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Abstract

Purpose

The objective of the present study is to develop and provide initial validation for the new E-Work Life (EWL) Scale. This measure assesses a range of theoretically relevant aspects of the e-working experience related to four main areas: job effectiveness, relationship with the organisation, well-being and work-life balance.

Design/methodology/approach

Structured item development is presented. Internal validity and reliability were tested on a sample of 260 e-workers (65% female, age range 25-74). Correlations of the EWL scale with a measure of General Health were tested on as subsample of 119 e-workers to provide initial evidence of construct validity.

Findings

Exploratory factor analysis supported a 17-item scale assessing four factors: Work-Life Interference, Productivity, Organisational Trust and Flexibility. Individual well-being was measured and a pattern of significant correlations against four factors as indicators of general health were found, including mental health and vitality.

Research limitations/implications

A new sample would confirm the strength of the EWL scale alongside further tests of validity. Coping strategies related to the scale would aid mapping of individual competencies for e-working to promote e-workers' self-management, management style and organisational policy.

Practical implications

The EWL scale helps organisations to evaluate and support the well-being of e-workers. It provides measurement on three levels: individual, supervisory and organisational, whereby practical strategies for improvement can be linked to the scale.

Originality/value

The EWL scale completes a gap in the research by providing a measure aiding organisations to evaluate and support e-worker well-being.

Keywords: remote e-working, teleworking, work-life balance, job effectiveness, well-being, scale development

Introduction

E-working remotely from the main organisational base using communications and computer technology has increased rapidly in recent years across many sectors. A wide variety of terms can be used to describe this phenomenon, for example, teleworking, telecommuting,

remote working, and more recently 'agile working', and therefore statistics worldwide refer to these different terms. In a recent report, covering ten European countries and five non-European countries, 17% of employees were engaged with using mobile technology, Information Communication Technologies (ICTs) and teleworking off site for work (Eurofound and ILO, 2017). The countries with the highest incidence of ICT usage outside of work included Japan, USA and Sweden. The UK where found to be medium users along with France and Belgium, whilst Germany, Italy and Spain were amongst the lowest (Eurofound and ILO, 2017).

Research in the USA, indicates that 3.7 million workers reported working from home at least half of their time and that Fortune 1000 companies already have mobile workers who spend 50-60% of their time away from their desks (Lister, 2016). A survey conducted by the WorldatWork (2013), a human resources association which undertakes research around employees' lives particularly in the North American context, showed that 88% of organisations offered remote e-working arrangements, in some form, to their employees. Workforce trends in the USA show an increase of 103% in 2016 since 2005 for remote e-working (Lister, 2016). In the UK over a quarter of the workforce is now accessing work from different locations (Eurofound and ILO, 2017; Gareis, 2002; Ruiz and Walling, 2005). The Office for National Statistics reported 4.2 million home workers in 2014, or 13.9% of those in work, this has increased by 11% since 1998 (ONS, 2014). In this paper the term used to describe e-working will be 'remote e-workers' and is described further in the next section.

E-working: definition and background

There are many different terms currently in use to describe e-working, including: 'e-worker' (mostly used in the UK), 'teleworking' or 'teleworker' and 'telecommuting' (North American in origin). All of these refer to the ability to work flexibly using remote technology

to communicate with the workplace. Latterly, 'agile working' has been added to the terminology (Gillies, 2011) referring to an organisation's capability to be flexible to meet changing market demands and adjusting working practices accordingly. The older term, 'teleworking' shares a number of similar aspects, including the use of technology for work, remote locations, with contractual arrangements between the employer and employee, and flexible working time (Eurofound and ILO, 2017; Haddon and Brynin, 2005). Sullivan indicates that 'the search for a universally accepted definition of telework, that is suitable for academic research, has been the source of some considerable contention and debate' (Sullivan, 2003, p. 158). Technology has developed to such a degree that a large amount of work can be completed at any time of day or place so the terminology may not be quite as important as the actual working practices.

In the context of this present research the term 'remote e-worker' is used to describe individuals who use technology to work remotely from the main group office at any time or place, as elicited from interviews of experienced e-workers conducted in a study by Grant *et al.* (2013). This definition was based on the work of Nilles (2007) who defines e-working as 'any form of substitution of information technologies (such as telecommunications and computers) for work-related travel: moving work to the workers instead of moving workers to the work' (p. 1). Further, he indicates that e-working emphasises the 'location independent aspect directly', whilst teleworking focuses more on 'travel substitution aspects' (Nilles, 2007, p. 1).

