Predicting employee aggression against coworkers, subordinates and supervisors: the roles of person behaviors and perceived workplace factors

LIANE GREENBERG AND JULIAN BARLING*

School of Business, Queen's University, Kingston, Ontario K7L 3N6, Canada

Summary   Predictors of employee aggression against coworkers, subordinates, and supervisors were studied in a sample of 136 men employed full-time. Person behaviors (history of aggression, amount of alcohol consumed) predicted aggression against a coworker. In contrast, aggression against a supervisor was predicted by two *perceived workplace factors* (procedural justice, workplace surveillance). However, neither person behaviors nor perceived workplace factors predicted aggression against a subordinate. In addition, person behaviors and perceived workplace factors interacted to predict aggression. First, procedural justice interacted with amount of alcohol consumed in predicting both aggression against a coworker and aggression against a subordinate. Secondly, both job security and procedural justice interacted with history of aggression in predicting aggression against a subordinate. Finally, job security and amount of alcohol consumed interacted to predict aggression against a subordinate. Results suggest that both the understanding and prediction of employee aggression will be enhanced by taking into account the target of employee aggression, and by including both perceived workplace factors and person behaviors as predictor variables. Copyright © 1999 John Wiley & Sons, Ltd.

Introduction

Violence increasingly pervades our daily lives, and the workplace is not immune (Leather, Cox and Farnsworth, 1990; Thomas, 1992). Some work groups are vulnerable to violent incidents in which the victim is providing a service and the aggressor is a client (e.g., police officers, social workers, nurses, and retail sales staff). However, there may be no differences between occupations in the likelihood of *employees* being violent (Toufexis, 1994). It is surprising that aggression and

violence have received limited research attention given that both the frequency and severity of work-related violent incidents have been increasing (Cawood, 1991; Leather *et al.*, 1990). Statistics indicate that workplace homicide is the fastest growing form of murder in the United States (Filipczak, 1993). Furthermore, the incidence of employees killing present or former employers, which has doubled or tripled over the last decade (Kinney and Johnson, 1993), is the fastest growing category of workplace violence (Bensimon, 1994). The immense costs of employee aggression and violence (e.g., lives lost, legal liabilities, lost productivity of victims, witnesses and survivors, damaged corporate reputation; Barling, 1996; Fox and Levin, 1994), and the fact that they are increasing, necessitate a theoretically and empirically focused pro-gramme of study into the nature of these behaviors.

To date, the majority of studies addressing workplace aggression/violence has taken one of three approaches. First, there are those addressing customer or client-perpetrated violence, describing elements of jobs, or characteristics of employees, which increase susceptibility to violence by non-employees (e.g., Breakwell, 1989; Davis, 1987; Kraus, 1987). The second approach to workplace aggression investigates demographic and psychological correlates, attempting to isolate employee attitudes (e.g., Merriam, 1977; Moretti, 1986; Slora, *et al.*, 1991a; Slora, Joy and Terris, 1991b), and/or personal characteristics associated with perpetrators of workplace violence (e.g., history of violent behavior, domestic disputes, alcohol or substance abuse; Herman, 1992). Information gleaned from theories and studies emphasizing the person predictors of counterproductive workplace behaviors has been utilized to create strategies for prevention and control of such behaviors. For example, in response to employee violence, some employers are seeking profiles of job applicants, or relying heavily on preemployment integrity tests to maintain greater control in selecting what they believe are the most honest and trustworthy employees from a pool of job applicants. A third area of research focuses on situational determinants/correlates of employee violence. However, this area has attracted little attention. To truly understand the nature of aggressive behavior, we will focus on the predictive roles of both person behaviors and workplace factors in this research.

Definition of outcome variable

Although the terms 'aggression' and 'violence' have been used interchangeably until now, it should be noted that there are differences between them. Aggression has been defined as any behavior where the aggressor delivers a noxious stimulus to another person—with the intent of harming the other person—and expects that this noxious stimulus will harm the targeted victim (Geen, 1990). Similarly, violence is defined as an act carried out with the intention, or perceived intention, of causing physical pain or injury to another person (Straus and Gelles, 1986). Conceptually then, aggression and violence differ with respect to the nature of harm imposed on a victim. The consensus in the literature is that if harm inflicted is *physical* in nature, then the behavior that brought about this harm can be classified as violent. Support for this distinction comes from work by Barling *et al.* (1987) in the area of marital aggression. In their study, two consistent factors emerged in two separate samples: violence (e.g., hitting, beating, kicking) and psychological aggression (e.g., insulting, swearing).

Person behaviors

We suggest that two person behaviors, namely alcohol use and a history of the use of aggression, will predict aggression by employees in the workplace. Because of a paucity of research on

employee aggression and violence in the workplace, the bases for our predictions of person behaviors derive from studies on family violence and aggression in general (Barling, 1996). Such findings are relevant to an understanding of aggression and violence in the workplace, because, as is the case of family violence, employees invariably aggress against someone who is known to them.

