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A Contemporary View of Interpersonal Aggression and Cyberbullying through ICT: Multilevel Insights from LMX Differentiation

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Abstract

Purpose – While the rapid adoption of Information Communication Technologies (ICT) in organizations has been linked with a higher risk of cyberbullying, research on the influence of cyberbullying on interpersonal behaviors in the workplace remains limited. By drawing on the ego-depletion theory and the leader-member exchange (LMX) theory, this research investigates how, why and when workplace cyberbullying may trigger interpersonal aggression through ICT.

Design/methodology/approach – We collected data from 259 employees and 62 supervisors working in large ICT organizations in China through a multi-wave survey. We performed multilevel analysis and used Hierarchical Linear Modeling (HLM) to test the proposed moderated mediation model.

Findings – The results revealed that workplace cyberbullying has a significant and positive influence on interpersonal aggression in the workplace via ego depletion. We found that differentiation in LMX processes at group level moderates the indirect relationship between workplace cyberbullying and interpersonal aggression (via ego depletion). Furthermore, the positive indirect effect of workplace cyberbullying was found to be stronger in the presence of a high LMX differentiation condition in comparison to a low LMX differentiation condition.

Research implications/limitations – The data were collected from Chinese ICT organizations, which may limit the generalization of this study's findings to other cultural and sectoral contexts.

Originality/value – This paper provides the first step in understanding how, why and when workplace cyberbullying triggers interpersonal aggression by investigating the role of ego depletion as a mediator and LMX differentiation as a boundary condition. This is the first study to empirically examine the relationships between workplace cyberbullying, ego depletion, LMX differentiation and interpersonal aggression in ICT organizations using multi-level modeling.

Keywords: Multilevel modeling, Workplace cyberbullying, Ego depletion, Interpersonal aggression, LMX, China.

1. Introduction

The growing adoption of Information and Communication Technologies (ICT) in our working lives has been linked to a higher occurrence of workplace cyberbullying in recent years (Zhang and Leidner, 2014; Lim and Teo, 2009; Farley *et al*., 2016). Workplace cyberbullying refers to a persistent and repeated exposure of individuals or groups to unwanted negative behavior through the use of internet technologies for communication (e.g., emails, social media) which often place them in a position of inferior power (Farley *et al*., 2016). Research on the dark side of ICT highlights workplace cyberbullying as a nascent field of inquiry (Farley *et al*., 2016; Privitera and Campbell, 2009). The field is attracting increased attention of researchers and practitioners (Kowalski *et al*., 2018; Glomb and Liao, 2003) because workplace cyberbullying creates a toxic organizational environment with severe and detrimental implications for individuals and organizations alike (Kowalski *et al*., 2018; Oksanen *et al*., 2020; Vranjes *et al*., 2018). At the individual level, for example, both cyberbullying and traditional bullying have been found to increase stress levels and turnover intention and diminish job satisfaction and wellbeing of those targeted (Coyne *et al*., 2017; Park and Choi, 2019). Most alarmingly, it has been reported that such behaviors trigger the intention to commit suicide among its targets (Ahmad and Sheehan, 2017; Zhang and Leidner, 2018).

To date, researchers have largely focused on examining the effects of cyberbullying on physiological and psychological outcomes of employees (Farley *et al*., 2016; Patchin and Hinduja, 2015) and relatively little attention has been paid to understanding its implications for interpersonal outcomes in the workplace. Recently, Cao and Lin (2016) reveal that cyberbullying elicits antisocial behavior in the workplace. Although the harmful effects of workplace cyberbullying on employees' health and job outcomes have been investigated (Anwar *et al*.,

2020; Turliuc *et al*., 2020; Vranjes *et al*., 2017; Baruch, 2005; Boncoeur *et al*., 2019), research on the underlying mechanisms and boundary conditions remains sparse (Coyne *et al*., 2017; Park and Choi, 2019). The present study thus responds to this deficiency in the literature by examining in-depth the relationship between workplace cyberbullying and interpersonal aggression in order to answer the question of how, why and when workplace cyberbullying triggers interpersonal aggression through ICT.

Interpersonal aggression entails behaviors that are directed toward others with an intention to cause harm or injury, such as physical fights, verbal insults and intimidation (Anwar *et al*., 2020; Glomb and Liao, 2003). In this paper, we argue that workplace cyberbullying is an indirect antecedent of workplace aggression. We propose an indirect relationship between workplace cyberbullying and interpersonal aggression because they both capture those negative and unwanted behaviors within organizations that have a strong potential to harm their targets. We draw on previous research (e.g., Neuman and Baron, 2011) that highlights how traditional bullying can serve as an antecedent to aggressive and violent behavior. This paper offers a nuanced understanding of the influence of workplace cyberbullying on interpersonal aggression by examining ego depletion as an underlying mechanism and LMX differentiation as a boundary condition in ICT organizations.

Baumeister *et al*. (1998) defined ego depletion as a "temporary reduction in the self's capacity or willingness to engage in volitional action (including controlling the environment, controlling the self, making choices, and initiating action) caused by prior exercise of volition" (p. 1253). They explained ego as the part of one's psyche that quests for self-control and mediates between conflicting inner and outer pressures. It is argued that the theory on ego depletion is useful for understanding the process through which cyberbullying may trigger

interpersonal aggression in the workplace (Anwar *et al*., 2020; Farley *et al*., 2016). Drawing on the ego-depletion theory (see also Baumeister *et al*., 1998; Muraven and Baumeister, 2000), this paper posits that workplace cyberbullying represents a provoking situation that triggers the ego depletion process in targeted individuals as a result of which they tend to act impulsively and aggressively. Furthermore, based on the LMX theory (Graen and Uhl-Bien, 1995), we argue that employees' exchange relationships with their leaders provide a meaningful context within organizations that affects their reaction to workplace cyberbullying. We argue that differences in the quality of employees' exchange relationships with their leaders (also known as LMX differentiation Henderson *et al*., 2009; Liden *et al*., 2006) will moderate the effect of workplace cyberbullying on an employee's ego depletion.

In a nutshell, this paper offers an original attempt in integrating the ego-depletion and LMX theories to propose (and subsequently test) a multi-level moderated mediation model (see Figure 1), explaining that the indirect effect of workplace cyberbullying on interpersonal aggression is mediated by ego depletion at the individual level and moderated by LMX differentiation at the workgroup level. In doing so, our research makes a three-fold contribution to the literature on internet technologies. First, it extends the literature on the dark side of internet technologies by proposing interpersonal aggression as one outcome of workplace cyberbullying. Second, it offers a nuanced understanding of the process through which workplace cyberbullying triggers interpersonal aggression by examining the role of individual-level ego depletion in the ICT context. Third, it expands the literature on boundary conditions associated with workplace cyberbullying by exploring the role of LMX differentiation at the workgroup level. It is hoped that the findings of this paper will help contemporary organizations to improve the quality of

work-life in general and interpersonal relations in particular by understanding some of the pain points associated with the use of ICT.

Insert Figure 1 Here

The next section reviews the relevant literature, discusses theory and presents the research hypotheses. The methods used to collect data to test the research hypotheses and associated model are then described. This is followed by a presentation and interpretation of empirical results obtained through multilevel analysis. Finally, theoretical and practical implications of the empirical results are discussed and areas for future research are identified.

2. Theoretical Underpinning and Hypotheses Development

2.1 Workplace cyberbullying

As ICTs permeate the daily working lives of individuals, workplace cyberbullying has emerged as a challenging social problem in contemporary organizations. Workplace cyberbullying encompasses a range of negative online behaviors, such as sending offensive emails or criticizing someone's work performance openly on social media which can be accessed by colleagues, supervisors or subordinates at work (Privitera and Campbell, 2009). Some of its characteristics (e.g., repetitive unwanted behavior that involves an imbalance of power between two parties whereby the more powerful party has either real or perceived intent to harm the weaker party) are similar to traditional bullying behavior.