Remote e-working is usually associated with the positive effects of improved productivity, flexible approaches to work, a reduction in work-life conflict and an increase in job satisfaction, many of these being mediated by a reduction in commuting aiding a better balance between work and non-working lives (e.g. Baruch, 2000; Grant, Wallace and Spurgeon, 2013; Roloff and Fonner, 2010). However, in other studies, remote e-working has been linked with poor

well-being, workplace pressure, and communication overload, all of which can lead to over-working, which could subsequently affect job effectiveness and performance (e.g. Barber and Santuzzi, 2015; Grant *et al.*, 2013; Hartig, Kylin, and Johansson, 2007; Mann and Holdsworth, 2003; Roloff and Fonner, 2010). In a study of flexible and remote workers Kelliher and Anderson (2010) found that whilst job satisfaction and engagement to work was high in these types of workers, usually due to the additional control over their working hours and location that was available, they also identified that flexible and remote working methods can increase work intensification. They found support for three categories that may help to explain the causes for work intensification of these workers: 'imposed', 'enabled' and through 'reciprocation and exchange' (p. 98). The categories of 'imposed', i.e., needing to complete the same amount of work, even if working hours had been reduced and 'enabled', where found to be the most prolific in remote workers. However, there was also evidence of reciprocation, with a sense of obligation and gratitude (through social exchange theory) providing an explanation of why these workers choose to increase their time spent working. Kelliher and Anderson conclude that whilst remote working is instrumental in supporting organisational commitment, and increased willingness to expend more energy on work, the more negative aspects may not be viable in the longer term and need further investigation. This paper highlights the need for organisations to track the impact of flexible working practices on employee well-being.

Notwithstanding the pervasive diffusion of remote e-working and the research interest associated with it, to the best of our knowledge a measure aimed to assess the quality and complexity of e-working experience is not currently available. The benefits in developing such a measure will enable individuals to assess their continued work effectiveness and well-being associated with remote e-working but also for their supervisors and organisations to understand the impacts and therefore, what strategies can be developed to help support remote e-worker's

job effectiveness, work-life balance and well-being. The present study aims to fill this gap by presenting the newly developed E-Work Life (EWL) Scale, a measure assessing a range of theoretically relevant aspects of the e-working experience related to job effectiveness, relationship with the organisation, well-being and work-life balance. The development of this measure capitalises and is based on previous research by Grant *et al.* (2013), whereby eight dimensions of E-Work Life were postulated. Previous studies assessing the components of remote e-working are limited and available measures of e-working have tended to focus on *ad hoc* surveys (Duxbury, Higgings, and Mills, 1992; Maruyama, Hopkinson, and James, 2009) as opposed to validated scales. More recently several studies surveying the emerging area of *technostress* (Derks, van Mierlo, and Schmitz, 2014; Hung, Chen, and Lin, 2015) focus on pressure, motivation and sometimes well-being but they do not address these as a composite measure of all the factors related to remote e-working. A composite measure of remote e-working can provide an holistic view of e-working so that strategies may be developed across a number of key dimensions, rather than specifically relying on only one factor of the e-working experience. This is important as there can be interaction between the aspects of remote e-working, for example, developing a trusting relationship with your supervisor may increase the ability to manage your working hours more flexibly, which in turn may improve work-life balance. This wider perspective allows for the whole e-working experience to be explored and for synergies to be identified across dimensions and thus related to developing 'actionable' strategies.

Previous remote e-working studies have focused on a narrow definition of e-working, i.e., teleworkers (static workers usually working from home), not necessarily applicable to all types of e-workers, including those with multi-location mobility (Hislop and Axtell, 2007). To address this additional issue, the current study was designed to select a sample comprising a wider range of remote e-working that varied in relation to modes of work and different types

of technology. The EWL scale has been developed to be suitable in a variety of contexts and to enable e-workers and their organisations to understand issues related to e-working and to help them to identify areas for improvement, ensuring that the benefits of e-working are fully realised for the individual and the organisation. To this end, information derived from this scale may inform the development of effective coping strategies for all levels within the organisation to ameliorate e-working related demands.

In the following sections evidence for the four main areas of the e-working experience that underpin the development of the EWL scale is presented.

Main areas of e-working experience

Working effectively with technology continues to be a priority for many organisations (Madsen, 2003). However, developments in technology imply changes for employees in terms of working practices, behaviours, skills and competencies that are likely to be mirrored, as further detailed below, in job effectiveness, relationship with the organisation, work-related well-being, and work-life balance (Baruch, 2000; Kowalski and Swanson, 2005; Leung and Zhang, 2017). In a qualitative study of the psychological factors affecting remote e-workers Grant *et al*. (2013) concluded that there are three primary research areas (job effectiveness, work-life balance and well-being) and ten interview themes associated with these that could be considered as important for developing a measure of the e-working experience (E-Work Life) (p. 544). For this present study an additional research area 'relationship with the organisation' has been added that relates to the e-worker relationship with the organisation, to ensure the organisational aspects of e-working are covered in the new measure.

The ten interview themes from Grant *et al.* (2013) were further refined into eight dimensions for scale development purposes (see Table 1.). Whilst identifying dimensions is an important part of the scale development process they can be effectively mapped together into the four research categories, (the eight related dimensions are shown in brackets):

Job Effectiveness (e-working effectiveness, e-job effectiveness) relates to the skills, competencies and self-management needed to ensure the e-worker is setting work objectives and meeting performance targets.

Relationship with the Organisation (management style, trust) relates to the way in which the e-worker perceives their relationship with their manager, and the level of autonomy they receive whilst e-working.

Work-Life Balance (work-life integration, role management/conflict, managing boundaries) relates to the ability to integrate work and non-work demands effectively, to switch between differing roles and to manage boundaries between work and non-work activities.

E-Well-Being (e-well-being) relates to how e-workers positively manage their health and well-being whilst working remotely, and being aware of issues such as when to 'switch off' from e-working.

