Short-term trajectories of workplace bullying and its impact on strain: A latent class growth modeling approach

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For publication in Journal of Occupational Health Psychology

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Acknowledgements: This research was supported by grant PSI2017-83465-P by the Spanish Department of Science and Innovation (Ministerio de Ciencia e Innovación).

Abstract

The aim of this weekly diary study was (1) to identify trajectories of workplace bullying over time and (2) to examine the association of each cluster with strain indicators (i.e., insomnia and anxiety/depression). A sample of 286 employees during four weeks of data was used (N occasions = 1144). Results of latent class growth modeling showed that three trajectories could be identified: a non-bullying trajectory, which comprised 90.9% of the sample, an inverted U trajectory, and a delayed increase bullying trajectory, both with 4.2% of the participants. We found a significant interaction between time and trajectories when predicting insomnia and anxiety/depression, showing each strain a differential pattern with each trajectory. It seems that the negative effects on insomnia are long-lasting and remain after bullying has already decreased. In the case of anxiety and depression, when bullying decreases strain indicators also decrease. In this study, by examining trajectories of bullying at work over time and their associations with strain, we provide new insights into the temporal dynamics of workplace bullying

Keywords: Trajectories, Workplace bullying, Insomnia, Anxiety/Depression, Time.

Workplace bullying refers to repeated and enduring negative acts, directed towards one or more targets who typically end up unable to defend themselves (Einarsen et al., 2011). Exposure to bullying behaviors has been systematically associated with several strain indicators, such as anxiety and sleep problems (e.g., Nielsen & Einarsen, 2012). Most of these findings have been found using longitudinal survey designs, paying little attention to short-term dynamics in bullying behaviors. Also, most longitudinal research has not taken into account different patterns of change over time between bullying and its cross-lagged effects. These are significant gaps in the workplace bullying field.

In the present multilevel weekly diary study, we explore the association between workplace bullying and strain indicators over time (four weeks). Specifically, we study insomnia and anxiety-depressive symptoms as possible outcomes of exposure to bullying behaviors. The term insomnia refers to the presence of problems for initiating sleep, frequent nocturnal awakenings, prolonged periods of wakefulness during the sleep period, and impaired daily functioning (Fernández-Mendoza et al., 2012). Anxiety-depressive symptomatology comprises manifestations of nervousness, worries, loss of interest, and depressive mood. It has been pointed out that these symptoms tend to occur at the same time, showing a high level of comorbidity (Andrews et al., 2001). We focus on these outcomes for several reasons. First, sleep problems and mood disorders are the most common immediate or short-term responses to bullying situations (e.g., Nielsen & Einarsen, 2012). Second, many studies have shown that insomnia is a predictor for the later development of psychiatric disorders (Breslau et al., 1996). Therefore, we analyze how these strain indicators evolve over time to better understand the bullying-strain association.

With the current research, we aim to make two relevant contributions to the existing literature. First, our research examines the short-term consequences of workplace bullying. Although several studies have explored the longitudinal effects of bullying, most of them have relied on two measurement waves with time lags ranging between one and two years (Nielsen, & Einarsen, 2018). Only recently, some studies have employed a shorter time lag using weekly (Tuckey & Neall, 2014) or daily (Hoprekstad et al., 2019; Rodríguez-Muñoz et al., 2017) diary designs. We assumed that a time lag of four weeks seemed reasonable for detecting the effects of interest between bullying and psychological strain. Unfortunately, there are no concrete recommendations about appropriate time lags when studying the development of strain indicators, and therefore no strong basis for decisions. In the literature, there are already studies that employ immediate (i.e., daily) and long (i.e., 1 year or more) time lags. However, what is still missing in bullying research is the use of a weekly or monthly time lag. There is evidence that changes in strain indicators due to bullying may occur quickly (e.g., Tuckey, & Neall, 2014). Moreover, it has been shown that short time lags avoid common method bias, as well as interim (e.g., interruptions) and attrition effects (Dormann & van de Ven, 2014). Therefore, following the recommendations of Trépanier et al. (2016), we decided to use a weekly design to better understand the short-term dynamics of bullying and its effects. We consider that adopting a less common time lag may increase existing knowledge about how long it takes for bullying consequences to emerge. In this sense, little is known about the initial phases of the process of bullying and its effects (Neall, & Tuckey, 2014; Nielsen, & Einarsen, 2018). This is especially important since increasing the knowledge about the initial stages of the process may help to identify patterns and plan prevention programs.

Second, our research focuses on temporal changes in workplace bullying patterns. Previous longitudinal research has focused mainly on long-term effects, but few have been concerned with change and temporal patterns in this process. For this aim, diary data are suited to explore individuals' changing experiences over time. However, as pointed out by McCormick et al. (2020), several studies have failed to incorporate specific temporal relationships in their hypotheses, and thus basically mirror "*between-person findings using a within-person design*" (p. 3). Among the few exceptions in bullying that included temporal hypotheses is the recent study of Hoprekstad et al. (2019). We extend bullying research by examining weekly change patterns and thus answer calls to incorporate time in the study of organizational phenomena (Gabriel, et al., 2019; Shipp, & Cole, 2015; Vantilborgh et al., 2018).

Theoretical Background

Existing research has demonstrated the detrimental effects of exposure to workplace bullying behaviors. For example, empirical evidence has shown the negative effect of bullying behaviors on target's sleep. Several studies on workplace bullying have pointed to an association between exposure to bullying behaviors and poor sleep quality (Lallukka et al., 2011; Notelaers et al., 2018), including increased sleep onset latency (Niedhammer et al., 2009) and increased amount of awakenings (Hansen et al., 2016). In this sense, in a recent meta-analysis, Nielsen et al. (2020) examined sixteen studies and found that workplace bullying was a significant risk factor for developing and maintaining sleep problems in all the studies. In addition, empirical evidence has also found that bullying is associated with decreased psychological well-being indicators, such as post-traumatic stress symptoms, depression, and anxiety (Nielsen & Einarsen, 2018). Indeed, meta-analytical studies are showing that bullying is strongly

associated with anxiety and depression (Nielsen & Einarsen, 2012). In a more recent meta-analysis, it was found that the most reliable strain indicator associated with bullying was depressive and anxious symptomatology (Verkuil et al., 2015).