While studies on cyberbullying conducted among children and adolescents support commonalities with traditional bullying behavior (Gini *et al*., 2018), the key distinction is that the behavioral occurrence is supported by ICT technologies such as the internet or digital and

social media (Farley *et al*., 2016; Olweus, 2013; Smith *et al*., 2008). Other distinctive features include the possibility that the perpetrator will remain anonymous (Kowalski and Limber, 2007), while targeting coworkers or supervisors or subordinates during or outside the organization's physical or spatial boundaries and normal working hours (Kowalski *et al*., 2014). This means that cyberbullying behavior transcends the boundaries that are created by time and space in the traditional workplace (Smith *et al*., 2008). In cyberbullying situations, the target or a group of targets may or may not be aware of, or have control over, the egregious activities that occur in the digital or virtual space, such as spreading malicious rumors about the target or their work performance (Langos, 2012). Moreover, the impact of cyberbullying on targets could be more profound than traditional bullying due to the relative potential of permanent online availability of egregious content and apparently wider social outreach (Coyne *et al*., 2017).

Previous research lends evidence to support the many harmful effects of workplace cyberbullying on those targeted through it (Oksanen *et al*., 2020; Pettalia *et al*., 2013). One study showed that workplace cyberbullying creates a toxic work environment where employees experience negative and unhealthy emotional states (Vranjes *et al*., 2017). Other studies, including meta-analytic reviews, have linked cyberbullying with poor organizational climate, task conflict, job stress, and substance abuse (Gaffney *et al*., 2019; Lim *et al*., 2020; Oksanen *et al*., 2020; Xia *et al*., 2020). Furthermore, employees who experience workplace cyberbullying feel distressed, and their stress reduces performance and productivity at work (Zhang *et al*., 2021). Researchers have also linked such behavior with feelings of ostracism and stigmatization, particularly when the targeted employee's stress and depression are used to rationalize their potentially reduced ability to successfully perform in important roles or projects (Ahmad and Sheehan, 2017). Other emotional effects of cyberbullying include:

- Increased stress and anxiety
- Mental health issues
- Depression
- Low self-esteem
- Acting out violently

This paper extends prior research by arguing that workplace cyberbullying is associated with interpersonal aggression via ego depletion because it affects employees' ability to control volitional actions.

2.2 Ego depletion, the strength model of self-control, and workplace cyberbullying

Prior research on traditional bullying highlights that a supervisor's bullying may lead to ego depletion among subordinates (see, e.g., Mackey *et al*., 2020). This study examines the impact of workplace cyberbullying on employees' ego depletion. According to Baumeister *et al*. (1998), "ego depletion is a short-term reduction of self-control ability as well as readiness to involve in volitional functions". The ego-depletion theory (see also Baumeister *et al*., 1998) helps us in understanding the connection between workplace cyberbullying and employee ego depletion. The theory is based on the premise that the self expends resources (e.g., energy, ego) when it engages in acts of volition (Baumeister *et al*., 1998; Muraven and Baumeister, 2000). The ego-depletion theory builds on the tenets of the 'Strength Model of Self-Control' (Baumeister *et al*., 1998) to explain that individuals' thoughts and behaviors are regulated by limited or consumable resources of self-control. Humans have an innate capacity to regulate their behavior and control the impulses that lure them to engage in indulgent or even violent actions. This capacity is called self-control capacity (Hagger *et al*., 2010). "Despite the human capacity to regulate the self, many behavioral and social problems stem from persistent lapses of self-control" (Hagger *et al*., 2010, p.495). We argue that interpersonal aggression is one such problem that is attributed to

employees' experience of workplace cyberbullying. That is, workplace cyberbullying provokes individuals to react aggressively, and their ego depletion acts as an underlying mechanism.

The ego-depletion theory (Baumeister *et al*., 1998) suggests that toxic situations (e.g., cyberbullying) deplete an individual's self-control resources and trigger ego depletion. In this regard, Muraven and Baumeister (2000) found that, when individuals are exposed to a situation that demands two consecutive actions of self-control, their performance in the second action is often impaired. This happens because individuals have finite self-control strength and its application results in the depletion of this limited resource (i.e., self-control strength). Self-control strength has been identified as a critical executive component of the self which is needed for individuals' volitional actions and self-regulation (Baumeister *et al*.,1998). In other words, depletion of an individual's self-control strength can impair personal ego. There are clear interpersonal consequences of such resource depletion. For example, the self-control strength-depleted individuals are less likely to follow basic social norms (DeBono *et al*., 2011), since prior studies have shown that they tend to cheat (Muraven *et al*., 2006), lie and steal (DeBono *et al*., 2011). Self-control strength-depleted individuals have also been found to be arrogant (Vohs *et al*., 2005).

In this paper, we examine how employees may react aggressively to workplace cyberbullying as a consequence of their ego depletion. By drawing on the ego-depletion theory, we argue that employees' relatively stable self-control capacity can be consumed or depleted when they experience cyberbullying in workplace settings (Baumeister *et al*., 1998). In our view, individuals' self-control capacities deplete because workplace cyberbullying can harm their positive emotional states and may obstruct constructive and developmental social interactions. This argument can be strengthened in the light of prior empirical research that reveals workplace

cyberbullying's positive connection with symptoms of anxiety and depression as well as with feelings of disempowerment and low self-worth (Baruch, 2005; Farley *et al*., 2015;Gaffney *et al*., 2019;Kowalski *et al*., 2018;Snyman and Loh, 2015). In line with these arguments, we propose the following hypothesis:

> *Hypothesis 1: Workplace cyberbullying will be positively associated with ego depletion.*

2.3 Ego depletion and interpersonal aggression

Baumeister *et al*. (1998) have described ego depletion as a psychological state which is associated with a temporary reduction in one's capacity to prevent oneself from engaging in aggression, especially in "situations where another's actions are interpreted in a hostile way" (p. 1253). While prior research has shown that ego depletion predicts aggressive behaviors (Barlett *et al*., 2016), workplace cyberbullying as a distal antecedent of interpersonal aggression (explained via ego depletion) has rarely been examined. Yet an emerging body of research highlights that cyberbullying can trigger co-worker harming by affecting individuals' self-control capacity (Deng *et al*., 2017). It is also associated with deviant work behavior (Ming *et al*., 2020). For example, Barlett *et al*. (2016) found that people who experience ego-depletion do not possess the cognitive abilities to re-appraise a situation and thus may engage in impulsive behavior. Numerous studies on aggression have consistently supported the notion that ego-depleted individuals, when provoked (e.g., through cyberbullying), tend to act in an aggressive manner (Barlett *et al*., 2016). Stucke and Baumeister (2006) argued that aggressive behavior is a consequence of diminished self-capacity which limits individuals' ability to control themselves. Prior research also revealed that an employee's ego depletion affects interpersonal trust (Liu and

Hao, 2020) and increases the incidence of 'incivility' (Wu *et al*., 2014), 'deviance' (Wang *et al*., 2015) and interpersonal aggression (Gubler *et al*., 2018) at work.

Glomb and Liao (2003) defined interpersonal aggression as "behaviors directed at other individuals with the intent of inflicting harm" (p. 487). Their conceptualization specifically focuses on one's behaviors directed toward the members of one's workgroup. As such, it does not capture employees' aggressive behaviors that are directed toward the organization in which they have been employed (either currently or formerly). Glomb and Liao (2003) highlighted the importance of examining antecedents of interpersonal aggression because such knowledge is fundamental to designing effective interventions.