Explaining the over-arching concepts of the e-working experience (Grant *et al*., 2013) is therefore, a useful way to ground the scale development in evidence based practice (p. 536). These over-arching groupings allow the research areas to be fully explored.

Job effectiveness

Job effectiveness can be defined as 'the evaluation of the results of an employee's job performance' (Jex, 1998, p. 26). E-working practices and policies, as well as deploying new technologies creates a new working environment and may be associated with increasing employees' performance but as van der Meulen, (2017) found this is only the case 'when home has fewer distractions than the office' (p. 20). Organisations often focus on technology use to increase consumer experiences, and enable employees to use the latest means to improve their productivity and satisfaction with work. The way that technology is implemented for remote e-workers requires consideration of both the positive and negative impacts on them (Grant *et al.,* 2013). In particular, e-workers need to have or to develop specific skills and competencies

that fit with the e-working practices, particularly related to the capacity to self-manage their work, including but not limited to setting adequate goals and targets, and ensuring that standards are met (Grant *et al.,* 2013).

Relationship with the organisation

Kowalski and Swanson (2005) consider that critical to the success of remote e-working is good management support and a formal policy underpinned by relevant managerial training, including the use of informal and formal communication skills. Employer support for training, particularly of line managers and when the employee is new to remote e-working, can be effective in improving e-working practices. A focus on the long-term results and creating shared objectives alongside training can also provide support for these effects (van der Meulen, 2017). Policies in remote e-working can be key to the success of organisations adopting e-working; though it should be noted that individual preferences need to be considered when preparing such policies (Grant *et al.*, 2013).

Furthermore, the organisation's management team should consider the culture and the way that using remote technology effectively can impact the whole organisation. Embedding a culture of trust within the organisation is essential as remote e-working relies on supervision from a distance and the honesty of the employee (Kowalski and Swanson, 2005). Van der Meulen (2017) found in a survey of several hundred remote workers across four studies that maintaining trust can be difficult for remote e-workers but this can be improved by frequent communication and coaching. The importance of trust between employees and their managers, and the development of effective working relationships with remote e-workers have been found to be essential to effective e-working (Golden and Raghuram, 2010; Peters and den Dulk, 2003). Richardson (2010) interviewed 76 Canadian managers and employees in the technology sector and found that trust alongside communication and autonomy were crucial concepts in managing people working away from the traditional office. Interviewees highlighted the

importance of trust as a means to urge employees to go the extra mile, to be more productive and committed, and to express greater organisational citizenship behaviour. The downside of this may be related to the fact that many organisations now expect employees to use remote based information communication technology (ICTs), such as smart phones, to keep in touch with work both inside and outside of work time (Vernon, 2005). Indeed, Grant *et al.* (2013) found that ICT usage has become exacerbated by a global culture where work needs to be completed with business contacts across the world working different times, meaning that contact may be required at all times of day and night.

Work-life balance

Remote access to work via technology has played an important part in how organisations retain skilled employees who, for a number of personal or family reasons, would benefit from the flexibility to work remotely. However, there are negative impacts as shown by some studies into work-life balance and remote e-working (e.g. Hilbrecht, Shaw, Johnson, and Andrey, 2008), indicating that whilst remote working provides the ability to combine the dual role of personal and family commitments, this resulted in very little time for personal leisure activities. Furthermore, Kimberly and Eddleston (2017), in a qualitative study of home e-workers found that an inability to fully disengage from work can lead to increased family-to-work conflict, and importantly that remote workers based solely at home found it increasingly difficult to disengage and to work over hours, thus negatively impacting their family oriented roles.

Remote ICTs provide ease of access to work, however, what this means in terms of managing the boundaries between work and personal lives for e-working employees needs to be considered. Technology provides a spatial link between the work and home environment, and whilst e-working has been shown to have some positive effects for work-life balance, there are some aspects which can be considered to be negative (Grant *et al.*, 2011). For instance,

boundaries between working and personal life can become blurred with both flexi-time and flexi-place working. However, Kossek, Lautsch and Eaton (2006) found that remote e-workers who separated the boundaries between work and family and had control over where and when they worked reported positive individual well-being. Kossek (2016), develops the notion that workplaces are becoming boundary-less due to the 'always on culture' leading employees to be constantly 'on call' to answer work communications such as email, and that work-life balance is becoming fragmented as a result of these changes (p. 259).

However, the relevance of e-working goes beyond the home environment with several more recent studies finding that technology usage, and smartphones in particular, can interrupt non-working time, increasing stress levels and thus reducing the amount of time left for recuperation (Derks and Bakker, 2014; Derks *et al.*, 2014; Lee, Chang, and Cheng, 2014).

E-worker workplace well-being

Some of the adverse effects of e-working have been linked with poor well-being (e.g. Hartig *et al.*, 2007; Mann and Holdsworth, 2003). Although e-working practices have been found to alleviate work stressors, for example by avoiding meetings and interruptions, e-working can also lead to the intensification of work or over-work (Fonner and Roloff, 2010; Grant *et al.*, 2013; Kelliher and Anderson, 2010). Over-working is a risk factor for mental health problems (Bakker, Demerouti, Oerlemans, and Sonnentag, 2013; Sonnentag, 2003). Furthermore, studies have examined both the physiological and psychological outcomes for e-workers finding mixed results (e.g. Golden, Veiga, and Simsek, 2006; Hartig *et al.*, 2007; Lundberg and Lindfors, 2002; Mann and Holdsworth, 2003; Maruyama, Hopkinson, and James, 2009).

