When workplace bullying goes online : construction and validation of the Inventory of Cyberbullying Acts at
Work (ICA-W)

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Abstract

There has been an increase in the use of Information Communication Technologies in the workplace. This change extends the scope of bullying behaviours at work to the online context. However, a generally accepted measure of workplace cyberbullying is still lacking. The purpose of the present paper is to construct and validate the Inventory of Cyberbullying Acts at Work, in order to contribute to this emerging field. Building on existing knowledge, we expected three types of cyberbullying behaviours to emerge in the work context: person related, work related and intrusive. First, the items of the scale were constructed and the three-dimensional structure of the scale was tested in two different samples. Then, the reliability and the convergent validity of the scale were assessed. Finally, we tested the predictive validity of the scale by assessing the impact of exposure to cyberbullying acts at work to individuals' mental well-being six months later. Our analyses confirmed the three dimensional structure of the scale. In addition, the scale was found reliable and valid. The construction of this scale offers an avenue for further research on cyberbullying in the work context.

1. Introduction

Information communication technologies (ICTs) are becoming an inherent part of people's working life. In Europe, the percentage of people working at least a quarter of their time with computers has increased from 39% in 2000 to 52% in 2010 (Korunka & Hoonakker, 2014, p. 15) – a number that is presumably even higher today. Besides the many advantages of online work, such as increased efficiency and flexibility (Hill, Miller, Weiner & Colihan, 1998), this new way of working also has the potential to give rise to a new form of workplace aggression – that is, workplace cyberbullying. Workplace cyberbullying refers to repeated aggressive online conduct with the intention to harm the victim (Tokunaga, 2010). This phenomenon has been receiving much attention in the school context, where it is stated to be a widely occurring form of aggression with victimization rates going up to 56.2% (Perren, Dooley, Shaw & Cross, 2010). Much less attention has been given to this form of online aggression in organizations. However, there is already some evidence that workplace cyberbullying is in fact present in the organizational context.

The studies looking into the phenomenon so far report varying victimization rates, going from 3.7% up to 46.2% (Farley, Coyne, Sprigg, Axtell & Subramanian, 2015; O'Driscoll et al., 2015). This is due to a lack of a generally accepted measure of workplace cyberbullying. Most of the studies on cyberbullying have been conducted in the context of schools (Berne et al., 2013). Consequently, the few studies that have examined cyberbullying victimization in the work context have either applied (a) youth cyberbullying scales (e.g., Brack & Caltabiano, 2014), (b) self-assessment, one-item measurements of cyberbullying at work (e.g., Baruch, 2005) or (c) adapted the most widely used offline bullying measurement, the NAQ-R (Einarsen, Hoel & Notelaers, 2009), to the online context (e.g., Privitera & Campbell, 2009). The first approach fails to address the specific context of work (i.e., work related negative online behaviours are unaccounted for). The second approach has been criticized for underestimating

the true rates of bullying because of individuals' reluctance to admit being subjected to these behaviours (Galanaki & Papalexandris, 2013). In addition, one-item measurements do not lend themselves to reliability testing. Finally, the latter approach fails to take into account the very specific characteristics of the online as opposed to offline environment (e.g., anonymity and viral reach; Dooley, Pyżalski & Cross, 2009).

We aim to fill the current gap in the literature by building and validating an Inventory of Cyberbullying Behaviours at Work (ICA-W). This measure is constructed after careful examination of the current workplace bullying and cyberbullying literature. In order to account for the shortcomings of the current cyberbullying scales, we follow the dominant approach in the workplace bullying literature by applying a behavioural experience approach when measuring workplace cyberbullying. That is, a list of negative online acts is presented. These acts are rated by individuals on frequency of their occurrence and victimization is determined by a predefined operational criterion. Usually either the criterion of one negative act per week over a period of at least 6 months is applied (Leymann, 1996) or the more conservative two acts criterion (Mikkelsen & Einarsen, 2001). This approach is argued to be more objective than self-labelling approaches as respondents' need for cognitive and emotional processing of information is reduced (Einarsen et al., 2009). In addition, the scale is based on a comprehensive definition of the cyberbullying construct and is specifically focused on cyberbullying victimization in the work context. That is, items are included which specifically assess negative online acts related to the work environment. Lastly, after reviewing the well-established cyberbullying at school literature, items are included which are specific for the online environment and tap aspects of e.g. viral reach and anonymity.

First, we define the concept of workplace cyberbullying and discuss its dimensionality, as this guides the scale and item construction. Next, we discuss the theoretical predictors and outcomes of workplace cyberbullying victimization, as well as related constructs. This guides our

selection of the relevant variables for establishing the congruent, discriminant and predictive validity of the ICA-W.

1.1 Defining characteristics and dimensionality of workplace cyberbullying

Workplace bullying is defined as repeated negative behaviour carried on over a period of time towards one or more individuals who cannot easily defend themselves (Einarsen, 2000). With regards to the relation between the offline and the online bullying construct, it has been argued that while frequency of negative behaviour is a necessary condition for offline bullying behaviour, this aspect decreases in importance in the online environment (Vandebosch & Cleemput, 2008). This is because an act, committed once on the part of the perpetrator, can cause on-going harm and exposure through online sharing and reposting (Dooley et al., 2009). Moreover, the online environment creates opportunity for the perpetrators to invade someone's private life. This refers to the intrusiveness of cyberbullying behaviours (D'cruz & Noronha, 2013). Lastly, an online context yields many opportunities for the perpetrator to remain anonymous (Staude-Müller, Hansen & Voss, 2012). This makes cyberbullying victims even more unable to react against negative behaviour, increasing their sense of helplessness (Wingate, Minney & Guadagno, 2013).

In the youth literature, cyberbullying has been defined as: "an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself" (Smith et al., 2008, p. 376). The conceptualization of youth cyberbullying resembles the workplace bullying literature. The aspects of repetition and endurance of negative behaviour and the powerlessness of the victim are reoccurring in both fields. However, in the work context, the aspect of intentionality by the perpetrator has been generally left out of the workplace bullying definitions because of the focus on the victims of this behaviour. So far, the few studies looking at the cyberbullying

construct in the workplace have taken over the youth cyberbullying definitions. However, recently, a definition has been proposed specifically tailored to the work context and accounting for the unique characteristics of the online environment. Following Vranjes, Baillien, Vandebosch, Erreygers and De Witte (2017), we define workplace cyberbullying as all negative acts stemming from working relationships and occurring through the use of ICTs that are either (a) carried out repeatedly and over a period of time or (b) conducted at least once but form an intrusion into one's personal life, having the potential to expose private information to a wide online audience.