Taken together, cross-sectional and longitudinal studies have shown that bullying leads mainly to sleep disturbances and mood disorders. These findings have been traditionally analyzed through the lens of Conservation of Resources Theory (Hobfoll, 1989, 2001). The fundamental tenet of COR theory is that people strive to gain, keep, and protect their resources. Resources are defined as "*anything perceived by the individual to help attain his or her goals*" (Halbesleben et al., 2014, p. 5). These can be classified as those entities that are either centrally valued in their own right (e.g., self-esteem, energy, health) or act as a means to obtain centrally valued ends (e.g., money, social support). In our case, and following Halbesleben et al. (2014) classification, insomnia can be conceptualized within the category of energetic resources (an indicator of lack), whereas anxiety and depression can be classified as a key resource (p. 5). Mood is categorized as a key personal resource because facilitates the mobilization of other resources and makes the use of other resources more effective (ten Brummelhuis & Bakker, 2012).

According to COR, psychological stress occurs when individuals are (1) threatened with resource loss, (2) lose resources, or (3) fail to gain resources following resource investment. A fundamental principle of COR theory is that resource loss is more salient than resource gain because it represents a threat to survival. In this vein, exposure to negative behaviors is related to resource loss (i.e., higher strain). Individuals who have gone through a process of bullying are thus more likely to have experienced significant resource depletion (i.e., anxiety/depression and insomnia). Loss spirals are theorized to occur when individuals do not have sufficient resources to stop

further resource loss, or to protect remaining resources (Hobfoll, 1989). Further, according to the second COR corollary, loss cycles are more powerful than resource gain in magnitude but also tend to affect people more rapidly and at increasing speed over time (Hobfoll et al., 2018). In line with this reasoning, individuals who experienced resource loss (i.e., insomnia) would be less capable of stress resistance and more susceptible to further resource losses. Therefore, workplace bullying conceptualized as a resource-loss process (Tuckey & Neall, 2014), since negative emotions typically accompany it, and impaired mental and physical health, such as sleep problems (Høgh et al., 2011) and mood disorders (Nielsen & Einarsen, 2012).

To better understand how workplace bullying impacts employees' health, different designs are needed. In this sense, it has been argued that "to fully address bullying as a process there is a need for studies testing a priori process models with multiple assessment points that can capture the dynamics both over short and long periods" (Nielsen & Einarsen, 2018, p. 78). This seems to be particularly crucial since bullying is inherently dynamic and has been defined as a process that develops and escalates over time (Baillien et al., 2016). So far, this approach has been scantly covered by within-person studies. To our knowledge, only three previous studies have explored the short-term effects of bullying on health and well-being. Rodríguez-Muñoz et al. (2017) showed that daily exposure to workplace bullying positively predicted conflicts at home and relationship dissatisfaction, and that psychological detachment and affective distress mediated these relationships. Tuckey and Neall (2014) found that weekly variability in bullying was positively related to weekly emotional exhaustion. More recently, using a sample of 110 naval cadets, Hoprekstad et al. (2019) found that daily bullying was related to higher levels of daily depressed mood.

A critical strength of intensive longitudinal designs is that they may enhance the temporal precision of constructs' relationships with other constructs (McCormick et al., 2020). In this vein, as such types of designs have become increasingly more common, several scholars have suggested that the inclusion of a temporal approach is needed for the advancement of our field (e.g., McCormick et al., 2020). Although these studies provide incipient information into short-term consequences of bullying, only one of them has included specific time hypotheses in the model (Hoprekstad et al., 2019). The latter authors found that being exposed to bullying behaviors was related to depressed mood on the same day for all individuals, but this effect on subsequent days was moderated by victimization status.

In this field, Shipp and Cole (2015) detailed several time dimensions, one of them being "pattern", which refers to the trajectory or shape of a construct, event, or process over time. The trajectory may show a stable or unstable, growth versus decline, or ongoing versus recurrent patterns (Ployhart & Vandenberg 2010). According to Gabriel et al. (2017), before examining any causal relationship between two variables, it is crucial and quite illustrative to understand the longitudinal trajectories on their own. Although a large number of papers have investigated antecedents and consequences of workplace bullying in longitudinal designs, to our knowledge, there are no studies about trajectories of bullying over time. This is especially relevant since this perspective may help to elucidate whether some individuals experience continuous strain in response to bullying and whether other individuals experience lagged effects over time.

An indirectly related perspective is the examination of clusters in cross-sectional designs. Magee et al. (2015), following a person-centered approach, explored the number of clusters of workplace bullying experiences and found six, from no-bullying at all to frequent exposure to bullying. Similarly, a recent study by Paciello et al. (2019)

supported a five-cluster solution, from not bullied with no symptoms to victims with many symptoms of strain. Based on existing research, it is reasonable to expect certain heterogeneity in bullying trajectories. Specifically, we expect at least two distinct profiles of bullying trajectories over time. Since this is the first study studying trajectories over time, we propose a research question, instead of a hypothesis:

> *Research Question 1:* Which trajectories of workplace bullying can be identified in the present study?

Another timing issue is duration, which refers to the length of time that a construct, event, or process lasts (Ship & Cole, 2015). Workplace bullying and resource loss seem to go hand in hand. As has been mentioned above, bullying is positively related to several strain indicators. However, despite robust evidence showing the detrimental consequences of bullying, to date, what is still understudied is how long the effects last. Considering that bullying is a time-dependent construct, this is a relevant question from both a theoretical and practical point of view. This perspective supposes a conceptual challenge since "*existing theories are often not temporally sophisticated enough to build temporally precise predictions*" (McCormick et al., 2020). One of the exceptions is the stressor-strain models developed by Frese and Zapf (1988), and further elaborated by Dormann, and van de Ven (2014). This approach deals with how stressor-strain relationships unfold over time and proposes several possible models. Two broad categories of stress reactions can be identified: stress reactions that occur as a more or less direct response to the stressor (initial impact), and stress reactions where after some time stressors lead to ill-health (exposure time models). Considering the scant empirical evidence on this issue (Hoprekstad et al., 2019), we expect that bullying should have an immediate direct effect on strain without much time delay (initial impact model).

