choose the answer that is closest to what you think.

Échelle de reponse/R*esponse scale*

1 = fortement en désaccord/*Strongly disagree*

2 = en désaccord

3 = d'accord

4 = fortement en accord/*Strongly agree*

JCQ _1	Mon travail implique que j'apprenne des choses nouvelles. / *My job implies that I learn new things.*
JCQ _2	Mon travail exige un niveau élevé de qualifications. / *My job requires a highlevel of qualifications.*
JCQ _3	Dans mon travail, je dois faire preuve de créativité. / *In my work, I have to be creative.*
JCQ _4	Mon travail consiste à refaire toujours les mêmes choses. / *My job is to do the same things over and over again.*
JCQ _5	J'ai la liberté de décider comment faire mon travail. / *I have the freedom to decide how to do my job.*
JCQ _6	Mon travail me permet de prendre des décisions de façon autonome. / *My job allows me to make decisions autonomously.*
JCQ _7	Au travail, j'ai l'opportunité de faire plusieurs choses différentes. / *At work, I have the opportunity to do many different things.*

JCQ _8	J'ai passablement de l'influence sur la façon dont les choses se passent à mon travail. / *I have a fair degree of influence on how things are done at my job.*
JCQ _9	Au travail, j'ai la possibilité de développer mes habiletés personnelles. / *At work, I have the opportunity to develop my personal skills.*
JCQ_10	Mon travail exige d'aller très vite. / *My job requires me to work very fast.*
JCQ_11	Mon travail exige de travailler très fort mentalement. / *My job requires me to work very hard mentally.*
JCQ_12	On ne me demande pas de faire une quantité excessive de travail. / *I am not asked to do an excessive amount of work.*
JCQ_13	J'ai suffisamment de temps pour faire mon travail. / *I have enough time to time to do my job.*
JCQ_14	Je ne reçois pas de demandes contradictoires de la part des autres/ *I do not receive conflicting requests from other people.*
JCQ_15	Mon travail m'oblige à me concentrer intensément pendant de longues périodes. / *My job requires me to concentrate intensely for long periods of time*.
JCQ_16	Ma tâche est souvent interrompue avant que je l'aie terminée, je dois alors y revenir plus tard. / *My task is often interrupted before I finish it, so I have to come back to it later.*
JCQ_17	Mon travail est très mouvementé. / *My work is very hectic*
JCQ_18	Je suis souvent ralenti dans mon travail parce que je dois attendre que les autres aient terminé le leur. / *I am often slowed down in my work because I have to wait for others to finish theirs.*
JCQ _19	Mes collègues de travail sont compétents dans leurs tâches. / My co-workers are competent in their tasks.
JCQ _20	Mes collègues de travail s'intéressent personnellement à moi. / *My co-workers are personally interested in me.*
JCQ _21	Les personnes avec qui je travaille sont amicales. / *The people I work with are friendly.*
JCQ _22	L'apport de mes collègues est utile pour terminer le travail. / *The contribution of my colleagues is useful to complete the work.*

JCQ _23	Mon supérieur se préoccupe du bien-être des collaborateurs sous sa responsabilité. / *My superior is concerned about the well-being of the employees under his responsibility.*
JCQ _24	Mon supérieur est attentif à ce que je lui dis. / *My supervisor pays attention to what I say.*
JCQ _25	L'apport de mon supérieur est utile pour terminer le travail. / *My supervisor's contribution is helpful in completing the work.*
JCQ _26	Mon supérieur arrive à motiver les autres à travailler ensemble. / *My supervisor is able to motivate others to work together.*

Le sens du travail/*Meaning of work*

Meaning of Work Questionnaire (Arnoux-Nicolas et al., 2016)

Instructions

Vous trouverez ci-dessous différentes questions qui sont en lien avec la perception que vous pouvez avoir de votre travail. Indiquez votre degré d'accord ou de désaccord en cochant la case qui vous convient le mieux.