Building on the existing literature, we propose that workplace cyberbullying consists of three different types of behaviour: (a) person related, (b) work related and (c) intrusive. The former two correspond with the distinction that is made in the workplace bullying literature (Einarsen, 1999). More specifically, person related and work related negative behaviours refer to acts that respectively target a person (e.g. gossiping) and make someone's job difficult to perform (e.g. withholding information). They are also represented in the most widely used measure of offline workplace bullying, the Negative Acts Questionnaire Revised (NAQ-R; Einarsen et al., 2009). These categories can easily be generalized to the online context. For instance, in their cyberbullying victimization subscale at school, Hinduja and Patchin (2010) refer to behaviours such as being made fun of online and receiving upsetting messages. Regarding work related behaviours, for instance, not sharing work related information online is a work related negative online act, given that it mirrors the offline bullying behaviour of withholding work related information. The latter component – intrusiveness – relates to behaviours that may be typically enacted in the online environment. More specifically, D'cruz and Noronha (2013) found that pervasiveness and boundarylessness of negative behaviour was an important theme in people's experience of cyberbullying at work. This relates to behaviours which invade someone's personal life and make individuals feel pursued. Given that new technologies are prevalent in

most aspects of our lives, both public and private, they create a constant, 24/7, availability of the victim, who cannot escape this negative behaviour (Slonje & Smith, 2008). In addition, new technologies can sometimes grant access to private information, previously unattainable in the physical context (Vranjes et al., 2017). These behaviours can be labelled as intrusive: even when only committed once from the perspective of the actor, they are invasive and can result into negative content being shared and reposted online countless times (Dooley et al., 2009). An example would be sharing embarrassing pictures online and hacking into personal information. Since this category is new and inherent to the online environment, it distinguishes cyberbullying behaviours at work from offline workplace bullying behaviours. Moreover, we argue that a measurement of workplace cyberbullying should include the three categories described above.

Hypothesis 1: Workplace cyberbullying consists of three distinct dimensions (i.e. person related, work related and intrusive), which contribute to an overall construct of workplace cyberbullying.

1.2 Measurement approach

Two common methods for assessing bullying at work are the self-labelling approach and the behavioural experience method (Nielsen, Matthiesen & Einarsen, 2010). The former relates to a one-item question, sometimes preceded by a definition of workplace bullying, in which the participant is asked whether he or she has been subjected to bullying behaviour at work. The latter refers to an inventory of various negative behaviours that may occur at work and can be considered as bullying. The participant then indicates the extent to which he or she has been subjected to these behaviours. The self-labelling method can produce psychological defence mechanisms, as people may not feel comfortable identifying themselves as victims of bullying (Magley, Hulin, Fitzgerald & DeNardo, 1999). It may also pose a significant threat to self-

esteem (van Beest & Williams, 2006). In contrast, respondents are more comfortable reporting being subjected to negative behaviour when the behavioural experience method is applied (Kokubun, 2007). Hence, the former method is more conservative. As a consequence, the two methods are often applied in conjunction. Previous studies did show that the two measurement methods are significantly correlated (e.g. Einarsen et al., 2009; Galanaki & Papalexandris, 2013; Simons, Stark & DeMarco, 2011). As our measure (i.e. the ICA-W) represents the behavioural experience approach, we expect it to be significantly correlated with a one-item measure of workplace cyberbullying.

Hypothesis 2: The ICA-W measure will be positively associated with a one-item, self-labelling measure of workplace cyberbullying.

1.3 Associated variables

Up to date, not much is known about variables associated with workplace cyberbullying. Personal factors, such as age and gender, provide mixed results with no clear trend both in the youth cyberbullying literature (Kowalski, Giumetti, Schroeder & Lattanner, 2014) and in the workplace bullying literature (Samnani & Singh, 2012). The same holds for personality characteristics in the work context (Aquino & Thau, 2009). In contrast, the workplace bullying literature has provided wide support for the work environment hypothesis (Einarsen, Raknes & Matthiesen, 1994; Leymann, 1996) claiming that workplace bullying stems predominantly from work related stressors. Studies have revealed that job related stressors (Balducci, Cecchin & Fraccaroli, 2012; Notelaers, De Witte & Einarsen, 2010), team related stressors (Baillien, Bollen, Euwema & De Witte, 2014) and organizational stressors (Baillien & De Witte, 2009; Coyne, Chong, Seigne & Randall., 2003) are associated with workplace bullying. Of these stressors, workload, role conflicts, role conflicts, job insecurity and autocratic leadership have received most empirical support (Salin & Hoel, 2010; Van den Brande, Baillien, De Witte,

Vander Elst & Godderis, 2016). It is plausible that the same holds for the online variant of this behaviour. In support, recent evidence by Gardner et al. (2016) shows that a poor work environment predicts both offline and online bullying. Finally, both in the youth (Modecki, Minchin, Harbaugh, Guerra & Runions, 2014) and the work literature (O'Driscoll et al., 2015), cyberbullying has been found to co-occur with offline bullying. That is, in most studies, victimized individuals report being subjected to both forms of negative behaviour.

Hypothesis 3: Workplace cyberbullying will be positively related to work related stressors of workload, role conflicts, job insecurity, autocratic leadership and interpersonal conflicts.

Hypothesis 4: Workplace cyberbullying will be positively and highly related to offline workplace bullying.

1.4 Outcomes of workplace cyberbullying

Workplace bullying carries a large cost for organizations. Studies have shown that outcomes such as organizational performance, culture, team effectiveness, job satisfaction and intention to leave – all of great importance for organizational effectiveness – are negatively affected by workplace bullying (Samnani & Singh, 2012). However, there are not many scientific contributions with regards to the outcomes of workplace cyberbullying. In the youth literature, cyberbullying has been linked to various negative effects including anxiety, depression, substance abuse, sleeping problems, suicide and physical symptoms (Mitchell, Ybarra & Finkelhor, 2007; Privitera & Campbell, 2009). Cyberbullying has also been linked to certain negative behaviours, such as absenteeism, dropping out of school and decreased performance (Beran & Li, 2007; Mitchell et al., 2007). In the few studies examining cyberbullying at work, cyberbullying has been found to predict reduced mental, physical and emotional well-being (Farley et al., 2015; O'Driscoll et al., 2015, Staude-Müller et al., 2012).

Hypothesis 5: Exposure to workplace cyberbullying will predict a decrease in individuals' well-being over time.

