

## RESEARCH REPORT

# Reciprocal Effects of Work Stressors and Counterproductive Work Behavior: A Five-Wave Longitudinal Study

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Previous research has clearly shown that work stressors are positively related to counterproductive work behavior (CWB). Most of these studies, however, used cross-sectional designs, which limits insight into the direction of effects. Nevertheless, it has been assumed that work stressors have a causal effect on CWB, but the role of CWB as an antecedent of work stressors has been neglected. The present study examined lagged reciprocal relationships between work stressors and CWB. We assumed that work stressors (organizational constraints and experienced incivility) are prospectively and positively related to CWB (interpersonal and organizational CWB) and that conversely CWB is prospectively and positively related to work stressors. We tested our hypotheses with a longitudinal study of 663 individuals who were assessed 5 times over an 8-month period. The results supported the possibility of a reciprocal relationship. Organizational constraints (but not experienced incivility) predicted subsequent CWB, and CWB predicted subsequent organizational constraints and experienced incivility. Because reciprocal effects point to a vicious cycle with detrimental effects of CWB to both actors and targets, the findings are not only of theoretical but also of practical importance.

**Keywords:** work stressors, counterproductive work behavior, incivility, longitudinal study, reciprocal effects

Past research has clearly shown that work stressors are positively related to counterproductive work behavior (CWB; behavior that harms; e.g., [Hershcovis et al., 2007](#)), which consists of many forms that can be directed either at organizations (e.g., theft) or people (e.g., abuse; [Robinson & Bennett, 1995](#)). Models of CWB and related constructs assume that stressful work conditions (stressors) serve as antecedents of CWB ([Spector & Fox, 2005](#)). However, the vast majority of CWB studies have used cross-sectional designs, which strongly limits conclusions about the direction and duration of effects. Such studies cannot rule out the possibility that CWB may also lead to more work stressors. Reversed effects such as these would indicate that engaging in CWB is not only harmful for the target but that it may also have negative consequences for the perpetrator. Moreover, effects in both directions would point to a vicious cycle of stressful work conditions and detrimental behavior. Interestingly, reciprocal effects have rarely been investi-

gated. In this article, we describe a longitudinal study that examined reciprocal effects of work stressors and CWB, and that tested whether the effect sizes depend on the length of the time lags.

CWB has been linked to several work stressors, including organizational constraints and experienced incivility. Organizational constraints refer to situations or conditions that prevent persons from translating ability and effort into job performance (see [Spector & Jex, 1998](#)), and several cross-sectional studies have shown that they are positively linked to CWB (for a meta-analysis, see [Hershcovis et al., 2007](#)). Experienced incivility refers to low-intensity antisocial behavior with ambiguous intent to harm the target ([Andersson & Pearson, 1999](#)). Previous research has mainly focused on its effects on strain (e.g., [Cortina, Magley, Williams, & Langhout, 2001](#); [Lim, Cortina, & Magley, 2008](#)), although it has also been linked to CWB ([Penney & Spector, 2005](#)). Importantly, various scholars have noted that targets of uncivil behavior often have the desire to retaliate, and experienced incivility can potentially spiral into more intense aggression (cf. incivility spiral; see [Andersson & Pearson, 1999](#)). Empirical tests of these assumptions, however, are rare and have been limited to cross-sectional data.

### Work Stressors → CWB

Different mechanisms have been proposed to explain why work stressors lead to CWB. For example, according to the stressor–emotion model of CWB ([Spector & Fox, 2005](#)), negative emotions play a crucial role in triggering CWB. Negative emotions arise when people appraise a situation as a threat or loss with regard to goals ([Lazarus, 1991](#)). In the work context, people have general

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This article was published Online First February 4, 2013.

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This research was supported by Swiss National Science Foundation Grant PA00P1-131482 to Laurenz L. Meier. We thank Martial Berset, Steve M. Jex, Viviane and Colm O'Mahony, and Min Ty for helpful comments on earlier versions of this article.

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goals (e.g., to be accepted and socially included by others; e.g., Baumeister & Leary, 1995), as well as specific task-related goals. These goals may be threatened by aversive work conditions and events (i.e., work stressors) such as rude behavior by others (as a threat to the goal of belonging, see Semmer, Jacobshagen, Meier, & Elfering, 2007) and organizational constraints (as a threat to task-fulfillment goals, see Peters & O'Connor, 1980). Confronted with work stressors, people will experience negative emotions (e.g., frustration, anger), which are likely to trigger aggressive tendencies that may result in CWB (see Berkowitz, 2003). Fox, Spector, and Miles (2001) claimed support for this mediation hypothesis with organizational constraints, although the cross-sectional design of their study makes such conclusions premature.

Other scholars have focused on revenge, grievance, or retaliation as the link between stressors and CWB (e.g., Greenberg, 1993). Individuals often seek revenge for violations of the shared belief that people deserve to be treated with respect and dignity (Folger & Skarlicki, 1998). Hence, after experiencing disrespect and injustice, employees might attempt to restore justice by punishing the perceived source of that injustice. Moreover, rudeness and injustice signal that one is not valued and respected by other group members. Hence, one's social standing and self-esteem is threatened (Tyler & Lind, 1992). As people are motivated to defend against threats to their social and personal identities, incivility is likely to trigger desire for revenge (Aquino & Douglas, 2003). In line with this assumption, Jones (2009) found evidence that desire for revenge mediated the effect of injustice on CWB, but again, design limitations render such conclusions tentative. Moreover, being exposed to unfair and antisocial behavior that goes unpunished may foster the impression that such behavior is acceptable. Hence, individuals who experience or observe such behavior are more likely to behave accordingly (O'Leary-Kelly, Griffin, & Glew, 1996; Robinson & O'Leary-Kelly, 1998).