In addition, home is typically seen as a place of restoration, so undertaking work and home activities together in the same location may impact on well-being (Fritz and Sonnentag, 2006) and also reduce the recuperative effects of being at home (Hartig *et al.*, 2007). Kossek,

Lautsch and Eaton (2009) suggested that taking work home could harm the value of home as a place of personal respite and restoration. This is further supported by a study that investigated the role of recovery experiences and sleep quality as predictors of morning affect, and found that 'low psychological detachment from work during the evening was related to fatigue and high negative activation in the morning' (Sonnentag, Binnewies, and Mojza, 2008, p. 681; Braukmann, Schmitt, Ďuranová, *et al.*, 2017). Furthermore, Kinnunen, Feldt, Sianoja, *et al.* (2017) also found that moderate rumination combined with low attachment from work can lead to more negative well-being outcomes.

Social isolation has also been identified as a negative factor for e-workers (Grant *et al.*, 2013) and Bentley, Tai and McLeod *et al.* (2016) found that organisational support for e-workers can increase job satisfaction and well-being. This study in particular, highlights the efficacy of organisational guidance and support for e-workers.

The development of the E-Work Life scale

The main aim of the present study is to develop and provide an initial validation of a new scale that measures e-working experience. The process for scale development and item generation is described, and the results presented from a study on a sample of e-workers to test the internal and construct validity of the scale.

Scale development and item generation

The EWL scale was developed combining information gathered from the literature reviewed above and interviews with eleven remote e-workers (Grant *et al.*, 2013).

The first stage of the scale development process ensured that work-life balance and e-working were clearly defined from the literature. Eight theoretical dimensions (summarised in Table 1. and related to the four main research areas previously detailed) were elicited from both the literature review of e-working and work-life balance, and the previously researched interview themes (Grant *et al.*, 2013).

Table 1. about here

This created a framework for the item development of the new scale and ensured that the measure was consistent with e-working practices. Relevant existing measures linked to the constructs being studied were identified (i.e. Allen, 2000; Bohen and Viveros-Long, 1981; Campbell-Clark, 2001; Carlson and Frone, 2003; Carlson, Kacmar, and Williams, 2000; Kopelman, Greenhaus, and Connolly, 1983; Sanders, Lengnick-Hall, Lengnick-Hall, and Steele-Clapp, 1998; Stephens and Sommer, 1996; Thomas and Ganster, 1995) and were scrutinised to identify items to be adapted to be included in the EWL scale. However, items from existing measures generally did not supply enough context or meaning to relate directly to the specific characteristics of e-working, for example, 'when at home how often do you think about work-related problems' (Carlson and Frone, 2003, p. 533), this item does not add in the context of remote e-working, nor does it check if the individual knows when to 'switch off' from work related activities. Furthermore, there are no known scales that cover the organisational aspects related to remote e-working and in particular the important aspect of supervisor role models when working remotely. Hence new items were generated to cover the gaps and to add in relevant items that related specifically to the issues related to remote e-workers and covering the three levels of individual, supervisory and organisational. Overall, the initial version of the scale comprised of 104 items.

Item evaluation and reduction

The pool of 104 items was reduced through a series of preliminary analytical steps. Face validity was checked by an expert panel of five experts, as well as for content validity to refine the items included looking for similar content, checking they were consistent with the postulated dimensions and they were suitable for the e-working context. The members of the

panel had significant experience of remote e-working (5 years or more), two Professors with experience of Health and Occupational psychology, two further academics who were also Practitioner Psychologists and a professional working in the private sector. They reviewed the items for comprehension, fit and face validity, specific changes to items included re-wording items to ensure that they adequately covered the issues, including adding in new wording such as knowing when to switch off. Then, the Q-Sort method (Brown, 1996; Stephenson, 1953) was implemented on data gathered from a pilot study of 13 remote e-workers from a variety of work roles with frequent off-site use of technology for work. This enabled a further review of content and e-workers' preferences for particular items to be included, and provided the basis for an exploratory analysis and further checks of content and face validity, items were removed that resulted in low preferences. The pool of 104 items after face and content validity was checked by the expert panel reduced items to 76 and following this the Q-Sort study reduced the items to 39. Finally, the item number was further reduced to 28 items after preliminary correlational analysis (Grant *et al*., 2011).

Method

Participants

The E-Work Life scale (EWL) was administered to two independent convenience samples. The first sample comprised 250 respondents, 158 (63%) female, 92 male (37%), age range 24-54 years, from 11 organisations, across three sectors of varying work role types but mainly employed in professional and managerial roles, 183 (73%) of these worked full time. The majority of respondents had two or more years of e-working experience. The second sample included 219 participants, 145 (66%) female, 74 (34%) male, age range 25-54 years, of whom 86% (189) were currently employed by the University to which the first author is affiliated, the remaining 14% (29) were from other Universities, the NHS, voluntary organisations and the private sector, covering a wide range of professional roles varying from

lecturers, professors to project managers, 165 (77%) worked full time. The majority had more than two years of e-working experience and 14% (29) with over 10 years.