1.5 Overview of studies

For the validation of the Inventory of Cyberbullying Acts at Work (ICA-W), we follow the widely recommended steps for scale development (Hinkin, 2005; Worthington & Whittaker, 2006). That is, we depart from a well-defined construct, following the definition by Vranjes et al. (2017), and begin with a theory driven item generation process in order to develop the measure. Second, we collect data and perform an exploratory factor analysis, in order to test the dimensionality of the measure (Study 1, Hypothesis 1). Next, we assess whether this three factor structure can be replicated in a different sample by means of confirmatory factor analysis (Study 2). In addition, the internal consistency of the measure is assessed (Study 1 and 2). Finally, we investigate the validity of the scale by both looking at the association of our measure with similar and related constructs (i.e. convergent validity; Study 2, Hypothesis 2, 3 and 4) and looking at the predictive power of our measure over time (i.e. predictive validity; Study 3, Hypothesis 5).

2. Study 1

2.1 Sample

The data collection took place in four different organizations from various sectors (public and private). In total, 710 employees participated in the study, with a response rate of 32%. The participants had a mean age of 44 (ranging from 19 to 63) and 52% of them were male. The sample consisted mostly of highly educated employees: 46% university degree, 29% higher, non-university degree, 23% secondary school diploma, 1% primary school diploma and 1% no diploma. Most of them, that is 58%, indicated to use some form of ICTs at work for more than 30 hours a week, whereas no-one reported to never use any ICTs at work.

2.2 Procedure

After a careful inspection of the literature on offline workplace bullying, workplace cyberbullying and youth cyberbullying, we constructed a list of 16 cyberbullying acts at work. First, looking at items used in various youth cyberbullying scales (for an overview, see Berne et al., 2013), we made a list of items that were (a) most reoccurring in different scales, and (b) applicable to the work context. Second, we adapted items of the most widely used scale of workplace bullying (NAQ-R; Einarsen et al., 2009) to the online context, when possible, and added these to the list. Next, overlapping items were removed and similar items were combined into a single item. For parsimony reasons, we referred to general types of behaviours (e.g., *Rumours or gossips are being spread about you by means of ICTs*) as opposed to very specific occurrences (e.g., *Rumours are spread about you by means of ICTs, People gossip about you by means of ICTs, People talk behind your back by means of ICTs*). In addition, because technologies change rapidly, items were constructed without indicating specific forms of electronic communication (e.g., mobile phone, computer, etc.). In other words, we referred to ICTs (internet, mail, mobile phone, telephone, tablet, etc.) in general. An example is: *You are being insulted, threatened or intimidated by means of ICTs*. However, because e-mail is the most common form of electronic communication amongst workers (even more common than face-to-face communication; Wajcman & Rose, 2011), three items specifically referred to this means of communication. An example is: *Your e-mails are forwarded to third parties in order to harm you*. Of these items, six could be classified as person related, five as work related and five as intrusive.

The 16 items were first pretested in a sample of 20 working subjects and were presented to two experts in the field of youth cyberbullying who assessed their face validity. After this pre-test, five items were omitted because they could not be conceptually disentangled from other related constructs such as cybercrime (e.g., *Someone sends you a virus or a malware*) and cyber

harassment (e.g., *You receive e-mails with sexual or aggressive content*). The remaining 11 items (see Table 1) were used in the further data collection. All items were answered on a 5-point Likert scale with the following labels: never, one time, monthly, weekly, daily. These labels reflect the widely used labels within the workplace bullying and youth cyberbullying literature with the exception of the label "one time". However, the inclusion of this label is of importance, since it accounts for the fact that intrusive behaviours, such as sharing personal information online, do not necessarily require repetition in order to be categorized as cyberbullying (Dooley et al., 2009).

All participants were notified about the study by their employer. They were informed that their participation was voluntary and that they could withdraw from participating at any point. It was also stated that their data would be treated confidentially and would not be passed on to third parties. It was indicated that by continuing to the online questionnaire link, they consented to participating in the survey.

2.3 Analysis and results

2.3.1 Exploratory factor analysis

In order to investigate the underlying factor structure of the items, we conducted an exploratory factor analysis in IBM SPSS version 23. We applied one of the principal factor methods – principal axis factors – in SPSS for extracting the factor structure, because this method is well suited for data in which the assumption of multivariate normality is severely violated (Fabrigar, Wegener, MacCallum & Strahan, 1999). Also, since in social sciences some correlation between the factors seems obvious, an oblique rotation (oblimin with Kaiser Normalization) was performed (Worthington & Whittaker, 2006).. We follow the recommendation by Tabachnick and Fidell (2001), who cite a rule of thumb of .32 as a minimum required loading of an item, with 'crossloading items' being defined as items loading .32 or higher on two or

more factors. Combination of the Kaiser criterion (factors with eigenvalues greater than one) and the scree test was used to determine the number of factors retained (Conway & Huffcutt, 2003).

First, Kaiser-Mayer-Olkin (KMO) and Barlett test for sphericity were calculated to test the suitability of the data for factor analysis. The KMO was .78, and the Barlett test for sphericity was significant ($p < .001$), indicating that factor analytic procedures could be applied. The EFA yielded a three factor solution, explaining 58.46% of the common variance. One item was dropped because it did not significantly load on any of the extracted factors. The other retained items all loaded above .32 on their respective factors. In addition, the factor structure extracted by the EFA reflected the definitional dimensions of 'person related', 'work related' and 'intrusive' acts. One item – 'Your work is criticized publicly by means of ICTs' – displayed a small crossloading, loading significantly on the factors 'work related' (.55) and 'person related' (.32). With regard to this, according to statistical research, small cross-loadings allow constructs to be estimated using all of the relevant information present at the indicator level (Asparouhov, Muthén & Morin, 2015). In addition, their exclusion results in inflated factor correlations, modifying the meaning of the construct of interest. Given this evidence and because the crossloading in question just reached the predefined criterion of .32, we decided to provisionally retain this item for further analyses. Correlations between the scales occurred, which warrants the use of an oblique transformation. The highest correlation was between work related and person related cyberbullying ($r = .38$), while other correlations were lower ($r_{\text{person intrusion}} = .20$, $r_{\text{work intrusion}} = .05$).

2.3.2 Reliability

Next, we assessed the internal consistency of the scale. Cronbach's alpha exceeding .90 indicates excellent internal reliability; alpha between .70 and .90 indicates high internal

reliability; alpha from .50 to .70 indicates moderate internal reliability, and alpha below .50 indicates low reliability (Hinton, Brownlow, McMurray & Cozens, 2004). The 10 item scale was reliable (α = .71). Cronbach's alpha for the 'work related' dimension was .74, for the 'person related' dimension .53, and for the 'intrusion' dimension .53 – indicating moderate to high internal consistency of the subscales.