There is a wealth of data linking alcohol use and partner aggression in intimate relationships. This link is consistent in correlational studies of dating (Makepeace, 1987), engaged (Arias, Samios and O'Leary, 1987) and married (Pan, Neidig and O'Leary, 1994) couples. Further, findings from an experimental study demonstrated that the prevalence and frequency of marital violence decreased one year after participants received treatment for alcoholism (O'Farrell and Murphy, 1995). With respect to the workplace, substance abuse is common among workplace murderers (Graham, 1991; Stuart, 1992).

Aggression is relatively stable across time and situations; aggressiveness at eight years of age has been shown to predict serious antisocial behavior some two decades later (Huesmann *et al.*, 1984). Research also shows that one's past use of aggression strongly predicts physical aggression towards an intimate partner (Malone, Tyree and O'Leary, 1989; Riggs and O'Leary, 1989). In a workplace context, a history of violent behavior is typical of workplace murderers (Graham, 1991; Stuart, 1992).

> *Hypothesis 1*: The amount of alcohol consumed by employees, and employees' history of aggressive behavior, will positively predict the amount of aggression they engage in at work.

Perceived workplace factors

As mentioned earlier, research over the last decade has primarily addressed person predictors of employee aggression. However, predicting employee aggression is a complex process, as many people who fit a violent profile may not actually behave violently at work. It has been well established that an individual's behavior is often influenced by social cues in their environment (Bandura, 1977). For example, the changing nature of, and increasing stresses within the workplace are associated with counterproductive workplace behaviors, such as theft, (Greenberg, 1990) and may also be associated with workplace violence (e.g., Barling, 1996; McLean Parks and Kidder, 1994). Until now however, when workplace factors are discussed as possible determinants of workplace aggression, it is typically done anecdotally. Therefore, our aim is to subject these often-mentioned workplace variables to empirical scrutiny. In addition, the majority of research conceptualizes aggression as a lack of self-control or personality flaw. In contrast (and as suggested by anecdotal evidence) our study (implicitly) views employee aggression as a mode of social control (i.e., a way that employees express grievances). Therefore, we include workplace variables that: (1) have often been suggested as potential predictors, (2) have not been tested empirically, and (3) allow for the possibility of conceptualizing aggression as an expression of a grievance and not simply as a character flaw (e.g., surveillance of employees as an invasion of privacy). In doing so, we suggest that four perceived workplace factors will predict workplace aggression and violence, namely job insecurity, procedural and distributive justice, and surveillance of employees.

Perhaps one of the most consequential organizational events in the past decade has been technological changes and downsizing. Changes such as these have led to considerably high levels of job insecurity in employees. Job insecurity reflects the perceived powerlessness to retain

control over one's job, or valued aspects of one's job (Greenhalgh and Rosenblatt, 1984). Possible consequences of job insecurity include anxiety and stress (Jick, 1985; Romzek, 1985), intentions to quit, and decreased job satisfaction, commitment, and trust in the company (Ashford, Lee and Bobko, 1989). There are no direct links between job insecurity and aggression in the literature, yet feelings of powerlessness may lead to the use of aggression in an effort to regain control. In many cases, workplace murderers in the United States were former employees who had been laid off or disciplined, and returned to seek revenge on the individuals they deemed responsible for their circumstances (Stuart, 1992).

Another workplace variable of considerable importance is procedural justice which includes perceptions of formal procedures and interactional justice. Formal procedures reflect the degree to which fair procedures are perceived to be present and used in an organization. Interactional justice was identified by Bies and his colleagues (Bies and Moag, 1986; Tyler and Bies, 1990), who found that a manager's actions in carrying out procedures and explaining decisions to employees are instrumental in determining employees' perceptions of procedural justice. Perceptions of procedural injustice are related to counterproductive behaviors such as employee theft (e.g., Greenberg, 1990, 1993). Some support also exists for a link between perceived unfairness and employee aggression. For example, organizations that offer effective grievance and harassment procedures have fewer violent incidents (Northwestern National Life Insurance Company, 1993). Further, frustration as a function of perceptions of procedural injustice, was related to verbal aggression at work (Spector, 1975) and several retrospective investigations have linked unfair discipline (e.g., harassment, coercion, and intimidation of employees) as the proximal cause of workplace violence (Committee on Post Office and Civil Service, 1992).

Unlike procedural justice, distributive justice reflects the perceived fairness of the rewards employees receive for their performance inputs (Folger & Greenberg, 1985). Individuals who feel inequitably underpaid, strive to restore a balance between their rewards and contributions to a job; either by lowering their inputs or by attempting to raise their outcomes (Adams, 1963). Research has supported this notion (Greenberg, 1990, 1993), with employee theft viewed as the expression of a grievance or a specific reaction to underpayment inequity. In their recent article, O'Leary-Kelly, Griffin and Glew (1996) suggest that workplace violence may ensue when employees perceive valued outcomes (e.g., promotions, compensation) to be distributed unfairly. Again, retrospective reports note that people who have killed former work colleagues or supervisors, for example, had been passed over for a promotion or denied a workers' compensation claim (Stuart, 1992).

