

# Enhancing Work-Related Attitudes and Work Engagement: A Quasi-Experimental Study of the Impact of an Organizational Intervention

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*Drawing on the job demands-resources model, this research presents a quasi-experimental evaluation of an organizational intervention aiming to enhance upstream organizational resources via a leadership-development program. Repeated-measures data for perceptions of work-related characteristics, attitudes, and outcomes were collected four months before (Time 1/baseline) and seven months after (Time 2) the leadership-development intervention. Results indicated a positive effect of the leadership-development intervention on perceptions of work characteristics and well-being for the immediate subordinates of the leadership-development intervention participants, compared with a control group. Analysis of mediated effects indicated that the leadership-development intervention had a positive effect on subordinates' perceptions of work-culture support and strategic alignment, which in turn had a positive effect on their job satisfaction and work engagement. This research successfully demonstrated that organizational interventions aiming to enhance upstream organizational resources (via leadership development) can effectively improve the psychosocial working environment for employees. Furthermore, this research addressed commonly cited limitations of intervention research, including the dearth of organizational-level inter-*

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ventions, lack of research focusing on positive outcomes, and failure to address mediating effects.

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Effective organizational interventions are required to combat the growing individual and organizational costs associated with negative work-related attitudes, high strain, and disengagement from work. Organizational interventions “attempt to break damaging linkages between work and employee health, repair the damage caused, or capitalize on those linkages by making positive changes in the work environment” (Randall & Nielsen, 2010, p. 91). There is a considerable deficit in knowledge regarding effective organizational strategies, however, due to an overreliance on individual-level strategies to address organizational-level problems, practical impediments to intervention implementation, and the dearth of scientifically robust intervention research designs (Brough & O’Driscoll, 2010). Furthermore, both individual and organizational interventions are usually developed to address negative work-related outcomes, such as poor morale, high turnover, and high psychological strain. The comparative lack of published evidence for organizational intervention strategies aiming to build strengths, resources, and positive experiences at work is also an important limitation of this research (Randall & Nielsen, 2010).

Drawing on the job demands-resources theory (JD-R; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), this research directly addressed these issues by employing a quasi-experimental research design to evaluate the effectiveness of an organizational intervention to improve work-related attitudes and work engagement, and to decrease psychological strain and turnover intentions. The organizational intervention consisted of a leadership-development program provided for senior leaders of an Australian state police service (hereafter referred to as the *leadership-development intervention*). The leadership-development intervention was designed to enhance upstream organizational resources through the provision of training on supportive and transformational leadership behaviors, which was ultimately intended to improve employees perceptions of psychosocial work characteristics (work-culture support, supportive leadership, job demands, and strategic alignment) and psychological outcomes (psychological strain, work engagement, job satisfaction, and turnover intentions).

Finally, in addition to examining the direct effect of intervention exposure on psychosocial work characteristics and outcomes, we tested a mediated model. That is, we expected that the provision of leadership training would have a positive impact upon perceptions of psychosocial work characteristics reported by the intervention participants’ immediate subordinates,

which would in turn improve reported psychological outcomes of the subordinates. Despite strong theoretical and practical justification for doing so, these mediated relationships are seldom tested in intervention-evaluation research (Holman, Axtell, Sprigg, Totterdell, & Wall, 2010).

## DUAL PROCESS OCCUPATIONAL HEALTH THEORY AND INTERVENTIONS

The disproportionate focus of published intervention-evaluation research on individual-level stress-management strategies is considered to be a major limitation within occupational health research (Richardson & Rothstein, 2008). Individual-level stress-management strategies aim to reduce ill health by enhancing employees' capacity to cope with stressors or rehabilitating strained individuals (Richardson & Rothstein, 2008). Organizational-level interventions, which aim to reduce the frequency or intensity of stressor exposure derived from organizational sources (e.g., leadership), tend to be implemented and evaluated to a lesser extent (Brough & O'Driscoll, 2010; Randall & Nielsen, 2010). Although the effectiveness of some individual-level interventions has been demonstrated, their limited effect on organizational outcomes and inability to demonstrate long-term effects is problematic (Lamontagne, Keegel, Louie, Ostry, & Landsbergis, 2007; Richardson & Rothstein, 2008).