Below you will find various questions that are related to your perception of your job. Indicate your level of agreement or disagreement by checking the box that best suits you.

Échelle de réponse / *Response scale*

1 = Fortement en désaccord/*Strongly disagree*

2 = En désaccord

3 = Légerement en désaccord

4 = Ni en désaccord ni en accord

5 = Legerement en accord

6 = En accord

7 = Fortement en désaccord/S*trongly agree*

IST_1	J'ai bien compris l'utilité de mon travail. / *I fully understood the purpose of my work.*
IST_2	Je ne vois pas très bien quel est le sens de mon travail actuel. / *I don't really see the sense of my current work.*

IST_3	Je trouve mon emploi enrichissant d'un point de vue personnel. / *I find my job personally fulfilling.*
IST_4	Je me dis souvent que dans mon poste de travail, je ne sais pas où je vais. / *I often think that in my job, I don't know where I'm going.*
IST_5	Mon travail n'apporte que peu de choses à ma vie. / *My work brings little to my life.*
IST_6	Je me dis parfois que mon travail ne sert pas à grand-chose. / *I sometimes think that my work is not very useful.*
IST_7	Mon travail a une direction bien claire et précise. / *My work has a clear and precise direction.*
IST_8	Mon emploi ne m'aide pas à avoir des perspectives de vie bien claires. / *My job does not help me to have a clear life perspective*
IST_9	Je n'arrive pas à bien saisir ce que mon travail apporte. / *I can't quite grasp what my work brings.*
IST_10	Mon emploi actuel donne du sens à ma vie. / *My current job gives meaning to my life.*
IST_11	Il arrive régulièrement que je ne comprenne pas les finalités de mon travail. / *It happens regularly that I don't understand the purpose of my work.*
IST_12	Je ne saisis pas ce que mon travail change à l'ordre du monde ou de la société. / *I don't understand what my work changes to the world order or society.*
IST_13	Dans mon emploi, les buts à atteindre sont stimulants et signifiants. / *In my job, the goals are challenging and meaningful.*
IST_14	Quoi qu'on en dise, je trouve que beaucoup d'emplois sont absurdes. /*No matter what anyone says, I think a lot of jobs are absurd.*
IST_15	Je ne sais pas bien ce que je dois faire pour que mon travail soit considéré comme réussi. / *I'm not sure what I need to do to ensure that my work is considered successful.*
Ennui au travail/*Boredom at work*	
Dutch Boredom Scale (DUBS; Reijseger et al., 2013)	
Instructions	

Les affirmations suivantes s'intéressent à la manière dont vous vous sentez au travail. Si vous avez déjà eu ce ressenti, indiquez la fréquence de ce dernier en cochant la case qui la décrit le mieux.

The following statements are about how you feel at work. If you have ever experienced this feeling, please indicate how often it occurs by checking the box that best describes it.

Echelle de reponse/*Response scale*

1 = Jamais/*Never*

2 = Presque jamais

3 = Rarement

4 = Quelquefois

5 = Souvent

6 = Très souvent

7= Toujours/*Always*

DUBS_1	Au travail, le temps passe très lentement. / *At work, time goes by very slowly.*
DUBS_2	Je m'ennuie à mon travail. / *I feel bored at my job.*
DUBS_3	Pendant mon temps de travail, je rêvasse. / *During work time I daydream.*
DUBS_4	J'ai l'impression que mes journées de travail sont interminables. / *It seems as if my working day never ends.*
DUBS_5	Pendant mon travail, j'ai tendance à faire d'autres choses. /*I tend to do other things during my work.*
DUBS_6	Dans mon travail, il n' y a pas grand-chose à faire. / *At my work, there is not so much to do.*

Comportements contreproductifs/ *Counterproductive Work Behavior*

10-Item Short Version of the Counterproductive Work Behavior Checklist (CWB-C) (Spector, & Bauer, 2010) – Translated to French

Instructions

Dans cette partie, vous trouverez une série de comportements que l'on pourrait adopter suite à des situations difficiles au travail, sana pour autant que cela fasse de nous de "mauvaises personnes".