Finally, limited self-control capacities have been proposed as a cause of CWB. Self-control depends on a finite energy resource that can be depleted by exposure to stressors (Muraven & Baumeister, 2000). As energy resources become depleted, self-control breaks down and an individual's behavior can become more selfish, impulsive, and antisocial (Baumeister & Exline, 1999). Consistent with this idea, laboratory (e.g., Gino, Schweitzer, Mead, & Ariely, 2011) and field (e.g., Barnes, Schaubroeck, Huth, & Ghumman, 2011) studies have found that individuals show more CWB when their self-control resources had been depleted. In sum, various theoretical mechanisms suggest that work stressors lead to CWB.

Despite acceptance of the idea that stressors precede CWB, there are surprisingly few direct tests. A number of empirical studies, summarized in meta-analyses (e.g., Berry, Ones, & Sackett, 2007; Cohen-Charash & Spector, 2001; Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Hershcovis et al., 2007), have indicated that there is indeed a positive relationship between work stressors and CWB. As noted above, however, most of these studies have been cross-sectional and shed little light on direction of effects. In fact, we are aware of only three longitudinal studies that controlled for baseline CWB (deemed important by Zapf, Dormann, & Frese, 1996) to examine potential prospective effects of work stressors on CWB: (a) In his seminal quasiexperimental study, Greenberg (1990) showed that experienced inequity and an inadequate explanation for a salary decrease led to more theft; (b)

Detert, Treviño, Burris, and Andiappan (2007) found that abusive supervision and managerial oversight, but not ethical leadership, were prospectively related to food loss (their measure of CWB) in a restaurant; and finally, (c) Tucker et al. (2009) showed that lack of job control, but not workload, was prospectively related to undisciplined behavior among soldiers. Tucker et al.'s study consisted of more than two measurement occasions, and hence they were able to test the duration of the effect across varying time lags. Interestingly, the effect of control was found with only a 5-month and not an 8-month lag. In sum, few longitudinal studies support the assumption that work conditions may lead to CWB, and they suggest that the specific time lag is important. Further research is needed to establish and replicate these findings with other work stressors and broader classes of CWB.

## CWB → Work Stressors

### Effects on Experienced Incivility

CWB violates norms of appropriate behavior and incurs a risk of retaliation by other individuals in the organization (e.g., Aquino, Tripp, & Bies, 2001), as both supervisors and coworkers may want to pay the offender back when they experience or observe CWB. Andersson and Pearson (1999) noted that targets of antisocial behavior often have a desire to respond in an uncivil, or aggressive, manner.

Different motives for punishing others' harm doing have been postulated. The moral virtue model assumes that people care about unjust behavior such as CWB because they have a basic respect for human dignity and a commitment to ethical standards (e.g., Cropanzano, Byrne, Bobocel, & Rupp, 2001; Folger, 2001). Proposing that justice is beyond personal interest, this model suggests that people who observe or are informed about the occurrence of CWB feel antipathy toward the perpetrator and experience an urge to punish him or her. In line with this, experimental studies by Turillo, Folger, Lavelle, Umphress, and Gee (2002) showed that participants who were informed that their partner previously acted in an unfair manner toward a third party were likely to monetarily punish their partner even though they thereby lost money themselves. By ruling out alternative explanations (e.g., self-interest such as public image), the authors concluded "virtue is its own reward" (p. 839). This does not rule out the possibility that self-interest is also a driving force for punishing people after witnessing harm to others. Observers of CWB are likely to be concerned whether this will happen again and whether they will be the next victims. By punishing the perpetrator, the observer expresses that such behavior is not tolerated and hence discourages further antisocial behavior (Tedeschi & Felson, 1994). However, overt retaliation against the perpetrator is an option only if no punishment is expected (e.g., Aquino et al., 2001), and hence observers may hesitate to directly intervene when the perpetrator is too powerful (e.g., supervisor, senior group member). In this case, more subtle and covert forms of retaliation, such as reducing support, withholding information, or spreading rumors, are still possible. Likewise, based on self-interest, observers may want to protect or defend the victim because they profit from this relationship (e.g., coworker as a source of social support). For example, observing unfairness was more strongly related to observer's emotions and

behavioral intentions when the observer expected that the victim was willing to provide help in the future (De Cremer & van Hiel, 2006). Thus, both, concern for others and concern for self may motivate observers of CWB to punish the perpetrator, for example by showing uncivil behavior.

Moreover, there are reasons to assume that observers of CWB will also show negative behavior such as incivility toward the perpetrator (as well as others) that does not have to be driven by a conscious decision to harm. First, observing CWB is likely to increase the accessibility of aggressive concepts in memory, without intention or awareness (see Bargh, 1989), which then will lead to aggressive tendencies and uncivil behavior. In line with this, Bargh, Chen, and Burrows (1996, Study 1) showed that participants whose concept of rudeness was primed with a scrambled-sentence test acted more rudely toward the experimenter. Also, Porath and Erez (2009) showed that witnessing rudeness increased aggressive thoughts and decreased prosocial behavior. Second, observing CWB is also likely to deplete self-control resources, which may lead to antisocial behavior, as outlined above. Witnessing CWB triggers negative emotions (e.g., anger, disgust, fear), which will prompt observers to regulate their emotions. Emotion regulation requires resources (e.g., Baumeister, Zell, & Tice, 2007), which in turn depletes energy available for self-control. In line with this, Totterdell, Hershcovis, Niven, Reich, and Stride (2012) showed that people who observed unpleasant interactions among coworkers were emotionally drained, which reflects a state of depleted self-control resources (e.g., Muraven, Tice, & Baumeister, 1998), which may lead to uncivil behavior against the perpetrator of CWB.