Table 1

Study 1: Descriptive statistics and factor loadings (EFA) of the preliminary items of the ICA-W

During the last six months, how often have you been subjected to the following acts by means of ICTs (internet, mail, mobile phone, telephone, tablet, etc.)?	Factor loadings			M	SD	Min.	Max.
	1	2	3				
1. Work Related 1. Your e-mails, phone calls or messages are ignored at work.	**.72**	.02	.07	1.25	0.58	1	5
2. Your e-mails are forwarded to third parties in order to harm you.	**.56**	.07	.04	1.09	0.36	1	4
3. Your work is criticized publicly by means of ICTs.	**.55**	.32	.04	1.15	0.47	1	5
4. Somebody is withholding e-mails or files you need, making your work more difficult.	**.61**	-.08	.02	1.18	0.50	1	5
2. Person Related 5. Rumours or gossips are being spread about you by means of ICTs.	.13	**.71**	-.01	1.05	0.26	1	5
6. You are being insulted, threatened or intimidated by means of ICTs.	.23	**.32**	-.15	1.01	0.11	1	2
7. Constant remarks are being made about you and your private life by means of ICTs.	-.03	**.65**	.07	1.01	0.10	1	2
3. Intrusion 8. Your personal information is hacked and used to harm you.	.21	-.06	**.78**	1.02	0.18	1	4
9. Somebody shares photos or videos of you on the internet to make fun of you.	-.12	.28	**.34**	1.01	0.09	1	2
10. Somebody takes over your identity.	.02	-.03	**.53**	1.00	0.05	1	2
% variance explained	31	15	12				

*Note. N = 710, *these items were removed because of low (<.32) and/or insignificant factor loadings*

2.4 Discussion

Together, the results of the exploratory factor analysis provided first support for the hypothesized three-factor structure of the ICA-W. However, many cyberbullying behaviours displayed low prevalence rates in our sample, which translated in moderated reliabilities. Consequently, we needed to replicate the findings in an additional sample in order to confirm the three-factor structure. Also, some intrusive acts were infrequently reported by participants, with only two subjects reporting that photos or videos of them were posted online (Item 9). Since evidence indicates that any ratio less than a minimum of three participants per item is inadequate (Velicer & Fava, 1998), we wanted to supplement this subscale with an additional item. Specifically, we wanted to construct a more broadly formulated item, that would encompass the general meaning of Item 9 together with some additional negative behaviours that may occur online, in order to increase the response rate for this item. Finally, we wanted to further investigate the psychometric properties of the ICA-W instrument.

3. Study 2

3.1 Sample

For the second study we collected data in two different organizations – one in the public and one in the private sector. In addition, an open link was distributed through snowballing technique. A total of 1650 participants filled out the questionnaire, of whom 100 via the open link. The response rate for the organizations was 43%. The participants were primarily from the public sector (92%). The response rate for the open link could not be assessed. The mean age of the participants was 42 (ranging from 18 to 69) and 46% were male. The sample consisted mostly of highly educated employees: 38% university degree, 29% higher, non-university degree, 30% secondary school diploma, 1% primary school diploma,1% no diploma

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and 1% other. Most of them, that is 61.1%, indicated to use some form of ICTs at work for more than 30 hours a week, whereas no-one reported to never use any ICTs at work.

3.2 Procedure

First, the subscale Intrusion needed to be supplemented with an additional item. As previously stated, online bullying distinguishes itself from its offline counterpart because online negative behaviour is pervasive and boundless (D'cruz & Noronha, 2013), the victim is always available (Slonje & Smith, 2008), and private information can become publicly shared and viewed countless times (Dooley et al., 2009).). This refers to the intrusiveness of this behaviour (Vranjes et al., 2017). In that respect, the following item was added: "*Personal information about you is shared online or distributed via messages to others*". Since technology is ever changing, this item was phrased broadly, encompassing different types of privacy invasive acts that would be harming to an individual.

First, we wanted to test whether the three-factor structure still holds in the new sample and whether this new item was a good addition to the (sub)scale. Next, we wanted to assess the reliability and construct validity of the new scale. For the convergent validity, we examined whether the constructs typically related to offline workplace bullying are also associated with our workplace cyberbullying measurement. We therefore selected some antecedents of workplace bullying that have received much evidence in the literature: workload, role conflicts, job insecurity and autocratic leadership (Salin & Hoel, 2010; Van den Brande, Baillien, De Witte, Vander Elst & Godderis, 2016). In addition, we wanted to inspect whether our workplace cyberbullying scale correlates significantly with a one-item, self-assessment measure of workplace cyberbullying. In the workplace bullying literature, these two types of measures are significantly correlated (e.g., Galanaki & Papalexandris, 2013; Einarsen et al., 2009; Simons et al., 2011). Finally, offline bullying is found to be highly correlated with cyberbullying, both in

the youth literature (Modecki et al., 2014) and in the working population (O'Driscoll et al., 2015). We therefore expected the ICA-W to be correlated with a workplace bullying measure.

Again, all participants were notified about the voluntary nature of the study and the confidentiality of their data by their employer. It was indicated that by continuing to the online questionnaire link, they consented to participating in this survey.

3.3 Measures

All the constructs in the study were measured using validated scales. For measuring workload, role conflicts, job insecurity and autocratic leadership, 5-point Likert-type response scales were used ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Workload was measured with three items (α = .88) from the Short Inventory to Monitor Psychosocial Hazard (SIMPH) developed by Notelaers, De Witte, Van Veldhoven and Vermunt (2007). A sample item is: "Do you work under time pressure?". Role conflicts were measured with three items (α = .79) from the Working conditions and control Questionnaire (WOCCQ) developed by De Keyser and Hansez (2000), with a sample item: "I get contradictory orders at work". We measured the quantitative aspect of job insecurity with a four-item scale (α = .89; Vander Elst, De Witte and De Cuyper, 2014). A sample item is: "I am insecure about the future of my job". Autocratic leadership (α = .74) was assessed with six items by De Hoogh, Den Gartog and Koopman (2004). A sample items is: "My direct supervisor does not tolerate divergent opinions once he has taken a decision".

For our one-item measurement of workplace cyberbullying, we first presented the participants with a definition, after which they were asked to indicate to what extent they have been subjected to this kind of negative behaviour in the past six months. Interpersonal conflicts and workplace bullying were measured with a 5-point response scale ranging from 1 (*never*) to 5 (*daily*). Interpersonal conflicts (α = .89) were assessed with two subscales – task and

relationship conflict – by Jehn (1995). A sample item for the task conflicts is: "How frequently are there conflicts about ideas in your work unit?". A sample item for the relationship conflicts is: "How much friction is there among members in your work unit?". Workplace bullying (α = .84) was measured with a short, nine-item version of the NAQ by Notelaers and Einarsen (S-NAQ; 2008). A sample item is: "Constant remarks are being made about your mistakes".