À quelle fréquence avez-vous adopté ces comportements dans votre emploi actuel? Indiquez votre réponse sur l'échelle.

In this section, you will find a series of behaviours that we might adopt following difficult situations at work, without making us "bad people". *How often have you engaged in these behaviours in your current job? Mark your answer on the scale.* 1=Jamais/N*ever* 2= Une ou deux fois 3 = Une ou deux fois par mois 4 = Une ou deux fois par semaine 5= Tous les jours/A*lways*	
CC_1	Gaspillé intentionnellement le materiel de votre employeur·euse. / *Purposely wasted your employer's materials/supplies.*
CC_2	S'être plaint·e au travail pour des choses de peu d'importance. / *Complained about insignificant things at work.*
CC_3	Raconté, en dehors du travail, pour quel endroit désagréable vous travaillez. / *Told people outside the job what a lousy place you work for.*
CC_4	Arrivé·e au travail tard, sans permission. / *Came to work late without permission.*
CC_5	Resté·e à la maison en disant que vous êtes malades alors que ce n'etait pas vrai. / *Stayed home from work and said you were sick when you weren't.*
CC_6	Insulté quelqu'un à cause de sa performance au travail. / *Insulted someone about their job performance.*
CC_7	S'être moqué·e de la vie personnelle de quelqu'un. / *Made fun of someone's personal life.*
CC_8	Ignoré quelqu'un au travail. / *Ignored someone at work*
CC_9	Entamé une dispute avec quelqu'un au travail. / *Started an argument with someone at work.*
CC_10	Insulté ou s'être moqué·e de quelqu'un au travail. / *Insulted or made fun of someone at work.*
Insecurité au travail (quantitative)/*Job insecurity (quantitative)*	

The Job Insecurity Scale (Vander Elst et al.,2014)

Instructions

Les 4 affirmations suivantes concernent votre sentiment de sécurité au travail. Lisez attentivement chaque énoncé et indiquez votre degré d'accord en cochant la case qui le décrit le mieux. *

The following 4 statements are about your feelings of security at work. Read each statement carefully and indicate your level of agreement by checking the box that best describes it. *

Echelle de reponse/*Response scale*

1 = Pas du tout en accord/ *Totally disagree*

2 = Plutôt pas d'accord

3 = Ni d'accord ni pas d'accord

4 = Plutôt d'accord

5 = Tout à fait en accord/*Totally agree*

Insec_1	Il se peut que je perde mon emploi sous peu. / *Chances are, I will soon lose my job.*
Insec_2	Je me sens inquiet quant à l'avenir de mon travail. / *I feel insecure about the future of my job.*
Insec_3	Je pense que je pourrai perdre mon emploi dans un avenir proche. / *I think I might lose my job in the near future.*
Insec_4	Je suis persuadé·e que je pourrai garder mon emploi. / *I am sure I can keep my job.*

Rapport avec la technologie/ *Relation with technology*

Les items ont été développés pour cette recherche/*Items have been developed for this research.*

Instructions

Voici six énoncés concernant l'impact de la technologie sur votre travail. Indiquez votre degré d'accord avec chacun de ces énoncés.

Here are six statements about the impact of technology on your work. Indicate your level of agreement with each of these statements.

Echelle de reponse/*Response scale*

1 = Pas du tout en accord/ *Totally disagree*

2 = Plutôt pas d'accord 3 = Ni d'accord ni pas d'accord 4 = Plutôt d'accord 5 = Tout à fait en accord/ *Totally agree*	
Techno_1	La technologie est très présente dans mon travail. / *Technology is very present in my work.*
Techno_2	La technologie a amélioré l'exécution de mes tâches au quotidien/ *technology has improved the execution of my daily tasks*
Techno_3	La technologie, dans le cadre de mon travail, a limité mon autonomie. / *Technology, in the framework of my work, has limited my autonomy*.
Techno_4	À cause de la technologie, je ne suis plus libre de choisir comment réaliser une tâche/ *Because of technology, I am no longer free to choose how to perform a task*
Techno_5	La technologie a globalement amélioré mon travail. / *Technology has generally improved my work*
Techno_6	Il est facile pour moi d'utiliser la technologie. / *It is easy for me to use technology.*

