



Article A Configurational Evaluation of Spanish Teleworkers' Perception and Nonperception of Stress during the COVID-19 Pandemic

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Abstract: This paper assesses the explanatory power of individual, environmental, and job factors on Spanish telecommuters' presence and absence of stress in a home telework setting during the COVID-19 crisis. It uses a survey of the Spanish agency "Centro de Investigaciones Sociológicas" on the perceptions of the Spanish population about several aspects of information communication technologies (ICTs) that was carried out in March 2021. We use fuzzy-set qualitative comparative analysis (fsQCA) to capture how factors combine to enable and inhibit stress feeling. The perception of stress is less covered by fsQCA configurations than the nonperception. However, fsQCA provides profiles that cause stress feelings and nonstress feelings with great consistency. We have checked that overload is the most important variable to explain stress. Likewise, fsQCA has also shown that while some variables, such as overload, isolation, non-adequacy, or organizational support, impact symmetrically on the presence and absence of stress perception, other factors, such as attaining a satisfactory work-home balance or gender, impact them asymmetrically. From a practical point of view, we can outline that clearer regulation of teleworking is needed to prevent imbalances in rights and obligations between companies and employees. However, there are also several challenges at the organization and worker level.

Keywords: teleworking; home-based telework; COVID-19 pandemic; fuzzy-set qualitative comparative analysis; configurational analysis; stress

1. Introduction

Telework involves carrying out work tasks outside of a traditional workplace, often relying on information communication technologies (ICTs) [1]. While much of our analysis can be applied to all forms of telework, it specifically focuses on home-based telework (HTW). Its advantages have been extensively discussed from various perspectives, including those of workers, firms, and society [2,3]. These positive outcomes, along with the energy crisis in the 1970s, led many scholars to predict its widespread adoption by the end of the 20th century [4]. However, until March 2020, the adoption of telecommuting varied across different regions due to diverse labor cultures, as well as the varying degrees of ICT infrastructure development [5]. In Europe, while Anglo-Saxon and Nordic countries had made significant advancements in remote work, teleworking had limited expansion in Mediterranean states, such as Spain and Italy [6].

In March 2020, most countries worldwide implemented movement restrictions to contain the transmission of SARS-CoV-2. Entrepreneurs and public agencies were strongly encouraged to conduct their activities remotely [7], and telecommuting allowed many companies to continue their economic operations [8]. Both organizations and employees were compelled to adopt HTW, often lacking prior experience or training in this work arrangement [7]. Consequently, throughout 2020, the majority of the Spanish workforce experienced telecommuting if their jobs were adaptable. Even in nonadaptable jobs, bureaucratic interactions with firms' administrative departments were likely conducted remotely.



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Copyright: © 2023 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). Additionally, many individuals rely on telecommuted services, such as medical assistance and shopping [9].

The widespread adoption of telework (TW) during the SARS-CoV-2 pandemic provides an excellent opportunity to examine the actual limitations of its implementation [10,11]. Numerous authors have reported that remote working is associated with lower levels of work-related stress compared to conventional workplaces. This is because remote workers can avoid frequent meetings and interruptions from colleagues, and they experience fewer office conflicts [3]. However, Lunde et al. [12] point out that there is no consensus regarding the impact of remote work on employees' well-being. Tavares et al. [13] identify three primary health concerns associated with the teleworking context: musculoskeletal pain, isolation, and stress. In terms of stress, undesirable consequences may include fear, worry, the inability to relax, or increased heart rate [14]. This paper aims to assess the perceptions of Spanish employees regarding the influence of individual, environmental, and job-related factors on the perception of stress caused by teleworking. The research questions (Qs) guiding this study are as follows:

Q1: How do individual, environmental, and job factors combine to induce the perception that teleworking enables stress in Spanish telecommuters?

Q2: How do individual, environmental, and job factors combine to induce the perception that teleworking does not produce stress in Spanish telecommuters?

All reviewed literature about the impact of HTW on stress performs quantitative analysis using conventional correlational methods, such as ANOVA or regression analysis. The novelty of this paper is the use of fuzzy-set qualitative comparative analysis (fsQCA) developed by Ragin [15] to complement results by regression methods in the literature. We are aware that the use of fsQCA in the human resource management (HRM) setting is not new. Although it has been applied to evaluate HRM policies in entrepreneurial performance [16], it is not a typical research method that can be considered novel in the assessment of working from home perceptions and consequences from workers' perspective.

This paper is interested in finding the ways in which the explanatory variables combine to obtain the outcome linked to stress, which is an extremely complex phenomenon [17]. To conduct this analysis, fsQCA is an adequate method because it is case-oriented [18]. This technique allows measuring the membership degree of each case in the set of attributes and the outcome set by using fuzzy-set union and intersection operators and, thus, discovers several ways in which input variables combine to produce an output [19]. Likewise, fsQCA allows different signs for the influence of an input factor on the output variable and, thus, captures all nuances of the influence over the studied outcome by input variables since that impact often does not have a univocal sign [18]. For example, several authors outline that technical and material help by the organization for remote work has a positive influence on workers' well-being [20], but others outline that it enables a sensation of greater surveillance that enables stress [21]. The use of fsQCA may show that in a subset of the sample, perceiving organizational support for telework is linked with an absence of stress, but also that there is a proportion of the cases reporting stress tied to the presence of organizational support.