Interpersonal aggression manifests on a continuum ranging from low-level aggressive behaviors (e.g., yelling, withholding resources needed by someone to complete the task) to extremely aggressive behaviors (e.g., assault, violence). Interpersonally aggressive behaviors overlap with other behavioral constructs in the dark side of organizational behavior space (Glomb and Liao, 2003), such as workplace bullying (Ahmad, 2018), organizational revenge and retaliation (Holt, 2016; Şantaş *et al*., 2018), workplace deviance (Akram *et al*., 2019), emotional abuse (Lim *et al*., 2020), and incivility at work (Hülsheger *et al*., 2021). As discussed earlier, extant research has shown that an individual's resources are depleted from practicing self-control during such behavioral encounters (DeWall *et al*., 2007; Osgood and Muraven, 2016; Barlett *et al*., 2016; DeWall *et al*., 2011). Stucke and Baumeister (2006) argued that depletion of self-resources (e.g., ego) can destabilize and remove inner restraints that would normally control the individual from acting in an aggressive manner. They stated that both animals' and humans' aggressive impulses are stimulated when they experience conflict and other intimidating situations; in comparison to animals, although humans have a better capacity to refrain from

acting on most of their impulses by exercising self-control, ego depletion in humans reduces their capacity to refrain from an aggressive reaction. With the help of experimental studies that involved manipulations to deplete ego strength in humans (e.g., by resisting eating chocolates or other tempting food, by restricting physical movements and facial expressions while watching a boring movie), the researchers found that the self-control actions resulted in ego depletion. In one of their experiments, the manipulation process involved insulting the research participants and then measuring whether people in a resource-depleted condition (induced by insults) reacted more or less aggressively than the control group. The researchers found that resource-depleted participants did react more aggressively to insulting comments made by the experimenters. This led them to conclude that aggression is caused by ego-depletion because it weakens people's capacity to restrain their impulses.

More recently, Yusainy and Lawrence (2020) observed a positive impact of reduced self-restraint capacity on aggressive behaviors. This happens because self-control capacity and self-regulatory resources tend to govern people's emotions and behaviors (Christian and Ellis, 2011) and allow them to control aggressive impulses (Baumeister *et al*., 1998; Christian and Ellis, 2011). Consistent with prior research and the ego-depletion theory, we hypothesize that employees' ego-depletion is positively related to interpersonal aggression:

Hypothesis 2: Ego depletion will positively influence interpersonal aggression.

Thus, so far in this paper, we have presented arguments to propose a direct relationship between workplace cyberbullying and ego depletion (Hypothesis 1) and a direct relationship between ego depletion and interpersonal aggression (Hypothesis 2). The next section builds on these two

hypotheses to posit that ego depletion acts as an underlying mechanism in linking workplace cyberbullying with interpersonal aggression.

2.4 Ego depletion as a proposed mediator

Research has shown that annoying, intimidating and provoking encounters (e.g., workplace cyberbullying) can deplete employees' ego and self-control capacities as a consequence of which they react aggressively to such situations (Baumeister *et al*.,1998; Mackey *et al*., 2020). DeWall *et al*. (2007) argue that ego-depleted individuals respond aggressively when they are provoked by humiliating comments; but when participants were not humiliated, the research showed that ego depletion did not trigger aggression. Subsequent research by Barlett *et al*. (2016) probed for changes in aggression levels overtime, as a function of ego-depletion and provocation. They found that aggression levels were higher for ego-depleted and provoked participants. These studies measured aggression that was induced by researchers through experiments and associated manipulations. Surprisingly, researchers have rarely utilized fieldwork with data collected from real-work settings to determine whether or not cyberbullying induces interpersonal aggression via ego depletion. Thus, a recent study by Staller *et al*. (2018) used an experimental design to assign German police officers to either a control group or a treatment group. The results from the experiment showed that ego-depleted police officers used more force when provoked in comparison to the control group.

In accordance with the ego-depletion theory, an employee's ability to restrain and repress their aggressive behavior depends on the availability of self-control resources (Baumeister *et al*., 1998; Christian and Ellis, 2011). When these resources are consumed (e.g., by responding to threats or external pressures), then employees may engage in unethical behavior (Barlett *et al*., 2016). Furthermore, prior research has shown that interpersonal behaviors can directly cause

hedonic pleasure (e.g., increased monetary reward through theft from co-workers) (DeWall *et al*., 2011). Baumeister *et al*. (1998) and Barlett *et al*. (2016) argued that ego depletion acts as an underlying mechanism in the relation between a provoking situation (e.g., intimidation, workplace cyberbullying) and aggressive reaction. Based on the ego-depletion theory (Baumeister *et al*., 1998) and building on our Hypotheses 1 and 2, we argue that workplace cyberbullying represents a provoking situation that depletes personal ego by draining self-control capacity, thereby triggering an aggressive reaction among those targeted by it. In other words, ego depletion mediates the relationship between workplace cyberbullying and interpersonal aggression. This discussion leads to the following hypothesis:

> *Hypothesis 3: Ego depletion will mediate the relationship between workplace cyberbullying and interpersonal aggression.*

Recent studies on ego depletion highlight the need to examine contextual and situational factors that thwart the depleted resources. For example, regular praying, which is central to the world's dominant religions (e.g., Christianity, Islam, Judaism) has been found to strengthen humans' self-control capacity by invoking feelings of inner strength and relief (e.g., Loschelder and Friese, 2016). While there may be multiple contextual factors that shape interpersonal behaviors in social settings, a growing body of internet research has taken into account the role of a leader's behavior (Lim *et al*., 2020; Tandon *et al*., 2022; Agarwal and Avey, 2020; Mehmood *et al*., 2021).Employees' reactions to situational factors depend not only on how they are treated individually, but also upon the broader organizational context, which includes the quality of their interactions with the leaders (O'Reilly and Aquino, 2011). The next section therefore explores LMX differentiation as a leadership-related contextual factor that may impose boundary conditions in the effects of employee ego depletion on interpersonal aggression.

2.5 LMX differentiation as a boundary condition

LMX captures the overall quality of a leader's relationship with his or her followers (Graen and Uhl-Bien, 1995; Uhl-Bien, 2011). The notion of LMX differentiation is based on the premise of LMX theory, according to which leaders develop differential relationships with their followers in workplace settings (Liden *et al*., 2006). These are determined by the quality of a leader's interaction with specific followers, for example, the degree of courtesy and respect shown by the latter (Liden *et al*., 2016). LMX differentiation captures such variability within the group, with meaningful implications for employees' job autonomy, opportunities, and status in the workplace (e.g., Liden *et al*., 2016). This variability occurs in almost all groups (Erdogan and Bauer, 2010). Research has shown that employees' reactions to specific situations (e.g., cyberbullying) are shaped by the quality of their interactions with the leaders (O'Reilly and Aquino, 2011): that is, how well they are treated by leaders. For example, Chen *et al*. (2018) and Carnevale *et al*. (2019) have argued that employees' cognitive feelings and emotional reactions are shaped by LMX differentiation. Since leaders' differential treatment of their followers is a common occurrence in work settings (Harris *et al*., 2014), Henderson *et al*. argued (2009, p. 517) that

> With some subordinates, leaders form low quality exchange relationships in which interpersonal interaction is largely restricted to fulfilling contractual obligations (Liden and Graen, 1980). With other subordinates, leaders form high quality LMX relationships that comprise social exchange patterns that transcend contractual obligations [e.g., mentoring, sponsorship].

The authors noted a deficiency of multi-level research on the LMX differential and argued that this deficiency must be overcome in future studies. Because leaders oversee multiple subordinates in a workgroup, their differential treatment of subordinates can influence interpersonal behaviors in the workgroup. In theory, LMX differentiation has been explained as a process in which the leader forms different quality exchange relationships with his or her

subordinates in a workgroup that typically range from low to high. Henderson *et al*. (2009, p. 519) conceptualized a workgroup in terms of a "leader and those subordinates who formally report to him or her". Thus, the multi-level nature of LMX differential is apparent from its theoretical conceptualization, unless a workgroup comprises a leader who has a single subordinate. In sum, LMX differentiation captures within-group variability in the quality of employees' exchange relationships with their leader/direct supervisor. Figure 2 depicts the different stages in development of LMX theory.