### Effects on Organizational Constraints

In addition to experienced incivility, increased organizational constraints can result from engaging in CWB. One pathway is that coworkers withhold help (e.g., withhold needed information), which makes it more difficult for perpetrators to do their jobs. Porath and Erez (2009), for example, showed that participants who observed rude behavior subsequently acted less prosocially. Coworkers might also engage in subtle forms of retaliative behavior such as providing faulty equipment and giving conflicting demands. In general, the presence of CWB in the workplace may erode the norms of mutual respect and is likely to create a team climate where trust, support, and collaboration is low and hence organizational constraints are high (e.g., Carter, 1998; Pearson, Andersson, & Wegner, 2001). Additionally, acts of CWB directed toward the organization can be self-sabotaging because damaging organization property might result in having inadequate availability of tools or equipment.

In sum, there are theoretical reasons to assume that performing CWB may increase work stressors (e.g., experienced incivility, organizational constraints). Empirical tests, however, have been rare. To the best of our knowledge, only Tucker et al. (2009) examined such reversed effects, and indeed, indiscipline was negatively related to subsequent level of job control. To extend our knowledge about the reciprocal effects of work stressors and CWB, we therefore conducted a longitudinal study, looking at two stressors not studied by Tucker et al.

### The Present Study

In this study, we focused on organizational constraints and experienced incivility as work stressors expected to relate to organization-directed and person-directed CWB. Specifically, we propose a reciprocal relationship between our two stressors and CWB for reasons outlined above.

*Hypothesis 1:* There will be a positive time-lagged relationship between work stressors (organizational constraints and experienced incivility) and both interpersonal and organizational CWB.

*Hypothesis 2:* There will be a positive time-lagged relationship between both interpersonal and organizational CWB and work stressors (organizational constraints and experienced incivility).

Most previous research has used cross-sectional designs, and hence these studies are mute about the direction and the duration of effects because positive correlations between stressors and CWB may be the result of different mechanisms. It may reflect that (a) work stressors cause CWB, that (b) CWB causes work stressors, that (c) work stressors and CWB cause each other, or that (d) work stressors and CWB are causally unrelated and a third variable accounts for their positive association. Although (passive observational) longitudinal designs can hardly rule out the last mechanism, they can indicate whether the data are consistent with a particular direction of effect. Furthermore, theories and empirical research in organizational psychology are often mute about the timing of processes (e.g., George & Jones, 2000; Mitchell & James, 2001; Sonnentag, 2012), and various researchers have noted the danger of poorly chosen time lags (e.g., Cohen, 1991; Maxwell & Cole, 2007). As only a few longitudinal studies about the prospective effects of work stressors on CWB exist, little is known about the importance of time lags regarding this relationship. Tucker et al. (2009) showed that effects of work stressors on CWB may persist for rather short time lags; we therefore used a longitudinal design with five waves and time lags of 2 months. Such a design allowed us to examine the reciprocal effects with time lags of 2, 4, 6, and 8 months. We have no explicit hypothesis about the duration of the effects. However, examining different time lags reduces the risk of erroneously concluding that an effect is nonexistent if the duration of the effect is actually shorter or longer. Hence, considering different temporal patterns is crucial to understand the processes by which our variables are related (e.g., Ployhart & Vandenberg, 2010; Selig & Preacher, 2009).

### Method

#### Participants and Procedure

We collected data using a web-based longitudinal survey that included five assessments at 2-month intervals. The participants were recruited (a) with the help of a group of master's-degree students who advertised the study as broadly as possible among their family members, neighbors, and coworkers; (b) by advertising the study on the Internet; and (c) by word of mouth. The sample characteristics of participants, which are reported below, suggest that the recruitment procedure resulted in a relatively

heterogeneous sample from various types of jobs. On the website of the study, participants received information on the purpose and procedure of the study and were informed that their data would be treated as strictly confidential. Participants were asked to provide an e-mail address at which they could receive e-mails containing individual links to subsequent assessments. As compensation for the participants' time and as an incentive for their continuing participation, participants were offered individual feedback about their work situation and well-being at the end of the study.

The sample consisted of 663 employees (51% female). Mean age of participants was 32.4 years ( $SD = 10.5$ , range = 16–62). Nine percent had completed obligatory years of schooling in their country, 52% had completed secondary education (approximately 12 years), 14% had a bachelor's degree, 23% had a master's degree, and 2% had a doctoral degree. Ninety-six percent lived in Switzerland, 3% in Germany, and 1% in other countries. Seventy percent of the participants worked full-time (about 42 hr/week;  $M = 39.0$ ,  $SD = 6.0$ ). Organizational tenure ranged from 0.1 to 35.0 years ( $M = 4.8$ ;  $SD = 5.5$ ). Data were available for 663 individuals at Time 1; 534 individuals at Time 2; 468 individuals at Time 3; 403 individuals at Time 4; and 382 individuals at Time 5. To investigate the potential impact of attrition, differences on study variables were tested between participants who completed the Time 5 assessment and participants who dropped out of the study before Time 5. For only one variable (organizational CWB at Time 1), participants who dropped out reported higher values than did participants who completed the full study ( $d = 0.23$ ,  $p < .05$ ). No significant differences emerged for any of the other variables.