3.4 Analysis and results

3.4.1 Confirmatory factor analyses

The descriptive statistics of the different items, obtained with IBM SPSS version 23, are presented in Table 2. Having supplemented the Intrusion subscale with a new item, we assessed the fit of the three-factor model identified in Study 1 using confirmatory factor analysis (CFA) in Mplus 7.4 (Muthén & Muthén, 2015). We tested whether the three-factor solution – subscales representing work related, person related and intrusive cyberbullying behaviours – provided a good fit to the data. In addition, we conducted a second-order CFA to test whether or not the three factors could be placed under a general "workplace cyberbullying" factor. Because bullying variables produce highly skewed data (Einarsen et al., 2009), which was also the case for our data, maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square test statistic, both robust to non-normality (MLM), were used to examine the latent structure of the scale (Muthén & Muthén, 2015, p. 607).

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Table 2

Study 2: Descriptive statistics of the final items of the ICA-W

During the last six months, how often have you been subjected to the following acts by means of ICTs (internet, mail, mobile phone, telephone, tablet, etc.)?		M	SD	Min.	Max.
Work Related	1. Your e-mails, phone calls or messages are ignored at work.	1.34	.68	1	5
	2. Your e-mails are forwarded to third parties in order to harm you.	1.08	.36	1	5
	3. Your work is criticized publicly by means of ICTs.	1.12	.42	1	5
	4. Somebody is withholding e-mails or files you need, making your work more difficult.	1.18	.52	1	5
Person Related	5. Rumours or gossips are being spread about you by means of ICTs.	1.06	.31	1	5
	6. You are being insulted, threatened or intimidated by means of ICTs.	1.03	.22	1	5
	7. Constant remarks are being made about you and your private life by means of ICTs.	1.03	.23	1	5
Intrusion	8. Your personal information is hacked and used to harm you.	1.02	.20	1	5
	9. Somebody takes over your identity.	1.02	.19	1	5
	10. Personal information about you is shared online or distributed via messages to others*	1.03	.28	1	5

*Note. N = 1650, *new item, added in Study 2*

Following recommendations by Byrne (2010), multiple indices of goodness of fit of the CFA structural model were used: chi-squared divided by the degrees of freedom (χ^2/df), the comparative fit index (CFI), the Tucker–Lewis index (TLI), the standardized root mean squared residual (SRMR) and the root mean squared error of approximation (RMSEA). A model is considered to fit the data well when χ^2/df ≤ 4 and very good when χ^2/df ≤ 2 (Brooke, Russell, & Price, 1988), SRMR $\leq .08$, RMSEA $\leq .06$ (Hu & Bentler, 1999) and CFI and TLI $> .90$ or preferably $> .95$ (Byrne, 2010). In addition, in order to compare the non-nested models, Akaikes' information criterion (AIC) is reported. A lower value indicates a better fit of the model (Akaike, 1987), and a difference higher than 4 shows considerably more support for the model with the lower AIC (Burnham & Anderson, 2002).

To test for the most appropriate latent structure, five models were compared: (1) the expected three-factor structure (person related, work related and intrusive), (2) a two-factor model with work and person related behaviours collapsed into one factor and intrusion into another, (3) a two-factor model with items referring to intrusion and person related behaviours collapsed into one factor and work-related behaviours into another, and (4) an one-factor model in which all items loaded on one general latent factor. Inclusion of Model 2 refers to the distinction between the traditional bullying factors (i.e., work and person related) versus the newly introduced factor (i.e., intrusion). Model 3 pertains to the fact that intrusive behaviours also relate to the person as opposed to work. Model 4 is tested because different instruments in youth cyberbullying literature report a one-dimensional structure (e.g., Menesini, Nocentini & Calussi, 2011). Finally, we also tested (5) a second-order model in which the three factors (i.e., work related, person related and intrusion) were the indicators of a general cyberbullying factor. The error variances of items 1, 2 and 4 were allowed to covary, because all three items referred to the use of e-mail. Model 1 displayed a good fit to the data (χ^2/df = 2.01, RMSEA = .03, SRMR = .06,

CFI = .94, TLI = .90, AIC = 1963.11). The item '*Somebody shares photos or videos of you on the internet to make fun of you*' did not significantly load on the Intrusion factor and was omitted. All the remaining items had significant factor loadings ranging from .51 to 89, with the new item loading .60 on the factor Intrusion. The three factors correlated significantly ($r_{\text{work intrusion}}$ = .57, p < .001; $r_{\text{work person}}$ = .70, p < .001; $r_{\text{person intrusion}}$ = .47, p < .05). These results are represented in Figure 1. Model 2 did not have a good fit and fitted the data worse than Model 1 (χ^2/df = 3.01, RMSEA = .04, SRMR = .07, CFI = .86, TLI = .80, AIC = 2204.16). The same held for Model 3, which fitted the data worse than Model 1 and Model 2 (χ^2/df = 7.08, RMSEA = .07, SRMR = .07, CFI = .58, TLI = .40, AIC = 2956.12). Model 4 again had the poorest fit and fitted the data even worse than Model 2 (χ^2/df = 7.11, RMSEA = .07, SRMR = .08, CFI = .57, TLI = .39, AIC = 3073.35). The second-order Model 5 displayed an equally good fit as Model 1 (χ^2/df = 2.01, RMSEA = .03, SRMR = .06, CFI = .94, TLI = .90, AIC = 1963.11), fitting better than the alternative models. All factors – work related (.91, p < .001), person related (.76, p < .001) and intrusion (.62, p < .001) – loaded significantly on the second-order cyberbullying factor. Finally, the subscales – person related (α = .78), work related (α = .72) and intrusion (α = .78) – and the scale as a whole (α = .81), displayed high internal reliability.