Insert Figure 2 Here

Our research thus offers a multi-level analysis of LMX differential in order to fully understand the indirect influence of workplace cyberbullying on interpersonal aggression via ego depletion. We propose that the influence of workplace cyberbullying on interpersonal aggression (via ego depletion) depends on the level of leaders' differential treatment of their subordinates in a workgroup. Previous studies have shown that LMX differentiation can affect employees' ego depletion (Mackey *et al*., 2020; Deng *et al*., 2016). Therefore, we examine the LMX differentiation as a boundary condition in the relationships between workplace cyberbullying, ego depletion and interpersonal aggression. The LMX-differentiated context can shape employees' cognitions and reactions in the workgroup. Recent research has shown that LMX differentiation influenced the relationships between abusive supervision, employees' ego depletion and voice behaviors (see, e.g., Mackey *et al*., 2020). A high LMX-differentiated condition is likely to strengthen the extent to which the ego-depleted employees' self-capacities are drained due to workplace cyberbullying compared to a low LMX-differentiated condition.

This implies that the effects of workplace cyberbullying on interpersonal aggression via ego depletion are moderated by LMX differentiation:

> *Hypothesis 4: LMX differentiation will moderate the relationship between workplace cyberbullying and ego depletion, such that this relationship will be stronger when LMX differentiation is high rather than when it is low.*

We have hypothesized that LMX differentiation moderates the indirect effect of workplace cyberbullying on interpersonal aggression via ego depletion. Recent research has shown that abusive supervision (Richard *et al*., 2020) and workplace harassment (Boncoeur *et al*., 2019) induce interpersonal aggression. For example, one study indicates that abusive behavior of supervisors reduces subordinates' self-control capacities due to which they act aggressively toward the supervisor (Mackey *et al*., 2020). In our view, the indirect effect will be stronger at higher levels of LMX differentiation in comparison to its lower levels. Employees under the low LMX-differentiation condition will endeavor to maintain it. A high-quality exchange relationship or interaction with the leader or supervisor would not affect their ego and as a result they are less likely to react aggressively. Thus, the integration of LMX theory with the ego-depletion perspective of interpersonal aggression helps to fully understand the relationships between workplace cyberbullying, ego depletion and interpersonal aggression in the presence of LMX differentiation as a moderator. Our fifth and final hypothesis explains this conditional indirect effect:

> *Hypothesis 5: LMX differentiation moderates the indirect effect of workplace cyberbullying on interpersonal aggression through ego depletion, such that this indirect effect would be stronger when LMX differentiation is high rather than low.*

3. Methodology

3.1 Sample and Procedures

To test our research hypotheses, we collected data through a survey of full-time employees and their supervisors working in five randomly selected ICT organizations operating in the Chinese city of Beijing. According to the Cybersmile foundation (2021), China has the largest Internet community worldwide with more than a billion users. Cyberbullying and online abuse have shown themselves in a variety of ways all across the world, and China is no exception. One notorious form of trolling in China is known as "The Human Flesh Search Engine", which emerged more than a decade ago and consists of interest users working together to target individuals for perceived wrong doing. Tens of thousands of people can become involved with victims being publicly shamed and abused. We targeted participants who were regularly using ICTs to complete their work tasks, because prior research shows that such employees are bullied by their supervisors through ICT, as a consequence of which they may engage in deviant behaviors (Vranjes *et al*., 2017). While our research examines the relationships between workplace cyberbullying, ego depletion, interpersonal aggression, and LMX differentiation is limited to employees working in the ICT organizations only, employees in many other organizational contexts routinely use internet technologies to perform their work duties (see, e.g., Zhang *et al*., 2021). We recruited participants through our personal and professional networks involving Human Resource (HR) managers in the ICT companies. We distributed the research questionnaires with the help of the HR managers, who were briefed about the research data collection procedures. We informed them that the data would be kept confidential and used for academic research only.

The data were collected in three waves, using a time-lagged research design (separated by an interval of four weeks) to alleviate 'common method variance' (Podsakoff *et al*., 2003). In the first wave survey (T_1), 1170 questionnaires were distributed to employees to elicit information on demographic variables, perceived workplace cyberbullying and perceived LMX. We received 811 usable responses (a response rate of 69.3%) for the T_1 survey. In the second wave survey (T_2), the surveys containing questions on perceived ego depletion were distributed to those employees who completed responses to the T_1 survey and we received 423 usable responses (a response rate of 52.1%). In the third-wave survey (T_3), we invited 85 supervisors of 423 employees who completed both T_1 and T_2 surveys to provide ratings of the employees' interpersonal aggression. We received 265 responses from 64 supervisors (with a response rate of 65.2%). We dropped workgroups with fewer than three matched supervisor-employee dyads to ensure that each workgroup consisted of at least three employees who reported to the same supervisor and provided ratings of LMX. We aggregated the values of LMX at the workgroup level to estimate LMX differentiation (see below). As a result of this principle, six out of 265 (i.e., 2.26%) responses were removed before further analysis of the data. Hence, our final sample comprised responses from 259 employees and 62 supervisors.

To sum up, a total of 259 employees were nested in 62 workgroups. In the research sample, more than half the employees were male (58.4%) and 62.9% held a bachelor's degree. The mean age of the participants was 32.05 years (SD= 3.24), and the average tenure of each dyad was 3.21 years (SD= 1.46).

3.2 Measures

Following the back-translation procedure suggested by Brislin (1980), we translated the original English-language scale into Chinese to confirm the accuracy and validity, because all scales were

previously published in English. All measures were taken from reputable international journals that provided evidence of their good psychometric properties. Unless specified, we used a 5-point Likert scale ranging from "1= strongly disagree" to "5= strongly agree" to measure our study variables.

Workplace Cyberbullying. Workplace cyberbullying was measured by using 10 items from Vranjes *et al*. (2018). Sample items were "rumors or gossip are being spread about you by means of ICTs" and "your work is criticized publicly by means of ICTs" and a 5-point Likert scale (ranging from 1= strongly disagree, 5= strongly agree). The Cronbach's alpha for the workplace cyberbullying measure was 0.92.

Ego Depletion. Ego depletion was measured using five items from Twenge *et al*. (2004). Previous studies by Lin *et al*. (2016) and Christian and Ellis (2011) have validated this scale. Participants reported the extent to which each statement represented how they felt during the past two days and rated items on a scale range from 1= "very slightly or not at all" to 5 = "very much". The sample items were "my mental energy is running low". The average value of Cronbach's alpha was 0.95.

Interpersonal Aggression. This measure, which included four-items, was adopted from Stewart *et al*. (2009), addressing employee deviance in terms of interpersonal aggression. These items were measured using a 5-point Likert scale where 1= "never" and 5 = "always". The sample items included the questions "how often does the employee act rudely toward someone at work?" and "how often does the employee make fun of someone at work?" The average value Cronbach's alpha was 0.96.

LMX differentiation. This research adapted the seven-items LMX introduced by Graen and Uhl-Bien (1995). A sample item included "how would you characterize your working relationship with your leader?" ("1= extremely ineffective" to "5= extremely effective"). The Cronbach's alpha for the LMX differentiation measure was 0.89. We followed the recommendations made by scholars such as Sui *et al*. (2016) and Liden *et al*. (2016) to calculate LMX differentiation scores. Our research data has a nested structure (i.e., employees in the workgroups), and therefore LMX differentiation was measured by analyzing the differences in perceived LMX within the workgroup. Since LMX ratings were captured at the individual level, we therefore aggregated the individual ratings within the workgroup to get LMX differentiation scores at the group level.