## Measures

**Organizational constraints.** Organizational constraints were assessed with a scale developed by Spector and Jex (1998). Respondents were presented with 11 items, representing the situational constraint areas identified by Peters and O'Connor (1980), and were asked how often they found it difficult or impossible to do their job because of each constraint within the preceding 30 days. Responses were measured on a 5-point scale ranging from 1 (*very rarely/never*) to 5 (*very often/all the time*).

**Experienced incivility.** Experienced incivility was assessed with an adapted seven-item scale developed by Cortina et al. (2001). The adaptations had been suggested by Blau and Andersson (2005). Participants indicated how often they had experienced behaviors such as "interrupted you while you were talking" at work within the preceding 30 days. Responses were measured on a 7-point scale ranging from 1 (*never*) to 7 (*very often*).

**Interpersonal and organizational CWB.** Interpersonal and organizational CWB were assessed with the two subscales of Bennett and Robinson's (2000) deviance scale. Participants indicated how often they had exhibited behaviors such as "cursed at someone at work" (seven items for interpersonal CWB) or "taken property from work without permission" (12 items for organizational CWB) within the preceding 30 days. Responses were measured on a 7-point scale ranging from 1 (*never*) to 7 (*very often*).

## Statistical Analyses

Confirmatory factor analyses and structural equation modeling analyses were conducted using the Mplus 6 program (Muthén &

Muthén, 2010). To deal with missing values and nonnormality of the measures, we employed robust full-information maximum-likelihood estimation (MLR) to fit models directly to the raw data (Muthén & Muthén, 2010). Model fit was assessed by the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root-mean-square error of approximation (RMSEA), based on the recommendations of Hu and Bentler (1999) and MacCallum and Austin (2000). Good fit is indicated by values greater than or equal to .95 for CFI and TLI and less than or equal to .06 for RMSEA (Hu & Bentler, 1999). To compare nested models, we calculated differences in fit according to Satorra and Bentler (2010; see also Bryant & Satorra, 2012) and used the test recommended by MacCallum, Browne, and Cai (2006).

## Results

Table 1 shows the means, standard deviations, alpha reliabilities, and correlations of the measures used. Work stressors and CWB were positively related, both within and across measurement occasions. For the structural equation models, we used three-item parcels as indicators for each construct because they produce more reliable latent variables than do individual items by reducing random error and thereby increasing the reliability of the structural coefficients of the model (Little, Cunningham, Shahar, & Widaman, 2002).

In a first step, we conducted confirmatory factor analyses to examine whether the four scales reflected different constructs. We tested three models (one, two, and four factors within each time period). In all analyses, all factor loadings were freely estimated and the uniquenesses of individual indicators were correlated over time to account for consistency in indicator-specific variance (Cole & Maxwell, 2003). In the one-factor model, all parcels were placed into a single factor for each measurement occasion, so that there were a total of five factors (one per occasion) that were correlated with each other. In the two-factor model, for each measurement occasion, the stressor parcels were placed into one factor and the CWB parcels were placed into another factor; all 10 factors (two per occasion) were correlated with each other. In the four-factor model, for each measurement occasion, the parcels were placed into the corresponding four factors, and all 20 factors (four per occasion) were correlated with each other. The results showed that only the measurement model with four factors had a good fit (see Table 2).

In the second step, we tested whether measurement invariance across time existed for the latent variables (e.g., Finkel, 1995). We compared the fit of the four-factor measurement model with freely estimated factor loadings with a second model that was identical to the first except that we constrained the factor loadings of each indicator to be equal across time. If the constrained model does not fit worse than the unconstrained model, then the constraints are empirically justified and ensure that the latent constructs have the same meaning across time (i.e., metric invariance; Schmitt & Kuljanin, 2008). The two models did not differ significantly in fit (see Table 2); consequently, we favored the more parsimonious constrained model and retained the longitudinal constraints on factor loadings in the subsequent analyses.

In the third step, we tested the fit of two structural cross-lagged models for each pair of work stressor and CWB measures. In cross-lagged models, a latent variable at Time 2 is predicted by the



Table 1  
*Descriptive Statistics and Correlations*

Variables	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. OC-t1	2.03	0.63	1.0–5.0	(.84)																			
2. OC-t2	2.03	0.63	1.0–4.6	.70	(.85)																		
3. OC-t3	2.02	0.65	1.0–4.6	.63	.74	(.88)																	
4. OC-t4	1.98	0.64	1.0–4.2	.57	.67	.72	(.89)																
5. OC-t5	2.01	0.63	1.0–3.9	.54	.63	.65	.76	(.88)															
6. EI-t1	1.83	0.79	1.0–6.3	.42	.33	.31	.31	.31	(.85)														
7. EI-t2	1.76	0.73	1.0–5.6	.33	.45	.39	.40	.36	.55	(.85)													
8. EI-t3	1.70	0.68	1.0–4.2	.28	.34	.42	.34	.34	.54	.65	(.85)												
9. EI-t4	1.66	0.69	1.0–4.9	.29	.37	.39	.47	.47	.57	.62	.65	(.86)											
10. EI-t5	1.68	0.80	1.0–5.9	.29	.33	.39	.42	.54	.46	.54	.58	.69	(.90)										
11. CWB-I-t1	1.36	0.49	1.0–6.4	.25	.23	.24	.28	.22	.43	.41	.42	.41	.36	(.80)									
12. CWB-I-t2	1.34	0.45	1.0–4.1	.21	.30	.27	.31	.25	.31	.51	.45	.44	.38	.63	(.78)								
13. CWB-I-t3	1.33	0.46	1.0–4.0	.21	.25	.28	.25	.22	.29	.37	.47	.37	.29	.62	.69	(.80)							
14. CWB-I-t4	1.32	0.44	1.0–4.3	.19	.23	.25	.31	.28	.29	.45	.38	.42	.38	.58	.65	.70	(.77)						
15. CWB-I-t5	1.31	0.44	1.0–4.4	.23	.22	.28	.33	.35	.25	.39	.32	.38	.53	.48	.65	.56	.61	(.79)					
16. CWB-O-t1	1.44	0.47	1.0–5.4	.16	.19	.25	.18	.15	.27	.28	.25	.22	.21	.46	.34	.26	.28	.22	(.79)				
17. CWB-O-t2	1.39	0.42	1.0–4.1	.19	.24	.24	.14	.12	.22	.37	.29	.20	.20	.33	.39	.24	.22	.23	.70	(.77)			
18. CWB-O-t3	1.39	0.41	1.0–3.5	.20	.26	.27	.21	.20	.19	.30	.39	.24	.24	.28	.34	.34	.29	.28	.68	.71	(.75)		
19. CWB-O-t4	1.37	0.40	1.0–3.3	.17	.24	.23	.22	.25	.22	.27	.29	.33	.27	.30	.33	.28	.36	.31	.62	.61	.71	(.75)	
20. CWB-O-t5	1.34	0.36	1.0–2.6	.16	.21	.19	.15	.20	.22	.26	.26	.24	.25	.30	.33	.25	.25	.24	.54	.61	.63	.66	(.75)

