

## **Modeling Workplace Bullying Behaviors Using Catastrophe Theory**

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**Abstract:** *Workplace bullying is defined as negative behaviors directed at organizational members or their work context that occur regularly and repeatedly over a period of time. Employees' perceptions of psychosocial safety climate, workplace bullying victimization, and workplace bullying perpetration were assessed within a sample of nearly 5,000 workers. Linear and nonlinear approaches were applied in order to model both continuous and sudden changes in workplace bullying. More specifically, the present study examines whether a nonlinear dynamical systems model (i.e., a cusp catastrophe model) is superior to the linear combination of variables for predicting the effect of psychosocial safety climate and workplace bullying victimization on workplace bullying perpetration. According to the AICc, and BIC indices, the linear regression model fits the data better than the cusp catastrophe model. The study concludes that some phenomena, especially unhealthy behaviors at work (like workplace bullying), may be better studied using linear approaches as opposed to nonlinear dynamical systems models. This can be explained through the healthy variability hypothesis, which argues that positive organizational behavior is likely to present nonlinear behavior, while a decrease in such variability may indicate the occurrence of negative behaviors at work.*

**Key Words:** cusp catastrophe model, nonlinear changes, workplace aggression, workplace bullying, organizational climate, healthy variability hypothesis

### **INTRODUCTION**

*Workplace bullying* is defined as negative behaviors directed at organizational members or their work context that occur regularly and repeatedly over a period of time (Einarsen, Hoel, Zapf, & Cooper, 2011). The consequences of workplace bullying are so significant and negative for

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individuals, organizations, and society as a whole (Aquino & Thau, 2009) that many scholars and practitioners have urged organizations to develop and support effective interventions (Leiter, Spence-Laschinger, Day, & Gilin-Oore, 2011).

In recent years, several studies have complemented the well-established existing knowledge of the negative consequences for victims and witnesses, shedding light on the damaging effects for perpetrators as well (Jenkins, Winefield, & Sarris, 2011). Considering these negative consequences, Vartia and Leka (2011) have stressed the importance of developing individual-level interventions focused on employee behaviors, as well as organizational-level interventions, through the introduction of policies and procedures for prevention. Several studies have claimed that if an organization could successfully implement appropriate policies, practices, and procedures for the protection of employees' psychological health and safety, bullying and its negative effects would likely be prevented (e.g. Dollard & Bakker, 2010).

One of the natural first steps for creating successful strategies to prevent workplace bullying behaviors within organizational contexts is to clarify the antecedents related to workplace bullying perpetration (WBP), which have not received enough attention and present a fruitful avenue for future research (Matthiesen & Einarsen, 2007). The present study aims to address this gap by investigating both victimization and a facet-specific component of organizational climate, psychosocial safety climate (PSC) (Dollard & Bakker, 2010), which may facilitate bullying behaviors. In the following section, we will briefly discuss the available empirical evidence on WBP. Second, drawing from conflict theories that assume a proportional and smooth escalation process, we will discuss the effects of workplace bullying victimization (WBV) and PSC (Hauge, Skogstad, & Einarsen, 2009). Finally, we will argue for the introduction of a cusp catastrophe model of workplace bullying behavior, which assumes that behavior changes following discontinuous "jumps" and nonlinear patterns (as opposed to gradual or incremental patterns) (Nowak & Vallacher, 1998).

Researchers have suggested that aggression is reciprocal in nature, evidencing influential processes in workplace aggression (Keashly & Nowell, 2011). In the workplace bullying domain, empirical studies estimating the prevalence rates of this organizational phenomenon have supported this view, showing that a number of victims take the role of perpetrator and also engage in bullying others (Baillien, De Cuyper, & De Witte, 2011; Glomb & Liao, 2003; Hershcovis, Reich, Parker, & Bozeman, 2012; Rodríguez-Muñoz, Moreno-Jiménez, Baillien, Sanz-Vergel, & Moreno, 2012). Mawritz, Mayer, Hoobler, Wayne, and Marinova (2012) showed a trickle-down effect of negative behaviors, where high level managers' bullying behaviors were positively correlated with middle level managers' bullying behaviors, and these with employees' bullying behaviors as well. Thus, it has been proposed that engaging in bullying behaviors is a result of victimization (De Cuyper, Baillien, & De Witte, 2009).

Similarly, following the work environmental hypothesis (Leymann, 1996), several studies have emphasized that in order for workplace bullying to occur, the organizational context must allow such behavior to take place (Hershcovis & Barling, 2010). The perception that organizations do not care about their employees can lead to behaviors that undermine organizational effectiveness, such as bullying (Parzefall & Salin, 2010). *PSC* has been defined as the policies, practices, and procedures that are implemented and enacted by managers for the protection of workers' psychological health and safety (Dollard & Bakker, 2010). As suggested by social exchange theory, organizations with strong *PSC* are unlikely to facilitate bullying, minimizing and/or removing the enabling structures (e.g. frustration, perceived power imbalances), motivating structures (e.g. reward systems, internal competition), and precipitating processes (e.g. organizational change, downsizing) modeled by Salin (2003). For example, with low *PSC*, bullying may be widespread because such structures and processes are not controlled and may prevail. Therefore, engaging in bullying behavior is likely to be condoned (Bond, Tuckey, & Dollard, 2010). A recent multilevel mediation study conducted by Escartín, Dollard, and Zapf (submitted) supported this idea, identifying *PSC* as a precursor to not only victim reports of workplace bullying, but also perpetrators of such negative behaviors. Thus, it has been proposed that engaging in bullying behaviors is a result of weak *PSC*. More specifically, we propose the following:

*Hypothesis 1:* *PSC* has a negative relationship with both *WBV* and *WBP*, and *WBV* has a positive relationship with *WBP*.

### **Linear Approaches**

Leymann (1990), one of the pioneer researchers in the field, claimed that bullying victims cannot defend themselves and that they do not normally contribute to the escalation process. The conflict research perspective (Glasl, 1982), on the other hand, pointed out that in the escalation process both parties (victims and perpetrators) intervene and are responsible. Recently, the bullying literature has focused on the second perspective, suggesting that being a target of bullying behaviors is related to being a perpetrator (i.e., Hershcovis et al., 2012; Rodríguez-Muñoz et al., 2012). Building from this conflict research perspective, we can assume a linear relationship between *WBV* and *WBP*. This approach is consistent with a social interactionist perspective, which suggests that when employees feel harassed they often respond with a counter-act of comparable severity (Neuman & Baron, 2011). For this paper, it is relevant to assume that causes and their effects are proportional and that for "any unique psychological situation there is likely to be a single modal response" (Tesser & Achee, 1994, p. 108).

More specifically, the conflict literature offers the study of workplace bullying a fuller consideration of the contributing activities of both actors and targets, particularly in escalated conflicts. Workplace bullying has been largely defined as an escalating and evolving process in which the victim ends up in an

inferior position and becomes the target of systematic negative social acts (Einarsen et al., 2011), which accelerates a downward spiral of negative behaviors and damages workgroup social relationships (Glomb, 2002). In line with the daily-hassles approach, which emphasizes the accumulation of conflicts, versus the major-life-events approach, which emphasizes the explosion of conflicts (Kanner, Coyne, Schaefer, & Lazarus, 1981), Einarsen (1999) stressed that “empirical studies indicate that bullying is not an either-or phenomenon, but rather a gradually evolving process” (p. 19). Some theoretical models from the conflict literature have been utilized to explain the workplace bullying process. Glasl’s (1982) model of conflict escalation differentiates among three phases and nine stages. The first phase is labeled “rationality and control,” the second “severing the relationship,” and the third “aggression and destruction.”