In an attempt to fully understand the association between work stress and health several authors are beginning to use a latent growth modeling (LGM) approach (e.g., Casper et al., 2019; Igic et al., 2017; Leineweber et al., 2019). LGM is a family of techniques that have the potential to be both variable and person-oriented, and one of the possibilities is to capture how intra-individual psychological phenomena unfold over time and how inter-individual differences can be set depending on grouped particular categories of change (Jung & Wickrama, 2008). In this context, our second research question is:

Research Question 2: How do bullying trajectories relate to strain indicators (i.e., insomnia and anxiety/depression) over the course of one month of time?

Method

Procedure and sample

Our sample consisted of full-time employees within different professions in Spain. They were recruited through the researchers' social networks and their students, who were granted extra course credits (Demerouti & Rispens, 2014). Following the recommendations of Wheeler et al. (2014), to assure the validity of data, students just facilitated emails of potential participants, and afterward, the first and third authors of this paper sent the online invitation for the study to all employees and were responsible for all communication (e.g., follow up, answering potential participants' questions). Before the beginning of data collection, participants were contacted via email explaining the aim of the study and the procedure that the research would follow during the month of study. Participants did not receive any gratification. We collected the data via online surveys with Qualtrics.com. Ethical approval was given by the first author's University Research Ethics Committee.

We used a multilevel weekly diary design (over four weeks) to test our hypotheses. The study consisted of two different phases. In the first phase, participants had to fill in a one-time questionnaire in which we measured demographic information and prior exposure to workplace bullying. The second phase began one week later, and it consisted of one weekly online survey, over four consecutive weeks. Of the 500 participants who were solicited for participation, 302 surveys (60.4% response rate) were returned. We eliminated from the analyses the responses from sixteen individuals who completed less than 50% of the weekly surveys. This left a final sample of 286 individuals. The mean age of the participants was 43.6 years (SD = 10.93), and 44% of them were men. The majority of participants (73.8%) had at least a child, and 53.2% of the sample had at least a university degree. The average number of hours worked per week was 37.5 hours (SD = 12.4). All participants worked in the services sector, with most of them working on education (16.1%), financial services (11.7%), hospitality/tourism (10.2%), healthcare (8.5), and telecommunication (6.4%). To explore potential selection bias, the final sample for analysis (n = 286) was compared to the excluded 16 participants who had participated in one wave but not in at least two or more waves. Attrition analysis showed that both samples neither differed regarding their demographic characteristics nor in our variables of interest, suggesting limited selection effects.

Measures

Weekly survey data

Workplace bullying. We measured weekly workplace bullying with the Spanish version (León Pérez et al., 2019) of the Short-Negative Acts Questionnaire (Notelaers et al., 2019). The timeframe of the original scale was adapted for capturing the week-level experience (“During the last week, have you been exposed to each of these acts?). Items were rated on a 5-point Likert scale, ranging from 1 = Never to 5 = Daily. The nine

items describe negative acts regarding work-related bullying (e.g., “Persistent criticism of your work and effort”) and person-oriented bullying (e.g., “Spreading gossip and rumors about you”). Cronbach's alpha across the four weeks ranged from .77 to .91.

Depression and Anxiety. The Patient Health Questionnaire, a brief four items screening scale, was used to measure symptoms of depression and anxiety (Löwe et al., 2010). Participants indicated how often they “felt bothered by” the following problems during the past month: “feeling nervous, anxious or on edge,” “not being able to stop or control worrying,” “little interest in pleasure in doing things,” and “feeling down, depressed, or hopeless.” The time frame of the scale was slightly adapted to the time lag of one week (“Over the last week, how often have you been bothered by the following problems?”). Response options were on a 5-point Likert scale from 0 (never or almost never) to 4 (nearly every day). Following recommendations of the authors (Lowë et al., 2010), items were combined into a single score where higher score indicates greater symptoms of depression and anxiety. Cronbach's alpha across the four weeks ranged from .80 to .85.

Insomnia. The Spanish version of the Insomnia Severity Index (Fernández-Mendoza et al., 2012) was used. The ISI is a screening scale that consists of 7 items assessing, assessing difficulty in falling asleep, problems remaining asleep, early morning awakenings, increased daytime sleepiness, impaired daytime sleepiness, impaired daily functioning, low satisfaction with sleep, and worrying about sleep. This measure follows DSM-V (Diagnostic and Statistical Manual of Mental Disorders) criteria for insomnia (American Psychiatric Association, 2013). Each item is scored on a five-point Likert scale from 0 (“none” or “not at all”) to four (“very severe problem”). Higher scores on the ISI indicate more severe insomnia. Cronbach's alpha across the four weeks ranged from .83 to .88.

General survey data

Control variables. To rule out alternative interpretations, we measured some control variables, such as gender and general level of workplace bullying. To capture the general level of workplace bullying during the last six months, we employed the same measure that was used for weekly surveys (Notelaers et al., 2019). Cronbach's alpha was .82.

Statistical analyses

We used a latent class growth analysis (LCGA; Muthén, 2004) to identify classes of individuals in different trajectories of workplace bullying across four waves. LCGA is a type of analysis, which combines techniques of growth curve modeling with latent class analysis to model unobserved heterogeneity in intra-individual change (Muthén & Muthén, 2010), to cluster individual to one of the trajectories. We conducted analyses with Mplus 8 (Muthén & Muthén, 2017). We handled missing data using full information maximum likelihood (FIML) with robust standard errors in the analyses, which uses all available information in the variance/covariance matrix. FIML has been shown to improve Type I error rates over traditional estimators. Following Berlin et al.'s (2013) suggestions, we used a multistep procedure. In the first step, we compared a lineal versus curve change function that determines the general pattern of change that is subsequently used to estimate and identify the trajectory clusters cluster. In our data, the lineal function presented a poor fit to the data (Root Mean Squared Error of Approximation – RMSEA = .25; Standardized Root Mean Square Residual – SRMR = .18) while the quadratic change function presented a proper fit (RMSEA = .04; SRMR = .02). We, therefore, used the quadratic base change function to estimate the next steps, which means that bullying levels generally evolve following a curvilinear function.