When stating research questions, we assumed that the mechanisms that produce perception of stress are not necessarily symmetrical with respect to those inhibiting this perception. FsQCA does not assume symmetrical relationships between variables, despite being effective in that case [19], and allows capturing the asymmetric explanation of the presence and absence of a given outcome.

2. Theoretical Framework

2.1. Initial Considerations

Figure 1 illustrates the theoretical foundation of our analytical study. This figure is based on the classical framework [1] to explain telecommuting adoption. Explanatory factors are categorized into personal, environmental, and job variables. Within individual variables, we further differentiate between sociodemographic factors and the perception that remote working facilitates achieving a satisfactory work–home balance. Using this conceptual groundwork and its inherent variables, Ref. [7] examines the adaptation of workers to home teleworking during the COVID-19 crisis. Likewise, it also serves to analyze the impact of mandatory working from home on telecommuters' feelings of isolation and stress using both a qualitative focus [8] and a correlational approach [9,11].



Figure 1. Framework used to explain perceived stress because of telework. Source: Own elaboration under the consideration of [1,7–9,11].

2.2. Individual Variables

The mainstream literature reports the statistical significance of sociodemographic variables in explaining well-being in telecommuting [8,22–28]. Gender has been found to be a relevant explanatory driver of psychological consequences due to teleworking [25]. Often, it is reported that women feel worse effects due to HTW since they have a more compromised role in home [29] or child care [30]. Thus, they usually perceive greater work–home conflicts [31]. Therefore, we propose the following propositions:

Proposition 1a (P1a). Being female is a condition in some causal configurations explaining stress perception.

Proposition 1b (P1b). Being male is a condition in some causal configurations explaining the absence of stress perception.

Although younger workers typically exhibit higher self-efficacy in the use of information communication technologies (ICTs) [32,33], remote work is commonly carried out by senior employees [5]. The mainstream literature suggests that mental health issues associated with remote working are less likely among older individuals and those with more seniority [11,34]. This could explain why Carillo et al. [7] and Scheibe et al. [35] observed that adaptation to home-based telework during the COVID-19 period increased with employee age. However, it is important to consider that perceptions of the impact of ICTs on daily life may vary across different generations. While Baby Boomers generally value face-to-face interactions, the X-generation tends to appreciate flexibility in work relationships [36]. Additionally, the millennial generation is often considered to be digital natives [37]. These factors lead us to speculate that age may also influence the perception of stress associated with telework. However, we cannot definitively determine the direction of this relationship. Therefore, we propose the following hypotheses:

Proposition 2a (P2a). Presence and absence of seniority is a condition in some causal configurations explaining stress perception.

Proposition 2b (P2b). *Presence and absence of seniority is a condition in some causal configurations explaining absence of stress perception.* Theoretically, working from home provides an opportunity to balance childcare responsibilities and job tasks [37–39], which could potentially mitigate stress levels. However, having children to care for increases household duties and leads to the sharing of limited resources, such as space and laptops, among multiple individuals. This explains why a significant body of literature highlights that the presence of children may amplify perceptions of stress [22,25,27,40–42]. Therefore, we propose the following propositions:

Proposition 3a (P3a). *The presence and absence of children in care are conditions in some causal configurations explaining stress perception.*

Proposition 3b (P3b). *The presence and absence of children in care are conditions in some causal configurations explaining the absence of stress perception.*

The positive impact of home-based telework (HTW) on achieving a better work–life balance has been consistently emphasized in the literature [2], and it has been shown to be an explanatory factor for job satisfaction and well-being [43]. However, the blurring of boundaries between work and home often leads to conflict between job and personal life [2,23] and increased exhaustion [44]. This conflict has been widely demonstrated to be a significant contributor to employees' experience of stress symptoms [45]. Based on these findings, we propose the following proposition:

Proposition 4a (P4a). *The absence of positive work–home balance is a condition in some causal configurations explaining stress perception.*

Proposition 4b (P4b). *The presence of positive work–home balance is a condition in some causal configurations explaining the absence of stress perception.*

2.3. Environmental Factors

The physical space dedicated to telecommuting plays a crucial role in overall wellbeing [39]. Limitations in the physical space can lead to work interruptions [46] and subsequently result in household conflicts [47]. Home-based teleworkers often have to utilize private areas and shared material resources, which can give rise to tense situations [11,47]. Moreover, inadequate physical spaces, equipment, and furniture are commonly associated with musculoskeletal pain [48] and poor air quality [49].

The adequacy of household resources also includes reliable connectivity and appropriate ICT equipment [27,41,50]. Telecommuters often express concerns about difficulties in accessing necessary information for remote work [33,51]. Insufficient ICT infrastructure can make remote work uncomfortable [6,52]. Based on these considerations, we propose the following hypotheses:

Proposition 5a (P5a). *Feeling that home was not prepared in the COVID-19 crisis to carry on teleworking is a condition in some causal configurations explaining stress perception.*

Proposition 5b (P5b). Nonexistence of feeling that home was not prepared in the COVID-19 crisis to carry on teleworking is a condition in some causal configurations explaining the absence of stress.