An empirical example of this model in the workplace bullying domain was offered by Zapf and Groß (2001) in a qualitative study with bullying victims; they found five different courses of bullying: (a) continuous escalation (21%), (b) first rapid escalation and then continuous escalation (10%), (c) continuously escalated and continuously de-escalated (5%), (d) escalated in stages (42%), and (e) escalation and de-escalation alternated several times (21%). Most participants reported that bullying escalated more and more as time went by. Around 25% of the cases seemed to escalate in a linear way (course 1 and course 3). (For a more detailed description, see Zapf and Groß, 2001, p. 510; Fig. 2). Zapf and Groß stated that bullying may not always follow the stage model of Glasl (1982). Rather, there may be variants. For example, steps in the model may be left out, and bullying may begin at higher levels of escalation. Thus, the qualitative data showed that most of the bullying cases escalated continuously or in stages. Overall, these studies support that causes and their effects are proportional.

In line with Spector and Fox’s (2005) stress–frustration–aggression model, and following Glasl’s (1982) above-mentioned model of conflict escalation, several authors have suggested that the escalation process impacts all parties, including perpetrators (Zapf & Einarsen, 2005). For example, in a situation with strong PSC, bullying targets will abstain from conducting bullying behaviors. However, while keeping constant the level of victimization, if the PSC gets increasingly weak, then the bullying victim will increasingly conduct bullying behaviors. Therefore, a large increase in one of the independent variables (e.g. PSC) should result in large changes in workplace bullying behavior, whereas small increases in the independent variable should lead to minor shifts in WBP. Thus, a linear and proportional relationship should be expected.

### **Nonlinear Approaches**

Although linear approaches are predominant within the workplace bullying domain, other scientific paradigms have complemented them (Zeeman, 1976). One branch of complexity science, catastrophe theory, which is based on

nonlinear modeling methods, enables the analysis of nonlinear and sudden changes in behavior and has helped increase predictability (Thom, 1975). Within the field of organizational psychology, catastrophe theory has been applied to management fields like leadership emergence, employee motivation (e.g. Guastello, 2007), and work-related flow (Ceja & Navarro, 2012). In this sense, describing workplace bullying in the terms of nonlinear dynamical systems should yield new insights concerning the likely mechanisms operating in such a process.

In a study on work-related flow, Ceja and Navarro (2012) stressed one of the main strengths of the above-mentioned methodologies: they are able to explain and model linear and nonlinear changes in an integrative manner, which, for the present paper, contributes to theory and empirical work on workplace bullying. More specifically, catastrophe theory provides a conceptual framework for modeling both continuous and discontinuous or nonlinear changes in organizational behavior. According to Kauffman and Oliva (1994), models based on catastrophe theory hold several advantages over the most commonly used linear models in organizational psychology. First, the catastrophe-theory approach focuses on process dynamics and is able to model discontinuous change. Second, the models' nonlinearity enables them to present rich descriptions of the phenomenon under consideration. And third, outlier behavior is included in the model and not viewed as measurement error.

All these advantages can contribute to the development of workplace bullying theory, as they are aligned with the ideas presented by Leymann (1990), who pointed out that "this social situation is not linear, that is, people hardly ever suffer from degrees of mobbing—either one is a victim or one is not" (p. 120). Interestingly, Leymann based his ideas on work by Lorenz (1963), who affirmed that aggressive behavior is influenced by conflicting drives. This approach later inspired Zeeman (1976) to use catastrophe theory as an example of a nonlinear model for conceptualizing aggression (for further details regarding the aggression-in-dogs model, see Zeeman, p. 66).

Inspired by the conflict research perspective, the previously discussed study of Zapf and Groß (2001), where participants stated that they have encountered critical work/life events, found initial empirical evidence of the existence of nonlinearity within the bullying process. In this study, where five different courses of bullying appeared, several escalated patterns showed abrupt changes (course 2, with 10% of the victim cases), discontinuities (course 4, with 42% of the victim cases), and escalation and de-escalation processes (course 5, with 21% of the victim cases). Therefore, although about 25% showed linear processes, 75% could be better described as nonlinear. Moreover, Zapf and Groß's study analyzed the conflict-management strategies utilized by the victims of workplace bullying. The study revealed that bullying victims tried various active and passive conflict-management strategies; these, however, were unsuccessful. Most ineffective was confronting the bullies, which usually escalated the situation abruptly. Although the most frequent course was voice-loyalty-voice-neglect-exit (VLVNE, according to the Exit Voice Loyalty

Neglect-model of Withey and Cooper 1989), most participants changed their strategy several times (unsuccessfully). Ultimately, only the intervention of third parties, such as higher management, helped to resolve the negative situations. Such a result highlights a central feature of many definitions of bullying: the imbalance of power between the parties (Einarsen et al., 2011). The fact that the coping strategies changed during the bullying process and that higher management had the power to abruptly stop the situation favors, at least in some situations, an interpretation of workplace bullying as a nonlinear phenomenon.

Other qualitative evidence can be found in Leymann (1990), who illustrated through a case reported by a Danish employee working in Norway that the bullying phenomenon does not always develop in a linear and progressive way, but with sudden and abrupt changes:

His workmates often made fun of him as he spoke Norwegian with a Danish accent. This happened so often that his personal relations became seriously disturbed—he became isolated. On one occasion he became so irritated that he thumped the table with his fist and demanded an end to all further jokes about his accent. From that point, things became worse. His workmates intensified and widened the range of their “jokes” (p. 120).

Leymann (1996), after studying hundreds of cases of workplace bullying like this one, concluded that bullying evolves from a conflict after a certain amount of time, sometimes very quickly, sometimes after weeks or months, usually because the social context changes. For instance, workplace bullying can suddenly become worse when managers take part in the process, normally by favoring the perpetrators or publicly avoiding or denying it. However, bullying could become better if managers stop it through positive interventions.

In sum, on the one hand, Leymann’s perspective shows that victims normally do not get involved as perpetrators, even if the situation worsens. On the other hand, the conflict research perspective shows how victims can become perpetrators through the victimization process. In the present study, we suggest that both perspectives help to illuminate the phenomenon. However, the main question is: under what circumstances will a target of workplace bullying behaviors carry out, or not carry out, workplace bullying behaviors him- or herself? Here, we will argue, catastrophe theory applies.

In order to study workplace bullying behaviors from a nonlinear dynamical systems perspective, an attractive type of catastrophe model, the cusp catastrophe model, which has the smallest number of independent and dependent variables and is considered the simplest model that accounts for sudden changes (Van der Maas, Kolstein, & van der Pligt, 2003). Although many variables produce quantitative effects on the system’s behavior, usually only a relatively small subset of them promotes noteworthy qualitative changes (Vallacher & Nowak, 1997). Considering the theoretical model underpinning the present study, with two predictors (WBV and PSC) and one outcome (WBP), the cusp catastrophe model will be further explained in the next section.