In the second step, we explore the data and compare different models to retain the optimal number of trajectories. The best-fitting model was determined by using the recommended indices (e.g., Jung and Wickrama, 2008; Nylund et al., 2007), including the Bayesian information criterion (BIC), the adjusted Bayesian Information Criterion (aBIC), entropy, the Lo-Mendell-Rubin likelihood ratio test (LMRT) and the bootstrap likelihood ratio test (BLRT). Lower levels of BIC and aBIC values and higher of entropy indicate a better fit of the model. LMRT and BLRT compare a model with "k" trajectories to a model with "k-1" trajectories; if the values of these indexes are significant indicates that the k trajectory model is a better fit to the data compared to the k – 1 trajectory model. As have been recommended in the literature (Jung & Wickrama, 2008) beyond the statistical criteria, we also considered the principle of clarity and interpretability of the trajectories, as well as to have a sufficient number of individuals in each class to examine further cluster differences. After we determined the model with the best fit, repeated-measures ANOVA was conducted to investigate class differences on strain. In these analyses, gender and prior exposure to workplace bullying were used as covariates.

Results

Preliminary analyses

Table 1 reports descriptive statistics and correlations among the study variables. Before conducting the main analyses, we tested whether the study variables can be empirically distinguished. We conducted a series of multilevel confirmatory factor analyses with Mplus 8 (Muthén & Muthén, 2017). Specifically, we compared a three-factor measurement model discriminating between the variables included in the study (workplace bullying, insomnia, and anxiety and depression) with a two-factor model in which all the strain items load on one single factor and bullying in other, and with a

one-factor model in which all the items load on one single factor. Results showed that three-factor model fit the data well (χ^2 (334) = 417.79, CFI = .94, TLI = .94, RMSEA = .01, SRMR (within) = .08 vs. SRMR (between) = .07). The chi-square difference test showed that the three-factor model fits much better to the data than the two-factor model ($\Delta\chi2$ (4) = 212.17, p = .000), and better also than the one-factor model with all the items loading on one common factor ($\Delta\chi2$ (6) = 401.34, p = .000). This indicates that the variables included in the study can be empirically discriminated from each other.

Furthermore, any examination of change in a variable over time requires the demonstration of measurement invariance (e.g., Ployhart & Vandenberg, 2010). This procedure evaluates temporal changes in a specific measure/construct, which helps to reinforce the conclusion that temporal changes (for example those observed in our trajectories) are not due to changes in the structure or measurement of the construct over time and can, therefore, be attributed to real changes that occurred over time. We assessed temporal invariance for the 3 variables included in our model, by testing and comparing several consecutive models with a) the same pattern of factors and factor loadings (Configural), b) the same factor loadings across time (Metric) and c) the same item thresholds (Scalar). Due to the ordinal nature of our variables, models were calculated with theta parametrization and WLSVM estimation method (for categorical data). For 2 out of the 3 measures, we found configural invariance, (respectively, for bullying $\chi2$ = 228.844, df = 534, p = 1.000, RMSEA = 0.000, CFI = 1.000; for insomnia, $\chi2$ = 484.552, df = 302, p = 0.000, RMSEA = 0.046, CFI = 0.985), and for anxiety/depression, we found scalar invariance ($\Delta\chi2$ = 25.22, Δdf = 21, p = 0.237, ΔRMSEA = 0.002, ΔCFI = 0.000), which according to Ployhart and Vandenberg (2010) warranties the stability of the measures across times.

We also calculated whether the variables included in the study exhibited sufficient between- and within-person variability. We calculated the intraclass correlations with the intercept-only model. ICC (1) is commonly referred to simply as the ICC in random coefficient models. Results showed that variance attributable to within-person variations (weekly variations) was 33.2% in bullying, 26.4% in insomnia, and 32.1% in anxiety and depression. These results support the use of a weekly diary design for exploring variations in bullying and strain.

-Insert Table 1 here-

Main analyses

Table 2 shows the model fit statistics of model comparisons with a different number of profiles specified. The 3-group solution was selected because its results were most consistent with a satisfactory model fit (see Table 2). Specifically, the 3-class solution demonstrated low values on the BIC and adjusted BIC, and both the LMRT and BLRT were significant. Also, the entropy values were higher than those of alternative models. Although BIC and adj. BIC values were lower in the case of the 4-group model, it contained just two individuals (0.7% of the sample). The five- and six-group solutions did not add substantially to the understanding of group patterns. As it has been pointed out by Jung and Wickrama (2008) when deciding for a specific model, one should not examine fit indices, but also a solution`s interpretability and usefulness. In this sense, the content and size of classes, and theoretical plausibility must be also considered. Furthermore, Jung and Wickrama also indicate that each trajectory must have at least 1% of the participants. Although previous papers in the bullying research field have used clusters with small sample sizes (e.g., N=1; Plopa, Plopa, & Skuzińska, 2017), we decided to exclude the cluster with only two participants. Therefore, a 3-cluster solution was identified as optimal (see figure 1).

-Insert Figure 1 and Table 2 here-

The sample classified in a non-bullying trajectory was much larger than the number of participants in bullying situations. Trajectory 3 (prevalence: n=260, 90.9% of the total sample) refers to persons with low levels of bullying and scores stable over time. Trajectory 2 (prevalence: n=12, 4.2% of the total sample) was labeled as inverted U bullying, where scores had an increase at time 2, and subsequently, a clear pattern of decline over time. Finally, Trajectory 1 (prevalence: n=12, also 4.2% of the total sample) was labeled delayed increase bullying, with scores increasing over one month after the second week.

Association with strain indicators

After assessing and interpreting the number and meaning of bullying trajectories, cluster membership was taken as a factor in several repeated measures ANOVAs, to study whether the trajectories were related to differences in insomnia and depression/anxiety symptoms during the four measurement points.

-Insert Table *3 here-*

Table 3 depicts trajectories' means throughout the four time-points, and table 4 reports the main effects of time and the interaction of time (development of insomnia and anxiety-depressive symptoms across measurements) with bullying trajectories. As can be seen in Table 4, no significant effect was found for either time (within-participants factor) or bullying trajectories (between- participants factor) on the two outcomes (insomnia, or anxiety/depressive symptoms). However, two significant interactions were found for (a) time (insomnia measured along four weeks) and bullying trajectories, and (b) time (anxiety and depressive symptoms measured along four weeks) and bullying trajectories.