Justice organisationnelle/ O*rganizational justice*

Organizational justice scale (Colquitt, 2001) – Sélection d'items/*Selection of items*

Instructions

Les questions suivantes se réfèrent à certaines prises de décisions (processus) qui peuvent vous concerner, ainsi qu'à la manière dont vous pensez être considéré·e dans votre travail. Vous trouverez ci-dessous sept affirmations. Indiquez votre avis à l'aide de l'échelle proposée.

The following questions refer to some of the decision making (processes) that may affect you, as well as how you feel you are regarded in your work. Below are seven statements. Indicate your opinion using the scale provided.

Echelle de reponse/*Response scale*

1 = dans une très petite mesure/ *to a very small extent*

2 = dans une petite mesure

3= dans une moyenne mesure

4 = dans une grande mesure 5 = dans une très grande mesure/ *to a very large extent*	
OrgJust_1	Avez-vous la possibilité d'exprimer vos opinions et sentiments lors de ces processus ? /*Have you been able to express your views and feeling during those procedures ?*
OrgJust_2	Ces processus sont-ils biaisés ? / *Are these processes biased?*
OrgJust_3	Ces processus sont-ils basés sur des informations correctes? /*Have those procedures been based on accurate information ?*
OrgJust_4	Ces procédures ont-elles été appliquées sans préjugé? / *Were these procedures applied without prejudice?*
OrgJust_5	Ces procédures ont- elles respecté les règles morales et d'éthique? /*Have those procedures upheld ethical and moral standards ?*
OrgJust_6	Vos responsables vous traitent-ils avec dignité ? / *Do your superiors treat you with dignity?*
OrgJust_7	Vos responsables vous traitent-ils avec respect ? / *Do your superiors treat you with respect?*
OrgJust_8	Votre situation de travail reflète-t-elle les efforts que vous avez fournis *?/ Does your work situation reflect the efforts you have put into your work?*
OrgJust_9	Votre situation de travail reflète-t-elle votre niveau de performance ? *Does your work situation is justified, given your performance ?*

Engagement/*Work Engagement*

Utrecht Work Engagement Scale (UWES) – Schaufeli, Bakker, & Salanova, 2006

Instructions

Lisez chaque énoncé et dites si vous éprouvez ce sentiment à l'égard de votre travail. Si vous n'avez jamais éprouvé ce sentiment, entourez le chiffre '1' (un). Si vous éprouvez ce sentiment, indiquez quelle en est la fréquence en entourant le chiffre entre '2' et '7' qui vous correspond le mieux

Read each statement and tell us if you feel this way about your work. If you have never experienced this feeling, circle the number '1' (one). If you do experience this feeling, indicate how often you experience it by circling the number between '2' and '7' that best describes you.

Échelle de réponse/*Response scale*

1= Jamais*/Never*

2 = Presque jamais (quelques fois par an ou moins)

3 = Rarement (une fois par mois ou moins)

4 = Quelquefois (quelques fois par mois)

5=Souvent (Une fois par semaine)

6=Très souvent (Quelques fois par semaine)

7=Toujours (Tous les jours)/*Always*

UWES_1	Je déborde d'énergie pour mon travail/ *At my work, I feel bursting with energy*
UWES_2	Je me sens fort(e) et vigoureux(se) pour faire ce métier/ *At my job, I feel strong and vigorous*
UWES_3	Je suis passionné(e) par mon travail/ *I am enthusiastic about my job*
UWES_4	Faire ce métier est stimulant/ *My job inspires me*
UWES_5	Lorsque je me lève le matin, j'ai envie d'aller travailler/ *When I get up in the morning, I feel like going to work*
UWES_6	Je suis content·e lorsque je suis captivé·e par mon activité/ *I feel happy when I am working intensely*
UWES_7	Je suis fier·e du travail que je fais/ *I am proud of the work that I do*
UWES_8	Je suis complètement absorbé(e) par mon travail/ *I am immersed in my work*
UWES_9	Je suis littéralement plongé(e) dans mon travail/ *I get carried away when I'm working*