Proposition 6a (P6a). The absence of feeling that ITCs were allowed to carry on professional activities with enough quality during the COVID-19 crisis is a condition in some causal configurations explaining stress perception.

Proposition 6b (P6b). *Feeling that ITCs allowed carrying on professional activities with enough quality during the COVID-19 crisis is a condition in some causal configurations explaining the absence of stress perception.*

Providing employees with learning resources [3,53] and promoting mediated communication practices to mitigate the negative effects of isolation [11,54] enhances job satisfaction and adherence to remote work [55]. This support for teleworking includes material and technical assistance for home offices [19]. According to a report by [56], approximately 95% of connectivity expansions during the SARS-CoV-2 pandemic were funded by employees, with 65% of them using their personal devices for remote work.

On the other hand, organizational support can also lead to increased stress due to perceived excessive surveillance [3,20] and the perception that firms' expectations for remote work are higher than those in conventional workplace settings [57].

Based on these considerations, we propose the following propositions:

Proposition 7a (P7a). *Either the absence or the presence of organizational support are conditions in some causal configurations explaining stress perception.*

Proposition 7b (P7b). *Either the absence or the presence of organizational support are conditions in some causal configurations explaining the absence of stress.*

2.4. Job Factors

The intensive use of ICTs in jobs can lead to connectivity overload [58,59], which may result in workers feeling the need to be constantly available and "on-line" [25], experiencing job cut-offs [60], increased workload [59], limited recovery time from work [60], and heightened work tension [40]. The perception of excessive dependence and entrapment due to the intensive use of ICTs is a key driver of digital stress [61].

An excessive workload not only hampers employees' ability to balance their work and personal lives, but also impedes emotional support from colleagues and family members [62,63]. Additionally, home-based teleworking negatively impacts social support in the workplace, as relationships rely heavily on electronic communication [47]. The consequences of a heavy workload can include reduced job satisfaction and physical and mental discomfort. Work overload has been identified as one of the most significant stressors [64,65]. Based on these findings, we propose the following propositions:

Proposition 8a (P8a). Perceiving that telecommuting produces work and information overload is a condition in some causal configurations explaining stress feeling.

Proposition 8b (P8b). Not perceiving that telecommuting produces work and information overload is a condition in some causal configurations explaining the absence of stress feeling.

In a remote work environment, the absence of face-to-face interactions can result in employees missing out on activities that stimulate their work [41]. Sahai et al. [66] highlight that isolation can have negative effects on employees' affective state, attitudes, and overall well-being. The consequences of isolation include a loss of confidence, skills, and knowledge needed to perform tasks, as well as increased difficulties in obtaining and sharing important information and knowledge [33]. Several studies indicate that isolation contributes to stress, fatigue, and burnout [11,59,67,68]. Based on these findings, we propose the following propositions:

Proposition 9a (P9a). *The perception of isolation in telecommuting is a condition in some causal configurations explaining stress.*

Proposition 9b (P9b). Nonperception of isolation is a condition in causal configurations explaining the absence of stress.

3. Materials and Methods

3.1. Materials

The survey used in this paper was conducted by the Spanish Government Institution "Centro de Investigaciones Sociológicas" (CIS), specifically, in March 2021. The aim was to capture the perceptions of employees who were actively working during that period. A subsample of the survey was analyzed, following the selection criteria outlined in Figure 2.



Figure 2. Procedure used to select the responses for analysis.

Table 1 provides information on the composition of the final sample. The gender distribution was 46.67% women and 53.33% men. Additionally, the sample consisted of 82.17% employees from private firms and 17.23% from the public sector.

Table 1. Gender and working situation in the sample and subsample used in this paper.