-Insert Figures 2, 3 and Table 4 here-

Tables 5a-b show pairwise comparisons for both insomnia and anxiety-depressive symptoms over time and bullying trajectories. In the case of insomnia, an examination of the simple effects revealed that a meaningful increase of insomnia was found between time-points 1 and 2 for the inverted U bullying trajectory (p = .027), and a significant decrease was found between time-points 1-3 (p = .001) and 1-4 (p = .001) for the non-bullying trajectory. Furthermore, focusing on differences between trajectories, no differences were found at time 1. At time 2, those participants in the inverted U trajectory scored significantly higher in insomnia than those in the delayed increase bullying (p = .013) and non-bullying trajectories (p = .002). At time 3, participants in the inverted U bullying trajectory showed significantly higher scores on insomnia than those in the non-bullying trajectory (p = .003). Interestingly, at time 4 there were no meaningful differences between the inverted U and delayed increase bullying trajectories, but individuals in the inverted U trajectory scored significantly higher in insomnia than individuals in the non-bullying trajectory (p = .005). Graphical results are depicted in figure 2.

On the other hand, looking at anxiety and depressive symptomatology, the examination of the simple effects showed that (a) for the delayed increase bullying trajectory, a meaningful increase in scores was observed between time-points 2 and 4 (p = .001), (b) for the inverted U bullying trajectory, a significant increase in scores was found between time-points 1-2 (p = .038) and 1-3 (p = .014), and c) for the non-bullying trajectory, a meaningful decrease in scores was observed between time-points 1 and 4 (p = .032). Additionally, focusing on differences between trajectories, no differences were found at time 1. At times 2 (p = .025) and 3 (p = .010), persons in the non-bullying trajectory scored significantly lower on anxiety and depressive symptoms than those in

the inverted U trajectory. Finally, at time 4, while there were no longer differences between the inverted U and the non-bullying trajectories, those individuals who were in the delayed increase trajectory showed higher scores in anxiety and depressive symptoms than those in the non-bullying trajectory (p = .000). Graphical results are depicted in figure 2 (anxious and depressive symptoms).

-Insert Tables 5a-b here-

Discussion

To our knowledge, our study is the first to examine trajectories of bullying at work over time and their associations with strain indicators, providing new insights into the temporal dynamics of workplace bullying. We identified three trajectories of bullying in a short period of time (one month). Furthermore, we found that each trajectory showed a differential pattern concerning strain indicators.

First, this study was aimed at increasing our understanding of how different bullying profiles develop over time. We identified three trajectories of bullying; non-bullying, inverted U bullying and delayed increase bullying. Similar to what has been found in previous research, the majority of the sample was allocated in a non-bullying group (e.g., Notelaers et al., 2006). This is also in accordance with the low prevalence rates of this phenomenon, where the incidence of systematic situations of bullying is around 10% (Zapf et al., 2011). Also, we identified a trajectory where bullying tends to increase and then decline and another trajectory in which bullying showed a delayed increase. Existing research has found that between five and six clusters emerged (Magee et al., 2015; Paciello et al., 2019). Above and beyond the static view of trajectories, the present study complements previous person-centered approaches by exploring the evolution of clusters over time.

One noteworthy finding was that even in a relatively short period (one month), we found variability in the effects of workplace bullying between clusters, after controlling for previous exposure to bullying behaviors. Although we did not find any significant effect for either time or trajectories, we found a significant interaction between time and trajectories when predicting insomnia and anxiety/depression. In the case of insomnia, the inverted U cluster showed the highest levels of sleep disorders, even when the level of bullying was already decreasing. It seems that the negative effects on insomnia are long-lasting and remain after bullying has already decreased. Regarding anxiety and depression, in the delayed increase cluster significant differences were found between time 2 and time 4, parallel to the increase in bullying level. Also, in time 4 we observed differences between the delayed increase trajectory and the non-bullying trajectory. In general terms, the pattern of the process of anxiety and bullying over time closely resembles the evolution of the bullying trajectories. Therefore, the present results support the short-term impact of weekly levels of exposure to bullying, but with a different pattern for each strain indicator.

The current study also broadens the literature by showing a differential pattern of each strain with each cluster of bullying. Linked to Frese and Zapf's (1988) perspective, our findings show that the association of bullying with anxiety and depression corresponds with the initial stress reaction model. As the exposure to bullying behaviors increases, so too do symptoms of anxiety and depression. However, when the stressor (i.e., bullying) is removed, the strain decreases. Therefore, an individual's level of strain as a result of bullying recedes once the stressor has passed.

In the case of insomnia, its association with of bullying fits better with the accumulation model, which postulates that the impact of the stressor on strain increases over time, and even when exposure to the stressor is reduced, the level of strain is stable

after some time. In contrast to anxiety and depression, insomnia does not decline once the stressful circumstances end, but rather, accumulates over time. As has been suggested by Igic et al. (2017) for strain to persist beyond stressful circumstances, some more permanent changes must have occurred in the individuals involved. Evidence suggests that physiological arousal is one response to short-term exposure to bullying (e.g., Hogh et al., 2012), which might explain the later development of other physical and mental health disorders. Similarly, workplace bullying has also been associated with later ruminative thoughts about transgression (Hogh et al., 2011). This repeated or chronic cognitive activation may prolong physiological activation, which in turn may lead to impaired health. Thus, with such comorbid symptomatology occurring in parallel, the strain reactions may become independent of exposure to bullying, due to the accumulative effects of strain.

This idea is consistent with the concept of resource loss spirals (Hobfoll et al., 2018), since past experiences of bullying may result in a loss of resources, which increases the likelihood of being a target in the future. In general, beyond Frese and Zapf's (1988) proposal, existing work stress theories do not offer explicit guidance regarding the temporal dynamics of stressor-strain processes. One exception is adaptation theory (Matthews, & Ritter, 2018), which argues that although stressors may temporarily affect people, over time, people return to pre-event levels of well-being. Although this model may support the explanation of the anxious/depressive symptoms, it is not the case for insomnia that does not show a reduction when bullying decreases. More research is needed to shed light on whether this distinct duration of strain is similar across longer periods of time. It would be interesting to explore how these short-term effects become chronic by using meso-term time lags (Dormann, & van de Ven, 2014).