An additional important limitation is the dearth of intervention strategies targeting positive outcomes (Randall & Nielsen, 2010). The emphasis on dysfunction in the general occupational health research presents an imbalanced perspective of employee well-being that neglects positive work-related states. This pathogenic focus is especially evident in the published intervention-evaluation literature, as intervention strategies predominantly consist of reactive approaches to detecting risks and solving problems (Bakker & Derks, 2010; Randall & Nielsen, 2010). Although organizational interventions have been evaluated against a plethora of outcomes, effectiveness is most often equated with a reduction in adverse psychological and organizational outcomes, such as mental health and absenteeism (Richardson & Rothstein, 2008). Despite copious research attention and organizational interest in work engagement, for example, there is little published research on interventions that effectively enhance work engagement (Bakker, Albrecht, & Leiter, 2011).

It is preferable, from a practical and theoretical perspective, to adopt intervention strategies that strive to address strengths and enhance positive work experiences as well as decrease stressors and negative work experiences (Bakker & Derks, 2010; Biggs, 2011). Given the limited published evidence

of organizational interventions targeting positive phenomena, the course of developing, implementing, and evaluating interventions that dually seek to reduce adverse outcomes and enhance positive outcomes is an important avenue for future occupational health psychology research. Such an approach may require new and innovative techniques, as “it is very unlikely that the same mechanisms that underlie employee ill health and malfunctioning constitute employee health and optimal functioning” (Bakker & Derks, 2010, p. 201). Theoretical models that emphasize dual processes to well-being are important in this context. The job demands-resources theory (Demerouti et al., 2001) is one theoretical model that emphasizes two interrelated processes that relate optimal well-being to a reduction of negative experiences and increase in positive experiences. It also addresses both individual- and organizational-level determinants of well-being. Thus, this theoretical model forms a suitable foundation for developing, implementing, and evaluating dual process interventions.

The JD-R model parsimoniously explains the dual processes through which two global categories of psychosocial working characteristics influence the development of well-being (Demerouti et al., 2001). The *energy or health-impairment process* describes a causal progression in which exposure to high psychosocial demands erodes energy, leading to ill health. The *motivational process* describes a causal progression from high psychological resources to work engagement and withdrawal cognitions/behaviors. Recent refinements to the JD-R model also acknowledge the role of upstream organizational variables in shaping psychosocial work characteristics, and resulting psychological outcomes; the previous lack of explanation of the origins of psychosocial demands and resources was an acknowledged limitation of this theory (Dollard & Bakker, 2010). Specific upstream variables that have been discussed emphasize the role of senior leaders in shaping the psychosocial work environment, and include psychosocial safety climate, positive leader–member exchanges, and transformational leadership (Christian, Garza, & Slaughter, 2011; Dollard & Bakker, 2010).

These refinements to the JD-R theory also suggest that intervention strategies that focus on improving leadership behaviors and styles will modify actual or perceived psychosocial job characteristics, which in turn impact psychological health outcomes. In addition, previous research conducted in police occupations indicated that employees’ attitudes, well-being, and work engagement were predominately influenced by the perceived supportiveness of the work culture and the quality of relationships between organizational leaders and front-line employees (Biggs, Brough, & Barbour, 2010; Brough & Biggs, 2010; Brough, Biggs, & Barbour, 2013). In line with this evidence, the current study presents research evaluating the effect of an organizational leadership-development intervention on psychosocial work characteristics and psychological outcomes. In doing so, this study directly

addresses recent calls for greater evidence of organization-level interventions designed to have an impact on both negative and positive psychological outcomes.

### THE USE OF A LEADERSHIP-DEVELOPMENT PROGRAM AS AN ORGANIZATION-LEVEL INTERVENTION

Leadership constitutes “a process of social influence that is enacted by designated individuals who hold formal leadership roles in organizations” (Kelloway & Barling, 2010, p. 261). Despite the established link between leadership and occupational health outcomes, and their proven ability to cultivate leadership skills and knowledge, there is limited evidence for the effectiveness of leadership-development programs in promoting positive occupational health outcomes (Kelloway & Barling, 2010; Skakon, Nielsen, Borg, & Guzman, 2010). Researchers have called for more research on organizational-level interventions, adopting leadership-development strategies to improve psychosocial work characteristics and positive employee outcomes (Kelloway & Barling, 2010).