Control variables

This study controlled for demographic characteristics of subordinates (e.g., gender, education, age, and dyadic tenure with their supervisors). For example, individuals' levels of tolerance toward bullying are affected by their age. We also adjusted for subordinate-reported LMX and work group mean LMX in line with previous research on LMX differentiation (see also Liden *et al*., 2006).

4. Analytical strategy

To test the proposed hypotheses, we utilized hierarchical linear modeling (HLM: Raudenbush et al., 2011) because our data have a nested structure. First, we investigated the degree of non-independence among the individual-level variables (i.e., workplace cyberbullying, ego depletion, and interpersonal aggression) by applying the ICC1 (intra class correlation coefficient) (Bliese, 1996). We used Mplus 7.4 (Muthén and Muthén, 2017), to test our hypotheses. We performed confirmatory factor analysis (CFA) to evaluate the measurement validity of our four-factor

measurement model, based on the values of model-fit indices and chi-square statistics such as Tucker-Lewis Index (TLI), root mean square errors of approximation (RMSEA), comparative fit index (CFI), and standardized root mean squared residual (SRMR) (Hu and Bentler, 1999). Next, we examined the multi-level moderated mediation model (Bauer *et al*., 2006) to evaluate the indirect effects of workplace cyberbullying on interpersonal aggression via ego depletion. Finally, we conducted a simple slope test, as suggested by Aiken *et al*. (1991), for moderation analysis.

5. Results

5.1 Confirmatory factor analysis

We performed a series of CFAs to evaluate the validity of measurement (of workplace cyberbullying, ego depletion, interpersonal aggression, and LMX). The outcomes of the CFA indicated that the hypothesized four-factor model showed a significantly better fit ($\chi^2(394) = 671.82$, *TLI = 0.94, CFI = 0.95, RMSEA = 0.06, SRMR = 0.04*) than the alternative model ($\chi^2(399) = 1427.81$, *TLI = .71, CFI = .85, RMSEA = 0.11, SRMR = 0.12*). The results of various alternative models are presented in Table I. The Chi-square test indicated the significance of the four-factor model ($\Delta\chi^2(4) = 834.68$). These alternative CFA factor outcomes give strong support for validating the hypotheses.

Insert Table I Here

5.2 Descriptive statistics

Table II display means, standard deviations, and bivariate correlations between the study's variables. In line with our expectations, workplace cyberbullying was positively correlated with

both ego depletion ($r = .16$, $p < .01$) and interpersonal aggression ($r = .32$, $p < .01$). Furthermore, ego depletion was positively correlated with interpersonal aggression ($r = .36$, $p < .01$).

Insert Table II Here

5.3 Hypothesis testing

Given our nested structure, we used the intra class correlation coefficients (ICC) for level-1 variables. The ICC values (0.16 for workplace cyberbullying, 0.09 for relational ego depletion, 0.13 for interpersonal aggression) showed strong nested effects, hence confirming the suitability of multi-level analysis to test their research hypotheses. We followed published guidelines (see, e.g., Zhang *et al*., 2019) to test for mediation. Table III shows the results.

Insert Table III Here

Hypothesis 1 predicted that workplace cyberbullying is positively related to ego depletion. This hypothesis was supported, because the results confirmed that workplace cyberbullying has a significant influence on ego depletion ($\gamma = 0.43$, $p < 0.01$; see Model 2 in Table III). Hypothesis 2 predicted that ego depletion has a positive influence on interpersonal aggression. As shown in Table III, HLM results and Model 9 ($\gamma = 0.28$, $p < 0.01$) demonstrate the significance of the relationship between ego depletion and interpersonal aggression. Hence Hypothesis 2 was supported.

Hypothesis 3 predicted that ego depletion mediates the relationship between workplace cyberbullying and interpersonal aggression. We used the PRODCLIN program to examine this indirect effect. The results presented in Figure 3, p= 0.14, 95% confidence interval (CI) (0.05, 0.26), show that the indirect relationship between workplace cyberbullying and interpersonal aggression is mediated by ego depletion. Hence Hypothesis 3 was also supported.

Hypothesis 4 predicted the moderating role of LMX differentiation in the relationship between ego depletion and interpersonal aggression such that the relationship will be stronger when LMX differentiation is high rather than when it is low. The results (see Table III, Model 4) supported a significant interaction between workplace cyberbullying and LMX differentiation (γ = 0.42, p <0.01). We followed Aiken *et al.*'s (1991) approach for simple slope analysis to plot the interaction (one *SD* below the mean and one SD above the mean). We found that the slope of low LMX-differentiation condition was not significant (b = -0.01, t = -0.06, *n.s*). However, the slope was significant under the high LMX-differentiation condition (b = 0.69, t = 7.22, p < 0.01). Hypothesis 4 was therefore supported.

Insert Figure 2 Here

Hypothesis 5 predicted that LMX differentiation will moderate the indirect effect of workplace cyberbullying on interpersonal aggression (mediated by ego depletion). Our results showed that the strength of this indirect influence was significant at higher levels of LMX differentiation p = 0.26, 95% CI (0.15, 0.35) than at lower levels p = -0.02, 95%CI (-0.13, 0.07). Hence Hypothesis 5 was supported.

Insert Figure 3 Here

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6. Discussion

The HLM results supported our research hypotheses and conceptual framework, developed by integrating the ego-depletion theory and the LMX theory. In line with our theorizing, workplace cyberbullying has a positive indirect relationship with interpersonal aggression (mediated by ego depletion). Moreover, we found that LMX differentiation acts as a boundary condition in the relationship between workplace cyberbullying and ego depletion, as well as the indirect relationship between workplace cyberbullying and interpersonal aggression (mediated via ego depletion). These findings stem from multi-sourced data collected through a multi-wave survey of employees and supervisors. Next, we discuss the implications of our research findings to advance scholarship and practice in the field. We also offer interesting directions for future research.

6.1 Theoretical implications

The study's findings make a four-fold contribution to the literature and theory. First, they offer an in-depth understanding of the process by which workplace cyberbullying triggers interpersonal aggression through the lens of ego depletion by considering LMX differentiation as a boundary condition. While previous research on workplace cyberbullying has focused on individual-level outcomes such as turnover intention and mental strain (Anwar *et al*., 2020), the literature has largely ignored interpersonal and relational outcomes. Our research bridges this gap in the literature by integrating LMX and ego-depletion theories, which has rarely been done to date.

Second, by identifying ego depletion as a mechanism and LMX differentiation as a boundary condition in the relationship between workplace cyberbullying and interpersonal aggression, our research reinforces Barlett *et al*.'s (2016) comment suggesting that the impact of ego-depletion on aggressive behavior can be moderated by contextual variables. We have identified LMX differentiation as a contextual moderator in the impact of workplace cyberbullying on both ego depletion and interpersonal aggression. In particular, we have explored the interaction between LMX differentiation and workplace cyberbullying by drawing on studies highlighting LMX differentiation as a key contextual factor in potentially moderating the adverse effects of abusive supervision and destructive voice in the workplace (Mackey *et al*., 2020). The present study offers multilevel insights on the moderating role of LMX differentiation in understanding employee responses to workplace cyberbullying. The findings of this study thus underscore the importance of leader-follower interactions in order to fully comprehend the consequences of technology-assisted forms of aggression in the workplace.