### Cusp Catastrophe Model

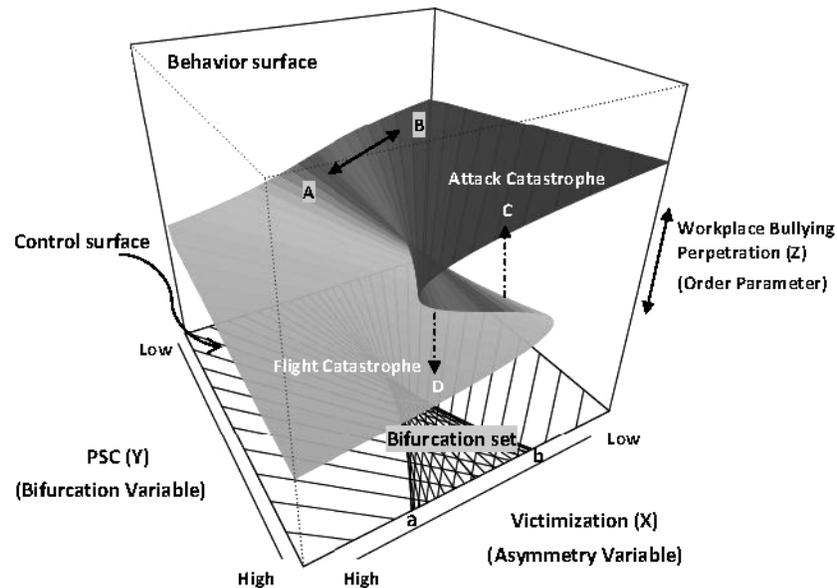
The cusp catastrophe model assumes that sudden, abrupt, and radically different responses are possible due to environmental changes that are small and seemingly inconsequential. In order to reach a sudden and radical change in the dependent variable, which in cusp-model terminology is called the *order parameter*, the predicting variables must reach a critical point or threshold (Vallacher & Nowak, 1997). Within the independent variables are two key factors. The *bifurcation variable* or *splitting factor* can be understood as a moderator variable that specifies conditions under which the asymmetry variable will affect the order parameter. The *asymmetry variable* or the *normal factor* is related to the dependent variable in a consistent pattern (Zeeman, 1976).

In the present cusp model, PSC is considered the bifurcation parameter. Tesser and Achee (1994) described the social psychological phenomenon of human aggression using a cusp catastrophe model and pointed out how external conditions, such as social pressure, were better considered as the splitting factor. They defined them as perceptions of “social forces that are opposed to the performance of the relevant behavior” (p. 102). Basing their ideas on conformity theory (e.g. Asch, 1956), Tesser and Achee further reasoned that when social forces are high, behaviors usually tend to change in the direction of the pressure. Moreover, considering reactance theory (e.g. Brehm, 1966), the authors reasoned that under the pressure of such social forces, an opposite behavior could also take place. Thus, some victims may fight back (Rodríguez-Muñoz et al., 2012) or bully others as a result of displaced aggression, especially against employees with less power status (Mawritz et al., 2012).

Following the previous example, in a situation with strong PSC, a bullying victim will rarely carry out bullying behaviors (see Fig. 1). Therefore, while keeping the level of victimization constant, even a strong, decreasing change in the level of PSC may have only short-term effects or no effects at all. However, if the PSC becomes increasingly weak, then even a small change in the bifurcation variable (PSC) could lead the bullying victim to eventually reach a breaking point or threshold of change (in Fig. 1, it should be reached by passing point “b” through point “a” of the bifurcation set), and to break off his/her passiveness and perpetrate workplace bullying behaviors, which could be related to reactance (Brehm, 1966). This sudden change in behavior might be called an *attack catastrophe* (Zeeman, 1976).

The cusp catastrophe model also predicts that once the victim has reached such a breaking point or threshold of change in the dependent variable (workplace bullying behaviors), returning to a previous lower level of bullying could be difficult even if PSC starts to increase. The catastrophe model predicts that once this happens, negative behavior will remain at a high level until PSC reaches a certain higher point, when a sudden drop of the negative behavior will occur (in Fig. 1, it should be reached by passing point “a” through point “b” of the bifurcation set). This sudden change in behavior might be called a *flight catastrophe* (Zeeman, 1976), and it is in line with conformity theory (Asch,

1956). At this stage, the duration of the workplace bullying behaviors reported by victims in most of the studies, which averaged several months (or even years), adds plausibility to such a dynamic process (see Zapf, Escartín, Einarsen, Hoel, & Vartia, 2011, Table 3.1, p. 79).



**Fig. 1.** Cusp catastrophe model of workplace bullying behaviors.

In this specified model, the dependent variable becomes bimodal for given X, Y pairs within the bifurcation set or cusp region (in Fig. 1, the area of overlap). In other words, a given X, Y pair (PSC and WBV) can give rise to two different Z values that represent the extent of the “attack” or “flight” response. In the attack response the victim starts on the front, left section of the behavior space and then moves to the right and as he or she passes through the area of the bifurcation set, from “a” to “b;” he or she reaches the righthand fold, and there is no more bottom surface, point “C”. In the flight response the victim starts on the front, right section of the behavior space and then moves to the left, and as he or she passes through the area of the bifurcation set, from “b” to “a,” he or she reaches the lefthand fold, and there is no more upper surface, point “D” response. Moreover, the value of the dependent variable is measured by its position along the vertical axis. Outside the bifurcation set, things become more continuous, and a given pair of X, Y values usually generates only one response type (points “A” and “B”). The bifurcation set defines the area of bimodality. Its edges are the threshold set for catastrophic jumps. Movement inside of or into the bifurcation set will not cause catastrophic changes in behavior. However,

changes in the bifurcation variable that cause a victim to pass through the bifurcation set, i.e., enter on one side and leave on the other, will produce catastrophic jumps in behavior upon leaving.

To summarize, according to Vallacher and Nowak (1997), this dynamical system principle specifies the conditions under which a phenomenon of interest is likely to “show gradual and incremental changes versus sudden and catastrophic changes in response to external factors, for example, or predict when a small change in an external factor will produce disproportionately large change in the phenomenon” (p. 95).

### **Competing Views from Two Theoretical Approaches**

Significant differences between the linear models and the nonlinear dynamical systems models of workplace bullying have been outlined, along with important implications for our understanding of how negative workplace behaviors develop. When we apply concepts used in stress research, we see that bullying can manifest in the form of daily hassles and critical life events. On the one hand, regarding the daily-hassles approach, Einarsen (1999) defined workplace bullying as a gradually evolving process. On the other hand, regarding the major-life-events approach, Leymann (1990) defined bullying as an either/or phenomenon. Divergent assumptions have been made about the particularly strong implications for research and practice. Our goal here is to compare both approaches to interpreting workplace bullying behaviors in order to gain new insights and questions in this research area.

However, because of the fact that nonlinear dynamical systems models are relatively young and even nonexistent in the workplace bullying domain, it is necessary to strongly justify the introduction of this model. Several authors have pinpointed at least five flags that can indicate whether a catastrophe model is the correct selection for a study, including hysteresis, bimodality, sudden jump, divergence, and inaccessibility (Gilmore, 1981). However, it has also been suggested that even if only one of the flags is observed in a behavior, the phenomenon should be tested in a cusp catastrophe model (Zeeman, 1976). Although a comprehensive examination of the flags is outside of the scope of this study (see Gilmore, 1981, for detailed explanations), some of the flags are briefly described here.