Note. Alpha reliabilities are provided in parentheses on the diagonal. OC = organizational constraints; t1–t5 = Time 1 to Time 5; EI = experienced incivility; CWB-I = interpersonal counterproductive work behavior; CWB-O = organizational counterproductive work behavior. All correlations are significant at  $p < .05$ .

same variable at Time 1 (the autoregressor) and the other latent variable at Time 1. The cross-lagged paths indicate the effect of one variable on the other, after controlling for the stability of the variables over time (Finkel, 1995). We accounted for variance due to measurement occasion by cross-sectionally correlating the disturbances of the corresponding factors (cf. Cole & Maxwell, 2003).

First, we examined the structural cross-lagged models for time lags of 2 months (see Figure 1a). In the first set of cross-lagged models, all structural coefficients were freely estimated. For all four work stressor–CWB pairs, the model fit for the model with free structural coefficients was good. In the second set of cross-lagged models, we constrained the structural parameters (stability coefficients and cross-lagged coefficients) to be equal across all four time intervals. For all work stressor–CWB pairs, the model with the free structural coefficients and the constrained model did not differ significantly in fit (see Table 3). Consequently, we favored the more parsimonious model and retained the longitudinal constraints on structural coefficients.

Table 4 shows the standardized cross-lagged effects for the final models with the longitudinal constraints on structural coefficients

and the cross-sectional correlations at Time 1; the stability coefficients (autoregressors) are shown in Table 5. Regarding the effects of work stressors on CWB (Hypothesis 1), the following pattern emerged: Both types of CWB were predicted by organizational constraints but not by experienced incivility. Regarding the reversed effects of CWB on work stressors (Hypothesis 2), the results indicated that both types of CWB predicted subsequent levels of organizational constraints and experienced incivility. In sum, the results show that there is a reciprocal positive relationship between organizational constraints and both types of CWB. In contrast, experienced incivility seems to be the result rather than an antecedent of CWB.

### Analyses for Time Lags of 4, 6, and 8 Months

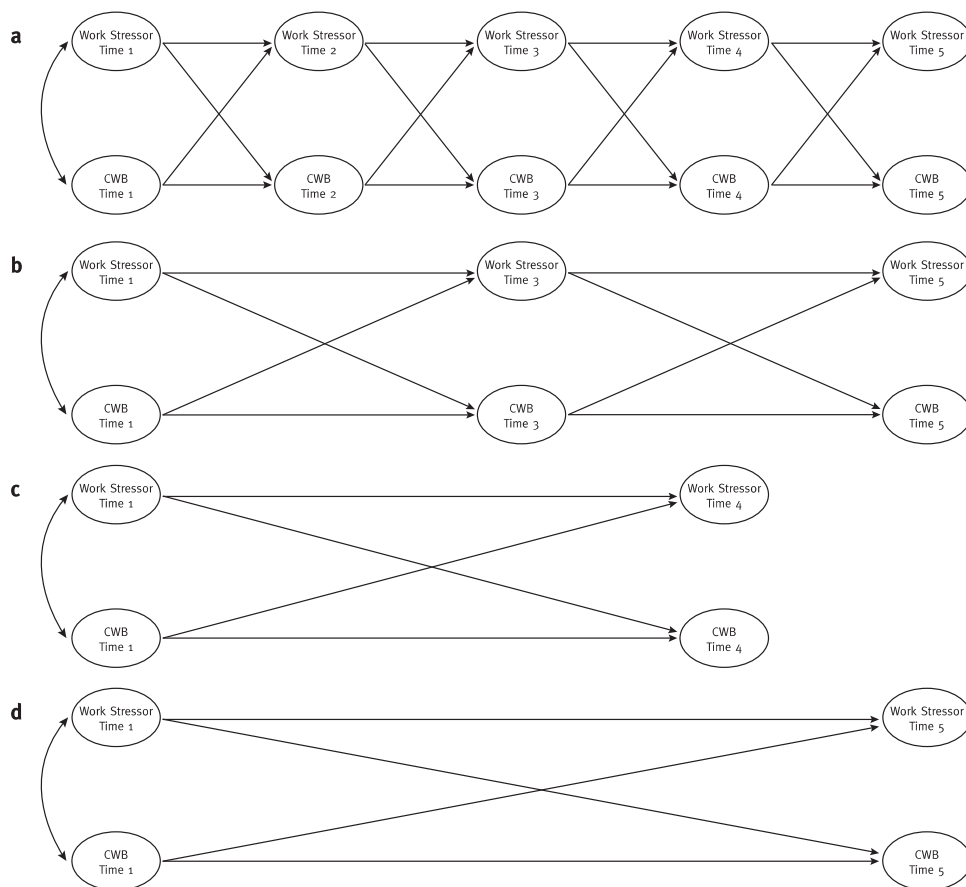
We examined the structural cross-lagged models for time lags of 4 months (see Figure 1b). For this, we used the data from Times 1, 3, and 5. We first examined the structural model using the same procedure as outlined above. Again, both structural models (the one in which the structural coefficients were freely estimated and the one in which they were constrained to be equal over time) fitted the data, and