The present study aimed to address this call for research by demonstrating that participation in a leadership-development intervention influences the psychosocial work context and, in turn, impact employee psychological outcomes. In line with recent revisions to the JD-R model (Demerouti et al., 2001; Dollard & Bakker, 2010), we expected that an organizational intervention aiming to enhance supportive leadership behaviors, positive relationships between subordinates and leaders, and transformational leadership styles would influence psychosocial outcomes by decreasing perceived demands and increasing perceived work-culture support, leadership support, and strategic alignment. These psychosocial work characteristics will, in turn, influence employee psychological outcomes. Specific expected associations are discussed in further detail below.

Leaders play a key role in shaping employees’ actual and perceived work environment; allocating resources, punishment, and rewards; and driving the pace and volume of work (Christian et al., 2011; Kelloway & Barling, 2010). Leaders who exhibit supportive behaviors and transformational styles use role-model strategies to effectively deal with work demands, encourage creative approaches to solving problems, and pay considered attention to the individual needs of employees (Skakon et al., 2010). Furthermore, positive leader-subordinate interactions improve clarity of job requirements and mitigate emotional demands arising from unhealthy leader-subordinate relationships (Skakon et al., 2010). Therefore, leadership development is expected to have a positive effect on the perceptions of job demands for subordinates of program participants.

Leadership-development interventions focusing on enhancing supportive and transformational leadership styles are expected to increase perceptions of a supportive work culture and leadership. Lyons and Schneider (2009) conducted an experimental study, which demonstrated that individuals exposed to transformational leadership reported higher social support and subsequently performed better as compared with individuals exposed to transactional leadership conditions (Lyons & Schneider, 2009, p. 744).

Supportive and transformational leaders inspire vision, promote alignment with organizational strategic priorities, and infuse job-related tasks with meaning and perceived challenge (Beehr, Glazer, Fischer, Linton, & Hansen, 2009; Biggs, Brough, & Barbour, in press; Skakon et al., 2010). Nielsen, Randall, Yarker, and Brenner (2008) demonstrated that transformational leadership predicted subordinates' perceptions of a meaningful work environment, role clarity, and development opportunities, which in turn predicted employee well-being in a longitudinal study. Leadership behaviors that are task-oriented and supportive provide clear performance expectations that are likely to enhance the alignment between an individual's job and the organization's strategic priorities (Beehr et al., 2009; Biggs et al., in press). That is, if leaders "are effective, the organization is more likely to be structurally aligned, because the supervisors will guide their units' subordinates to perform in a manner that is congruent with the goals of the organization" (Beehr et al., 2009, p. 4).

Research has also demonstrated a link between leadership behaviors and styles and employee psychological outcomes. For example, Skakon et al. (2010) conducted a review of 49 studies that indicated that the most optimal stress and well-being levels were reported by employees whose leaders demonstrated those positive leadership behaviors that embodied consideration, support, feedback, trust, integrity, and confidence; high-quality leader-employee relationships; and leaders who embraced a transformational leadership style. In particular, recent research has drawn attention to the role of leadership behaviors and styles in the prediction of work engagement (Christian et al., 2011). Organization-level interventions comprising effective leadership-development strategies are, therefore, likely to improve work engagement and job satisfaction, in addition to reducing psychological strain and turnover intentions.

Finally, Kelloway and Barling (2010) noted that, although most occupational health interventions primarily target the actual program participants, leadership programs primarily target the immediate subordinates of the program participants. Therefore, successful programs should affect positive outcomes for the program participants as well as their immediate colleagues/subordinates. This research therefore tested the effects of the intervention on the direct subordinates of the intervention participants. Results were compared with a control group (subordinates whose supervisors received no



intervention). In accordance with the major tenets of the revised JD-R model, we expected that exposure to a leadership-development intervention would provide upstream resources that influence both psychosocial work characteristics and psychological outcomes:

*Hypothesis 1:* Compared with a control group, the direct subordinates of the leadership-development intervention participants will report more positive perceptions of work-culture support, supportive leadership, and strategic alignment; higher levels of job satisfaction and work engagement; and lower levels of job demands, psychological strain, and turnover intentions, measured at postintervention (Time 2).