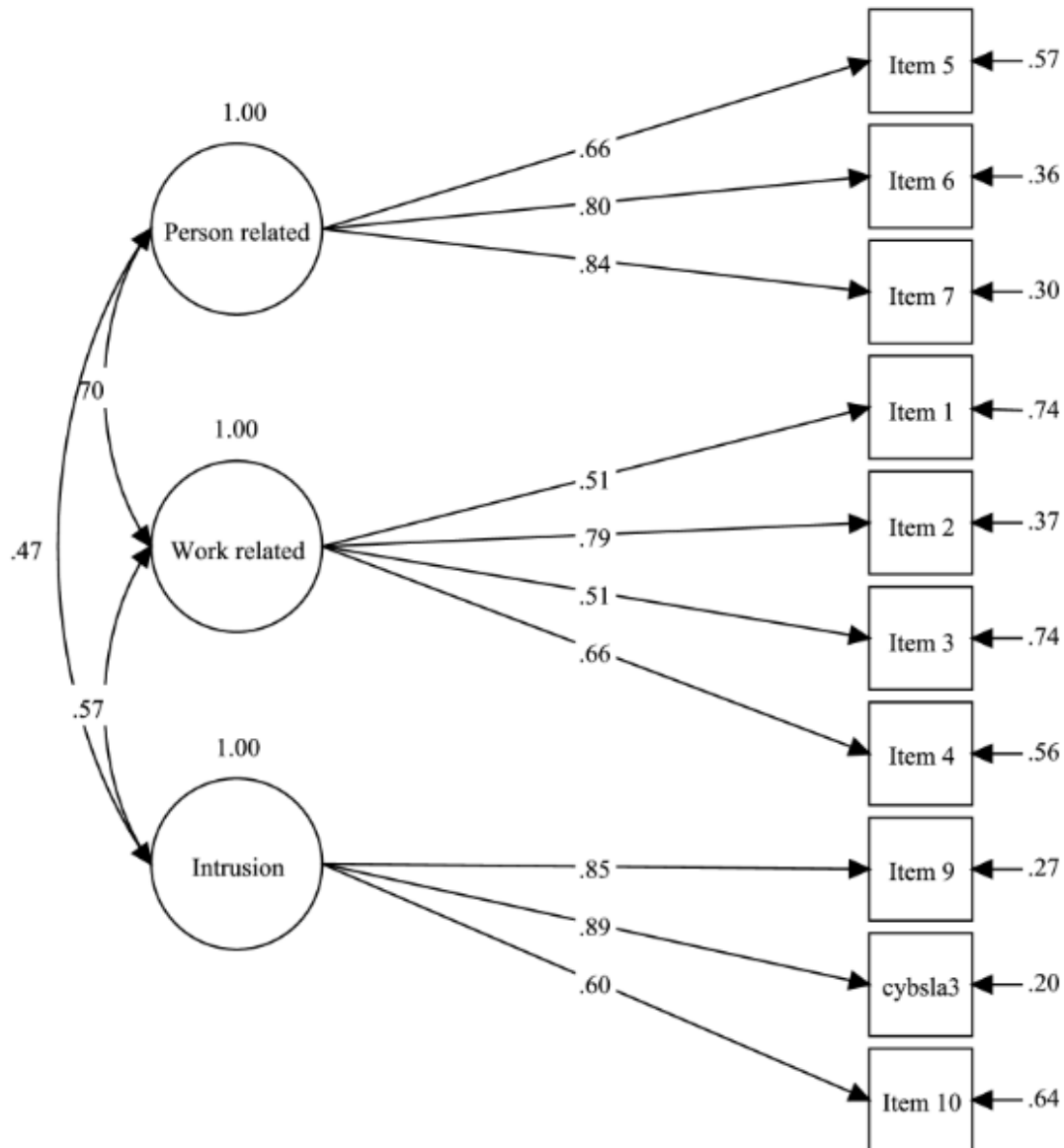Inventory of Cyberbullying Acts at Work

Figure 1. The confirmatory factor analysis (Model 1) of the ICA-W. Standardized results are reported. The error variances of items 1, 2 and 4 were allowed to covary.

3.4.2 Convergent validity

In order to test the convergent validity of the ICA-W, we calculated Pearson correlations between the ICA-W and the related constructs (workload, role conflicts, job insecurity, autocratic leadership, interpersonal conflicts and one-item measure of cyberbullying). Because of the non-normality of the ICA-W scores, we additionally report Kendall's Tau-b, which is a non-parametric correlation coefficient that does not require data to be normally distributed. These results are presented in Table 3. The ICA-W scale correlated significantly with all of the

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included variables. The correlations with workload and autocratic leadership were rather low. However, the same could be observed with regards to offline workplace bullying, measured with the validated S-NAQ measure. Moreover, ICA-W measure (i.e., operational measure) and the one-item measure (i.e., self-assessment measure) correlated .38 (Pearson's r), which is comparable with other workplace bullying studies (e.g., $r = .54$, Einarsen et al., 2009; $r = .38$, Galanaki & Papalexandris, 2013; $r = .21-.31$, Simons et al., 2011). It also correlated highly and significantly with the offline bullying scale, both by Pearson's r (.59, $p < .001$) and by Kendall's Tau-b (.39, $p < .001$), which aligns with the findings from the cyberbullying in school literature (e.g., Olweus, 2012; Olweus, 2013; Sourander et al., 2010)

Table 3

Correlations table of the ICA-W and the related constructs

Measure	1	2	3	4	5	6	7	8
1. ICA-W	–	.06**	.23**	.15**	.08**	.21**	.17**	.39**
2. Workload	.04	–	.22**	.03	.07**	.11**	.01	.06**
3. Role conflicts	.23**	.30**	–	.19**	.11**	.26**	.06**	.31**
4. Job insecurity	.18**	.04	.25**	–	.10**	.09**	.09**	.15**
5. Autocratic leadership	.06*	.09**	.15**	.13**	–	.08**	.09**	.13**
6. Interpersonal conflicts	.26**	.12**	.35**	.14**	.12**	–	.09**	.38**
7. One-item measure	.38**	.04	.09**	.14**	.10**	.15**	–	.15**
8. Workplace bullying	.59**	.04	.36**	.25**	.15**	.51**	.32**	–

*Note. Pearson Correlations and Kendall's Tau-b correlation coefficients are shown in the lower and upper diagonal, respectively; *p < .01 **p < .001.*

3.5 Discussion

The results of the analyses confirmed that ICA-W is a reliable and valid scale. First, after supplementing the subscale Intrusion with an additional item, the predicted three-factor structure was again confirmed, with the new item displaying a high and significant loading on the intended factor. In addition, all three subscales had good reliability indices. Furthermore, there was evidence that the three subscales can be combined into one general measure of workplace cyberbullying, which was also found reliable. Second, we found that the ICA-W was significantly associated with different workplace stressors (i.e., workload, role conflicts, job insecurity, autocratic leadership and interpersonal conflicts), confirming its convergent validity. It is notable that the correlations with the constructs of workload and autocratic leadership were rather low. However, the same trend was visible in our data with regards to the validated offline bullying scale (S-NAQ). Thus, it is possible that in our sample these two construct were not good predictors of bullying behaviour in general (i.e., offline and online). Finally, the ICA-W was significantly associated with the self-assessment measure of workplace cyberbullying and in the similar order of magnitude as in the offline bullying literature.