Many organizations make use of human and machine-like supervision and surveillance in the workplace (e.g., electronic performance monitoring). Some studies have found that monitored workers report increased stress, decreased social interaction with coworkers and supervisors (Irving, Higgins and Safayeni, 1986), adverse health consequences (Lund, 1992), and boredom, tension, anxiety, depression, anger, and fatigue (Smith *et al.*, 1992). Reasons for this may be specific to the electronic nature of the surveillance (with, for example, its feelings of loss of control). Another reason suggested for the above negative personal and workplace consequences is that electronic surveillance invades the privacy of workers, 'erod[ing] their sense of dignity and frustrat[ing] their efforts to do high-quality work . . .' (Lund, 1992, p. 54). It is possible that *other* types of supervision (i.e., non-electronic) will also exert feelings of loss of privacy and/or loss of control. For example, invasion of privacy is clearly illustrated by some of the surveillance methods used by the U.S. Postal Service (e.g., monitoring employees' bathroom visits). Furthermore, in one empirical study, overly close supervision led to verbal aggression against a supervisor (Day and Hamblin, 1964). The above research findings reveal that, in addition to person

characteristics, a complete analysis of employee aggression and violence must acknowledge the contribution of specific organizational factors.

> *Hypothesis 2*: Feelings of job insecurity, perceptions of procedural injustice, and workplace surveillance each will be positively associated with aggressive acts at work while perceptions of distributive injustice will be negatively associated with aggressive acts at work.

In addition to the above predictions, we addressed—in a more exploratory way—two other research questions in the area of employee aggression. The first of these is concerned with whether the proposed perceived workplace factors will contribute significantly to the prediction of employee aggression and violence over and above the contribution made by person behaviors. The second question we explored relates to the interaction between person behaviors and perceived workplace factors in predicting aggressive acts in the workplace.

Interactions between person behaviors and perceived workplace factors

An understanding of complex human behavior demands consideration of person-by-situation interactions (Mischel, 1968). The interaction of person behaviors and workplace factors is apparent in actual incidents of workplace violence. For example, Fox and Levin (1994) note that the U.S. Postal Service's 'authoritarian' structure may have exacerbated aggressive tendencies among some of its employees. Empirical studies, too, have found support for person-by-situation interactions: One study addressing sexual harassment in the workplace observed a significant interaction effect (Dekker and Barling, 1998). Furthermore, Storms and Spector (1987) found that employees having an external locus of control were more likely to respond to organizational frustration by engaging in counterproductive behaviors than were people with an internal locus of control. Therefore, extending beyond the above individual predictions, we explored the possibility that the interaction between person behaviors and workplace factors would predict workplace aggression and violence.

Outcome variables: employee aggression against coworkers, subordinates, and supervisors

Incidents of workplace violence that have attracted increased media attention invariably consist of murder of former supervisors by subordinates. While this type of violence is worthy of empirical scrutiny, it also has limited our focus of attention in two important ways: (1) it limits the scope of behaviors on which we focus; and (2) it limits research to only one type of victim.

First, although one of the gravest manifestations of workplace violence is bodily injury, in reality, it represents only a small portion of workplace violence. That is, employees engage in less serious forms of violence even more frequently than incidents of workplace homicide; however, these incidents are not as highly publicized or researched as murder. For example, a recent national victimization survey of 600 civilian workers found that one third of non-lethal violent incidents were committed by current or former coworkers, supervisors or subordinates (Fox and Levin, 1994). Furthermore, Northwestern National Life Insurance's (1993) survey suggests that each year in the U.S., more than two million employees endure physical attacks, more than six

million employees are threatened in some way, and more than 16 million employees are harassed (Toufexis, 1994). Like family violence then (Straus, 1979), workplace violence can be conceptualized as a continuum ranging from the least harmful behaviors (e.g., shouting) to those that are extreme and injurious (e.g., severe bodily injury or murder; Slora *et al.*, 1991a; Slora *et al.*, 1991b). Yet, there is a paucity of research examining these less severe forms of person-directed workplace violence, even though the frequency of their occurrence suggests that they are worthy of more focused research attention. It was the aim of this study to explore this full range of aggressive and violent behaviors.

Concerning the second limitation, the stereotype of the disgruntled employee returning to seek revenge against a former supervisor has obscured the fact that employees aggress against coworkers and subordinates as well as supervisors. To redress this, in our study we include aggression against coworkers, subordinates, and supervisors and investigate whether these three types of aggression can be differentiated through their predictors. This second goal is exploratory in nature as we lack sufficient theory and evidence that would provide us with a basis to form more specific hypotheses (e.g., which variables might predict aggression against a coworker but not aggression against a supervisor).