A secondary aim of this study is to add to the modest literature investigating *both* direct and indirect intervention effects, by investigating the extent to which the intervention will produce changes in perceived psychosocial work characteristics, which will in turn impact upon psychological outcomes. Theoretical models and extensive empirical research have revealed that psychosocial work characteristics, such as job demands, social support, and leadership, contribute to employee outcomes (Brough, O’Driscoll, Kalliath, Cooper, & Poelmans, 2009; Bunce, 1997). Intervention protocols are often developed to impact outcomes by modifying these psychosocial work characteristics (Griffiths, 1999). This suggests a mediated relationship, whereby participation in an intervention produces actual modifications to psychosocial work characteristics, which in turn improves targeted employee and organizational outcomes (see Figure 1). Despite strong theoretical and practical justification for doing so, these mediated relationships have only been tested in a small number of intervention studies (Bunce, 1997). Bond and Bunce (2001), for instance, demonstrated that participation in a participatory action-research intervention influenced mental health, sickness absence, and self-rated performance through the mediating influence of job control.

In accordance with the JD-R model, we expect that a mediated effect will be observed, in which the intervention’s impact on psychological outcomes

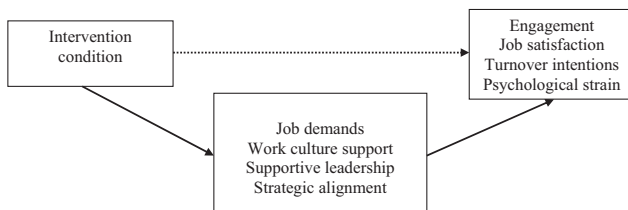


Figure 1. Theoretical model for Hypothesis 2.

will be mediated by changes in psychosocial work characteristics. Our second hypothesis, therefore, is:

*Hypothesis 2:* The positive effect of participation in a leadership-development intervention program on psychological outcomes (job satisfaction, work engagement, turnover intentions, and psychological strain) will be mediated by changes in job demands, work culture, supportive leadership, and strategic alignment.

## METHOD

### Research Context: Intervention Structure and Implementation

The leadership-development intervention was developed and facilitated by a consultant external to the organization. The program aimed to support leaders in developing effective leadership styles and behaviors. Specific topics included education about leadership styles (e.g., transformational leadership), effective communication, and strategic leadership. The structure of the program comprised three primary components. First, intervention participants, their immediate supervisors, and their direct subordinates completed a 360° review process. These subordinates form the intervention group for the present study (described below). Second, action-learning workshops were conducted over five days: These workshops provided training on theoretical leadership styles and behaviors, as well as practical resources to enhance their leadership capabilities. Participants were asked to conduct their own action-learning project (e.g., implementing a change strategy) during workshop sessions, which enabled participants to engage in the material in a manner that was meaningful to their work context and allowed opportunities for vicarious learning through shared experiences. Finally, individual coaching was provided to program participants (leaders) throughout the duration of the program. These coaching sessions involved personalized feedback based on the 360° review process and enabled participants to discuss difficulties or positive outcomes associated with their newly implemented leadership practices. The leadership-development intervention program was customized in consultation with key organizational stakeholders to ensure its relevance to the police organization. The workshops and coaching sessions were conducted by an external facilitator, and the 360° review process was conducted independently by the university researchers.

This leadership-development intervention was implemented within two organizational regions of a large, Australian state police service. Leaders



within these regions were invited to complete the leadership-development-intervention program if they were employed at a rank above sergeant and if their job roles entailed people-management responsibilities. The 76 highest ranking officers in the two organizational regions were, therefore, invited to participate in the program. Six of these participants were unable to attend, primarily due to roster conflicts.