4. Study 3

4.1 Sample

For the third study, an additional wave of data was collected from the sample of Study 2, six months later. A total of 849 respondents participated at both time points (response rate of 58%, relative to T1, 95% public sector). The mean age of the participants was 42 (ranging from 20 to 69) and 46% were male. The sample consisted mostly of highly educated employees: 39% university degree, 32% higher, non-university degree, 26% secondary school diploma, 1% primary school diploma, 0% no diploma and 2% other. Most of them, that is 61.8%, indicated

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to use some form of ICTs at work for more than 30 hours a week, while no-one reported never using ICTs at work.

4.2 Procedure

There is strong evidence that bullying is associated with negative outcomes for individuals, whether youngsters or adults (e.g., Bowling & Beehr, 2006; Gini & Pozzoli, 2009). With regards to cyberbullying, we find evidence both in the cyberbullying at schools literature as well as in the cyberbullying at work literature, that this negative online behaviour negatively impacts individuals well-being (Coyne et al., 2017; Farley et al., 2015; Kowalski et al., 2014). Therefore, we examined the predictive validity of the ICA-W by testing the relationship between cyberbullying at T1 and mental well-being at T2.

4.3 Measures

The ICA-W scale had a good reliability in both waves ($\alpha_{T1} = .81$; $\alpha_{T2} = .72$). We measured mental well-being ($\alpha_{T1} = .82$; $\alpha_{T2} = .85$) with a short, five-item version of the Mental Health Inventory (MHI-5; Berwick et al., 1991). The respondents were asked to indicate on a 6-point scale ranging from 1 (*never*) to 6 (*always*) how they felt in the previous month. An example item is: "How often have you felt very happy in the previous month?".

4.4 Analysis and results

Before conducting the analysis, we first checked for measurement invariance of the scales measuring the core study variables: mental well-being and workplace cyberbullying. For both variables, we found a good fit of the baseline model, the invariant factor loadings model and the invariant thresholds model. This confirmed the scalar invariance of the scales, indicating that same constructs are measured over time. In addition, we assessed whether systematic dropout of respondents could have affected the results. We performed a logistic regression analysis in IBM SPSS version 23 to test whether participation at both waves (N = 849) versus

dropout after the first wave (N = 512) was predicted by the core study variables (i.e., exposure to workplace cyberbullying and mental well-being). We found that the Chi-square, $\chi^2(2) = 2.01$, $p = .36$, did not reach significance. Hence, dropout was not predicted by the core study variables.

A cross-lagged panel analysis was used to assess whether exposure to cyberbullying acts at T1 (i.e., ICA-W as a whole) was associated with mental well-being at T2. The structural model was fitted using Mplus 7.4 (Muthén & Muthén, 2015). Because of the skewness of cyberbullying scores, we ran 10 000 bootstrap samples to obtain 95% confidence intervals (CI) of the path coefficients (Efron & Tibshirani, 1993). The standardized results are presented in Figure 1. The structural model fits the data well ($\chi^2 = 30.97$, $df = 3$, $p < .001$, RMSEA = .10, SRMR = .04, CFI = .97, TLI = .94). The chi-square model fit statistic is reported, however, it should be noted that in the case of non-normal data, this statistic is inflated and therefore not reliable as a fit indices (Barrett, 2007). The autoregressive paths, together with the cross-lagged path were all significant. With regard to the cross-lagged path, we found that exposure to cyberbullying T1 significantly predicted a small decrease in mental well-being T2 ($\beta = -.06$, $p < .05$), with bootstrapped 95% CI of the path coefficients not containing zero (-0.53, -0.03).
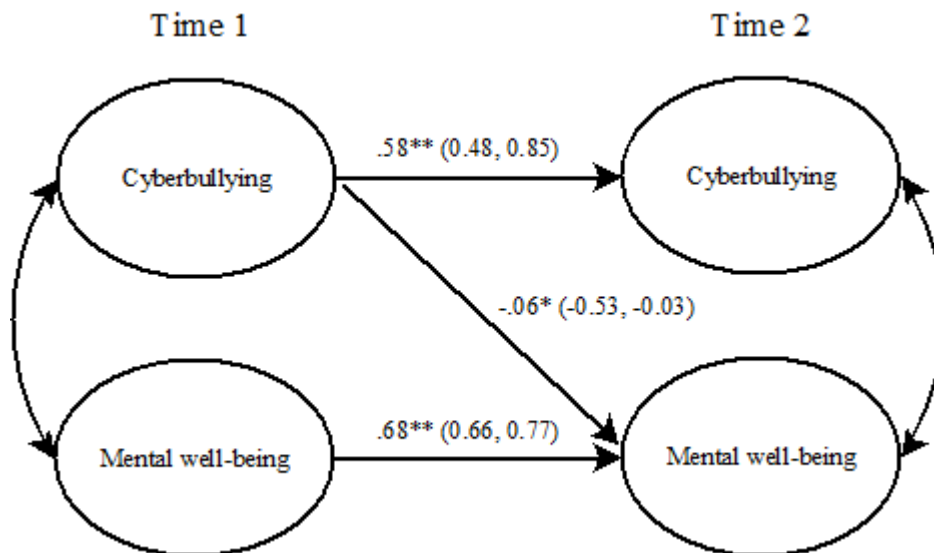
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Figure 2. Cross lagged panel model with standardized regression coefficients testing the effect of cyberbullying on mental well-being. Bootstrapped 95% confidence intervals are reported in parentheses. *p < .05, **p < .001.

4.5 Discussion

Cyberbullying at work and in schools has been shown to have a negative impact on individuals. We therefore assessed whether ICA-W scores would predict a change in individuals' mental well-being across time. The results of Study 3 provided support for the predictive validity of the ICA-W scale. That is, exposure to cyberbullying acts predicted a small but significant decrease in individuals' mental well-being six months later.

5. General Discussion

5.1 Main findings

It is notable in the literature that the phenomenon of workplace cyberbullying has not received as much attention as its offline counterpart. However, recent studies suggest that cyberbullying is in fact present in organizations, which underlies the importance of correctly assessing this phenomenon. The aim of this study was to construct a psychometrically sound, yet compact, instrument for measuring cyberbullying victimization in organizations – the ICA-W. To achieve this goal, we combined knowledge from the workplace bullying as well as the youth

cyberbullying literature in both constructing and validating the scale. The results of Study 1, 2 and 3 jointly provided evidence of good reliability and convergent and predictive validity of the ICA-W instrument. That is, the three-factor structure – work related acts, person related acts and intrusion – was confirmed in both Study 1 and 2 and was found to fit the data better than all alternative models. In addition, the analyses from Study 2 showed that the three factors could be taken together to represent an overarching cyberbullying construct and that the three subscales and the scale as a whole were reliable. In addition, the ICA-W scale was further found to be significantly related to different workplace stressors found to predict offline bullying behaviour at work (i.e., workload, role conflicts, interpersonal conflicts, autocratic leadership, and job insecurity), to the workplace bullying scale (S-NAQ) and to the one-item measure of workplace cyberbullying. Furthermore, Study 3 also showed that ICA-W scores could significantly predict change in mental well-being over time.