Third, the research findings enrich the literature on workplace cyberbullying and interpersonal aggression by demonstrating that depletion of self-control resources mediates the relationship between workplace cyberbullying and interpersonal aggression. Previous studies mainly focused on understanding the emotional path through which workplace cyberbullying induces mental strain (Coyne *et al*., 2017; Camacho *et al*., 2018) and paid relatively little attention to behavioral self-control and cognitive processes (Lord *et al*., 2010). Our findings illuminate depletion of ego as a key cognitive mechanism that explains how cyberbullying may trigger interpersonal aggression through ICT. According to the ego-depletion theory (Baumeister *et al*., 1998), self-control resources are limited yet instrumental in preventing individuals from engaging in aggressive behaviors. The results of this study thus support the relevance of applying

the ego-depletion theory to understand the dark side of workplace cyberbullying. Our study thus contributes to the literature on aggression by revealing workplace cyberbullying and ego depletion as key antecedents of aggressive behavior. The activation of rudeness-related concepts (i.e., workplace cyberbullying) in semantic memory is a cognitive mechanism that helps to explain how rudeness spread from one person to another (Foulk *et al*., 2016; Vranjes *et al*., 2018; Khan *et al*., 2021; Akram *et al*., 2019). According to ego-depletion theory, an increase in ego depletion may be a key cognitive mechanism that explains how cyberbullying may trigger interpersonal aggression through ICT. According to the ego-depletion theory (Baumeister *et al*., 1998), self-control resources are limited yet instrumental in preventing individuals from engaging in aggressive behaviors. Along with extending this stream of research, the current study explored the cognitive mechanism underlying the relationship between cyberbullying and interpersonal aggression by examining the mediating role of ego depletion. This approach proved useful, because a key variable from the ego-depletion theory (i.e., subordinates' depletion) formed a cognitive linchpin mechanism that transformed the experience of workplace cyberbullying into subsequently enhanced interpersonal aggression through ICT. The results of this study thus support the relevance of applying the ego-depletion theory to understand the dark side of workplace cyberbullying. Our study thus contributes to the literature on aggression by revealing workplace cyberbullying and ego depletion as key antecedents of aggressive behavior.

Finally, prior research has largely examined the outcomes of workplace cyberbullying at individual and intrapersonal levels, whereas our research has demonstrated the interpersonal consequences of workplace cyberbullying by showing that targets of workplace cyberbullying are likely to perpetuate aggressive and deviant behavior within the workgroup. Recent literature has not provided evidence-based insights on the group-level effects of cyberbullying. Moreover,

since the incidence of workplace cyberbullying varies across individuals working in a workgroup (Farley *et al*., 2016), multi-sourced data from both employees and supervisors have methodological strengths over single-sourced data (i.e., obtained only from employees). Our methodological approach, involving multi-sourced data, random sampling and HLM/multilevel analysis, thus strengthens the nascent workplace cyberbullying literature by showing its implications for interpersonal aggression at group-level.

6.2 Practical implications

This research has noteworthy managerial implications. First, our results suggest that workplace cyberbullying triggers interpersonal aggression. Given the increased use of ICT within organizations, it is important to consider the dark side of individuals' online activities and behaviors. On the basis of our research findings, we encourage managers to regulate the time employees spending in digital environments that cyberbullying risks (e.g., chat rooms, discussion boards) by using formal and informal control mechanisms. For example, companies should have clear policies on the use of social media and public dissemination of personal information or images on such media sites, as these increase cyberbullying risks (Farley *et al*., 2016; Baldry *et al*., 2015; Casas *et al*., 2013; Lowry *et al*., 2017).

Second, policy makers and regulators of digital media are advised to re-examine the architectures of the media platforms that pose higher risks for cyberbullying and establish measures to lower such risks, such as by penalizing the offenders. For example, offenders typically take advantage when cyber communication is done anonymously, and therefore digital media platforms should be designed in a manner that improves individuals' sense of accountability and visibility in the digital space. An ICT environment with clear policy could

help make the online disinhibition effect a lesser power driver of cyberbullying, thereby contributing to a healthier ICT environment.

Third, the results provide evidence that digitally-mediated forms of victimization (e.g., cyberbullying) have the potential to turn a target into an aggressor and emphasize the importance of leader-follower interactions in reducing interpersonal aggression. Leaders can prevent aggressive behaviors by cultivating ethical digital cultures and taking a zero-tolerance approach for aggressive behavior. They should intervene when aggression or cyberbullying occurs and punish the offenders. In particular, our research highlights the effects of a leader's differential treatment of the followers (i.e., LMX differentiation) on organizational behavior. Therefore, it is important for managers to engage in reflective practice to evaluate whether they are treating employees equally or differently. As the effect of workplace cyberbullying on interpersonal aggression is stronger in the presence of high LMX differentiation, managers must re-evaluate their working relationships and ensure equity in the provision of support and resources.

Fourth, our findings highlight the importance of reducing the interpersonal aggression in organizations, especially given that evidence may be "contagious", a view echoed by Robinson and O'Leary-Kelly (1998). The mechanisms through which a group impacts individual behaviors are multifold, implying the importance of a multi-pronged approach to avoiding and reducing interpersonal aggression at the workplace. Managers can prevent aggressive behaviors by changing the social information that is disseminated, communicating strong behavior-outcome contingencies (for example, having and enforcing a zero-tolerance approach, communicating serious consequences for aggressive employees), eliminating aggressive role models, and intervening when aggressive behavior is likely to reciprocated or escalated.

Fifth, we encourage managers' awareness of the impacts of differential leader treatment on their subordinates' ability to cope with cyberbullying. We found evidence that workplace cyberbullying is associated with ego depletion and interpersonal aggression. However, these relationships were stronger for subordinates in higher LMX differentiation than lower LMX differentiation. In addition, we found that the conditional indirect effect of workplace cyberbullying on interpersonal aggression was weak and non-significant for subordinates in a lower LMX differentiation. Therefore, it may be helpful for leaders to evaluate the extent in which they treat employees differently in order to manage ego depletion and interpersonal aggression. We encourage practitioner awareness of how low LMX differentiation manifests in employees' internal psychological states (i.e., ego depletion) and aggressive behavior (i.e., interpersonal aggression) through ICT and internet research.

Finally, organizational development and training programs should focus on improving employees' emotional regulation, self-management and interpersonal skills. The content of these programs should cover topics on the ethical use of digital and social media, as well as raise awareness of the harms associated with unethical behavior, such as cyberbullying. Strategies in conflict management skills and self-management tactics may be valuable in their own right, as well as signals: investing resources in training gives social information indicating the importance of interpersonal aggression prevention (Akram *et al*., 2021). Thus, given that the explanations for aggression are dynamic, the solutions are likely to be dynamic as well, and these will work jointly over time to reduce interpersonal aggression. Furthermore, future researchers should consider the moderating role of organizational justice in the relationship between workplace cyberbullying and dysfunctional behavior. For future research, organizational justice would be particularly effective in work scenarios when employees must deal with high levels of workplace

cyberbullying. Therefore, practitioners should explore how organizational justice can be increased in general, as well as situations where employees have to cope with workplace cyberbullying and dysfunctional behavior.

6.3 Limitations and future research focus

Despite notable implications, the present study has limitations. In this section, we acknowledge those limitations which also point to fruitful directions for future studies. First, the design of the present study is not suitable to inferring cause-and-effect relationships implied in the research hypotheses. Therefore, we urge researchers to use experimental or longitudinal designs to infer causality in future studies.

Second, our sample is limited to ICT organizations in China, which may limit the generalization of this study's findings to ICT companies in other countries. Workplace cyberbullying is a concept that started in Western societies. Future research would be required to determine how Chinese cultural norms and values may affect employee responses to bullying and cyberbullying behavior (Ahmad *et al*., 2021). Therefore, future studies can replicate this study in other national cultural settings to enhance the cross-cultural generalizability of this study's findings.