First, the cusp catastrophe model of workplace bullying behavior introduced in the present paper shows a hallmark of nonlinear dynamical systems (Guastello, 2002). As shown in Fig. 1, the behavior is bimodal in some parts of its range (not paths “A” and “B” but “C” and “D”) (e.g. conducting or not conducting workplace bullying behaviors), so it could be defined as existing in a bimodal state. Second, sudden jumps are observed between conducting (bottom-up process) and not conducting (top-down process) workplace bullying behaviors. These two characteristics are derived from Zapf and Groß’s (2001) study, in which several patterns (linear and nonlinear) of behavior appeared. Third, this model implies the possibility of divergent behavior, because two different paths become available as the values of the bifurcation variable

increase: to show reactance and bully or to show conformity and not bully (Tesser & Achee, 1994). Finally, between the top and bottom sheets there is an inaccessible zone on the behavior axis: the middle sheet, which represents the least likely behavior. An intermediate response between bullying and not bullying seems rare if not impossible.

To sum up, the two theoretical approaches have very similar structures. They both contain the same independent variables (WBV and PSC) and the same dependent variable (WBP). Each tries to explain the same phenomenon, workplace bullying behaviors. They both define workplace bullying as a long-lasting process, and both postulate that together, in an interactive manner, increased WBV and decreased PSC will make targets more prone to bullying. Here, however, the agreement stops. According to the linear approach, increasing the effects of the independent variables will proportionally affect the dependent variable, leading to continuous changes in employees' negative behavior. In contrast, according to the nonlinear approach, increasing the effects of the independent variables will, under certain circumstances, disproportionately affect the dependent variable, leading to discontinuous, abrupt, and sudden changes in employees' negative behavior.

How do we choose between two theories with competing predictions about the relationship among WBV, PSC, and WBP? Although the two theories are not necessarily competing in the sense that if one is right, then the other is wrong, it may well be that in some situations, one is right, and in other situations, the other is. We have already seen in our cusp catastrophe model (see Fig. 1) that linear behavior can be expected outside the bifurcation set (areas "A" and "B" of the behavior surface) but that nonlinear behavior can also be expected when crossing through the bifurcation set (areas "C" and "D" of the behavior surface). These remarks merely reconfirm the complexity of the processes involved. Nevertheless, because we were able to observe four flags in workplace bullying behavior, because the catastrophe model allows us to simultaneously consider both continuous and discontinuous changes, and because cusp catastrophe models have proven to lead to increasing predictability in several organizational phenomena, such as leadership emergence and work motivation and flow, we propose the following:

*Hypothesis 2:* The cusp catastrophe model of the effect of WBV and PSC on WBP will explain more variance than its comparable linear model.

## **METHOD**

### **Participants**

This study forms part of a national research project conducted by the authors on the prevalence of workplace bullying in Spain (references removed). With the assistance of the researchers' and psychology MA and MBA students' contact networks, a questionnaire was emailed to a sample of 100 organizations within the private, public, and voluntary sectors across the country, including a wide range of economic sectors, such as services (29%), trading (25%), education (23%), health (16%), and industry (7%). A total of 4,848

questionnaires were returned and completely filled out, a response rate of 70%. The final sample consisted of slightly more female (54%) than male (46%) employees. Mean age was 37 years old ( $SD = 11$ ). Most of the participants were married (54.6%) and had a permanent contract with their company (77%). Average company tenure of the participants was nine years ( $SD = 9$ ). The data collection took place between September 2010 and June 2011.

### **Measures**

All measures were administered in Spanish and came from self-reports. Although self-reported data, especially those concerning undesirable behaviors, have been controversial, several researchers have presented evidence of their validity in comparison to external measures (e.g. Fergusson & Barry, 2011). Five-point Likert scales were employed to measure the dependent variable (WBP), the normal factor (WBV), and the splitting factor (PSC). The scales used ranged from (0) strongly disagree to (4) strongly agree. All analyses were conducted with these three continuous variables.

### **Dependent Variable**

WBP was measured using the Spanish 14-item version of the Negative Acts Questionnaire (NAQ) validated by Moreno-Jiménez, Rodríguez-Muñoz, Martínez, and Gálvez (2007). Because the NAQ evaluates behaviors reported by the victims through items formulated in a passive way, the set of items was slightly adapted from such a passive (i.e., “being isolated”) to an active (i.e., “isolating”) formulation in order to evaluate perpetrators’ behaviors. Such items have been previously used in other studies (Ceja, Escartín, & Rodríguez-Carballeira, 2012; Escartín, Sora, Rodríguez-Muñoz, & Rodríguez-Carballeira, 2012) and have shown good reliability and validity. A sample item is “I have ignored, excluded or physically isolated others.” For the continuous variable, Cronbach’s alpha was .84 (see Table 1).

### **Predictors**

WBV was measured using the behavioral experience method through the 12-item scale *Escala de Abuso Psicológico Aplicado en el Lugar de Trabajo* (EAPA-T) from Escartín, Rodríguez-Carballeira, Gómez-Benito, and Zapf (2010), which showed good reliability and validity. A sample item is “I have been excluded from celebrations and social activities organized by my co-workers.” For the continuous variable, Cronbach’s alpha was .91.

PSC was measured using the four-item scale from Dollard and Bakker (2010). The content domain of the PSC four-item scale comprises: (a) senior management support for stress prevention; (b) the involvement of all levels of the organization in stress prevention; and (c) participation, consultation, and heeding inputs to resolve occupational health and safety issues with all stakeholders (i.e., managers, employee representatives). A sample item is “Senior management show support for stress prevention through involvement and commitment.” Cronbach’s alpha was .83.

## Analysis

Although all the analyses were conducted with the continuous variables, the frequency of workplace bullying behaviors from targets, perpetrators, and targets and perpetrators together was calculated. Based on the literature, we classified employees as perpetrators when they performed at least one negative act per week, or at least four negative acts per month (Escartín, Ullrich, Zapf, Schlüter, & van Dick, 2017). This guideline resulted in 4% of employees being classified as bullying perpetrators. Likewise, we classified employees as targets when they were victimized at least once per week, or four times per month. This guideline resulted in 7% of employees being classified as bullying victims. The number of victims who acted as perpetrators was calculated as well. Out of this sample, 3.6% of employees were both bullying victims and perpetrators.

To check the construct validity of the measures, model comparisons using Confirmatory Factor Analysis (CFA) were performed. According to chi-square difference tests, a model specifying three correlated factors (WBV, WBP, and PSC) yielded a significantly better fit than a model collapsing the two bullying constructs,  $\Delta\chi^2 = 3126.42$ ,  $p < .01$ , or a simple null model,  $\Delta\chi^2 = 9832.80$ ,  $p < .01$ . Thus, it was appropriate to regard these measures as representing distinct constructs.