Limitations

The findings of the study should be considered in light of the limitations. First, our analyses did not allow us to make causal inferences concerning cluster membership and reported symptoms of strain. For example, it is conceivable that anxiety also increases the perception of victimization (e.g., Rodríguez-Muñoz et al., 2015). However, our model was driven by generally accepted theoretical models according to which stressful situations such as workplace bullying lead to increased negative outcomes. A second limitation refers to the data collection procedure. Although some concerns have been raised about the use of students for recruiting samples (Marcus et al., 2017), meta-analytic evidence suggests that results obtained from student-recruited samples were not meaningfully different from other types of samples (Wheeler et al., 2014) and provide a more heterogeneous sample (Demerouti & Rispens, 2014). However, future research should replicate our findings in other samples and countries. Third, we examined the study variables over a month, focusing on weekly fluctuations. Although we wanted to focus on the short-term effects of bullying, we could also have chosen a different time lag. Therefore, we may have just captured a portion of the entire short-term process. Future research could combine different short- and meso-term time lags and investigate how the association between trajectories of bullying and employee's strain change based on time. Furthermore, not controlling for the source of bullying may limit the breadth of our findings. In particular, earlier studies have emphasized that bullying from superiors (vertical) may be more detrimental for targets than from coworkers (lateral) due to formal power imbalance (e.g., Einarsen et al., 2011; Waschgler et al. 2013). Future research may alleviate this concern by distinguishing the sources of bullying behavior and its effects on strain indicators.

Practical implications

Finally, our study has practical implications for prevention and intervention to combat the harmful effects caused by exposure to workplace bullying. Our findings show that the effects of bullying on insomnia remain after exposure. This means that ongoing support should be provided to employees to manage these short-term effects. Coping strategies training programs have been previously suggested as an effective way of dealing with workplace bullying and its effects, especially when preventive actions have been ineffectively implemented or have not worked (Anasory et al., 2019). Counseling is also an important resource that the organization can put in place to help employees deal with the difficult situations lived at work (Tehrani, 2011). However, as Tehrani emphasizes, for the counseling to work, it needs to be entered into freely. In this sense, a combination of mindfulness mediation with cognitive-behavior therapy for insomnia has proved to be efficient in the reduction of sleep-related arousal (Ong et al., 2008). Further, training on emotion regulation strategies could help employees to reduce their weekly level of anxiety and depression. This is particularly important since it has been shown that high levels of anxiety might increase the likelihood of being bullied (Rodríguez-Muñoz et al., 2015).

In sum, our study provides evidence that bullying has an impact on health, and that this impact may remain over time, even when the exposure to bullying has decreased. Zero-tolerance policies need to be put in place as the first prevention mechanism, but it is important to note that if for any particular reason these policies are not correctly implemented and workplace bullying occurs, organizations need to offer extra support. This extra support goes beyond legal advice or counseling, and it should be focused on giving the employees skills to manage the health-related consequences. Indeed, the training programs that we mentioned above should be considered a crucial

aspect of preventive policies and early interventions. Tackling workplace bullying requires an integrative approach that embraces not only organizational but also health-related aspects.

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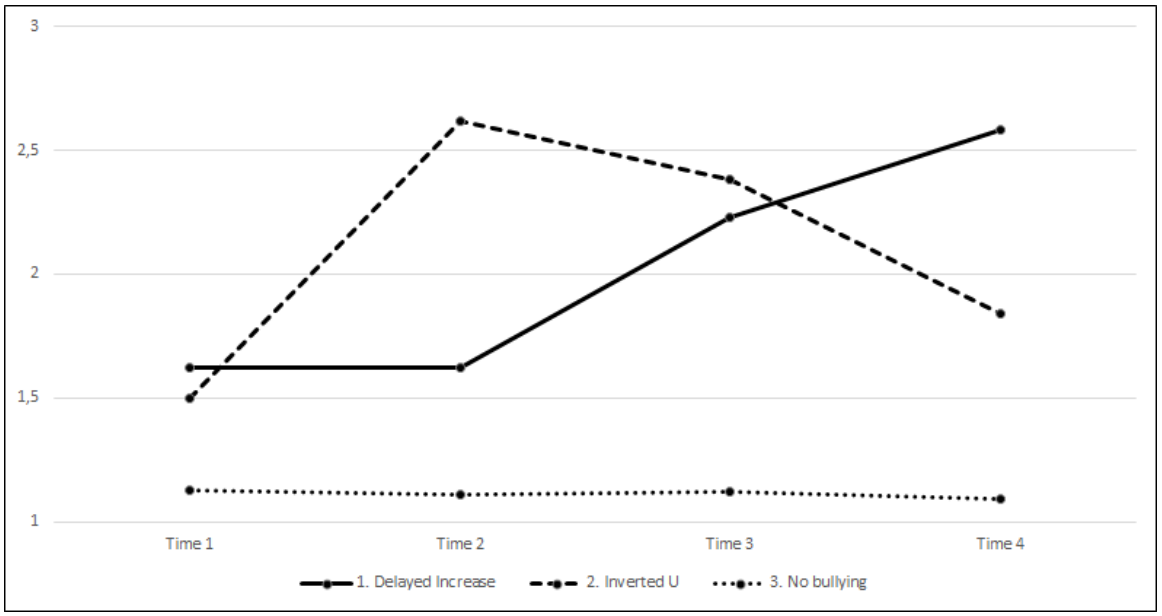