5.2 Strengths and limitations

Some strengths and limitations of the study need to be addressed. A strength of this study is that we applied robust, non-parametric techniques for scale analysis and validation that work with non-normal data. This has often been overlooked in previous studies on workplace bullying and adds to the robustness of the results. In constructing and validating the scale, we conducted three different studies and tested the scale structure and fit in two different samples, one representing a variety of sectors and one consisting of predominantly public sector workers. Lastly, we collected two-wave data and performed a full panel, cross-lagged analysis with bootstrapped confidence intervals in order to test the predictive validity of the scale. Again, this analysis is often lacking in validation studies.

A limitation of this study is that the sample from Study 2 and 3 was mostly representative for the public sector, limiting the generalizability of the findings. However, the structure of the

scale was confirmed in two different samples (Study 1 and 2), representing both the public and the private sector. In addition, there is no reason to believe that the association between workplace cyberbullying as measured by the ICA-W and workplace stressors and mental well-being would be less strong in other samples. On the contrary, we believe that given the characteristics of the public sector (i.e., older employees, working less long hours, and having more job security; Millard & Machin, 2007), the relationship between ICA-W and workplace stressors would be even stronger when measured in a more balanced sample of public and private sector employees.

Another limitation is the low occurrence of certain cyberbullying behaviours, especially regarding the dimension intrusion, which constrained the variability in our data and the power of our analyses. Despite this limitation, we were still able to observe meaningful relationships in the data, which further validates our findings. Also, it should be noted that we did not collect data in this sample regarding similar online constructs such as cyber aggression and cyber incivility. Cyber aggression relates to all intentional and harmful act online (Grigg, 2010). It is therefore a broader construct of online negative behaviour than cyberbullying. Cyber incivility, which is online behaviour that violates workplace norms of mutual respect (Lim & Teo, 2009), refers to a mild form of negative online behaviour, that does not require the negative behaviour to be intentional, repeated or harmful. However, we did include an offline bullying scale as a related construct, since research has shown that these two types of bullying are often related (Modecki, Minchin, Harbaugh, Guerra & Runions, 2014).

Lastly, an important issue that needs to be addressed is the highly skewed distribution of workplace bullying (Einarsen et al., 2009; Nielsen, Notelaers & Einarsen, 2011; Notelaers & Einarsen, 2013). The same was applicable to our measurement of cyberbullying at work. To account for this, we applied various techniques throughout our different studies that are suited for data in which the assumption of multivariate normality is violated. In Study 1, we applied

the principal axis factors method in SPSS for extracting the factor structure (Fabrigar, Wegener, MacCallum & Strahan, 1999). In Study 2, we used the maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square test statistic for assessing the latent structure of the scale (Muthén & Muthén, 2015, p. 607). In addition, when testing for convergent validity, we reported the non-parametric correlation coefficient, Kendall's Tau-b (Bonett & Wright, 2000). Finally, when testing for predictive validity in Study 3, we applied the bootstrapping procedure (Carpenter & Bithell, 2000). Also, there has been a long-standing controversy regarding applying parametric test to ordinal, Likert scale-data. However, statistical evidence suggest that parametric tests are generally more robust than nonparametric tests, even when certain statistical assumptions, such as a normal distribution of data, are violated (Norman, 2010).

5.3. Future studies

We have developed and validated the ICA-W measure, which we believe will provide great value to understanding the cyberbullying construct in the work context. However, as this is still a relatively new construct, more research is needed to better understand this negative phenomenon at work.

First, given the novelty of this construct and the low prevalence rates of certain acts in our samples, future research could test the ICA-W scale in a variety of organisational contexts in order to confirm the findings of our three studies. Next, it would be recommended to incorporate similar online constructs, such as cyber aggression and cyber incivility, when testing the ICA-W in order to establish the incremental validity of this measure. In addition, since cyberbullying is very prevalent amongst youngsters (Kowalski et al., 2014) and since jobs characterized by high levels of computer work are associated with higher violence risks (van den Bossche, Taris, Houtman, Smulders & Kompier, 2013), studies on cyberbullying at work should consider

focussing on young employees working in high-tech sectors. Finally, as our own findings pointed out, there was a weak relationship between our cyberbullying measure and the stressors workload and autocratic leadership. This goes against empirical evidence from the workplace bullying literature (Salin & Hoel, 2010; Van den Brande et al., 2016). One possibility is that cyberbullying could be somewhat differently related to work stressors than its offline counterpart. Future empirical studies should therefore tap into the association between online and offline bullying and their potentially distinctive predictors. Finally, recently the workplace cyberbullying measure (WCB) was developed and validated (Farley, Coyne & Axtell, 2016). While the aim of both WCB and the ICA-W is to measure the cyberbullying phenomenon at work, some differences can be pointed out. The WCB is a more lengthy scale (17 items) with a single-factor structure. We believe that the ICA-W scale adds to this instrument given that it enables parsimonious testing of the cyberbullying phenomenon and allows different types of negative online acts to be differentiated. However, future studies should examine the value of both scales in different contexts.

5.3 Practical implications

From a practical standpoint, the ICA-W offers the opportunity to evaluate cyberbullying in organizations efficiently through a parsimonious 10-item measurement instrument. In other words, because of its compactness, this scale is well suited for inclusion in general questionnaires in addition to other constructs of interest. The ICA-W enables a quick and easy evaluation of cyberbullying occurrence in the workplace without sacrificing psychometric rigor or limiting the analysis to one narrow dimension of this construct. It can be used either as a general instrument to assess the occurrence of cyberbullying behaviour at work or to tap into different types of cyberbullying behaviours that may occur – work related, person related and intrusive. With this scale, HR practitioners and researchers interested in the psychosocial well-being at work can assess whether negative online acts at work are present and whether

employees are cyberbullied. It is suggested that online negative acts should either occur frequently and during a longer period of time or be performed once but form an intrusion into someone's life in order to be classified as cyberbullying (Vranjes et al., 2017). Therefore, we suggest that practitioners or researchers use this guideline for classifying employees. More specifically, we suggest that people reporting at least two negative online acts (i.e. the two act criterion; Mikkelsen & Einarsen, 2001) on a frequent and long lasting basis should be categorized as cyberbullied. However, we also suggest that if one of these acts is intrusive, an one-time occurrence of this act in combination with a second one-time intrusive or frequent person or work related online act is enough to classify someone as cyberbullied.

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