Method

Participants and procedure

Questionnaires were distributed to all 550 non-faculty males employed full-time at a Canadian university; 136 usable questionnaires were returned (response rate = 25 per cent) by mail. In this study we focused on aggression by male employees because of consistent findings that men are more aggressive than women across different contexts (e.g., Malone *et al.*, 1989; Marchetti and McCartney, 1990). Selecting only men would increase the probability of obtaining reports of aggressive behaviors in the workplace. At the time of data collection, the average age of participants was 41.2 years (S.D. = 9.4; range 23–65), their average income was U.S. $43,345 (*S.D.* = $13, 950; range $14,500–99,000), they worked 40.3 hours per week (*S.D.* = 7.7; range 35–70), and had been employed at the university for 12.1 years (*S.D.* = 8.0; range 25–33). On average, participants had between three and four years of college or university education. All of the participants had coworkers, 97 per cent (132) had supervisors, and 68 per cent (92) had subordinates.

Questionnaires

Descriptive statistics and alpha coefficients for all scales are presented in Table 1. See Table 2 for an intercorrelation matrix of all scales.

Alcohol consumption was measured with The Quantity–Frequency–Variability Index (Cahalan, Cisin and Crossley, 1969). First, participants were asked separately how often they usually drink wine, beer, and liquor. Seventeen participants did not drink any wine, beer, and liquor at least once per month or more and were asked *not* to continue with this scale. For those who drink at least one type of alcohol once per month or more ($n = 119$), the scale's remaining nine questions—three for each type of alcohol—are as follows: how often they drink as many as five or six glasses, three or four glasses, and one or two glasses at any one time. Participants were

Table 1. Mean, reliability, *S.D.*, observed range, and possible range of study variables

Variables	*M (Alpha)*	*S.D.*	Observed range	Possible range
Age	41.15 (−)	9.44	23–65	−
Education	3.60 (−)	1.26	1–4	1–5
Income[a]	43.35 (−)	13.95	14.50–99.00	−
Amount of alcohol	10.47 (0.67)	3.48	6.0–20.9	6–30
History of aggression	19.60 (0.79)	4.25	12–33	12–60
Job security	56.46 (0.77)	9.39	32–78	18–90
Formal procedures	39.63 (0.95)	12.06	8–56	8–56
Interactional justice	35.85 (0.96)	11.91	7–49	7–49
Distributive justice	21.76 (0.97)	9.36	5–35	5–35
Workplace surveillance	2.57 (0.71)	2.97	0–14	0–14
Aggression against a coworker	6.21 (0.78)	7.10	0–44	0–60
Aggression against a subordinate	4.36 (0.76)	6.32	0–41	0–60
Aggression against a supervisor	4.97 (0.73)	6.31	0–32	0–60

[a] Income is in thousands of dollars.

only required to complete all nine questions if they initially reported drinking *all three substances* at least once per month. If, for example, they only drink wine once a month (and drink beer and liquor less than once a month), they were asked to complete only the three questions related to wine drinking (and ignore the six questions concerning beer and liquor). All nine of these questions use a 5-point response scale (1 = never, 5 = nearly every time). The coding is as follows: Items were summed to form separate composite scores for wine, beer, and liquor consumption on the basis of how often they drink five or six glasses, how often they drink three or four glasses (multiplied by a coefficient of 0.7), and how often they drink one or two glasses (multiplied by a coefficient of 0.3). This differential weighting was used to reflect severity of drinking behavior. For example, if weights were not used, a person who routinely drinks five or six glasses of wine but never drinks three (or four) or one (or two) glasses of wine would score the same as a person who always drinks one (or two) glasses of wine but never drinks three (or four) glasses of wine (i.e., a score of 5). That is, different weights were used so that 'five or six drinks at a time' would be reflected as more serious drinking behavior than 'one or two drinks at a time'. Finally, the three composite scores were summed to create an overall alcohol consumption index. The aforementioned 17 participants were assigned a composite score of zero.

To assess *history of aggressive actions*, a modified version of Malone *et al.*'s (1989) scale was used. Participants indicated how often they hit their parents, their siblings, or non-family members, both during high school and post high school. The following changes were made to the original scale. First, 'hitting mother' and 'hitting father' were combined into a 'hitting either parent' item because violence against parents is rare (Malone *et al.*, 1989). Second, to assess verbal aggression, items related to how often participants yelled at and argued with parents, siblings, and others during high school and post high school were added. Third, participants were not asked about aggressive behaviors during junior high school because aggressive young adults are typically aggressive as young teenagers (Huesmann *et al.*, 1984). The responses for this scale range from 1 = never to 5 = very frequently.