To analyze the fit of the cusp catastrophe model to the workplace bullying data and compare the fit to a linear model, the R cusp package (Grasman, van der Maas, & Wagenmakers, 2009) was used. This method implements and extends Cobb's maximum-likelihood approach (Cobb & Watson, 1980) and makes it easy to fit the cusp model to real data and compare it to linear regression models (including main effects and interaction between PSC and WBV). This method is also appropriate for cross-sectional data (Grasman et al., 2009). Several model-fit statistics were calculated in order to assess the fit of the cusp model and the linear regression model. First, the conventional  $R^2$  for the linear model and the pseudo- $R^2$  statistic for the cusp model were calculated. It is important to emphasize that the pseudo- $R^2$  is not in all cases a trustworthy guide for selecting the model, especially in nonsymmetrical distributions (Grasman et al., 2009). When selecting among models, some preference should be given for the model with fewer parameters, other things being approximately equal, for this reason, a second comparison criterion based on Akaike's information criterion corrected (AICc) and Bayes's information criterion (BIC) indices were used. These indices can help compare the cusp model to competing models like the linear regression model; the model that shows the lower AICc and BIC indices emerges as fitting the data best. Finally, the likelihood ratio chi-square test was utilized to compare the fit of the cusp model and the linear regression model (contrasting the AICc and BIC indices).

To our knowledge, workplace bullying theory has not yet examined whether PSC and WBV are good bifurcation and asymmetry parameters.

Nevertheless, adopting a wider perspective to include human aggression, Tesser and Achee (1994) indicated that the cusp catastrophe model applies to those behaviors that “engage both a disposition and a conflicting social pressure” (p. 102), and that the bifurcation parameters are the external ones. In the present study, as stated in the introduction, victimization could be considered a disposition, in other words, the asymmetry parameter, and PSC an external pressure, in other words, the bifurcation parameter.

## RESULTS

The first hypothesis expected a positive and significant relationship between WBV and WBP, and a negative and significant relationship between WBV and PSC and between PSC and WBP. As Table 1 shows, all correlations were significant and in the expected direction. Therefore, although the relationship between PSC and WBP was low (but significant), hypothesis 1 was fully supported.

**Table 1.** Means, Standard Deviations, and Correlations of Study Variables.

	<i>MEAN</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>
1. WBV	.24	.45	(.91)		
2. PSC	1.87	.93	-.18***	(.83)	
3. WBP	.19	.41	.58***	-.05**	(.84)

*Note:* Workplace bullying victimization, WBV; psychosocial safety climate, PSC; workplace bullying perpetration, WBP.

\*\*\*  $p < .001$ ; \*\*  $p < .05$

**Table 2.** Tests on the regression weights of the study variables.

	<i>Linear</i>		<i>Cusp</i>	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
	<i>Full Sample</i>			
WBV	.25***	.02	-1.27***	.05
PSC	-.01*	.00	-.00	.05
WBV x PSC	.16***	.01		
WBP			1.54***	.01
	<i>Subsample: Victims &amp; Perpetrators</i>			
WBV	.05	.04	.32***	.05
PSC	.06	.07	-.02	.09
WBV x PSC	.016***	.03		
WBP			1.09***	.03

*Note:* \* $p < .05$ , \*\*\* $p < .001$ . Linear model for the full sample [ $F(3, 4844)=942,3^{***}$ ] and subsample [ $F(3, 694)=61.28^{***}$ ]. The linear models tested the interaction effect; the cusp models also calculated the coefficients of the dependent variable.

**Table 3.** Fit Statistics for Linear and Cusp Models.

		<i>Full Sample</i>		<i>Subsample: Victims &amp; Perpetrators</i>	
		<i>Linear</i>	<i>Cusp</i>	<i>Linear</i>	<i>Cusp</i>
WBP	AICc	3133.79	7448.66*	1503.55	1521.69*
	BIC	3159.72	7887.56*	1593.93	1621.10*
	$R^2$	.34	.45	.18	.37

Note: Full sample ( $\chi^2 = 4711$ ,  $df = 2$ ;  $*p < .001$ ); Subsample ( $\chi^2 = 86.32$ ,  $df = 2$ ;  $*p < .001$ ).

The second hypothesis intended to compare the linear model and the cusp model as predictors of workplace bullying perpetration (WBP) (see Table 2 and Table 3). As shown in Table 3, the Akaike information criterion corrected (AICc) and Bayesian information criterion (BIC) values for the linear model were lower than those for the cusp model. However, the  $R^2$  for the linear model ( $R^2 = .34$ ) was lower than that for the cusp model ( $R^2 = .45$ ). Finally, the chi-square test was calculated to further statistically compare both models. The results showed a significant difference between the linear model and the cusp model ( $\chi^2 = 4711$ ,  $df = 2$ ;  $p < .001$ ), the former model being the one that better fit the data. Therefore, hypothesis 2 was not supported.

Finally, a subsample of employees who were categorized as both victims and perpetrators was used in order to compare further the fit of the cusp catastrophe model and its linear counterpart. This was conducted in order to confirm that the previous results are not being affected by the fact that only 3.6% of our total sample can be categorized as both victim and perpetrator. Lower values of AICc and BIC indicate a better fitting model; as shown in Table 3, results from these analyses confirmed once again the supremacy of the linear model over the cusp catastrophe model (i.e., the linear model presented lower AICc and BIC indices) when solely considering the victim-perpetrator cases. Nevertheless, according to the  $R^2$ , the cusp model provided a better fit to the data. However, because the  $R^2$  is not in all cases a trustworthy guide in selecting the model (Grasman, et al., 2009), considering the AICc and BIC the linear model provided a better fit. In addition to this, AIC and BIC statistics are more reliable when the tested model has few parameters, being equal the rest of fit statistics (i.e. the  $R^2$  in our case). These results again do not support this Hypothesis 2. This adds evidence to the linear explanation of workplace bullying perpetration; in other words, such a negative behavior appears to be better explained as mostly linear and continuous.

## DISCUSSION

The main purpose of this study was to investigate workplace bullying behaviors as predicted by WBV and PSC. The first hypothesis expected

significant correlations among the study variables. Like in other empirical studies with similar correlations (Hershcovis et al., 2012), WBV was positively correlated with WBP. As argued by several authors (Hauge et al., 2009), such overlap demonstrates the importance of taking WBV into account when predicting workplace bullying behaviors. Similarly, this result adds support to the social interactionist perspective on workplace bullying, which suggests that when employees feel harassed they often respond with a counter-act of comparable severity (Neuman & Baron, 2011). Moreover, PSC was negatively correlated with both WBV and WBP. These results are also supportive of previous empirical evidence (Bond et al., 2010) and add value to the work environmental hypothesis (Leymann, 1996). Therefore, hypothesis 1 was fully supported.

The second and main hypothesis of this study expected that the cusp catastrophe model could predict WBP better than the linear model. Against expectations, the results showed that workplace bullying behaviors can be better explained as continuous linear responses in employee behavior rather than as discontinuous changes. The variance explained by the linear and cusp models compares equally to results from other studies, which explained an average of 45% of the variance. These studies used from 8 to 14 variables to explain perpetrators' behaviors (Baillien et al., 2011; Hauge et al., 2009). Adding numerous predictor variables to the explanatory models does not appear to substantially increase the explained variance. Therefore, although the results give further support to the evidence that WBV and PSC are powerful predictors of WBP, hypothesis 2 was not supported.

One possible explanation for the supremacy of the linear model over the cusp catastrophe model in explaining workplace bullying perpetration could be derived from the hysteresis effect, which refers to the tendency for behavior to resist change in spite of the existence of substantial variables. In other words, hysteresis could be an underlying condition that could maintain certain level of behavior (i.e., high workplace bullying perpetration) as a stable state, for instance after experiencing a substantial level of entropy (i.e., the attack catastrophe). Therefore, once in an original position (i.e., perpetrating workplace bullying), such position would produce resistance to change making smooth shifts most of the time.