Table 2  
*Fit of Measurement Models to Test Construct Dimensionality and Measurement Invariance*

Model	SB- $\chi^2$	<i>df</i>	CFI	TLI	RMSEA (90% CI)
One-factor model	5,829.89*	1,580	.75	.72	.064 [.062, .065]
Two-factor model	4,664.74*	1,545	.82	.79	.055 [.053, .057]
Four-factor model					
Free loadings	1,988.61*	1,400	.97	.96	.025 [.023, .028]
Longitudinal constraints on loadings	2,015.96*	1,432	.97	.96	.025 [.022, .027]

Note. SB- $\chi^2$  = Satorra-Bentler scaled chi-square; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; CI = confidence interval.

\*  $p < .05$ .



*Figure 1.* Structural models to test the reciprocal effect of work stressors and counterproductive work behavior (CWB), using a time lag of 2 months (a), 4 months (b), 6 months (c), and 8 months (d). The figure shows only latent constructs and omits observed variables and within-wave correlations of residual variances.

the difference in fit was not significant, leading us to retain the longitudinal constraints on structural coefficients. The results closely mirrored those of the models with 2-month time lags: Both types of CWB were predicted by organizational constraints but not by experienced incivility. Moreover, both types of CWB predicted subsequent levels of organizational constraints and experienced incivility.

Next, we examined the structural cross-lagged models for a time lag of 6 months (see Figure 1c), using data from Times 1 and 4. Contrary to our prediction, work stressors were unrelated to subsequent CWB. In line with the findings from shorter time lags, however, both types of CWB were prospectively related to work stressors. Finally, we also examined the structural cross-lagged models for a time lag of 8 months (see Figure 1d), using data from Times 1 and 5. Organizational constraints predicted subsequent levels of interpersonal CWB, which was prospectively related to both types of work stressors. In contrast, there was no prospective relationship (in either direction) between work stressors and organizational CWB.

### Additional Analyses: Different Effect Sizes for Different Time Lags?

A close look at the results pattern suggests that the effect of CWB on work stressors became larger with increasing time lags (see Table

4). For example, the relationship between instigated interpersonal CWB and experienced incivility is .14 when the time lag is 2 months and .29 when the time lag is 8 months. To test whether the effect sizes depend on the time lag, we compared the regular structural 2-month lag model (see Figure 1a and Table 3) with a model in which the cross-lagged effects were constrained to be equal to the estimates of the model with a 8-month time lag (e.g., for the effect of interpersonal CWB on experienced incivility, the cross-lagged effect was constrained to .29). If the constrained model fitted worse than the unconstrained model, then the effect size of a 2-month time lag would differ from the effect size of an 8-month time lag.<sup>1</sup>

<sup>1</sup> Due to sample attrition, the sample size became smaller across waves, and as a result, models with an 8-month time lag contained only a subsample of the participants of the models with a 2-month time lag. To rule out that different effect sizes in short and long time lags merely reflect different effect sizes for different samples (participants who dropped out vs. participants who stayed), we used a subsample that consisted of only individuals who also participated at the fifth measurement occasion ( $N = 382$ ) for these analyses. Furthermore, because constraints can be imposed on only unstandardized coefficients—but unstandardized coefficients equal standardized coefficients when standardized data are used—we standardized the latent factors as suggested by Ferrer, Balluerka, and Widaman (2008).

Table 3  
Fit of Structural Models With a 2-Month Time Lag

Model	SB- $\chi^2$	df	CFI	TLI	RMSEA (90% CI)
Interpersonal CWB					
Organizational constraints					
Free structural coefficients	476.80*	340	.98	.98	.025 [.019, .030]
Longitudinal constraints on structural coefficients	487.60*	352	.98	.98	.024 [.019, .029]
Experienced incivility					
Free structural coefficients	575.50*	340	.96	.95	.032 [.028, .037]
Longitudinal constraints on structural coefficients	594.00*	352	.96	.95	.032 [.028, .037]
Organizational CWB					
Organizational constraints					
Free structural coefficients	484.42*	340	.98	.98	.025 [.020, .030]
Longitudinal constraints on structural coefficients	491.89*	352	.98	.98	.025 [.019, .029]
Experienced incivility					
Free structural coefficients	521.47*	340	.97	.97	.028 [.023, .033]
Longitudinal constraints on structural coefficients	535.55*	352	.97	.97	.028 [.023, .033]

Note. SB- $\chi^2$  = Satorra-Bentler scaled chi-square; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; CI = confidence interval; CWB = counterproductive work behavior.

\*  $p < .05$ .