Exclusion/Inclusion criteria

The participants for the research were not pre-selected, but volunteered against the e-working definition i.e., *working remotely independent of location using technology, considering themselves to e-work as part of their normal working activities*. The specific amount of time they spent remote e-working was not a criterion.

Procedure

Data was collected using an on-line version of the E-Work Life survey. Participants received the survey link via email and consented to the study once they entered the link. Following completion they were asked to cascade the link to others using a snowballing effect to increase data collection. Participants were entered into a competition to win a tablet device if they completed the survey. Data was held anonymously online and participants advised that they could withdraw at any time. It took approximately three months to collate the responses in both studies. Both studies followed the same procedure with the exception for sample two as this was focussed on participants only working for the University. Ethical approval was gained from the University Ethics Committee to which the first Author is affiliated.

Measures

Personal information was collected in both samples for the key variables of gender, age, number of dependants (18 or under living in the household) and marital status. Contextual questions were included regarding the participant's ICT usage, job role, including management of teams and role autonomy. Participants were also asked open questions about their e-working and work-life balance in order to provide qualitative data to support the quantitative analysis.

The E-Work Life (EWL) scale items comprising the 28 items was measured on a five point Likert scale (from 1 = strongly agree to 5 = strongly disagree, with the option 6 = 'not

applicable' available to select). The first sample used a prior 39-item version of the scale, the additional items were reduced through preliminary study employing validation procedures (Grant *et al.*, 2011).

Health status and subjective well-being were assessed in the first sample by using three subscales of the *Health Survey SF-36 v2*, (Ware *et al.*, 2008). The SF-36v2 measures were used according to the publishers' requirements and included a variety of answer types. Specifically, in the present study the following subscales were considered:

General Health (GH) scale included five items, one asking the respondents to rate their general status on a 5-point scale ranging from poor to excellent, and the additional four asking the respondents to rate the truthfulness (from definitely true to definitely false) of health-related statements in relation to their own health status. Higher score reflects better evaluation of the health. Cronbach's alpha for the GH scale in the present study was .78.

Vitality (VT) scale included four items aimed at providing a proxy measure of subjective well-being. Respondents were asked to rate how frequently (from 'all of the time' to 'none of the time') in the last four weeks they felt full of energy. Higher score reflects greater vitality. Cronbach's alpha for the VT scale in the present study was .82.

Mental Health (MH) scale included five items referring to major mental health dimensions. Respondents were asked to rate how frequently (from 'all of the time' to 'none of the time') in the last four weeks they experienced mental health issues. Higher score reflects better evaluation of mental health. Cronbach's alpha for the MH scale in the present study was .80. These measures were not included in the second sample due to practical constraints.

Plan of analyses

In order to test the factorial structure of the 28 item E-Work Life scale (EWL) data from the two samples were merged. Prior to this, one item was excluded from further analyses (item 22: 'My line manager is a good role model for me in terms of managing my e-working and

work-life balance') due to a not fully consistent wording across samples. Respondents endorsing the option 'not applicable' to any of the items included in the scale were removed. This was done in order to guarantee that all respondents included in the factor analyses provided responses to the same set of items. Finally, respondents who did not provide response to any of the items (i.e., missing in all items) were excluded. As a result, the final data set comprises 260 respondents (65% female, 119 from the first sample and 141 from the second one). Their age was recorded in categories, distributed as follow: 4% between 18 and 24 years old, 29% between 25-34 years old, 30% between 35 and 44 years old, 26% between 45 and 54 years old, 10% between 55 and 64 years old, and finally 1% between 65 and 74 years old.

Factor analysis was implemented in Mplus 7.1 (Muthén and Muthén, 1998–2012). In line with the literature (Tanaka, 1993), a set of goodness-of-fit indices was considered to evaluate the factorial solutions. Specifically the following criteria were adopted to identify a good fit: (i) non-significant Chi-square; (ii) a Comparative Fit Index (CFI; Bentler, 1990) greater than 0.95; (iii) Root Mean Square Error of Approximation (RMSEA; Steiger, 1990) lower than 0.08 along with a non-significant test of close fit (Hu and Bentler, 1999); (iv) Standardised Root Mean Squared Residual (SRMR; Hu and Bentler, 1999) lower than 0.08. The reliability of the emerged factors was evaluated using Factor Scores Determinacies (Tabachnick and Fidell, 2013). Following this, the correlation patterns with the GH, VT and MH dimensions of the Health Survey SF-36 v2 were explored.

Results

The descriptive statistics for the items are presented in Table 2. Skewness and kurtosis were greater than 1 for at least some of the items, suggesting a non-normal distribution. Given this, Exploratory Factor Analysis was implemented using maximum likelihood estimation with robust standard errors (MLR) estimator. Although 3, 4 and 5 factor solutions were explored, for the sake of simplicity only the 4 factor solution is presented and discussed here, since it was

considered to be the optimal one in terms of theoretical and methodological interpretability of the results (data are available upon request). The 3 factor solution was not theoretical, clear and interpretable, and the 5 factor model had a very low number of indicators, hence the 4 factor model was selected.