| Whole Sample (N = 3014) | | Active Population (N = 1739) | | Working Population (N = 1405) | | Employees (N = 1155) | |
|----------------------------|---|---|---|---|---|--|--|
| Size | % | Size | % | Size | % | Size | % |
| 1557 | 51.66 | 845 | 48.59 | 624 | 44.41 | 539 | 46.67 |
| 1457 | 48.34 | 894 | 51.41 | 781 | 55.59 | 616 | 53.33 |
| Size | % | Size | % | Size | % | Size | % |
| 956 | 31.72 | 956 | 54.97 | 956 | 68.04 | 956 | 82.77 |
| 199 | 6.60 | 199 | 11.44 | 199 | 14.16 | 199 | 17.23 |
| 250 | 8.29 | 250 | 14.38 | 250 | 17.79 | 250 | |
| 50 | 1.66 | 50 | 2.88 | 50 | | 50 | |
| 281 | 9.32 | 281 | 16.16 | 281 | | 281 | |
| 43 | 1.43 | 43 | 2.47 | 43 | | 43 | |
| 114 | 3.78 | 114 | | 114 | | 114 | |
| 567 | 18.81 | 567 | | 567 | | 567 | |
| 115 | 3.82 | 115 | | 115 | | 115 | |
| 434 | 14.40 | 434 | | 434 | | 434 | |
| | Whole (N = Size 1557 1457 Size 956 199 250 50 281 43 114 567 115 434 | Whole Sample (N = 3014) Size % 1557 51.66 1457 48.34 Size % 956 31.72 199 6.60 250 8.29 50 1.66 281 9.32 43 1.43 114 3.78 567 18.81 115 3.82 434 14.40 | Whole Sample (N = 3014)Active P (N =Size%Size155751.66845145748.34894Size%Size95631.729561996.601992508.29250501.66502819.32281431.43431143.7811456718.815671153.8211543414.40434 | Memory Constant in the second symple in the | Whole Sample (N = 3014)Active Population (N = 1739)Working I (N =Size%Size%Size155751.6684548.59624145748.3489451.41781Size%Size%Size95631.7295654.979561996.6019911.441992508.2925014.38250501.66502.88502819.3228116.16281431.43432.47431143.7811411456718.815675671153.8211511543414.40434434 | Whole Sample (N = 3014)Active Population (N = 1739)Working Population (N = 1405)Size%Size%155751.6684548.5962444.41145748.3489451.4178155.59Size%Size%Size%95631.7295654.9795668.041996.6019911.4419914.162508.2925014.3825017.79501.66502.88502819.3228116.16281431.43432.47431143.781141141153.8211511543414.40434434 | Whole Sample (N = 3014)Active Population (N = 1739)Working Population (N = 1405)Empl (N =Size%Size%Size%Size155751.6684548.5962444.41539145748.3489451.4178155.59616Size%Size%Size%Size95631.7295654.9795668.049561996.6019911.4419914.161992508.2925014.3825017.79250501.66502.8850502819.3228116.1628143431.43432.4743431143.7811411411456718.815675675671153.8211511511543414.40434434434 |

Source: Own elaboration from data from CIS (2021).

This information about the sample composition helps provide a context for the analysis and allows for a better understanding of the specific population from which the data were collected. It is important to note that the gender and sector distribution in the sample may have implications for the generalizability of the findings to the broader population of Spanish employees. Table 2 displays the items of the survey used in this study.

| : | Sociodemographic Variab | Perceptions about Enabling Conciliating Work–Family | |
|---------------------------------------|--|--|--|
| IND1 = Gender | IND2 = Children in Home | IND3 = Age | IND4 = HTW Has Positive Effects on Me Because |
| Female (44.41%) | None (60%) | >=55 (19.22%) | Makes easier parents and children and conciliating work and family duties (49%) |
| Male (55.59%) | One (18.53%) | >=35 and <55 (59.56%) | Makes easier to workers organizing their agenda (42.25%) |
| | >=Two (21.47%) | <35 (21.21%) | Allows spending more time with family (37.25%) At least one item (62.41%) Sum. Mean = 1.28, SD = 1.18 |
| | Environmental factors | | |
| ENV1 = Home | es are not ready to separate | ENV2 = Quality of internet allowed developing many professional activities with a high quality level | |
| Agree | (12.47%) | Yes (76.02%) | |
| | Not agree/other (87.53% |)) | No/other (23.98%) |
| ENV3 = Techr | nological equipment/help | by the employer | |
| Had alread | dy equipped you with a lap | ptop (22.16%) | |
| Gave | you a portable computer (| (13.68%) | |
| You used an own cor | nputer until he/she provid | ded one laptop (12.03%) | |
| Compensated y | ou for having more internet | et capacity (1.14%) | |
| Oiga | At least one item (51 515% | %) | |
| | Sum: mean = 1.50 : SD = 1.50 | .58 | |
| | Job factors | | |
| JOB1 Teleworking makes Telework | = Work/communication w more difficult disconnection ing supposes more worklo At least one item (13.59% Sum. Mean = 0.23, SD = 0. | vorkload ng from work (11.34%) oad (12.12%) 6) 61 | JOB2 = Teleworking produces People isolation (16.71%) Problems linked to loneliness (12.90%) Burden to promote due to invisibility (8.05%) At least one item (17.49%) Sum. Mean = 0.38, SD = 0.89 |
| | Output factor | | |
| Stress = 1 | TW increases stress due to | teleworking | |
| | Yes (10.04%) | - | |
| | No/NA (89.96%) | | |
| | Source: Own elabora | tion from data from CIS (2021) | • |
| | 3.2. Variables Use | ed in Data Analysis | |

Table 2. Questions and responses on explanatory factors in the sample.

The variables used in this paper have been defined from questions displayed in Table 2, in such a way that they are modeled to allow the evaluation of the propositions exposed in Section 2.

With regard to individual variables, we define:

- FEMALE = a dummy variable that takes 0 for males and 1 for women. It is defined from IND1 in Table 2.
- SENIORITY = workers' age declared in IND2.
- CHILDREN = Number of children to care for in the home (IND3).
- WH_BALANCE = The perceived balance between work and family due to teleworking and comes from the sum of the items in IND4, which varies between 0 and 3.