Figure 1. Trajectories of workplace bullying over time

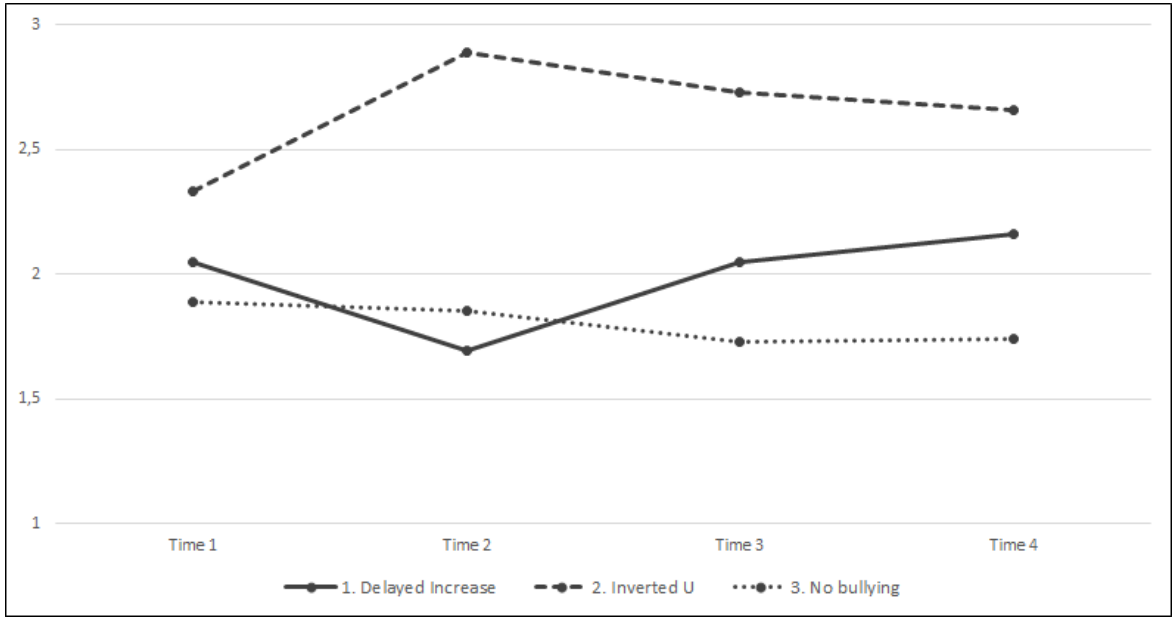

Figure 2. Trajectories of insomnia symptoms between bullying clusters.

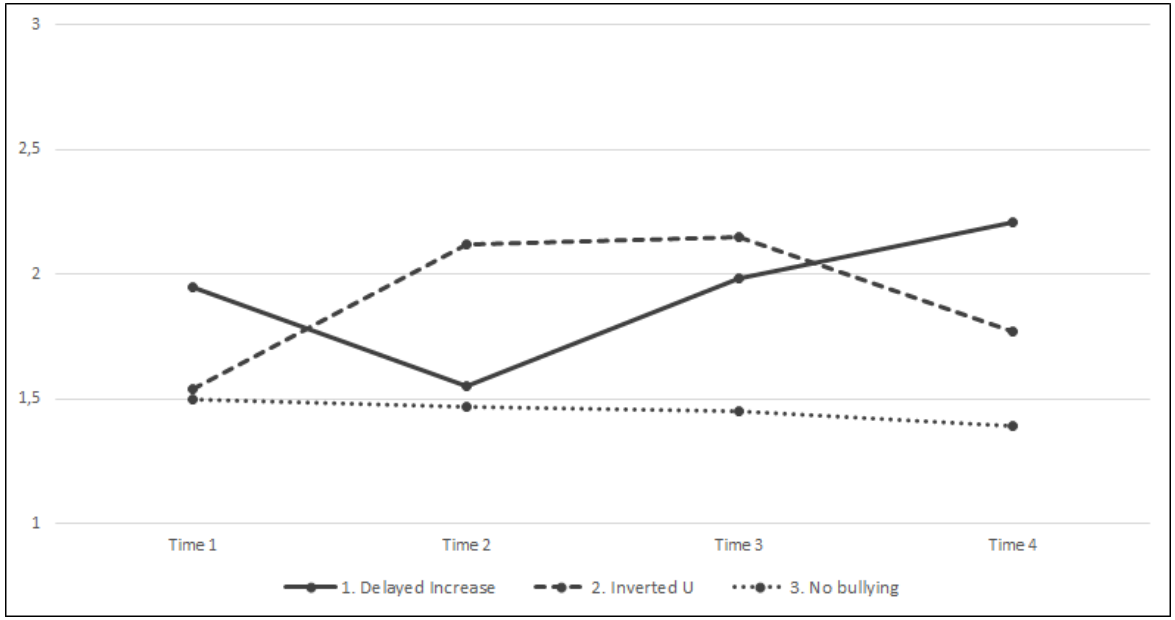

Figure 3. Trajectories of anxiety and depressive symptoms between bullying clusters.

Table 1
Mean, standard deviations, and correlations

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	---	---												
2. Prior exposure to workplace bullying	1.48 (0.64)	.01	---											
3. T1 Workplace bullying	1.18 (0.35)	.01	.08	---										
4. T2 Workplace bullying	1.22 (0.50)	.01	.13*	.66**	---									
5. T3 Workplace bullying	1.25 (0.57)	.03	.13*	.65**	.83**	---								
6. T4 Workplace bullying	1.20 (0.47)	.02	.11	.68**	.74**	.86**	---							
7. T1 Insomnia	1.97 (0.74)	.07	.17*	.14*	.29**	.17**	.25**	---						
8. T2 Insomnia	1.97 (0.83)	.11	.22**	.27**	.37**	.38**	.33**	.72**	---					
9. T3 Insomnia	1.87 (0.81)	.04	.18*	.23**	.34**	.43**	.39**	.73**	.69**	---				
10. T4 Insomnia	1.88 (0.82)	.03	.20**	.23**	.37**	.39**	.39**	.72**	.75**	.84**	---			
11. T1 Anxiety-depression	1.55 (0.60)	.11	.08	.33**	.27**	.32**	.30**	.33**	.36**	.35**	.31**	---		
12. T2 Anxiety-depression	1.54 (0.64)	.12	.16*	.31**	.42**	.44**	.37**	.37**	.53**	.46**	.42**	.66**	---	
13. T3 Anxiety-depression	1.54 (0.63)	.02	.17*	.35**	.46**	.55**	.49**	.39**	.53**	.53**	.52**	.65**	.77**	---
14. T4 Anxiety-depression	1.50 (0.57)	.16*	.10	.32**	.34**	.40**	.45**	.47**	.55**	.48**	.54**	.63**	.68**	.75**

Note: Gender was coded as 1= Male and 2 = Female.
* p < .05. ** p < .01.

Table 2
Fit indices and number of classes comparisons

Nº. of classes	BIC	Adj. BIC	Entropy	LMRT	BLRT (*p*)
1-Class	644.25	603.03			
2-Class	481.33	427.42	0.986	177.69	**
3-Class	351.69	285.10	0.996	121.64	**
4-Class	267.43	188.15	0.990	114.39	**
5-Class	406.77	314.80	0.993	115.34	**
6-Class	337.99	233.34	0.994	70.23	**

* $p < .05$, ** $p < .01$.