Table 2. about here

The initial 4 factor solution, including the complete 27-item scale, results in an inadequate fit: Chi-square=435.389 (d.f.= 249; p<.001), RMSEA=.054 (C.I.: .045-.062; p=.23); CFI=.891; SRMR=.040. Items presenting loadings lower than .30 on each of the factors or loading on more than one factor (being the secondary loading greater than half of primary loading) were removed (Tabachnick and Fidell, 2013). The final solution including 17 items (see Table 2.) results in an excellent fit: Chi-square=83.604 (d.f.=74; p=.21), RMSEA=.022 (C.I.: .000-.043, p=.99), CFI=.99, SRMR=.024.

The first factor, having a Factor Determinacy score equal to .93, comprises items 4, 5, 6, 7, 16, 23, 27 and was then labelled 'Work Life Interference'. The second factor, having a Factor Determinacy score equal to .90, comprises items 8, 14, 15 and 25 and was then labelled 'Effectiveness/Productivity'. The third factor, having a Factor Determinacy score equal to .86, comprises items 2, 12 and 13 and was then labelled 'Organisational Trust'. Finally the fourth factor, having a Factor Determinacy score equal to 84, comprises items 10, 18 and 21 and was then labelled 'Flexibility.' The score for each EWL dimension was computed by averaging the corresponding items, recoded so that the higher the observed score the higher is the level of agreement with the statement.

Table 3. about here

Correlations were examined on the first sample (N=119), see Table 3. Findings were that work-life interference negatively correlated with general health (r=-.28, p=.003), vitality (p=-.34, p<.001) and mental health (r=-.39, p<.001); productivity and organisational trust positively correlated with both vitality (r=.20, p=.034 and r=.37, p<.001 respectively) and mental health (r=.27, p=.005 and r=.35, p<.001); finally, flexibility positively correlated with mental health (r=.22, p=.024).

Discussion

The research presented has initially validated a new scale to assess theoretically relevant aspects of remote e-working, this is rooted in previous literature by Grant *et al*. (2011) and Grant *et al.* (2013). The rationale for developing the E-Work Life (EWL) scale was to support organisations, individuals, and their supervisors to aid e-workers to develop strategies to support their well-being when working remotely. The EWL scale meets a gap in research in that no current scale exists to specifically measure employees' experience of their e-working, despite the increasing occurrence of these working practices worldwide. Eight theoretical dimensions were postulated corresponding to four main research areas: job effectiveness, relationship with the organisation, e-well-being, and work-life balance (see Grant *et al*., 2013 and previously for mapping). Twenty-eight items were initially included in the EWL scale with findings providing support for a 17-item reduced version of the measure, assessing four factors named: Effectiveness/Productivity (4 items), Organisational Trust (3 items), work related Flexibility (3 items), and Work-Life Interference (7 items). The first two factors correspond to the expected areas of job effectiveness and relationship with the organisation, specifically characterised in terms of trust; the third factor of work related Flexibility combined items originally referred to the same areas but characterised by the reference to flexible work arrangements, an additional asset of e-working practices. Finally the items developed within

the areas of e-well-being and work-life balance collapsed into a unique fourth factor of Work-Life Interference.

Findings further provide initial evidence and support to the relationship between perceived characteristics of e-working reported by employees and their health and subjective well-being. In particular, each of the four dimensions was significantly associated with an indicator of remote e-worker's mental health. Work-Life Interference, Productivity and Organisational Trust were also correlated with workers' vitality, a proxy of their subjective well-being. This means that the more e-workers consider that e-work supports their productivity and is conducted within a supportive and trustful organisation, the better is their self-reported mental health and vitality, and *vice versa*. On the other hand, the more e-workers report that e-work interferes with their non-working life, the worse their self-reported mental health and vitality, and *vice versa*. Furthermore, the more e-workers consider e-working to provide them with an adequate level of flexibility and autonomy, the better is their level of mental health. In terms of general health, the only dimension showing a significant relationship is Work-Life Interference. The most recent research advises that creating shared objectives and training can support e-workers (van der Meulen, 2017). In particular, the more e-workers consider their e-work to intrude upon their personal life the worse is their self-reported general health. This finding is supported by research that indicates e-workers find it harder to create boundaries between their working and non-working lives and therefore, can have a tendency to overwork as a result (Grant *et al.*, 2013; Bakker *et al*., 2013). Overall, these findings confirm the interplay between relevant characteristics of e-work and workers' mental health and subjective well-being, and provide support for a multi-dimensional measure such as the EWL scale.

It is acknowledged that the present study has some limitations, particularly in relation to the limited sample size and to the cross-sectional nature of the research. Future research

should replicate the results, and further test psychometric properties of the scale, exploring discriminant validity, confirmatory factor analysis and test-retest reliability, as well as testing the longitudinal impact of the suggested four dimensions on e-workers' health and subjective wellbeing. Notwithstanding this, the results are promising, suggesting potentially interesting theoretical and practical implications, and set the direction for future developments. Although findings substantially confirmed the relevance of the areas theoretically posited, a specific factor related to e-well-being was not identified. However, literature exploring well-being in e-workers may provide the need to consider a measure (e.g., Bentley, Teo, McLeod, Tan, *et al*., 2016 and Kinnunen, Feldt, Sianoja, *et al.*, 2017).