Environmental conditions that embed home conditions and organizational support are defined from questions ENV1, ENV2, and ENV3 in Table 2. Thus,

- HOME_NO_A = A dummy variable defined from ENV1 that takes 1 if the respondent perceived that homes were not adequate to implement HTW during COVID-19 and 0 otherwise. It is defined from ENV1.
- G_CONNECT = A dichotomous variable whose value is 1 if it is perceived that the quality of ICTs allows developing jobs satisfactorily during COVID-19 crises and 0 otherwise. It is defined from ENV2.
- ORG_SUPP = Measures support of the firm to the worker during COVID-19 confinement to carry on the work and is defined as the sum of the items in ENV3, which varies between 0 and 4.

Job factors are defined from questions JOB1 and JOB2. Therefore, OVERLOAD and ISOLATION are the sum of the items in JOB1 (which may vary between 0 and 2) and JOB 2 (whose value is within 0 and 3), respectively. The output variable, STRESS, is a dichotomous variable that takes 1 if the employee declares teleworking-linked stress perception and 0 otherwise.

3.3. Fuzzy-Set Qualitative Comparative Analysis

We perform fsQCA analysis by implementing the following steps [18]: (1) membership function calibration of embedded variables, (2) necessity analysis, (3) sufficiency analysis by stating configurations that induce stress perception and stress nonperception, and (4) interpretation of results in (2) and (3) to assess the propositions in Section 2.

Step 1. Membership function calibration

We express the ten variables exposed in Section 3.2. in terms of membership functions, i.e., normalized in [0, 1]. Table 3 shows the exact membership values of x = 0, 1, 2, ... in the case of CHILDREN, WH_BALANCE, ORG_SUPP, OVERLOAD, and ISOLATION.

Table 3. Membership functions for variables CHILDREN, WH_BALANCE, ORG_SUPP, OVERLOAD, and ISOLATION.

| | CHILDREN | | WH_BALANCE | | ORG_SUPP | | OVERLOAD | | ISOLATION | |
|---|----------|-------|------------|-------|----------|-------|----------|-------|-----------|-------|
| x | f_x | m_x | f_x | m_x | f_x | m_x | f_x | m_x | f_x | m_x |
| 0 | 0.60 | 0.00 | 0.37 | 0.00 | 0.48 | 0.00 | 0.86 | 0.00 | 0.83 | 0.00 |
| 1 | 0.78 | 0.81 | 0.56 | 0.57 | 0.51 | 0.51 | 0.89 | 0.93 | 0.87 | 0.92 |
| 2 | 0.97 | 1.00 | 0.78 | 0.81 | 0.63 | 0.65 | 1.00 | 1.00 | 0.92 | 1.00 |
| 3 | 0.99 | 1.00 | 1.00 | 1.00 | 0.89 | 0.93 | | | 1.00 | 1.00 |
| 4 | 0.996 | 1.00 | | | 1.00 | 1.00 | | | | |

Note: f_x stands for the cumulative relative frequency and m_x for the membership function.

Variables FEMALE, HOME_NO_A, G_CONNEC, and STRESS were initially defined as dummy variables. Therefore, they are not transformed to be expressed by means of membership functions that, for a variable X, we denote as m_X . For example, in the case FEMALE, $m_X = 1$ if the response comes from a woman, and $m_X = 0$ otherwise. Likewise, for HOME_NO_A, $m_X = 1$ if the answer reported that home was not adequate to telecommute, and $m_X = 0$ otherwise. We proceed in the same manner for G_CONNEC and STRESS.

To state the membership punctuation SENIORITY, $m_{SENIORITY}$, we differentiate members of the Baby Boom generation and subsequent generations. Baby Boomers in Spain are supposed to have been born in a fuzzy boundary in the middle 1960s. We calibrate the membership function as follows:

$$m_{SENIORITY} = \begin{cases} 1 & x \ge 55\\ \frac{x-50}{5} & 50 \le x < 55\\ 0 & x < 50 \end{cases}$$

where *x* is the age of the surveyed person.

In regard to CHILDREN, WH_BALANCE, ORG_SUPP, OVERLOAD, and ISOLATION, whose dominion is a finite discrete set x = 0, 1, 2, ..., the membership values of x have been obtained from the cumulative relative frequencies of these values, f_x .

$$m_X = \begin{cases} 0 \text{ if } x = 0\\ 0 \text{ if } f_x \le 0.05\\ \frac{f_x - 0.05}{0.9} \text{ if } 0.5 \ge f_x > 0.05\\ 1 - \frac{0.95 - f_x}{0.9} \text{ if } 0.95 \ge f_x > 0.5\\ 1 \text{ if } f_x > 0.95 \end{cases}$$

Step 2. Necessity analysis

In step 2, we perform a necessity analysis to state if the evaluated explanatory factors can be viewed as single necessary conditions to cause the presence or absence of stress. To do so, we calculate the so-called consistency (cons) of the presence or absence of a given variable when the assessed outcome occurs. Consistency measures the membership degree of a condition within the outcome set and could be assimilated to a measure of significance in statistics (Thiem, 2010). The literature usually agrees that a condition can be considered necessary if the consistency attains values ≥ 0.9 [67].

Step 3. State configurations that induce stress perception and stress nonperception.