Job security was assessed using Kuhnert and Vance's (1992) 18-item scale (e.g., 'I am not really sure how long my present job will last'). Responses are scored on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

Table 2. Intercorrelation matrix of all scales

	1	2	3	4	5	6	7	8	9	10	11
1. Age											
2. Education	−0.19*										
3. Income[a]	0.39†	0.24†									
4. Amount of alcohol	−0.24†	0.08	−0.13								
5. History of aggression	−0.21*	0.00	−0.18*	0.12							
6. Job security	−0.03	0.06	0.20*	0.01	−0.11						
7. Procedural justice	0.07	0.07	−0.01	−0.08	−0.19*	0.30†					
8. Distributive justice	0.04	0.03	0.05	−0.02	−0.24†	0.14	0.58†				
9. Workplace surveillance	0.11	−0.19*	−0.16	0.06	0.00	−0.16	−0.20*	−0.32†			
10. Aggression against a coworker	−0.08	−0.16	−0.15	0.23†	0.30†	−0.04	−0.21*	−0.15	0.10		
11. Aggression against a subordinate	−0.02	−0.03	−0.12	0.11	0.19	−0.25*	−0.21*	−0.17	0.17	0.76†	
12. Aggression against a supervisor	−0.06	−0.07	−0.02	0.11	0.16	0.00	−0.37†	−0.35†	0.26†	0.52†	0.38†

[a] Income is in thousands of dollars.
Note: This table was derived using pairwise deletion. The average n for all correlations was 136, except for the correlations with subordinate aggression, and supervisor aggression, where the average ns were 92 and 132, respectively.
* $p < 0.05$; † $p < 0.01$.

The two dimensions of *Procedural justice* were measured by Moorman's (1991) Formal Procedures Scale and Interactional Justice Scale (7 items each). The Formal Procedures Scale measures the degree to which an organization uses fair procedures. The Interactional Justice Scale measures perceptions of the interactions that accompany the formal procedures. Responses for both scales are scored on a 7-point Likert scale ('Strongly disagree' to 'Strongly agree'). Because these two scales were substantially intercorrelated ($r(136) = 0.79$), they were combined into a single scale and renamed procedural justice.

Price and Mueller's (1986) five item *Distributive justice* scale measures the extent to which employees believe that rewards are related to performance inputs. Responses are scored on a 7-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree'.

A *Workplace surveillance* scale was developed for this study as no relevant scale exists. Participants reported ('Yes', 'No', or 'Don't know' coded 2, 0, and 1, respectively) on the presence of seven different monitoring devices (e.g., 'punching a time card', 'timed lunches', and 'frequent employee evaluations') that might be used by management to monitor employees in their present workplace.

Outcome variables: employee aggression

There is currently no inventory of aggressive workplace behaviors. Therefore, a measure of employee aggression was developed based on Straus's (1979) Conflict Tactics Scales. Although Straus's (1979) scale was designed to measure the use of reasoning, verbal aggression, and violence within the family, its list of behaviors is generalizable to other contexts such as the workplace. The following modifications and additions were made to the original scale. First, the introductory wording was changed for applicability to the workplace. Second, the 'Reasoning' subscale was omitted. Third, several items were added to the 'Verbal aggression' subscale ('gossiped about', 'spread rumours about', 'played mean pranks', 'argued with', 'name-called', 'made rude gestures to') which subsequently, was renamed 'Psychological aggression'. Fourth, two items ('threatened with a knife or gun' and 'used a knife or gun') were deleted from the 'Violence' subscale as it was unlikely that these behaviors occurred in a university setting. Last, items consisting of two or more behaviors were divided into separate items; 'insulted and swore at' were separated, as were 'threatened to hit/threatened to throw something at', 'push/grab/shove' and 'kick/bit/hit with fist'.

This modified version of the Conflict Tactics Scale consists of 22 behaviors ranging from psychological aggression (e.g., gossiping), to violence (e.g., beating up). Using Straus's (1979) scoring system (0 = never, 1 = once, 2 = twice, 3 = three to five times, 4 = six to ten times, 5 = 11 to 20 times, 6 = more than 20 times), participants indicated separately the number of times they used any of the behaviors against a coworker, subordinate, or supervisor at work during the past 12 months (or during their current job, if they had been at their job less than a year). Eighty-two per cent, 74 per cent, and 76 per cent of respondents admitted to at least one incident of psychological aggression against a coworker, subordinate, and supervisor, respectively (with 'gossiped about' and 'argued with' having the greatest frequency of occurrence). In contrast, only two participants engaged in physical aggression; thus, physical aggression was removed from any further analyses.

Composite scores of verbal aggression against a coworker, subordinate, and supervisor were derived using Barling *et al.*'s (1987) procedure: Each item was standardized before summing in order to obtain relatively low weights for common behaviors (e.g., gossiping), and higher weights for less frequent behaviors (e.g., beating up).

Results

The data were first checked to ensure that they satisfied the assumptions of multiple regression. For example, each predictor variable was linearly related to each of the dependent variables. With the exception of the three outcome variables, all scales were not significantly skewed. Transformations of the dependent variables, however, were not undertaken because transformed variables are often difficult to interpret, they are generally highly correlated with the original variables, and because regression analysis is robust under violations of normality (Kirk, 1982). As mentioned earlier, formal procedures and interactional justice scales were combined in order to avoid effects of multicollinearity.