Third, our research is limited to identifying ego depletion as an underlying mechanism in the relationship between workplace cyberbullying and interpersonal aggression. However, extant research points out the relevance of examining other related mechanisms. For instance, Mackey *et al*. (2020) argued that supervisory abuse triggers emotional exhaustion and affects subordinates' work behavior. Finally, our research is confined to examining LMX differentiation as a boundary condition. It will be helpful to examine other moderators in future research. As

one example, researchers can examine the interaction between workplace cyberbullying and the Dark Triad of personality (Sumner *et al*., 2012). Most recently, research by Akram *et al*. (2021) has revealed that organizational justice imposes boundary conditions on the emotional process that underlie employee responses to abusive supervision. Therefore, it is worthwhile to explore the influence of organizational justice on employees' responses to workplace cyberbullying.

7. Conclusion

This paper advances the contemporary literature by answering the questions of how, why and when workplace cyberbullying triggers interpersonal aggression through ICT. The results indicate that workplace cyberbullying indirectly triggers interpersonal aggression by depleting employees' egos. Furthermore, we found that this indirect relationship between workplace cyberbullying and interpersonal aggression is amplified in the presence of a high LMX-differentiation condition. The novelty of our research lies in integrating ego-depletion and LMX theories to advance an understanding of the occurrence, consequences and management of technology-mediated forms of aggression in the workplace. We hope that the findings of our research will assist in cultivating safe and healthy digital environments with zero-tolerance for aggressive and cyberbullying behaviors.

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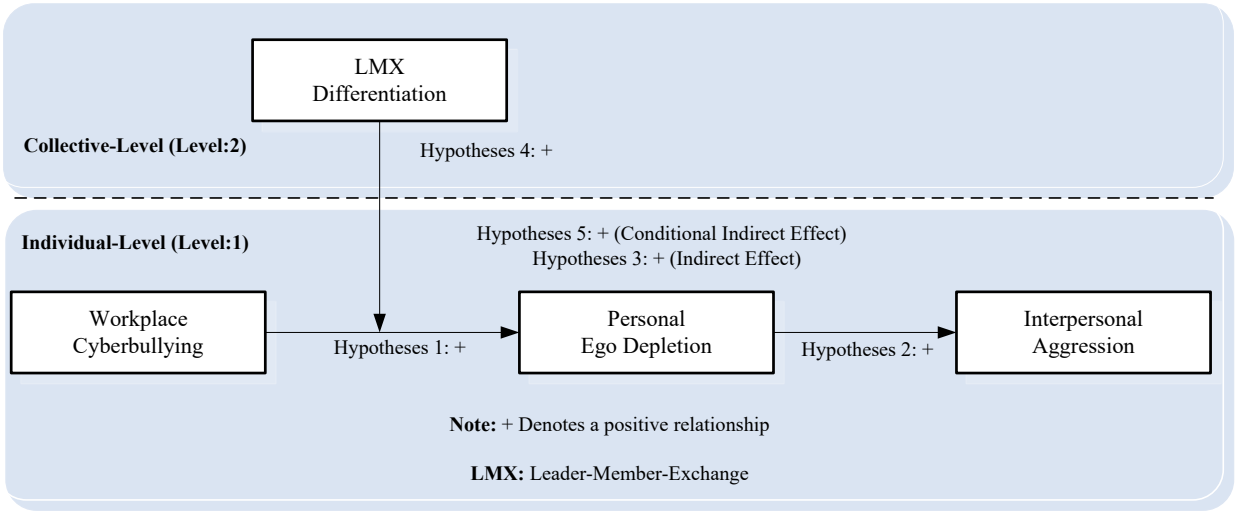

Figure 1. Conceptual Model

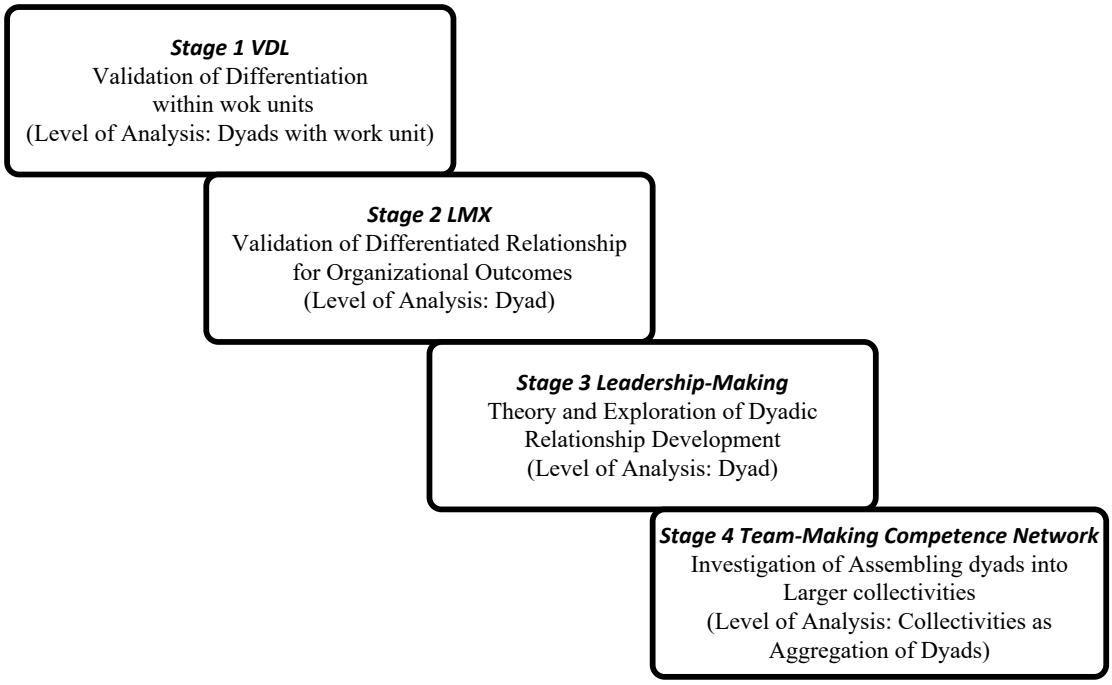

Figure. 2 Different Stages in Development of LMX Theory,

Source: Graen and Uhl-Bien, (1995)

Table I. Summary of confirmatory factor analysis

	χ^2	*df*	$\Delta\chi^2$	TLI	CFI	SRMR	RMSEA
Baseline four-factor model	671.82	394	------	0.94	0.95	0.04	0.06
Alternative three-factor measurement model							
1.(Workplace cyberbullying and ego depletion were combined)	1541.42	406	922.54	0.72	0.78	0.11	0.09
2.(Workplace cyberbullying and LMX were combined)	1572.63	403	963.42	0.76	0.72	0.13	0.07
3.(Ego depletion and interpersonal aggression were combined)	998.72	403	438.98	0.82	0.89	0.06	0.10
4.(LMX and ego depletion were combined)	1427.81	399	834.68	0.71	0.85	0.12	0.11

Note: CFI= Comparative Fit Index, TLI= Tucker-Lewis Index, SRMR= Standardized Root Mean Square Residual, RMSEA= Root Mean Square Errors of Approximation

Table II. Descriptive statistics and correlations among variables

Variables	1	2	3	4	5	6	7	8	9
1.Age	-								
2.Gender	0.27**	-							
3.Education	0.58**	0.17*	-						
4.Dyadic Tenure	0.44**	0.12	0.42**	-					
5.Workplace cyberbullying	0.04	0.04	-0.03	0.02	**(0.92)**				
6.LMX	-0.06	-0.02	-0.04	0.11	-0.35**	**(0.89)**			
7.LMX differentiation	-0.13*	-0.19	-0.01	0.06	0.05	-0.52**	-		
8. Ego depletion	0.16	0.06	0.07	-0.04	0.16**	-0.04	0.18**	**(0.95)**	
9.Interpersonal aggression	-0.09	0.08	0.05	0.05	0.32**	-0.19**	0.11	0.36**	**(0.96)**
Mean	32.05	1.64	5.22	3.21	2.24	4.45	0.92	3.21	3.24
SD	3.24	0.45	2.00	1.46	0.97	1.09	0.68	1.16	1.36