If we symbolize the negation of a variable as "~", we adjust the following Boolean functions by means of McCluskey's algorithm:

~STRESS = f(FEMALE, SENIORITY, CHILDREN, WH_BALANCE, HOME_NO_A, G_CONNECT, ORG_SUPP, OVERLOAD, ISOLATION)

While STRESS fits how explanatory factors combine to produce the perception that teleworking drives stress, ~STRESS does so for the absence of that perception. In both cases, to fit the Boolean functions, we strictly use the cases of truth tables whose consistency is ≥ 0.8 .

Following [68], to assess the influence of explanatory factors on STRESS and its negation and to state the core conditions and the peripheral conditions in the recipes (or prime implicates/configurations) that conform to the solution of STRESS and ~STRESS, we combine parsimonious and intermediate solutions.

For every recipe, we must calculate its consistency. It is commonly agreed that a recipe with consistency >0.75 could be considered a sufficient condition [68]. Along with consistency, it is of interest coverage measure that quantifies the proportion of the output set explained by a configuration and can be interpreted in an analogous manner to R^2 [69].

The 2nd and 3rd steps are implemented with the help of fsQCA 3.1 software [70].

Step 4. Assess the propositions in Section 2

The use of fsQCA allows evaluating propositions in Section 2 from a complementary point of view to that by conventional correlational methods. The influence of every variable on stress is relevant in a given configuration if it needs to be present (affirmed) or absent (negated) in at least one recipe. Otherwise, if this variable is "do not care", it is not significant since it may be either present or absent.

4. Results

Table 4 displays the results of the necessity analysis. With regard to STRESS, OVER-LOAD (cons = 0.92) is the unique necessary simple condition. However, not attaining work–home balance (cons = 0.88) is close to attaining that status. Regarding the absence of stress, whereas both the absence of overload (cons = 0.95) and the negation of the existence

of home inadequacy (cons = 0.92) attain the status of necessary condition, ~ISOLATION (cons = 0.88) is close to being a necessary condition.

| | STRE | SS (Y) | ~STRESS (~Y) | | | |
|---------------|-----------------------|--|--------------|-------------------------|--|--|
| Condition (X) | Consistency of X⇒Y | Consistency of $X \Rightarrow Y$ Consistency of $\sim X \Rightarrow Y$ | | Consistency of ~X⇒~Y | | |
| FEMALE | 0.46 | 0.54 | 0.47 | 0.53 | | |
| SENIORITY | 0.79 | 0.21 | 0.81 | 0.19 | | |
| CHILDREN | 0.37 | 0.63 | 0.36 | 0.64 | | |
| WH_BALANCE | 0.12 | 0.88 | 0.54 | 0.46 | | |
| HOME_NO_A | 0.57 | 0.43 | 0.08 | 0.92 | | |
| G_CONNECT | 0.59 | 0.41 | 0.78 | 0.22 | | |
| ORG_SUPP | 0.41 | 0.59 | 0.48 | 0.52 | | |
| OVERLOAD | 0.92 | 0.08 | 0.05 | 0.95 | | |
| ISOLATION | 0.63 | 0.37 | 0.12 | 0.88 | | |

Table 4. Necessity analysis of the simple conditions on stress and nonstress.

Notes: (1) "X" stands for any input factor and Y for stress. (2) With "~", we denote absence (or negation).

Table 5 shows the intermediate solution of fsQCA for the perception of stress. It presents a high consistency (above 0.9) and coverage of 0.437. The eight configurations displayed in Table 5 show a univocal positive influence of inadequate home, overload, and isolation on STRESS. A consistent absence of attaining satisfactory work–home balance on feelings of stress can also be checked. The most relevant variable is OVERLOAD since it is present in all configurations. Therefore, there is a full accomplishment of propositions P4a, P5a, P8a, and P9a.

Table 5. Intermediate fsQCA solution for STRESS.

| Recipe | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| FEMALE | | \otimes | | • | \otimes | | \otimes | \otimes |
| SENIORITY | \otimes | \otimes | • | \otimes | • | • | | • |
| CHILDREN | • | • | \otimes | | • | \otimes | | • |
| WH_BALANCE | \otimes | | \otimes | \otimes | \otimes | \otimes | \otimes | \otimes |
| HOME_NO_A | • | | | • | | • | • | • |
| G_CONNECT | | \otimes | \otimes | • | | • | \otimes | \otimes |
| ORG_SUPP | \otimes | • | \otimes | \otimes | • | • | \otimes | |
| OVERLOAD | • | • | • | • | • | • | • | • |
| ISOLATION | • | | • | • | • | • | • | • |
| coverage | 0.057 | 0.041 | 0.129 | 0.062 | 0.058 | 0.041 | 0.112 | 0.042 |
| consistency | 0.893 | 1.000 | 0.901 | 0.979 | 1.000 | 0.959 | 1.000 | 1.000 |
| coverage | 0.437 | | | | | | | |
| consistency | 0.919 | | | | | | | |

Note: Solid circles " \bullet " indicate the presence of a condition, crossed circle " \otimes " indicates their absence and blank "do not care". Large circles represent core conditions, and small circles represent peripheral conditions.