### Participants

All employees within the two organizational regions (i.e., both intervention participants and nonparticipants) were invited to complete electronic surveys prior to the leadership-development intervention (Time 1; baseline) and postintervention (Time 2; 7 months later). At Time 1, 2,637 employees were invited to participate in the survey and responses were returned by 1,098 employees (42% response rate). Respondents were included in the final dataset according to four specific criteria, which were implemented to enhance the internal validity of the intervention. First, given the variability of work experiences reported by police officers and civilian staff, inclusion in the current research was limited to police officers only. Second, data obtained from police officers who either moved into or out of the intervention regions after baseline (Time 1) measurement were excluded. Third, respondents who had participated in a concurrent intervention, unrelated to the leadership-development intervention, were also excluded. Fourth, the actual leadership-development intervention participants were excluded from the data, as this study assessed the impact of the program on their direct subordinates. Of the 853 responses that met these criteria at Time 1, 377 participants also returned Time 2 surveys (44% of the Time 1 sample). Four participants missing greater than 50% of their data on any variable were also excluded. Remaining missing values were imputed utilizing maximum likelihood estimation with the expectation-maximization algorithm applied. A further five participants were removed from the dataset as their data contained multivariate outliers (significant at the  $p < .001$  level). This produced a total matched Time 1–Time 2 sample of  $N = 368$ . This sample consisted of two subgroups: (a) *intervention subordinates*, who worked directly with the leadership-development intervention participants, but who did not participate in the intervention themselves ( $n = 146$ ) and (b) a *control group*, comprising remaining police officers who neither worked directly with the intervention participants nor participated in the intervention ( $n = 222$ ). The demographic characteristics for the two groups reported at Time 1 are presented in [Table 1](#). Independent  $t$  tests and chi-squared

**Table 1.** Demographics and Response Rates for Intervention Conditions ( $N = 368$ )

Variable	Subordinates ( $n = 146$ )		Control ( $n = 222$ )	
	<i>n</i>	%	<i>n</i>	%
Gender				
Male	112	77%	181	82%
Female	34	23%	41	19%
Region				
Region 1	79	54%	63	28%
Region 2	67	46%	159	72%
Rank				
Constable	27	19%	78	35%
Senior constable	50	34%	86	39%
Sergeant	50	34%	46	21%
Senior sergeant	9	6%	10	5%
Inspector	10	7%	2	1%
Shift work				
No	33	23%	52	23%
Yes	113	77%	170	77%
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (years)	40.00	7.72	39.32	8.38
Tenure (years)	15.64	9.99	12.45	10.05
Hours worked per week (hours)	42.86	7.92	43.27	8.93

difference tests were conducted to determine whether there were significant differences in demographic characteristics between the two intervention conditions. There were no significant differences for gender, shift work, work hours, or age. However, there were significant differences for rank and tenure. The rank and tenure of the leadership-development intervention subordinates/colleagues were significantly higher than the rank and tenure of the control group.

## Measures

### *Job Demands*

The nine-item job demands measure developed by Wall, Jackson, and Mullarkey (1995) was utilized in this study. Sample items include “Does your work need your undivided attention?” and “Are you required to deal with problems, which are difficult to solve?” Responses were rated according to a 5-point response format ranging from 1 (*not at all*) to 5 (*a great deal*), with high scores reflecting higher perceived job demands.

### *Strategic Alignment*

Four items assessing employees' perceived awareness and importance of the organization's strategic priorities, in addition to their understanding of how their jobs align with these priorities, were assessed in this research (Biggs et al., in press). An example item is "I am aware of how my day-to-day work aligns with [the organization's] strategic priorities." Responses were made according to a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating a greater degree of alignment with the strategic priorities endorsed by the organization.

### *Individual Perceptions of Work-Culture Support*

Four items assessing perceptions of the supportiveness of the work culture were included in this research (Gracia, 2007). Specifically, this measure assesses the extent to which the organization's culture is viewed as supportive of staff in response to both chronic and acute stressors. An example item is "[the organization] is sufficiently people-focused in its day-to-day management approach." Responses were made according to a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores suggested more positive perceptions of the supportiveness of the police work culture.