Burnout/*Burnout*

Maslach Burnout Inventory - General Survey (MBI-GS; Schaufeli et al.,1996).

Instructions

Veuillez lire attentivement chaque affirmation : indiquez si vous éprouvez ce sentiment à l'égard de votre travail en cochant la case qui vous correspond le mieux.

Please read each statement carefully: indicate whether you experience this feeling about your work by checking the box that best describes it.

Echelle de reponse/*Response scale* 1=Jamais/*Never* 2=Presque Jamais 3= rarement 4= Quelquefois 5= Souvent 6=Très souvent 7= Toujours/*Always*	
MBI_1	Je suis moins intéressé·e par mon métier depuis que je suis dans cette entreprise. / *I have become less interested in my work since I started this job.*
MBI_2	Je suis devenu·e moins enthousiaste en ce qui concerne mon travail. / *I have become less enthusiastic about my work.*
MBI_3	Tout ce que je veux, c'est faire mon métier et que l'on ne me dérange pas. / *I just want to do my job and not be bothered.*
MBI_4	Je suis devenu·e plus cynique quant à ma contribution pour cette entreprise. / *I have become more cynical about whether my work contributes anything.*
MBI_5	Je doute parfois de l'importance de mon travail. / *I doubt the significance of my work.*
MBI_6	Je me sens vidé·e affectivement par mon travail. / *I feel emotionally drained from my work.*
MBI_7	Je suis épuisé·e à la fin d'une journée de travail. / *I feel used up at the end of the workday*.
MBI_8	Je suis fatigué·e lorsque je me lève le matin et que j'ai à affronter une journée de travail/ *I feel tired when I get up in the morning and have to face another day on the job.*
MBI_9	Travailler toute la journée est vraiment pénible pour moi. / *Working all day is really a strain for me.*
MBI_10	Je me sens usé·e à force de travailler. / *I feel burned out from my work.*

MBI_11	Je peux resoudre efficacement les problèmes qui surviennent dans mon travail. / *I can effectively solve the problems that arise in my work.*
MBI_12	J'ai la sensation d'apporter une contribution à mon entreprise. / *I feel I am making an effective contribution to what this organization does.*
MBI_13	Je pense être plutôt efficace dans mon travail. / *In my opinion, I am good at my job.*
MBI_14	Accomplir ce travail me rend euphorique. / *I feel exhilarated when I accomplish something at work.*
MBI_15	Dans ce métier, j'ai accompli des choses qui en valent la peine. / *I have accomplished many worthwhile things in this job.*
MBI_16	Au travail, je suir sûr·e d'agir de façon efficace. / *At my work, I feel confident that I am effective at getting things done.*

Satisfaction de vie/*Life satisfaction*

The Satisfaction with Life Scale (Diener et al., 1975)

Instructions

Vous trouverez ci-dessous cinq affirmations avec lesquelles vous pouvez être en accord ou en désaccord. En utilisant l'échelle proposée, indiquez votre degré d'accordou de désaccord avec l'énoncé.

Below are five statements that you may agree or disagree with. Using the scale provided, indicate your level of agreement or disagreement with the statement.