The absence of seniority and having children to care for are core conditions three and two times, but their presence is also a core condition in two (SENIORITY) and one (CHILDREN) recipes. Therefore, P2a and P3a are also accomplished. The absence of organizational support perception is a core condition in one configuration, and its presence in two recipes is also a core condition. Thus, P7a is also accomplished.

Other factors (being women and declaring a good ICT infrastructure) are also relevant because they are present and absent in at least one recipe. However, their impact on stress does not necessarily have the supposed sign in all configurations. Being male seems to be basically, but not strictly, linked with the profiles perceiving stress since FEMALE is negated as a core condition in four recipes. We can make a similar appreciation for G_CONNECT,

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which comes negated as a core variable in three prime implicates, but affirmed in two. Therefore, P1a and P6a are not strictly fulfilled.

Table 6 displays prime implicates of no perception of stress. The set of recipes has an extremely high consistency (practically 1) and coverage = 0.911. The configurations show that being male, not perceiving inadequacy in home to develop telework, and the absence of OVERLOAD and ISOLATION are conditions in several configurations of nonstress and, in any case, are never conditions as "present" variables. Being a man is a condition in three recipes (two as a core variable and one as a peripheral one). Non-adequacy of home is negated as a core condition in two recipes and negated in peripheral conditions in six configurations. ISOLATION is absent as a core condition in six recipes. The most relevant variable to explain ~STRESS is OVERLOAD. It is negated in eleven configurations. Therefore, propositions P1b, P5b, P8b, and P9b are fulfilled.

Table 6. Intermediate solution of fsQCA for ~STRESS.

| Recipe | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| FEMALE | \otimes | | | | | | \otimes | | | \otimes | | | |
| SENIORITY | | • | | | • | • | • | • | \otimes | | \otimes | • | ٠ |
| CHILDREN | \otimes | \otimes | | | • | | | ٠ | \otimes | \otimes | | | • |
| WH_BALANCE | | | ٠ | | | ٠ | | | | | | \otimes | |
| HOME_NO_A | \otimes | | \otimes | \otimes | | \otimes | | | \otimes | | \otimes | \otimes | \otimes |
| G_CONNECT | | | | • | | | • | • | \otimes | • | • | \otimes | \otimes |
| ORG_SUPP | | | | | | | | | | | • | \otimes | \otimes |
| OVERLOAD | \otimes | | |
| ISOLATION | | \otimes | \otimes | \otimes | \otimes | | | | \otimes | \otimes | | \otimes | \otimes |
| coverage consistency | 0.323 0.994 | 0.423 0.997 | 0.509 0.998 | 0.658 0.995 | 0.296 0.996 | 0.429 1.000 | 0.323 0.991 | 0.244 0.992 | 0.025 1.000 | 0.250 0.992 | 0.258 0.996 | 0.055 0.985 | 0.050 0.994 |
| coverage consistency | 0.911 0.994 | | | | | | | | | | | | |

Note: Solid circles "•" indicate the presence of a condition, crossed circle "⊗" indicates their absence and blank "do not care". Large circles represent core conditions, and small circles represent peripheral conditions.

The variables SENIORITY, CHILDREN, and ORG_SUPP can also be considered significant in explaining profiles linked to nonperception of stress. As we expected, they are conditions either as present or absent factors in several configurations, so P2b, P3b, and P6b are accomplished.

Attaining an adequate balance in work and home duties and good ICT infrastructure are also conditions in some recipes. However, in several configurations, they must be present, but in others absent. This fact supposes a contradiction of propositions P4b and P6b, which supposed only the presence and not the negation of both variables to explain nonstress.

5. Discussion

In the line of [7–9,11], this work demonstrates that the conceptual frameworks derived from [1] in explaining telecommuting arrangements are suitable for understanding adaptation to it when it is mandatory and the effects resulting from such work arrangements, such as isolation, as is the case of this study, stress. Likewise, we have shown that this conceptual framework allows understanding how working from home influences stress, not only through qualitative [8] and correlational [11] methods, but also with fsQCA.

Perceiving that the home is inadequate for telecommuting and experiencing overload and isolation consistently have a positive impact on stress and a negative impact on its absence (referred to as "~STRESS"), and furthermore, they symmetrically influence the perception and nonperception of stress. Additionally, overload emerges as a key variable in explaining the presence or absence of stress perception, as it is closely associated with being a necessary condition and is present in the majority of explanatory factors related to stress and ~STRESS. These findings align with mainstream literature on the suitability of the home environment for telecommuting [27,41,44,47,53], the effects of isolation [11,59,66–68], and the impact of work and information overload [25,40,60,61,64,65].

The absence of the perception that telecommuting enables work–personal life balance is unequivocally linked to the perception of stress. This result aligns with the works of Baruch [2] and empirical findings by [22,23,41,44,45,59]. However, its impact on ~STRESS, depending on the configuration, can be both positive and negative. Therefore, the influence of the perception of job–personal life balance on experiencing or not experiencing stress is asymmetrical.

Being female tends to be negated in configurations explaining stress and ~STRESS. Thus, both the perceivers and non-perceivers of telework-related stress profiles are often associated with being male. This finding contradicts several reports, such as [22,23,26,30], regarding the link between being female and stress.