One goal of this study was to investigate whether the three types of aggression under investigation could be differentiated through their predictors. However, because the three outcome variables were substantially intercorrelated (suggesting they may not be distinct forms of aggression) it was neither conceptually nor statistically sound to begin by running separate regression analyses (i.e., one for each outcome). In other words, high intercorrelations amongst outcome variables could result in the corresponding regression analyses not being as separate or independent as we would want them to be, possibly rendering our solution unstable. We therefore, first conducted a canonical correlation analysis which produced three linear combinations, of which two were significant. These two linear combinations demonstrated that the three types of aggression under investigation were significantly distinct to proceed with hierarchical regression analyses.

Next, hierarchical multiple regression was used to assess the predictors of employee aggression against coworkers, subordinates, and supervisors. The predictor variables were entered in three blocks: demographic variables, person behaviors, and workplace factors. The first block includes three demographic variables (age, education, income), all of which are associated with aggression (Straus, Gelles and Steinmetz, 1980). Their effects were controlled so that the amount of variance uniquely accounted for by person behaviors and workplace factors could be assessed. The second block includes both person behaviors (amount of alcohol and history of aggression). The third block includes the four workplace factors (job security, procedural justice, distributive justice, and workplace surveillance). The order of entry of blocks was predetermined. However, within each block, no order was specified because there was no theory stating which of the variables would be most predictive.

Aggression against a coworker

The results of the hierarchical regression analysis for variables predicting aggression against a coworker can be found in Table 3. First, neither as a block (4 per cent of the variance, $p > 0.05$) nor alone, do any of the demographic variables account for aggression against a coworker. Second, hypothesis 1 is supported: After controlling for demographic variables, both the amount of alcohol consumed and history of aggressive behavior predict aggression against a coworker $\beta = 0.21, p < 0.05$ and $\beta = 0.24, p < 0.01$, respectively). Together, these two variables add 12 per cent of the variance in aggression against a coworker ($p < 0.01$). However, Hypothesis 2 is not supported because none of the four workplace factors predict aggression against a coworker. Further, the four workplace factors as a block do not account for a significant amount of variance (2 per cent; $p > 0.05$) beyond the variance attributable to demographic variables and person behaviors.

Table 3. Summary of hierarchical regression analysis for variables predicting aggression against a coworker ($n = 136$), subordinate ($n = 92$), and supervisor ($n = 132$)

Variable	Coworker				Subordinate				Supervisor			
	B	SE B	β	F	B	SE B	β	F	B	SE B	β	F
Step 1—Control variables												
Age	0.02	0.07	0.03	0.07	0.02	0.08	0.03	0.05	−0.01	0.06	−0.02	0.06
Education	−0.66	0.43	−0.14	2.41	−0.09	0.54	−0.02	0.03	−0.09	0.40	−0.02	0.04
Income	−3.20	4.99	−0.06	0.41	−1.26	5.78	−0.03	0.05	−0.94	4.75	−0.02	0.04
Step 2—Hypothesis 1												
Amount of alcohol	8.86	3.59	0.21	6.10*	3.73	4.71	0.09	0.63	2.27	3.34	0.06	0.46
History of aggression	3.00	1.09	0.24	7.53†	1.85	1.30	0.15	2.02	0.97	1.04	0.08	0.87
Step 3—Hypothesis 2												
Job security	0.04	0.06	0.06	0.44	−0.13	0.08	−0.19	2.82	0.09	0.05	0.15	2.67
Procedural justice	−0.44	0.30	−0.16	2.17	−0.30	0.36	−0.11	0.69	−0.72	0.28	−0.27	6.48†
Distributive justice	0.00	0.07	−0.16	2.17	−0.03	0.08	−0.04	0.10	−0.09	0.06	−0.14	1.92
Workplace surveillance	0.16	0.51	0.03	0.10	0.52	0.66	0.09	0.62	0.95	0.48	0.18	4.01*

Notes: (Coworker) $R^2 = 0.04$ for Step 1 ($p > 0.05$); $\Delta R^2 = 0.12$ ($p < 0.01$) for Step 2; $\Delta R^2 = 0.02$ ($p > 0.05$) for step 3.
(Subordinate) $R^2 = 0.01$ for Step 1 ($p > 0.05$); $\Delta R^2 = 0.05$ ($p > 0.05$) for Step 2; $\Delta R^2 = 0.08$ ($p > 0.05$) for step 3.
(Supervisor) $R^2 = 0.01$ for Step 1 ($p > 0.05$); $\Delta R^2 = 0.03$ ($p > 0.05$) for Step 2; $\Delta R^2 = 0.18$ ($p < 0.01$) for step 3.
* $p < 0.05$; † $p < 0.01$.