Echelle de réponse/*Response scale*

1 = Fortement en désaccord/*Strongly agree*

2 = En désaccord

3 = Légerement en désaccord

4 = Ni en désaccord ni en accord

5 = Legerement en accord

6 = En accord

7 = Fortement en désaccord/*Strongly disagree*

SWLS_1	En général, ma vie correspond de près à mes idéaux. /*In most ways my life is close to my ideal.*

SWLS_2	Mes conditions devie sont excellentes./*The conditions of my life are excellent.*
SWLS_3	Je suis satisfait(e) de ma vie./*I am satisfied with life*
SWLS_4	Jusqu'à maintenant, j'ai obtenu leschoses importantes que je voulais de la vie./*So far I have gotten the important things I want in life*
SWLS_5	Si je pouvais recommencer ma vie, je n'y changerais presque rien./*If I could live my like over, I would change almost nothing.*

Satisfaction de travail/*Job Satisfaction*

l'échelle de satisfaction de vie professionnelle (ESVP) en langue française (Fouquereau, & Rioux, 2002).

Instructions

Vous trouverez ci-dessous cinq affirmations avec lesquelles vous pouvez être en accord ou en désaccord. En utilisant l'échelle proposée, indiquez votre degré d'accordou de désaccord avec l'énoncé.

Below are five statements that you may agree or disagree with. Using the scale provided, indicate your level of agreement or disagreement with the statement.

Echelle de réponse/*Response scale*

1 = Fortement en désaccord/*Strongly agree*

2 = En désaccord

3 = Légerement en désaccord

4 = Ni en désaccord ni en accord

5 = Legerement en accord

6 = En accord

7 = Fortement en désaccord/*Strongly disagree*

JobSat_1	En général, ma vie professionnelle correspond de près à mes idéaux. / *In most ways my professional life is close to my ideal.*
JobSat_2	Mes conditions de vie professionnelle sont excellentes. / *The conditions of my professional life are excellent.*
JobSat_3	Je suis satisfait·e de ma vie professionnelle. */ I am satisfied with my professional life.*

JobSat_4	Jusqu'à maintenant, j'ai obtenu leschoses importantes que je voulais de ma vie professionnelle. */ So far, I have gotten the important things I want in my professional life.*	
JobSat_5	Si je pouvais recommencer ma vie professionnelle, je n'y changerais presque rien. / *If I could live my like over, I would change almost nothing.*	
Questions supplémentaires/ *Additional questions*		
Sant	Comment évaluez-vous votre état de santé en général ?/ *How would you rate your general health?*	1=très mauvais/*very bad* 2=mauvais 3 = assez bon 4=bon 5=très bon/ *very good*
JobChange	Avez-vous déjà pensé à changer d'emploi? / *Have you ever thought about changing your job?*	1=oui/*yes* 2=non/*non*
Pres	Au cours du dernier mois, combien d'heures, au total, avez-vous travaillé alors que vous vous sentiez pas bien/malade? / *In the past month, how many hours in total did you work while feeling unwell?*	Reponse libre/*Free answer*
Abs	Au cours du dernier mois, combien d'heures de travail, au total, avez-vous manqué à cause de problèmes de santé ? / *In the past month, how many hours of work, in total, have you missed due to health problems?*	Reponse libre/*Free answer*
Feed_1	Je reçois régulièrement un retour de mes supérieurs	1= fortement en désaccord/*Strongly agree*

	quant à la qualité de mon travail. / *I receive regular feedback from my superiors on the quality of my work*	2=en désaccord 3=légerement en désaccord 4= ni en désaccord ni en accord 5=légerement en accord 6= en accord 7= fortement en accord/ *Strongly disagree*
Feed_2	Je dispose des informations nécessaires pour évaluer la progression de mon travail. / *I have the necessary information to evaluate the progress of my work*	1= fortement en désaccord/*Strongly agree* 2=en désaccord 3=légerement en désaccord 4= ni en désaccord ni en accord 5=légerement en accord 6= en accord 7= fortement en accord/ *Strongly disagree*

Note. Items specific to the organizations studied were not reported. Not all scales presented in this survey were administered to all samples. Some scales have not yet been used in the articles included in this thesis. The scales presented were not relevant to Study 1. JCQ and MBI scales are protected by copyright.