### *Individual Perceptions of Organizational Leadership*

The perceived supportiveness and effectiveness of organizational leadership was measured with four items (Gracia, 2007). Aspects of supportive and effective leadership included the extent to which organizational leaders successfully resolve conflict, role model effective leadership behaviors, value and support staff, and acknowledge employees' contributions. An example item is "My input is valued and acknowledged by my managers." Respondents were asked to indicate their agreement with the items on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicating a more positive perception of leadership.

### *Job Satisfaction*

A 15-item measure developed by Warr, Cook, and Wall (1979) was employed to assess respondent's affective reactions to aspects of work,

including pay, promotion, and ability to utilize skills. Satisfaction ratings to each of the 15 items were made according to a 7-point response format ranging from 1 (*I'm extremely dissatisfied*) to 7 (*I'm extremely satisfied*). High scores were indicative of high job satisfaction.

### *Work Engagement*

The nine-item Utrecht Work Engagement Scale (UWES; [Schaufeli, Bakker, & Salanova, 2006](#)) was utilized in this research to measure work engagement. Responses were made according to a 7-point response scale, ranging from 0 (*never*) to 6 (*every day*). A sample item is “When I get up in the morning, I feel like going to work.” Higher scores indicated a higher degree of work engagement.

### *Turnover Intentions*

Police officers' intention to leave the organization over the preceding 12 months were assessed, utilizing three items based upon a measure developed by [Brough and Frame \(2004\)](#). A sample item is: “In the last 12 months, I have seriously considered quitting my job at [the organization]”). Responses were made on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated that respondents have more seriously considered leaving their jobs over the past 12 months.

### *Psychological Strain*

The 12-item General Health Questionnaire (GHQ-12; [Goldberg, 1972](#)) was employed to assess the degree of psychological strain reported by respondents. The GHQ-12 is a widely used context-free, diagnostic tool that detects the presence of psychological strain within the general population ([Kalliath, O'Driscoll, & Brough, 2004](#); [Mullarkey, Wall, Warr, Clegg, & Stride, 1999](#)). For the GHQ-12, respondents are asked to indicate the extent to which 12 different symptoms of psychological strain have remained the same, improved, or worsened within a 4-week time frame. Each of the 12 items contained a unique response scale, although all items were scored from 0 to 3 and higher scores indicated a decline in psychological health (high strain).

## Statistical Analyses

Multiple regression analyses were employed to test each of the research hypotheses (Hammer, Kossek, Anger, Bodner, & Zimmerman, 2011; Tews & Tracey, 2008). The intervention condition was dummy coded, with “0” representing the control group and “1” representing the intervention group. First, the direct impact of intervention participation on all of the research variables was evaluated. Second, additional analyses were conducted to evaluate potential indirect effects illustrated in Figure 1.

## RESULTS

### Evaluation of Pre-Existing Differences Between Intervention Conditions

A series of ANOVAs were conducted to examine whether preexisting differences between the intervention conditions existed for the research variables. There were no statistically significant differences between the intervention subordinate group and the control group for job demands, strategic alignment, work engagement, job satisfaction, turnover intentions, or psychological strain. There was a statistically significant difference between intervention conditions at baseline for supportive leadership,  $F(1, 366) = 5.33, p = .02$ ; partial  $\eta^2 = .01$ , and for work-culture support,  $F(1, 366) = 4.46, p = .04$ ; partial  $\eta^2 = .01$ . Specifically, intervention subordinates reported significantly poorer perceptions of work-culture support and leadership at Time 1 compared with the control group.

### Scale Descriptives

Means, standard deviations, Cronbach’s alphas, and bivariate relationships for each measure at Time 1 and Time 2 are presented in Tables 2 and 3. The internal consistency of all of the measures was adequate, exceeding .81. Significant, positive associations occurred between supportive leadership, work-culture support, strategic alignment, work engagement, and job satisfaction. Each of these variables was significantly negatively associated with turnover intentions and psychological strain, as was expected. Finally, turnover intentions and psychological strain were significantly associated with one another. This pattern of association occurred at both Time 1 and Time 2. Job demands were positively