Measuring the success of e-working is important as employers seek to justify the cost savings of remote e-working and to capture the productivity gains, whilst sustaining employee well-being. This new scale will aid organisations to identify the barriers to effective e-working and therefore enable organisational guidance and policy to be developed that supports organisational well-being policies. It is important that the EWL scale is not only utilised to find problems but also to help organisations identify workable solutions. To this extent, this study has several strengths. Firstly, the scale is based on a thorough literature review of previous scales and a series of qualitative interviews (Grant *et al.*, 2013). Secondly, it has been generated adopting a quite broad definition of e-worker, making the scale suitable for a wide variety of organisational context and job roles. Finally, the new scale is internally reliable, meaning that sub scale and total scale scores can be used.

The new EWL scale provides a means for Human Resource (HR) professionals and academics to measure the components of remote e-working using technology on job effectiveness, relationship with the organisation, flexibility and work-life interference. The impact of technology on well-being, particularly in the context of the duty of employers to protect the health of employees, is becoming a critical issue for employers and employees,

ameliorating the effects of technology and 'switching off' from work becomes more prevalent. Research indicates that an increase in accessibility to work through technology usage, e.g., smartphones have increased the intensity of work and can now lead to increased stress levels (Derks and Bakker, 2014; Derks *et al.*, 2014; Lee, Chang, and Cheng, 2014). The scale could be employed to enable evidence-based strategies to effectively manage e-working practices, to allow for individuals to develop self-awareness and to consider self-management techniques. Further, the scale could provide a means for supervisors to consider their own practice and for senior management to put in place appropriate policies. The scale can therefore, be used to monitor e-workers' experiences and practices and may inform the design of intervention programmes aimed to promote specific coping strategies to support the "weaker" areas.

An area that would offer further significant benefits to HR professionals and employers would be to research further into individual differences including their use of personal coping skills. The development of a framework of work related competencies for employees, such as, being open to change, developing self-awareness, and for managers competencies in learning to trust, using coaching skills rather than trying to control employees could be tested in organisations. The EWL scale could be employed to identify areas within organisations for intervention. An example would be to develop a competency framework for individuals and their employers. Organisations could be more effective by introducing policies that indicate email etiquette and in particular, the need to understand others' preferences for working.

In conclusion, these results suggest that a new 17 item scale to measure the components of remote e-working is a timely addition and has many practical uses for individuals, HR professionals, and organisations. Through this study it has become apparent that well-being and the proliferation of technology supporting a culture that is 'always switched on' needs further research. In particular, how organisations can assess the impact of e-working and how policies and guidance can be effectively developed and related to appropriate training and

individual coping strategies. These actions will help to develop awareness and to identify both healthy and unhealthy behaviours for e-workers in the future.

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Table 1. Description of the eight postulated E-Work Life dimensions.

Area	**Dimension**	**Description**
Job effectiveness	E-working Effectiveness	Using skills and competencies, including self-management to be an effective e-worker.
	E-Job Effectiveness	Performing well as an e-worker, having appropriate technology and setting clear goals and targets to achieve a high work performance.
Relationship with the organisation	Management Style	Defined by the e-worker in relation to how they perceive effective management skills, e.g., the way in which a line manager or supervisor manages an e-worker by using management practices and communicates with the team.
	Trust	The level of autonomy and responsibility afforded to the individuals whilst e-working.
E-well-being	E-Well-being	Being able to positively self manage health and wellness whilst e-working, including curbing over-working and not continuing to think about work after hours.
Work-life balance	Work-Life Integration	The ability to integrate work and non-work demands effectively. Poor work life integration may lead to problems on other dimensions such as e-well-being.
	Role Management/Conflict	Being able to switch effectively between the different roles required, e.g., parent, worker, carer etc.

	Managing Boundaries	Being able to switch effectively between work and non-work activities. Setting clear boundaries e.g., for family members when e-working, or for work when completing non work tasks.

Table 2. Items descriptive statistics, factor loadings and factor correlations for the initial and final 4-factor solutions.