Comparison tests indicated that the constrained models and the unconstrained models did not differ significantly in fit, suggesting that the cross-lagged effects of CWB on work stressors (as well as the effects of work stressors on CWB) over 8 months are not significantly larger than the effects over 2 months.<sup>2</sup>

## Discussion

We examined reciprocal relationships between work stressors and CWB, using longitudinal data from a sample assessed five times over an 8-month period. The results indicated that work stressors predicted subsequent CWB and that CWB predicted subsequent work stressors. The effect sizes did not depend on the length of the time lag.

### Work Stressors → CWB

The findings showed a significant effect of organizational constraints on CWB that is targeted toward the organization and individuals. However, the effects on organizational CWB were significant only in the models with rather short time lags. Thus, one might conclude that such effects are short-lived and decline over periods of several months. However, the average effects of stressors on CWB were not significantly different across the different time lags. Thus, the safest conclusion is that the effects persist over time, although it is possible that the lack of significant differences over time may reflect a lack of statistical power to detect them.<sup>3</sup> The effect of organizational constraints on CWB is also in line with the few existing studies that showed prospective effects of work stressors on CWB (Detert et al., 2007; Greenberg, 1990; Tucker et al., 2009). In general, the lagged effects of organizational constraints on CWB were rather small. This is, however, in line with the results of a recent meta-analysis by Dormann and Haun (2010) that showed that prospective effects of work stressors on well-being are of similar size.

Unexpectedly, experienced incivility did not predict future CWB. To the best of our knowledge, this is the first study that used longitudinal data to test whether experienced incivility is linked to

subsequent CWB. In their cross-sectional study, Penney and Spector (2005) found a positive correlation between experienced incivility and CWB, not much different from our corresponding within-wave correlations. As noted in the introduction, however, a significant correlation between work stressor and CWB may reflect different mechanisms, for example a reversed effect of CWB on work stressors, as in the present study.

### CWB → Work Stressors

Our results clearly support the notion of a reversed effect of CWB on work stressors. Both types of CWB were positively related to organizational constraints and experienced incivility. It is worth noting that interpersonal CWB predicted experienced incivility, whereas experienced incivility did not predict interpersonal CWB. This suggests that others at work react with uncivil behavior toward the perpetrator of CWB, whereas experiencing incivility does not necessarily lead to CWB. This asymmetry may be the result of differences in the severity of the two constructs. In line with the definition of incivility as low-intensity antisocial behavior, the measure of experienced incivility (adapted version of Cortina et al., 2001) mainly contained mild forms of interpersonal mistreatment (e.g., “interrupted you while you were talking”). In contrast, the measure of interpersonal CWB (Bennett & Robinson, 2000) consisted of arguably more severe conduct (e.g., “cursed at someone at work”). Therefore, it is possible that the experience of incivility is not stressful enough to trigger more harmful behavior.

<sup>2</sup> Detailed information on the additional analyses can be obtained from the first author.

<sup>3</sup> To examine the role of sample size, we ran additional analyses with a subsample that consisted of only individuals who also participated at the fifth measurement occasion ( $N = 382$ ). For this subsample, the lagged effects of organizational constraints on CWB over 2 months were significant and of very similar size as the effects in the full sample. Thus, reduced sample size is not a likely explanation for differences in results across waves. Rather, these findings point to the advantages of aggregating coefficients over time (if empirically justifiable), as the coefficients will be estimated more precisely.

Table 4  
Overview of the Cross-Sectional Correlation and Cross-Lagged Effects, Separated by Time Lag

Work stressor	$r_{WS,CWB}$	Work stressor → CWB Time lag				CWB → work stressor Time lag			
		2	4	6	8	2	4	6	8
Interpersonal CWB									
Organizational constraints	.30*	.06*	.11*	.05	.14*	.06*	.09*	.17*	.14*
Experienced incivility	.51*	.05	.02	.07	−.01	.14*	.21*	.29*	.29*
Organizational CWB									
Organizational constraints	.20*	.05*	.06*	.04	.07	.08*	.14*	.12*	.11
Experienced incivility	.35*	−.01	.00	.01	.05	.07*	.12*	.10	.14

Note. Although the coefficients were constrained to be equal across time, the constraints were imposed on unstandardized coefficients (as is typically recommended), which led to slight variation in the resulting standardized coefficients. To reduce complexity, we report the mean of the standardized coefficients. Time lag is indicated in months. CWB = counterproductive work behavior;  $r_{WS,CWB}$  = correlation between the latent work stressor and CWB at Time 1 (average of the various models).

\*  $p < .05$ .

However, experiencing or observing more intense behavior may elicit at least mild uncivil behavior. Furthermore, due to its low intensity, potential effects of experienced incivility may be more short-lived and hence were not detected with the present study design. Future studies may therefore want to focus on even shorter time lags (e.g., 1 day) to test the incivility spiral in more detail.

In the present study, organizational constraints were related to an increase in interpersonal and organizational CWB, which were related to an increase in organizational constraints and experienced incivility. Importantly, this suggests that CWB has detrimental effects for the target and the perpetrator.