Aggression against a subordinate

Hypotheses 1 and 2 are not supported for aggression against a subordinate. None of the control variables, person behaviors, or workplace factors emerge as significant predictors of aggression against a subordinate (see Table 3); they account for 1, 5 and 8 per cent of the variance, respectively, in aggression against a subordinate (all $p > 0.05$).

Aggression against a supervisor

None of the demographic variables predict aggression against a supervisor and, as a block, they account for only 1 per cent of the variance ($p > 0.05$; see Table 3). Likewise, after controlling for demographic variables, neither of the person behaviors is a significant predictor (i.e., no support for Hypothesis 1; $p > 0.05$); as a block, they account for 3 per cent of the variance in aggression against a supervisor. In contrast, Hypothesis 2 is partially supported. That is, two of the workplace factors (procedural justice and workplace surveillance) significantly predict aggression against a supervisor. Procedural justice is negatively, while workplace surveillance is positively related to aggression against a supervisor ($\beta = -0.27$, $p < 0.01$, $\beta = 0.18$, $p < 0.05$). Furthermore, as a block, perceived workplace factors account for a significant amount of variance above and beyond that attributed to control variables and person behaviors (18 per cent, $p < 0.01$).

Person × situation interactions

The strategy outlined by Aiken and West (1991) was used to test for interaction effects on workplace aggression. This procedure requires standardizing all predictors (both person and workplace variables) and calculating interaction terms by multiplying one standardized person behavior with one standardized workplace factor. Using hierarchical regression, each outcome variable is regressed first on a person behavior and workplace factor, and then on the interaction of these two variables. Finally, an F test is used to determine if R^2 changes significantly from step one to step two of the regression equation. However, this interaction test is very stringent and, therefore, reduces the likelihood of detecting small effects. Evans (1985) suggests that an interaction term accounting for anything greater than 1 per cent of outcome variance is meaningful (regardless of statistical significance). Thus, we report the results of all interaction terms accounting for a minimum of 2.5 per cent of the variance beyond that accounted for by each of the main effects.

The first two significant interactions involve procedural justice and amount of alcohol consumed. Specifically, procedural justice interacts with amount of alcohol consumed in predicting both aggression against a coworker ($R^2 = 0.04$, $p < 0.05$) and subordinate ($R^2 = 0.08$, $p < 0.01$). Under conditions of low justice perceptions, amount of alcohol consumed is strongly and positively related to aggression against a coworker ($\beta = 0.39$, $p < 0.01$) and a subordinate ($\beta = 0.39$, $p < 0.01$). In contrast, amount of alcohol consumed is not a significant predictor of aggression against a coworker ($\beta = 0.00$, $p > 0.05$) or subordinate ($\beta = -0.26$, $p > 0.05$) when perceptions of justice are high.

The remaining three interactions meet the criterion for incremental variance, but are not significant at the 0.05 level; furthermore, all three involve aggression against a subordinate. First, job security interacts with amount of alcohol consumed ($R^2 = 0.03$, $p = 0.09$), and with history

of aggression ($R^2 = 0.03$, $p = 0.08$) in predicting aggression against a subordinate. Amount of alcohol consumed and history of aggression are positively related to aggression against a subordinate when job security is low ($\beta = 0.30$, $p < 0.05$; $\beta = 0.43$, $p < 0.01$, respectively). In contrast, when job security is high, neither amount of alcohol consumed ($\beta = -0.03$, $p > 0.05$) nor history of aggression ($\beta = 0.00$, $p > 0.05$) is related to aggression against a subordinate.

Lastly, procedural justice interacts with history of aggression in predicting aggression against a subordinate ($R^2 = 0.03$; $p = 0.12$). When perceived justice is low, history of aggression is significantly related to aggression against a subordinate ($\beta = 0.35$, $p < 0.05$). In contrast, when perceptions of justice are high, history of aggression is not related to aggression against a subordinates ($\beta = 0.07$, $p > 0.05$).

Discussion

Results of the analyses concerning the prediction of employee aggression against supervisors, coworkers, and subordinates are clear-cut. First, after controlling for the effects of three demographic variables and two person behaviors, two workplace factors predicted aggression against a supervisor. Employees' perceptions of procedural justice were negatively associated, and the number of surveillance methods used to monitor employees positively associated, with aggression against a supervisor. These results are consistent with empirical (Spector, 1975) and non-empirical studies (see Bensimon, 1994).

In contrast, after controlling for the effects of demographic variables, aggression against a coworker was positively and significantly predicted by both person behaviors (amount of alcohol consumed and history of aggression) but not by any workplace factors. This link between alcohol and employee aggression is consistent with findings in different contexts (Arias *et al.*, 1987; Makepeace, 1987; O'Farrell and Murphy, 1995; Pan *et al.*, 1994). Aggression against a subordinate, however, was not predicted significantly by any variables in the regression equation. One possibility is that the sample size was too small; only 92 of the original sample had subordinates who reported to them.