Another possible explanation could be derived from the healthy variability hypothesis (Schuldberg, 2006), which argues that positive organizational behavior is likely to present high levels of variability as well as sudden changes, while a decrease in such variability may indicate the occurrence of negative behaviors at work. In that sense, several studies have shown a positive association between variability in the dynamics and positive behaviors, such as flexibility, creativity and innovation, and high levels of work motivation (Arrieta, Navarro, & Vicente, 2008). For instance, Fredrickson and Losada (2005) found an association between flourishing business teams and variability in their behavior; this variability allowed teams to be innovative and flexible in their interactions with the environment. At the same time, the authors found that

low-performing business teams tended to be less innovative and flexible in their interactions, thereby presenting linear behavior. Consistent with this earlier evidence, Ramos-Villagrasa, Navarro, and García-Izquierdo (2012) found that high variability (presents in chaotic dynamics) is related to better team effectiveness. In their paper on flow experiences in the workplace, Ceja and Navarro (2011) found that employees presenting high levels of enjoyment, absorption, and interest at work were associated with high levels of variability, whereas those presenting low and medium levels of enjoyment, interest, and absorption showed linear or random behavior.

### **Theoretical and Practical Implications**

Most of the existing literature on the antecedents of workplace bullying has focused on linear approaches, which consider that bullying behaviors might be predicted as a function of the sum or average of several organizational, job, or individual characteristics, or an interactive combination of (some of) them (Zapf & Einarsen, 2011). The present study extended such theoretical and empirical explanations of workplace bullying by formulating a nonlinear theoretical interpretation of bullying. Because the cusp catastrophe model of workplace bullying explained more variance than the linear model, our study provides initial evidence that although most of the changes in employees' negative behaviors are smooth and continuous, some of these changes can also present discontinuous or sudden changes. These implications are aligned with the work of Zapf and Groß (2001), who found different courses of bullying, some of them linear and some of them nonlinear.

The results also have obvious practical implications since understanding how victimization begets perpetration is a serious concern for managerial practice (Hershcovis et al., 2012). The well-established negative effects of workplace bullying (for individuals and organizations), together with the present results, which show that victimization and low PSC can allow perpetration to occur, should be considered by organizations, managers, and other stakeholders. Rather than regard workplace bullying as a problem for employees to resolve privately, organizations should actively discourage it. For interventions to be effective, the focus should be not only on patterns of social interaction within groups or departments, but also on the organizational climate in which such social relationships form. Regarding primary interventions, a significant increase in PSC could also prevent bullying, mainly gradually but also abruptly, making bullying behaviors more difficult to perpetrate. From a secondary and tertiary intervention perspective and following the contingency approach applied to the Glasl (1982) model of conflict escalation, the results demonstrate that in order to avoid negative behaviors at work in the form of WBP, interventions should consider previous levels of both WBV and PSC. In other words, it seems necessary to assess the history and the current status of the bullying situation in order to avoid inappropriate interventions. Finally, since, according to our results, the linear model seems to better explain most cases of WBP, when the conflict models are used for interventions, de-escalation should



be approached stage by stage rather than “jumping down” (Keashly & Nowell, 2011). Nevertheless, as one of the reviewers brought to our attention, interventions discussed in the bullying literature focus on conflict management procedures (i.e. mediation; Jenkins, 2011), which seem to be compatible with both the cusp and the linear model. For instance, the conflict management procedures may be compatible with a cusp approach when one party is in an inferior position, so if power gets out of balance there is a sudden shift from one conflict management strategy to another (e.g., from mediation to arbitration or power intervention by a higher level person). Likewise, the linear approach is likely to work when both parties are in a similar position and therefore the conflict management strategy should be followed stage by stage rather than suddenly shifting from one strategy to another (Keashly & Nowell, 2011). Vallacher, Coleman, Nowak and Bui-Wrzosinska (2010) have used the dynamical systems theory to explain the genesis and maintenance of long-lasting conflicts (i.e., workplace bullying) through the notion of attractor (i.e., stable and recurring patterns of relations between the parties to the conflict). For these authors, the conflict escalation could be determined by an attractor, getting the conflict stuck in a loop centered on behaviors that are harmful to themselves and to the organization without (favorable) alternatives to move toward. Therefore, in order to resolve such conflict escalation, should be tantamount to changing the systems’ attractors. Accordingly, to study possible attractors should be at the forefront of the research agenda (Vallacher et al., 2010).

### **Limitations and Future Research**

Several limitations should help guide future research. First, it is important to note that common method variance may have influenced our correlations. To date, considerable attention has been given to possible inflation of correlations as a result of common method variance (Podsakoff, MacKenzie, & Podsakoff, 2012). We feel confident, however, that common method variance did not substantially influence our results. To reduce potential risks of common method variance, we followed suggestions for questionnaire design, such as allowing anonymity and instructing the participants that there are no right or wrong answers. Moreover, nonlinear effects are hardly attributable to method bias (Aiken & West, 1991) and, in any case, could attenuate rather than strengthen interaction. Although an overlap between self- and other-ratings of negative behaviors has been shown, leading us to question the use of other-ratings (Berry, Carpenter, & Barratt, 2012) to strengthen this research design, future research still may benefit from collecting and comparing multimethod data, such as managerial reports or scores from third-party observers, and separating perpetrator and victim responses. Second, the correlation between perpetrators and victims was moderately high as it is found in several studies (Herscovis et al., 2012). Nevertheless, we were able to identify separately victims (7%) from perpetrators (4%) and not only mixed profiles of victims and perpetrators (3.6%). Moreover, the subsamples of victims, perpetrators, and both victims and perpetrators were relatively small (although similar to other studies;

i.e., Matthiesen & Einarsen, 2007), which is consistent with the fact that bullying is a very skewed distributed variable (Notelaers & Einarsen, 2012). This means that the large sample included not only severe workplace bullying behaviors but also negative work behaviors of minor severity. Future studies should seek to discriminate between negative work behaviors and workplace bullying behaviors, which is of the utmost importance regarding primary, secondary, and tertiary prevention (Notelaers & Einarsen, 2012). Third, our data were collected from several companies in diverse economic sectors. This design limited our ability to control for certain extraneous variables, and thus it does not take into account potential confounding variables that might have influenced the study findings. However, the sampling of a variety of organizations could also be considered a strength in that it increases the generalizability of the study findings across various settings. Fourth, social desirability may have played a role in the findings presented here (Nielsen, Notelaers, & Einarsen, 2011). Nevertheless, if we consider the prevalence rates obtained from the present sample of nearly 5,000 employees regarding victimization (7%) and perpetration (4%), and if we consider the recent studies that have assessed bullying behaviors from perpetrators (Baillien, Rodríguez-Muñoz, Van den Broeck, & De Witte, 2011), we are persuaded to assume that social desirability is not a real threat within the present study. Fifth, although we have preliminary evidence that workplace bullying behaviors can be better explained using a linear model as shown by the AICc and Bic indexes; the higher  $R^2$  for the cusp catastrophe model indicates that further research is necessary to replicate or to compare the effects of WBV and PSC on WBP. In this sense it may be interesting to build on this first cusp catastrophe model of workplace bullying and include other measures like gender, types of leadership (e.g., laissez-faire leadership, power vacuum or transformational leadership) or disentangle the different kinds of bullying behavior (e.g. work-related versus person-related). Finally, all data were collected utilizing a cross-sectional study design, so causality cannot be inferred. It might be fruitful for future research to address this important issue through longitudinal study designs.