*N= Individual level-1 (259) and group level-2 (62). LMX= leader-member exchange *p <0.05, **p < 0.01; Bracket () values show the results of Cronbach's alpha.*

Table III. Results of hierarchical linear modeling

	Ego Depletion				Interpersonal Aggression				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	3.15**	3.15**	3.15**	3.11**	3.24**	3.24**	2.26**	3.22**	3.25**
Level-1 Individual level									
Gender	0.02	0.07	0.03	0.06	0.03	0.05	0.02	0.04	0.03
Age	0.06	0.05	0.05	0.03	-0.02	-0.09	-0.07	-0.08	-0.05
LMX	-0.17**	-0.09	-0.08	-0.06	-0.28**	-0.26**	-0.32**	-0.38**	-0.26**
Workplace cyberbullying		0.43**	0.48**	0.35**		0.38**	0.41**	0.49**	0.44**
Ego depletion									0.28**
Level-2 Collective level									
LMX differentiation			0.28	0.26			0.22	0.15	0.13
Cross-level interaction									
Workplace cyberbullying× LMX differentiation				0.42**				0.35**	0.21
Model deviance	764.83	742.78	764.27	751.22	842.34	821.67	865.32	867.72	897.53

N= Individual level-1 (259) and group level-2 (62). LMX= leader-member exchange,

**p <0.05, **p < 0.01*

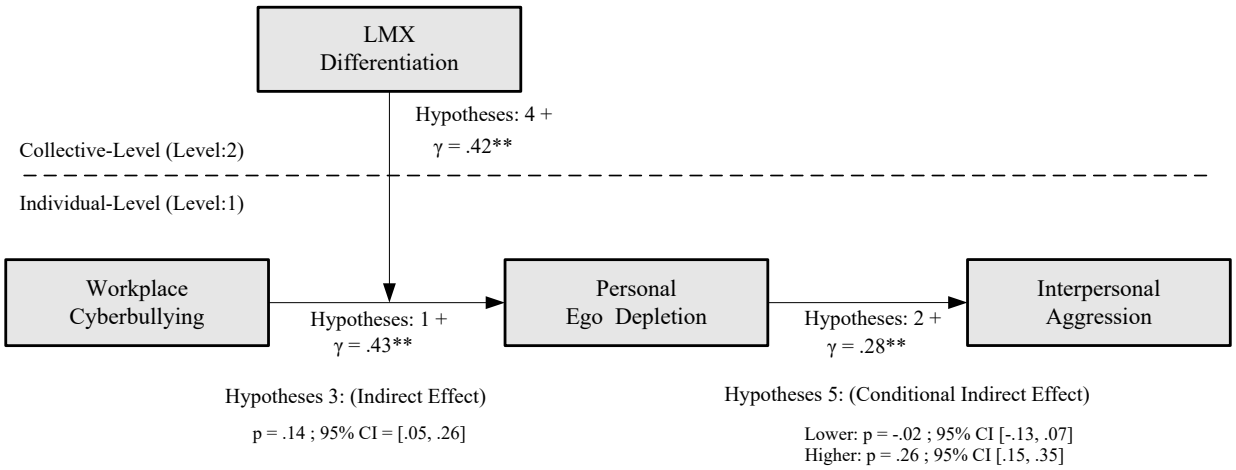

Figure 3. Standardized effects and confidence interval CI reported in Figure3. Statistical tests were based on two-tailed testes ($\alpha = 0.05$), *$p < 0.05$, **$p < 0.01$

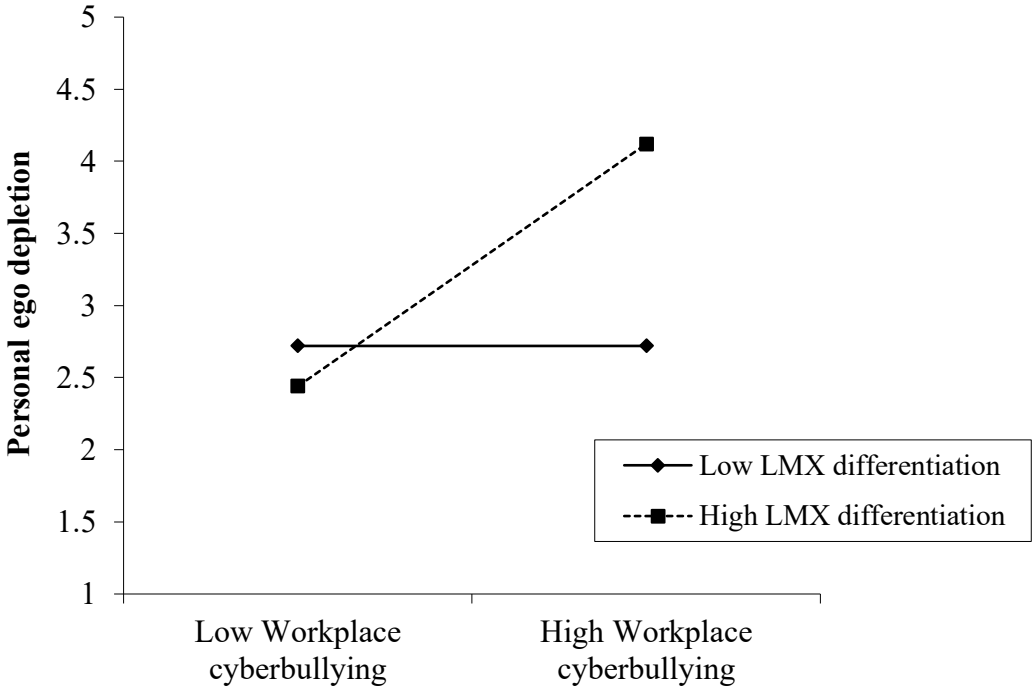

Figure 4. The moderating role of LMX differentiation

Appendix A. Appendix

Constructs/Items

Workplace Cyberbullying (Vranjes *et al*., 2018)
1: Your emails, phone calls or messages are ignored at work.
2: Your emails are forwarded to third parties in order to harm you.
3: Your work is criticized publicly by means of ICTs.
4: Somebody is withholding emails or files you need, making your work more difficult.
5: Rumors or gossips are being spread about you by means of ICTs.
6: You are being insulted, threatened or intimidated by means of ICTs.
7: Constant remarks are being made about you and your private life by means of ICTs.
8: Your personal information is hacked and used to harm you.
9: Somebody shares photos or videos of you on the internet to make fun of you.
10: Somebody takes over your identity.

Ego Depletion (Twenge *et al*., 2004)
1: I feel drained
2: My mind feels unfocused
3: It would take a lot of effort for me to concentrate on something
4: My mental energy is running low
5: I feel like my willpower is gone

Interpersonal Aggression (Stewart *et al*., 2009)
1: How often does the employees act rudely towards someone at work?
2: How often does the employees make fun of someone at work?
3: How often does the employees said something hurtful to someone at work?
4: How often does the employees lost their temper while at work?

Leader-Member Exchange (LMX) (Graen and Uhl-Bien, 1995)
1: How would you characterize your working relationship with your leader? (Your member)
2: How well does your leader recognize your potential? (How well do you recognize)
3: How well does your leader understand your job problems and needs? (How well do you understand)
4: Do you know where you stand with your leader ...do you usually know how satisfied your leader is with what you do? (Does your member usually know)
5: Regardless of how much formal authority he/she has built into his/her position, what are the chances that your leader would use his/her power to help you solve problems in your work? (What are the changes that you would).
6: Again, regardless of the amount of formal authority your leader has, what are the chances that he/she would "bail you out," at his/her expense?(What are the chances that you would)
7: I have enough confidence in my leader that I would defend and justify his/her decision if he/she were not present to do so? (Your member would)