One plausible explanation for this pattern of findings is that employees' aggression is target-specific: When dissatisfied with aspects of their job, they direct aggression towards those presumed responsible for their dissatisfaction. Because of the nature of workplace factors investigated in this study (job insecurity, procedural and distributive justice, workplace surveillance), one would not expect dissatisfaction regarding these factors to be directed—presumably in the form of aggression—against coworkers. Similarly, it is possible that employees choose not to aggress against subordinates because subordinates: (1) do not have the power to improve negative workplace conditions, and (2) would not necessarily be presumed as the cause of the workplace dissatisfaction. This explanation remains speculative, however, as the motives underlying aggressive behavior, or the 'intent of behavior', was not measured in the present study.

Consistent with our initial expectations, five interactions met the criterion of accounting for at least 2.5 per cent of the variance in workplace aggression: Two of these were statistically significant but the three interactions involving aggression against a subordinate, were not. One reason for this may be that the sample was substantially smaller for this outcome ($n = 92$ as opposed to $n = 136$), probably resulting in a power not high enough to yield significant interactions.

First, procedural justice interacted with amount of alcohol consumed in predicting both aggression against a coworker and aggression against a subordinate. Secondly, both job security and procedural justice interacted with history of aggression in predicting aggression against a subordinate. Finally, job security and amount of alcohol consumed interacted to predict agression against a subordinate. The same pattern occurred for each of the above interactions. More specifically, when organizational procedures and supervisor–subordinate interactions were perceived as unfair or when employees were insecure about their jobs, then the amount of alcohol consumed or employees' history of aggression was strongly related to aggressive acts at work. In contrast, when employees perceived the procedures and supervisory actions accompanying procedures as being fair or when job security was high, amount of alcohol consumed or employees' history of aggression was not related to aggression in the workplace.

As is the case with most empirical research, several constraints were placed on the design of this study which may affect the interpretation and generalizability of results. First, because our data is cross-sectional, we are not able to make causal inferences regarding predictor/outcome relationships: to enable true causal inferences, longitudinal designs are necessary. Further, while we could not assess physical violence in the present study, research has shown that psychological aggression often proceeds physical violence in marriages (Murphy and O'Leary, 1989). It would be interesting to see, through longitudinal research, if a similar progression of violence occurs in different contexts, such as the workplace.

Second, self-selection bias may have contributed to the low response rate, and limited generalizability of these findings. The response rate obtained in this study, although seemingly low, is consistent with those of studies investigating other controversial behaviors (e.g., sexual harassment; Dekker and Barling, 1998). Furthermore, given the nature of the question under investigation, social desirability may affect the likelihood of obtaining accurate reports of aggression. This is of some concern as social desirability may be an issue in self-reported partner-directed aggression (Arias et al., 1987) and sexual harassment (Dekker and Barling, 1998). However, if social desirability is operating, self-reported levels of aggression would in all probability, underestimate true levels, leading to truncated relationships due to a lack of variance. Thus, future studies relying solely on self-report data should control for social desirability.

Third, because all data is self-report, there is no way to separate method variance from true score variance. It is possible that method variance bolstered the magnitude of relationships between predictors and outcomes, but seems unlikely that it resulted in a meaningful pattern of interactions, as the one we observed. To reduce the possibility of mono-method bias, future studies should aim to incorporate an external criterion so as not to rely solely on subjects' reports.

Fourth, the generalizability of our results may also be limited because all participants were from one workplace and all were men. Although they were asked about their *perceptions* of workplace factors, there may have been some restriction of range in their responses because organizational procedures, and the way they are implemented, will be at least somewhat similar for employees in the same workplace. Despite popular stereotypes, we obtained few reports of actual physical violence. One possibility for this is that such behaviors were less likely to occur in our sample. It would seem, then, that different occupational groups experience variable rates of employee aggression and violence; whether this is due to the type of people hired in different industries or to different organizational cultures (or some type of interaction of the two) remains to be seen. Therefore, because of the limited nature of this sample, replication of this research across a variety of workplaces and blue-collar and white-collar jobs (with social desirability controlled) would be useful.

In a similar vein, there is a need for the development of an in-depth measure of workplace violence; one that is designed to measure a range of interpersonally violent behaviors that are

job-related (e.g., serious versus less serious, physical, psychological, verbal). Once the definition of workplace violence is broadened, researchers can begin to study the complete range of violent behaviors. Finally, future studies should also investigate the extent to which additional organizational factors (e.g., quality of supervision, job stress) and person behaviors (drug abuse, non-work stress) influence employee aggression.

In conclusion, our findings are of theoretical importance because they increase our knowledge concerning the predictors of different targets of employee aggression. These findings also provide a useful starting point for considering the prevention of employee aggression. Clearly, any attempts to reduce or control employee aggression must be sensitive to the target of aggression. In addition, our findings reveal that recruitment strategies which exclude potentially aggressive applicants will be insufficient. Instead, successful attempts will be based on a simultaneous focus of both person behaviors and workplace factors.

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