### **Main Contributions**

This study contributes to the literature in five distinct ways. First, considering workplace bullying as a social stressor at work (Hauge, Skogstad, & Einarsen, 2010), the study provides evidence in favor of the daily-hassles approach above the major-life-events approach (Kanner et al., 1981). Second, this study is one of the very few that theorizes interactional individual and organizational effects for the explanation of workplace bullying. The study provides evidence that WBV and PSC interactively can explain the likelihood of WBP. Third, this study is likely the first to have implemented a nonlinear approach to the study of workplace bullying. Fourth, it is also one if not the first to compare linear and nonlinear models in the development of workplace bullying behaviors. And fifth, a methodological strength is that the linear and nonlinear (cusp catastrophe) models are tested together, which has not been

done so far within the bullying domain. Overall, we hope that our findings stimulate other workplace bullying scholars to use nonlinear approaches (e.g. catastrophe theory, nonlinear metrics) and continue asking new questions and providing innovative insights into the complex dynamics of workplace bullying.

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### REFERENCES

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, London: Sage.
- Aquino, K., & Thau, S. (2009). Workplace victimization: Aggression from the target's perspective. *Annual Review of Psychology*, *60*, 717-741.
- Arrieta, C., Navarro, J., & Vicente, S. (2008). Factores asociados a la emergencia de patrones diferenciales de la motivación en el trabajo [Variables related to the emergence of differential patterns in work motivation]. *Psicothema*, *20*, 745-752.
- Asch, S. E. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs*, *70* (Whole no. 416).
- Baillien, E., De Cuyper, N., & De Witte, H. (2011). Job autonomy and workload as antecedents of workplace bullying: A two-wave test of Karasek's job demand control model for targets and perpetrators. *Journal of Occupational and Organizational Psychology*, *84*, 191-208.
- Baillien, E., Rodríguez-Muñoz, A., Van den Broeck, A., & De Witte, H. (2011). Do demands and resources affect targets' and perpetrators' reports of workplace bullying? A two-wave cross-lagged study. *Work & Stress*, *25*, 128-146.
- Berry, C. M., Carpenter, N. C., & Barratt, C. L. (2012). Do other-reports of counterproductive work behavior provide an incremental contribution over self-reports? A meta-analytic comparison. *Journal of Applied Psychology*, *97*, 613-636.
- Bond, S. A., Tuckey, M. R., & Dollard, M. F. (2010). Psychosocial safety climate, workplace bullying, and symptoms of posttraumatic stress. *Organization Development Journal*, *28*, 37-56.
- Brehm, J. W. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Ceja, L., Escartín, J., & Rodríguez-Carballeira, Á. (2012). Organizational contexts that foster positive behaviour and well-being: A comparison between family and non-family business. *Revista de Psicología Social*, *27*, 69-84.
- Ceja, L., & Navarro, J. (2011). Dynamic patterns of flow in the workplace: Characterizing within-individual variability using a complexity science approach. *Journal of Organizational Behavior*, *32*, 627-651.
- Ceja, L., & Navarro, J. (2012). "Suddenly I get into the zone": Examining discontinuities and nonlinear changes in flow experiences at work. *Human Relations*, *65*, 1101-1127.
- Cobb, L., & Watson, B. (1980). Statistical catastrophe theory: An overview. *Mathematical Modelling*, *1*, 311-317.

- De Cuyper, N., Baillien, E., & De Witte, H. (2009). Job insecurity, perceived employability and targets' and perpetrators' experiences of workplace bullying. *Work & Stress, 23*, 206-224.
- Dollard, M. F., & Bakker, A. B. (2010). Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement. *Journal of Occupational and Organizational Psychology, 83*, 579-599.
- Einarsen, S. (1999). The nature and causes of bullying at work. *International Journal of Manpower, 20*, 16-27.
- Einarsen, S., Hoel, H., Zapf, D., & Cooper, C. L. (Eds.). (2011). The concept of bullying and harassment at work: The European tradition. In S. Einarsen, H. Hoel, D. Zapf, & C. L. Cooper (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 3-40). London: Taylor & Francis.
- Escartín, J., Dollard, M., & Zapf, D. (2012). Workplace bullying as a mediator between psychosocial safety climate and health and well-being: A multilevel mediation model. **Manuscript submitted for journal review.**
- Escartín, J., Rodríguez-Carballeira, A., Gómez-Benito, J., & Zapf, D. (2010). Development and validation of the workplace bullying scale "EAPA-T." *International Journal of Clinical and Health Psychology, 10*, 519-539.
- Escartín, J., Sora, B., Rodríguez-Muñoz, A., & Rodríguez-Carballeira, A. (2012). Adaptación y validación de la versión española de la Escala de Conductas Negativas en el trabajo realizadas por acosadores: NAQ-Perpetrators. [Adaptation and validation of the Negative Acts Questionnaire-Perpetrators at work (NAQ-P)]. *Revista de Psicología de las Organizaciones y del Trabajo, 28*, 157-170.
- Escartín, J., Ullrich, J., Zapf, D., Schlüter, E., & van Dick, R. (2013). Individual and group level effects of social identification on workplace bullying. *European Journal of Work and Organizational Psychology, 22*, 182-193.
- Fergusson, M., & Barry, B. (2011). I know what you did: The effects of interpersonal deviance on bystanders. *Journal of Occupational Health Psychology, 16*, 80-94.
- Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American Psychologist, 60*, 678-686.
- Gilmore, R. (1981). *Catastrophe theory for scientists and engineers*. Mineola, NY: Dover Publications.
- Glasl, F. (1982). The process of conflict escalation and roles of third parties. In G. B. J. Bomers & R. Peterson (Eds.), *Conflict management and industrial relations* (pp. 119-140). Boston: Kluwer-Nijhoff.
- Glomb, T. M. (2002). Workplace anger and aggression: Informing conceptual models with data from specific encounters. *Journal of Occupational Health Psychology, 7*, 20-36.
- Glomb, T. M., & Liao, H. (2003). Interpersonal aggression in work groups: Social influence, reciprocal, and individual effects. *Academy of Management Journal, 46*, 486-496.
- Grasman, R. P., van der Maas, H. L. J., & Wagenmakers, E. J. (2009). Fitting the cusp catastrophe in R: A cusp package primer. *Journal of Statistical Software, 32*, 1-27.