It is well known that CWB can have negative effects on targets, namely the organization and its members. Direct costs of CWB that is directed toward the organization such as theft can be considerable (e.g., Camara & Schneider, 1994), and interpersonal CWB can adversely affect people's health and well-being, which can result in costs for the organization (e.g., sick leave) and society (e.g., health care). In contrast, some previous research has suggested that engaging in CWB might have positive effects on the perpetrator. It has been noted that many people may engage in

aggressive behavior to improve their mood (Bushman, Baumeister, & Phillips, 2001; see also, however, Bushman, Baumeister, & Stack, 1999), and so CWB may function as a form of emotion-focused coping that buffers the effect of work stressors on the perpetrator's well-being (e.g., Allen & Greenberger, 1980; Krischer, Penney, & Hunter, 2010). People may also engage in CWB to restore a sense of justice (Bies & Tripp, 1996), to defend or improve their social status, and to discipline others (see Neuman & Baron, 1998; Salin, 2003). Together, this suggests that perpetrators are likely to benefit from their behavior. The present results, however, show that CWB may also have negative consequences for perpetrators, as it is likely to increase their work stressors, and that might lead to further CWB. In sum, our findings suggest a vicious cycle with negative consequences for all parties involved.

## Limitations

A first limitation of this research is that both work stressors and CWB were assessed via self-report, which might have distorted observed relationships among our measures due to shared biases. There is an ongoing debate about the potential biasing role of negative affectivity (NA) in stress research, with some noting that NA differences affect the experience and/or measurement of stressors and well-being and hence lead to a biased estimate of their association (e.g., Watson, Pennebaker, & Folger, 1987). Similarly, it is possible that NA affects the frequency and/or measurement of CWB. To examine the effect of NA on the longitudinal relationships between stressors and CWB, we ran a set of analyses controlling for depressive symptoms (measured at each wave with the scale by Radloff, 1977) as a proxy for NA. Including depressive symptoms did not alter the prospective effects of stressors and CWB. Additionally, research using multisource data has often shown a correspondence between self- and other-report CWB measures, as well as a similar pattern of relationships with other variables (e.g., Berry, Carpenter, & Barratt, 2012; Fox, Spector, Goh, & Bruursema, 2007). Overall, it is unlikely that the relationships found in the present study were due primarily to interindividual differences in NA or shared biases among self-report measures.

Table 5  
Overview of the Stability Effects, Separated by Time Lag

Construct	Time lag			
	2	4	6	8
Work stressor				
Organizational constraints	.79*	.66*	.58*	.57*
Experienced incivility	.67*	.55*	.56*	.43*
CWB				
Interpersonal	.76*	.68*	.65*	.58*
Organizational	.86*	.79*	.79*	.73*

Note. Although the coefficients were constrained to be equal across time, the constraints were imposed on unstandardized coefficients (as is typically recommended), which led to slight variation in the resulting standardized coefficients. Furthermore, the different models for each time lag led to slight variation in the estimates of the stability effect. To reduce complexity, we report the mean of the standardized coefficients. Time lag is indicated in months. CWB = counterproductive work behavior.

\*  $p < .05$ .



Second, participants were recruited on a voluntary basis through a snowball sampling technique, implying that they may not be representative of the general population. For example, our sample was somewhat younger than the general Swiss working population (Federal Statistical Office, 2012). Whereas some studies have suggested that stressors tend to decline with age (Almeida & Horn, 2004), previous research on experienced incivility has reported no age differences (e.g., Cortina et al., 2001; Milam, Spitzmueller, & Penney, 2009). Furthermore, age is only weakly related to CWB (Berry et al., 2007). Thus, the fact that our sample was comparatively young likely had little impact on results. Of course, our sample may be different from a representative sample in other characteristics, which could have affected the findings in an unknown way. A recent meta-analysis by Wheeler, Halbesleben, Shanine, and Donovan (2012), however, showed that correlations from snowball samples were only slightly smaller than those from nonsnowball samples, suggesting that if anything, our results provide a conservative estimate of stressor–CWB relationships. Nevertheless, future research on reciprocal effects of work stressors and CWB would benefit from using probability samples.

Third, it is noteworthy that our participants reported relatively low levels of stressors and CWB. However, although stressors were low and CWB was rather rare (and hence variance was restricted), we still found significant associations. Moreover, the (cross-sectional) correlations were similar to those of previous research. Nevertheless, it is possible that some effects (e.g., the effect of incivility on CWB) emerge only once a certain threshold is reached; therefore, future research should examine the reciprocal effects in a population where stressors and CWB are more frequent (e.g., in public administration or community and social services, where the prevalence of a hostile work environment is particularly high; see Alterman, Luckhaupt, Dahlhamer, Ward, & Calvert, in press).

Finally, our findings suggest that CWB leads to higher levels of work stressors. However, the present research did not examine the underlying mechanism that links CWB and stressors. To test such potential mechanisms, future research should include self- and other-report of CWB as well as potential mediators such as desire for revenge, negative affect, and impaired self-control resources.

## Conclusions and Implications

The vast majority of research about the relationship between work stressors and CWB has used cross-sectional study designs, so little knowledge about prospective effects exists. Moreover, previous research has focused almost exclusively on a unidirectional path, assuming that work stressors are antecedents of CWB, with little effort toward considering work stressors as potential byproducts of CWB. The present study extends previous research by examining the reciprocal relationship between work stressors and CWB in a longitudinal design. Our results indicate not only that work stressors are prospectively linked to CWB but that CWB is also prospectively linked to work stressors. This suggests the need for more complex models and theories that recognize the dynamic interplay between employees and their work environments. Such theories need to treat behavior at both the input and output stages, including feedback loops from behavior to environment and the reverse. Such models and theories will go a long way to better explain employee behavior by incorporating time and focusing on

processes rather than static snapshots. As our study clearly suggests, CWB has negative effects not only for its target but for the perpetrator in the form of increased work stressors. This points to a vicious cycle with negative consequences for all parties involved.

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Received November 16, 2011

Revision received December 13, 2012

Accepted January 2, 2013 ■