Table 3

Descriptive means for bullying trajectories, insomnia, anxiety and depressive symptoms across the four measurements

Variable	Cluster	Time			
		1	**2**	**3**	**4**
Bullying trajectories	**1**	1.625	1.629	2.237	2.581
	2	1.509	2.621	2.387	1.842
	3	1.133	1.112	1.126	1.093
Insomnia	**1**	2.051	1.695	2.05	2.164
	2	2.33	2.897	2.793	2.667
	3	1.899	1.857	1.73	1.741
Anxiety and Depressive symptoms	**1**	1.951	1.55	1.987	2.215
	2	1.542	2.122	2.158	1.772
	3	1.505	1.475	1.458	1.398

Table 4

Main effects of time and interaction (bullying trajectories x time)

Variable	Factor	Value	F[1]	gl	Sig.
Insomnia	**Time**	0.03	1.558	3	0.202
	Time*Gender	0.023	1.169	3	0.324
	Time*Baseline Bullying	0.024	1.225	3	0.303
	Time*Cluster	0.116	3.105	6	0.006**
Anxiety and Depressive symptoms	**Time**	0.006	0.314	3	0.815
	Time*Gender	0.013	0.651	3	0.584
	Time*Baseline Bullying	0.004	0.189	3	0.903
	Time*Cluster	0.185	5.141	6	0.000***

**p<.05; **p<.01; ***p<.001*

Note: Gender and prior exposure to bullying were used as covariates in all the analyses

Table 5a

Pairwise comparisons of cluster membership (bullying trajectories) pairs for every measurement point

Variable	Time	Cluster pairs	Mean difference	SE	Sig.	CI 95%
Insomnia	1	1-2	-0.279	0.409	1	-1.268 / 0.71
		1-3	0.152	0.317	1	-0.615 / 0.919
		2-3	0.431	0.297	0.448	-0.289 / 1.151
	2	1-2	-1.202	0.414	0.013*	-2.203 / -0.2
		1-3	-0.162	0.321	1	-0.938 / 0.615
		2-3	1.04	0.301	0.002**	0.311 / 1.769
	3	1-2	-0.689	0.418	0.303	-1.7 / 0.322
		1-3	0.32	0.324	0.972	-0.463 / 1.104
		2-3	1.009	0.304	0.003**	0.274 / 1.745
	4	1-2	-0.503	0.395	0.614	-1.46 / 0.453
		1-3	0.423	0.306	0.509	-0.319 / 1.165
		2-3	0.926	0.288	0.005**	0.23 / 1.623
Anxiety and Depressive symptoms	1	1-2	0.409	0.317	0.597	-0.358 / 1.175
		1-3	0.446	0.246	0.215	-0.149 / 1.04
		2-3	0.037	0.231	1	-0.521 / 0.595
	2	1-2	-0.572	0.332	0.261	-1.375 / 0.232

	1-3	0.076	0.257	1	-0.547 / 0.698
	2-3	0.647	0.242	0.025*	0.062 / 1.232
3	**1-2**	-0.171	0.323	1	-0.952 / 0.611
	1-3	0.529	0.25	0.108	-0.077 / 1.135
	2-3	0.7	0.235	0.01**	0.131 / 1.269
4	**1-2**	0.443	0.268	0.302	-0.206 / 1.092
	1-3	0.817	0.208	0.000***	0.314 / 1.321
	2-3	0.374	0.195	0.171	-0.098 / 0.847

**p<.05; **p<.01; ***p<.001*

Note: Gender and prior exposure to bullying were used as covariates in all the analyses

Table 5b
Pairwise comparisons of time-point pairs for cluster membership (bullying trajectory)

Variable	Cluster	Time pairs	Mean difference	SE	Sig.	CI 95%
Insomnia	**1**	**1-2**	0.356	0.21	0.553	-0.206 / 0.918
		1-3	0.001	0.221	1	-0.589 / 0.591
		1-4	-0.112	0.208	1	-0.669 / 0.445
		2-3	-0.355	0.251	0.943	-1.025 / 0.314
		2-4	-0.469	0.24	0.318	-1.111 / 0.174
		3-4	-0.113	0.18	1	-0.595 / 0.368
	2	**1-2**	-0.567	0.197	0.027*	-1.092 / -0.041
		1-3	-0.409	0.206	0.295	-0.961 / 0.142
		1-4	-0.336	0.195	0.517	-0.857 / 0.184
		2-3	0.157	0.234	1	-0.469 / 0.784
		2-4	0.23	0.225	1	-0.37 / 0.831
		3-4	0.073	0.168	1	-0.378 / 0.523
	3	**1-2**	0.043	0.042	1	-0.069 / 0.154
		1-3	0.169	0.044	0.001***	0.053 / 0.286
		1-4	0.159	0.041	0.001***	0.048 / 0.269
		2-3	0.127	0.05	0.071	-0.006 / 0.26
		2-4	0.116	0.048	0.096	-0.011 / 0.243

		3-4	-0.011	0.036	1	-0.106 / 0.085
Anxiety and Depressive symptoms	**1**	**1-2**	0.401	0.224	0.45	-0.197 / 0.998
		1-3	-0.037	0.212	1	-0.603 / 0.53
		1-4	-0.264	0.191	1	-0.775 / 0.247
		2-3	-0.437	0.167	0.058	-0.884 / 0.009
		2-4	-0.665	0.176	0.001***	-1.136 / -0.194
		3-4	-0.228	0.183	1	-0.717 / 0.261
	2	**1-2**	-0.58	0.209	0.038*	-1.138 / -0.021
		1-3	-0.616	0.198	0.014**	-1.145 / -0.086
		1-4	-0.23	0.179	1	-0.708 / 0.248
		2-3	-0.036	0.156	1	-0.454 / 0.381
		2-4	0.35	0.165	0.212	-0.091 / 0.79
		3-4	0.386	0.171	0.153	-0.072 / 0.843
	3	**1-2**	0.031	0.044	1	-0.088 / 0.149
		1-3	0.047	0.042	1	-0.065 / 0.159
		1-4	0.107	0.038	0.032*	0.006 / 0.209
		2-3	0.017	0.033	1	-0.072 / 0.105
		2-4	0.077	0.035	0.178	-0.017 / 0.17
		3-4	0.06	0.036	0.596	

*p<.05; **p<.01; ***p<.001
Note: Gender and prior exposure to bullying were used as covariates in all the analyses