- Guastello, S. J. (2002). *Managing emergent phenomena: Nonlinear dynamics in work organizations*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Guastello, S. J. (2007). Nonlinear dynamics and leadership emergence. *Leadership Quarterly*, *18*, 357-369.
- Hauge, L. J., Skogstad, A., & Einarsen, S. (2009). Individual and situational predictors of workplace bullying: Why do perpetrators engage in the bullying of others? *Work & Stress*, *23*, 349-358.
- Hauge, L. J., Skogstad, A., & Einarsen, S. (2010). The relative impact of workplace bullying as a social stressor at work. *Personality and Social Sciences*, *51*, 426-433.
- Hershcovis, M. S., & Barling, J. (2010). Towards a multi-foci approach to workplace aggression: A meta-analytic review of outcomes from different perpetrators. *Journal of Organizational Behavior*, *31*, 24-44.
- Hershcovis, M. S., Reich, T. C., Parker, S. K., & Bozeman, J. (2012). The relationship between aggression and target deviant behavior: The moderating roles of power and task interdependence. *Work & Stress*, *26*, 1-20.
- Jenkins, M. (2011). Practice note: Is mediation suitable for complaints of workplace bullying? *Conflict Resolution Quarterly*, *29*, 25-38.
- Jenkins, M., Winefield, H., & Sarris, A. (2011). Consequences of being accused of bullying. *International Journal of Workplace Health Management*, *4*, 33-47.
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine*, *4*, 1-39.
- Kauffman, R. G., & Oliva, T. A. (1994). Multivariate catastrophe model estimation: Method and application. *Academy of Management Journal*, *37*, 206-221.
- Keashly, L., & Nowell, B. L. (2011). Workplace bullying, conflict and conflict resolution. In S. Einarsen, H. Hoel, & D. Zapf (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 423-455). London: Taylor & Francis.
- Leiter, M. P., Spence-Laschinger, H. K., Day, A., & Gilin-Oore, D. (2011). The impact of civility interventions on employee social behavior, distress and attitudes. *Journal of Applied Psychology*, *96*, 1258-1274.
- Leymann, H. (1990). Mobbing and psychological terror at workplaces. *Violence and Victims*, *5*, 119-126.
- Leymann, H. (1996). The content and development of mobbing at work. *European Journal of Work and Organizational Psychology*, *5*, 165-184.
- Lorenz, K. (1963). *On aggression*. New York: Harvest.
- Matthiesen, S. B., & Einarsen, S. (2007). Perpetrators and targets of bullying at work: Role stress and individual differences. *Violence and Victims*, *22*, 735-753.
- Mawritz, M. B., Mayer, D. M., Hoobler, J. M., Wayne, S. J., & Marinova, S. V. (2012). A trickle-down model of abusive supervision. *Personnel Psychology*, *65*, 325-357.
- Moreno-Jiménez, B., Rodríguez-Muñoz, A., Martínez, M., & Gálvez, M. (2007). Assessing workplace bullying: Spanish validation of a reduced version of the negative acts questionnaire. *The Spanish Journal of Psychology*, *10*, 449-457.
- Neuman, J. H., & Baron, R. A. (2011). Social antecedents of bullying: A social interactionist perspective. In S. Einarsen, H. Hoel, D. Zapf, & C. L. Cooper

- (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 201-225). London: CRC Press.
- Nielsen, M. B., Notelaers, G., & Einarsen, S. (2011). Measuring exposure to workplace bullying. In S. Einarsen, H. Hoel, D. Zapf, & C. Cooper (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 149-174). London: Taylor & Francis.
- Notelaers, G., & Einarsen, S. (2012). The world turns at 33 and 45: Defining simple cutoff scores for the negative acts questionnaire-revised in a representative sample. *European Journal of Work and Organizational Psychology*, 1-13. DOI: 10.1080/1359432X.2012.690558.
- Nowak, A., & Vallacher, R. R. (1998). *Dynamical social psychology*. New York: Guilford Press.
- Parzefall, M., & Salin, D. (2010). Perceptions of and reactions to workplace bullying: A social exchange perspective. *Human Relations*, 63, 761-780.
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources/causes of common method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539-569.
- Ramos-Villagrasa, P. J., Navarro, J., & García-Izquierdo, A. L. (2012). Chaotic dynamics and team effectiveness: Evidence from professional basketball. *European Journal of Work and Organizational Psychology*, 21, 778-802.
- Rodríguez-Muñoz, A., Moreno-Jiménez, B., Baillien, E., Sanz-Vergel, A. I., & Moreno, Y. (2012). Agredidos que agreden: La relación recíproca entre víctima y agresor en situaciones de acoso psicológico en el trabajo. *Psicothema*, 24, 358-363.
- Salin, D. (2003). Ways of explaining workplace bullying: A review of enabling, motivating and precipitating structures and processes in the work environment. *Human Relations*, 56, 1213-1232.
- Schuldberg, D. (2006). Complicato, ma non troppo: A small nonlinear model and the good life. In A. Delle Fave (Ed.), *Dimensions of well-being* (pp. 552-566). Milan: FrancoAngeli.
- Spector, P. E., & Fox, S. (2005). The stressor-emotion model of counterproductive work behavior (CWB). In S. Fox & P. E. Spector (Eds.), *Counterproductive work behavior: Investigations of actors and targets* (p. 46). Washington, DC: American Psychological Association.
- Tesser, A., & Achee, J. (1994). Aggression, love, conformity, and other social psychological catastrophes. In R. R. Vallacher & A. Nowak (Eds.), *Dynamical systems in social psychology* (pp. 95-109). New York: Academic Press.
- Thom, R. (1975). *Structural stability and morphogenesis*. New York: Benjamin-Addison-Wesley.
- Vallacher, R. R., Coleman, P. T., Nowak, A., & Bui-Wrzosinska, L. (2010). Rethinking intractable conflict: The perspective of dynamical systems. *American Psychologist*, 65, 262-278.
- Vallacher, R. R., & Nowak, A. (1997). The emergence of dynamical social psychology. *Psychological Inquiry*, 8, 73-99.
- Van der Maas, H. L. J., Kolstein, R., & van der Pligt, J. (2003). Sudden transitions in attitudes. *Social Methods & Research*, 32, 125-152.
- Vartia, M., & Leka, S. (2011). Interventions for the prevention and management of bullying at work. In S. Einarsen, H. Hoel, & D. Zapf (Eds.), *Bullying and*

- harassment in the workplace: Developments in theory, research and practice* (pp. 359-380). London: Taylor & Francis.
- Withey, M. J., & Cooper, W. H. (1989). Predicting exit, voice, loyalty, and neglect. *Administrative Science Quarterly*, *34*, 521-539.
- Zapf, D., & Einarsen, S. (2005). Mobbing at work: Escalated conflicts in organizations. In S. Fox & P. E. Spector (Eds.), *Counterproductive workplace behavior: Investigations of actors and targets* (pp. 237-270). Washington, DC: American Psychological Association.
- Zapf, D., & Einarsen, S. (2011). Individual antecedents of bullying: Victims and perpetrators. In S. Einarsen, H. Hoel, D. Zapf, & C. L. Cooper (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 177-200). London: Taylor & Francis.
- Zapf, D., Escartín, J., Einarsen, S., Hoel, H., & Vartia, M. (2011). Empirical findings on prevalence and risk groups of bullying in the workplace. In S. Einarsen, H. Hoel, D. Zapf, & C. L. Cooper (Eds.), *Bullying and harassment in the workplace: Developments in theory, research and practice* (pp. 75-105). London: Taylor & Francis.
- Zapf, D., & Groß, C. (2001). Conflict escalation and coping with workplace bullying. *European Journal of Work and Organizational Psychology*, *10*, 497-522.
- Zeeman, E. C. (1976). Catastrophe theory. *Scientific American*, *234*, 65-83.