Organizational support (ORG_SUPP) is found to be both negated and affirmed in several explanatory factors for both the presence and absence of stress perception. This finding provides support for the positive effects of organizational support on employees' well-being [19,53,71]. In several explanatory factors, the absence of organizational support is a condition for stress, while its presence is a condition for the absence of stress. However, it is also evident that organizational support can contribute to stress due to perceived oversurveillance [3,20] and the perception that supervisors' expectations in remote working modes exceed those in conventional workplaces [57]. This phenomenon is captured in the explanatory factors explaining stress where organizational support is affirmed and in explanatory factors explaining the absence of stress perception where organizational support is negated.

Sociodemographic variables, such as being an older worker (SENIORITY) and having children to care for (CHILDREN), do not have a consistent impact on STRESS and ~STRESS. The presence or absence of these variables varies across different explanatory factors. This is not surprising, as older workers are often associated with greater seniority, indicating more experience with telecommuting [5]. This is captured in explanatory factors where SENIORITY is negated for stress and affirmed for the absence of stress perception. However, older individuals may also have less proficiency in using information and communication technologies (ICTs) [32], and Baby Boomers, in particular, may underestimate the benefits of remote working [36]. These profiles are reflected in explanatory factors where SENIORITY is present for stress perception and absent for the absence of stress perception.

Regarding having children to care for, the findings from fsQCA indicate that its presence can either enable or inhibit stress depending on the specific profiles. This result aligns with reports suggesting that telework can be facilitated by having children, as it allows for balancing childcare responsibilities with job duties [38,39]. However, there are also reports indicating the opposite phenomenon or suggesting that having children can amplify stress perceptions [6,22,25,27,40,41].

Practical Implications

The overload of information and work is identified as the key variable that explains telecommuting-related stress perception. To mitigate these effects, employees should be protected through legal regulations, such as the right to digital disconnection, which is governed by Royal Decree 28/2020 in Spain. Shifting occupational culture towards flexible work involves reducing information flows and channels to minimize communication overload. Both employees and employers should recognize the importance of using ICTs efficiently in a remote work context. Effective implementation of ICTs goes beyond technical skills and requires making informed decisions about when, why, and where to use them.

While Spanish authorities have proposed measures to address overload, their success depends on a cultural adaptation of both firms and employees. Business culture needs to adopt alternative criteria for evaluating productivity, moving away from presentism, and focusing on objective targets and trust. Perceiving telecommuting as less productive than

conventional workplaces may lead telecommuters to work longer hours and with greater intensity. Harris [72] highlights the significance of an implicit agreement, which entails mutual acceptance of rights and obligations between the employee and the organization, in a teleworking context.

Organizations committed to telecommuting face various challenges, including training employees in the new work arrangement, adapting the organizational culture, and modifying infrastructure [71]. Employees also encounter a new work–life scenario where work–home balance becomes crucial. When homes serve as both living spaces and workplaces, clear boundaries must be established to ensure a healthy equilibrium between professional and personal responsibilities. The management of limited home space when it doubles as an office is a relevant factor in explaining stress.

Our methodology reveals how different factors interact to produce or inhibit stress perception. Similar to [73], our findings indicate that there are distinct worker profiles in telecommuting that affect well-being perception. To successfully implement teleworking, human resources managers must not only address variables that have a significant impact on stress, but also be attentive to the diverse profiles of workers and cater to their specific needs since they are pivotal to the successful implementation of new work arrangements.

6. Conclusions

This study aims to examine the influence of various individual, environmental, and job variables on the perception of telecommuting-related stress among Spanish employees using fsQCA (fuzzy-set qualitative comparative analysis). To the best of our knowledge, no previous research has been conducted using a configurational methodology to assess the impact of telecommuting on workers' well-being. Configurational analysis allows for the identification of different worker profiles associated with the presence or absence of stress perception related to remote work, taking into account variables such as gender, age, and the presence of children.

However, it is important to acknowledge certain limitations of this study that should be addressed in future research. The primary data used in this study came from a crosssectional survey conducted in Spain during a specific period when telecommuting was mandated due to strict measures to combat the spread of SARS-CoV-2. The exceptional circumstances, such as the lockdown and the absence of children attending schools, may have intensified the challenges associated with adapting to remote work, potentially influencing perceptions of the impact of telecommuting on well-being. Therefore, a longitudinal approach would provide a more comprehensive understanding of how workers' perceptions evolve over time.

Additionally, it is crucial to recognize that this study focused specifically on the Spanish context, which had its own unique labor regulations and patterns of teleworking adoption prior to March 2020. Therefore, caution should be exercised when generalizing the findings to other regions or countries with different contexts. Nevertheless, the use of configurational methods can be valuable in conducting similar studies at various geographic levels, within specific organizations, or across different sectors of the economy, aiming to identify patterns associated with the perception of enablers and inhibitors of stress among teleworkers.

In conclusion, while this study offers valuable insights into the factors influencing the perception of telecommuting-related stress among Spanish employees, further research using a longitudinal perspective and encompassing a broader geographical scope is necessary to enhance our understanding of the complex dynamics of remote work and its impact on employee well-being.

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