Items		Descriptive statistics				Factor loadings** Initial 4-factor solution				Factor loadings Final 4-factor solution			
		Mean	**Var.**	**Sk.**	**Kur.**	**F1**	**F2**	**F3**	**F4**	**F1**	**F2**	**F3**	**F4**
1	I know what it takes to be an effective e-worker	1.88	0.61	0.95	1.27	-0.03	0.18	0.21	0.22	Removed			
2	My organisation provides training in e-working skills and behaviours	3.20	1.45	-0.13	-1.04	0.03	0.09	0.50	-0.07	0.01	0.09	**0.49**	-0.04
3	Having flexible hours when e-working allows me to integrate my work and non-work life	1.92	0.90	1.21	1.15	-0.25	0.10	0.08	0.27	Removed			
4	My e-working takes up time that I would like to spend with my family/friends or on other non-work activities* (1)	3.09	1.53	-0.28	-1.26	0.73	0.13	-0.04	-0.02	**0.73**	0.08	-0.05	0.03
5	When e-working remotely I often think about work related problems outside of my normal working hours*	2.19	1.06	0.86	-0.20	0.62	0.05	0.03	0.22	**0.58**	0.03	0.05	0.10
6	I am happy with my work life balance when e-working remotely	2.34	1.15	0.86	-0.07	-0.71	0.13	0.02	0.09	**-0.70**	0.16	0.06	0.07
7	Constant access to work through e-working is very tiring*****	3.07	1.44	-0.17	-1.28	0.72	-0.14	0.09	0.01	**0.72**	-0.13	0.07	-0.04
8	When e-working I can concentrate better on my work tasks	2.10	0.96	0.81	-0.07	-0.04	0.92	0.02	-0.40	-0.12	**0.73**	0.01	-0.11
9	I can manage my time well when e-working	1.98	0.67	1.27	2.24	-0.33	0.35	0.03	0.06	Removed			
10	My supervisor gives me total control over when and how I get my work completed when e-working	1.93	1.05	1.31	1.23	-0.14	-0.01	0.16	0.39	-0.13	-0.05	0.05	**0.59**
11	I trust my line manager to advise me if I am not effectively performing whilst e-working	1.99	0.89	0.98	0.55	-0.03	0.09	0.41	0.19	Removed			
12	My organisation trusts me to be effective in my role when I e-work remotely	1.85	0.83	1.52	2.75	0.02	-0.01	0.74	0.00	0.01	0.00	**0.68**	0.07
13	I trust my organisation to provide good e-working facilities to allow me to e-work effectively	2.49	1.32	0.58	-0.78	-0.19	-0.03	0.66	0.01	-0.17	-0.01	**0.70**	-0.01
14	E-working makes me more effective to deliver against my key objectives and deliverables	1.93	0.77	1.05	1.03	0.01	0.80	-0.05	-0.09	-0.04	**0.82**	-0.02	-0.01

15	If I am interrupted by family/other responsibilities whilst e-working from home, I still meet my line manager's quality expectations	1.74	0.49	1.03	1.75	0.16	0.49	0.14	0.07	0.09	**0.43**	0.13	0.12
16	When e-working from home I do know when to switch off/put work down so that I can rest*****	2.75	1.52	0.45	-1.00	-0.49	-0.05	0.02	0.07	**-0.48**	-0.05	0.03	0.09
17	My children/family/friends understand that when I am e-working remotely from home I should not usually be interrupted	2.36	1.18	0.76	-0.48	-0.06	0.19	0.12	-0.01	Removed			
18	My work is so flexible I could easily take time off e-working remotely, if and when I want to	2.85	1.27	0.26	-1.12	-0.09	0.06	-0.08	0.37	-0.04	0.09	-0.05	**0.37**
19	E-working has a positive affect on other roles in my non-working life	2.37	1.06	0.72	-0.33	-0.53	0.36	0.05	0.08	Removed			
20	When e-working remotely I often think about family related and/or non work related problems*****	3.40	1.01	-0.53	-0.94	0.07	-0.36	0.00	0.29	Removed			
21	My line manager allows me to flex my hours to meet my needs, providing all the work is completed	2.00	0.68	1.41	2.91	-0.04	0.05	0.10	0.52	0.00	0.04	0.00	**0.75**
22	My line manager is a good role model for me in terms of managing my e-working and work-life balance	Dropped				Dropped				Removed prior to analysis			
23	I feel that work demands are much higher when I am e-working remotely*****	3.40	1.09	-0.87	-0.32	0.66	-0.02	-0.03	0.20	**0.64**	0.02	0.01	0.03
24	I am highly motivated to work past normal work hours when e-working*****	2.47	1.15	0.58	-0.76	0.48	0.40	0.04	0.08	Removed			
25	My overall job productivity has increased by my ability to e-work remotely/from home	2.12	0.82	0.97	0.71	0.14	0.67	-0.04	0.10	0.08	**0.60**	0.01	0.15
26	I have adapted to e-working by developing suitable skills and behaviours	2.10	0.68	0.93	0.86	-0.04	0.43	0.00	0.31	Removed			
27	My social life is poor when e-working remotely*****	3.62	1.23	-1.06	0.24	0.66	-0.02	-0.05	-0.01	**0.67**	-0.02	-0.05	-0.01
28	I know how to socialise using technology	2.43	1.06	0.82	-0.25	-0.16	0.10	0.01	0.20	Removed			
						Factor correlations				**Factor correlations**			
					F1	1.00				1.00			
					F2	-0.29	1.00			-0.15	1.00		

F3	-0.39	0.40	1.00		-0.35	0.28	1.00	
F4	-0.24	0.48	0.40	1.00	-0.25	0.30	0.39	1.00

Note: Var.=variance; Sk.=skewness; Kur.=kurtosis

*items that are reverse scored.

**The Factors are named:

F1 = Work-Life Interference, 7 items

F2 = Effectiveness/Productivity, 4 items

F3 = Organisational Trust, 3 items

F4 = Flexibility, 3 items

(1) Item developed from Carlson, Kacmar & Williams (2000)

Table 3. Correlations among EWL scale factors and Health Survey SF-36 v2 subscales

	Health Survey SF-36 v2 subscales		
EWL scale factors	General Health	Vitality	Mental Health
Work-Life interference	-.282**	-.343**	-.386**
Productivity	-.029	.202*	.268**
Organisational trust	.182	.368**	.347**
Flexibility	.022	.085	.215*

Note: * correlation is significant at the .05 level; ** correlation is significant at the .01 level