**Table 2.** Scale Descriptives for Time 1 and Time 2 ( $N = 368$ )

Research measures (items)	Intervention conditions						
	Total sample ( $N = 368$ )			Subordinates ( $n = 146$ )		Control ( $n = 222$ )	
	<i>M</i>	<i>SD</i>	$\alpha$	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Job demands (T1)	3.92	.63	.85	3.94	.62	3.90	.64
Job demands (T2)	3.83	.68	.89	3.83	.68	3.82	.69
Work-culture support (T1)	2.79	.81	.81	2.68	.82	2.86	.80
Work-culture support (T2)	2.84	.84	.85	2.87	.89	2.82	.81
Supportive leadership (T1)	2.89	.85	.90	2.76	.86	2.97	.84
Supportive leadership (T2)	2.99	.88	.89	2.90	.93	3.05	.83
Strategic alignment (T1)	4.81	1.30	.90	4.84	1.21	4.79	1.36
Strategic alignment (T2)	4.79	1.35	.93	4.95	1.25	4.68	1.41
Work engagement (T1)	3.83	1.37	.92	3.84	1.39	3.82	1.36
Work engagement (T2)	3.74	1.42	.93	3.89	1.37	3.65	1.45
Job satisfaction (T1)	4.36	.88	.88	4.25	.90	4.42	.86
Job satisfaction (T2)	4.34	.86	.89	4.35	.90	4.34	.83
Turnover intentions (T1)	2.41	1.15	.89	2.34	1.08	2.45	1.20
Turnover intentions (T2)	2.58	1.18	.89	2.44	1.14	2.67	1.19
Psychological strain (T1)	.98	.43	.89	.98	.41	.98	.44
Psychological strain (T2)	1.03	.46	.91	1.05	.49	1.01	.44

Note. T1 = Time 1; T2 = Time 2.

associated with turnover intentions and psychological strain, and negatively related to job satisfaction and work-culture support at Time 1. At Time 2, job demands were positively associated with psychological strain only.

### Intervention Evaluation: Intervention Colleagues Versus Control Group

Hypothesis 1 predicted that the intervention would have a positive effect on levels of key psychosocial job characteristics for the intervention subordinate group compared with the control group. Following recommendations for the testing of significance over time (e.g., Hammer et al., 2011), eight separate multiple regression equations were constructed for each research variable, with baseline values of the dependent variable entered in Step 1 and intervention condition entered in Step 2. After controlling for baseline measures of the dependent variables, the intervention condition was significantly associated with higher levels of work-culture support ( $\beta = .10, p < .01$ ), strategic alignment ( $\beta = .09, p < .05$ ), work engagement ( $\beta = .08, p < .05$ ), and job satisfaction ( $\beta = .07, p < .05$ ) at 7 months postintervention (Time 2). No significant effects were demonstrated for job demands, supportive leadership, psychological



strain, or turnover intentions. A summary of these results for Step 2 of each analysis are presented in [Table 4](#).

### Mediated Effects

Hypothesis 2 predicted that significant effects of intervention participation on employee outcomes would be mediated by changes in psychosocial work characteristics. Mediation analysis was conducted in accordance with the Criterion set by [Baron and Kenny \(1986\)](#), in which the following relationships are required to be demonstrated: a significant relationship between the independent variable (IV) and dependent variable (DV; Criterion A); a significant relationship between the IV and mediating variable (MV; Criterion B); a significant relationship between the MV and DV, when the IV is held constant (Criterion C); and a reduction in the significance of the regression path from the IV to the DV when the MV is included (Criterion D). Also, given the longitudinal design of this research, baseline variables of the DVs and MVs were controlled for in the analyses, producing regressed change scores ([Bond, Flaxman, & Bunce, 2008](#)).

Based on the significant findings obtained from the test of the direct intervention effects (Hypothesis 1; [Table 4](#)), four separate mediation analyses were conducted to examine the effect of intervention participation (IV) on job satisfaction and work engagement (DVs), mediated by work-culture support and strategic alignment (MVs). The process for evaluating mediation effects was consistent for each test and conformed with the aforementioned criteria set by [Baron and Kenny \(1986\)](#). Criterion A and Criterion B were already established when we tested Hypothesis 1 (see [Table 4](#)). Criteria C and D were tested with hierarchical regression equations for each DV, with baseline values of the DV entered in Step 1, baseline values of the MV entered in Step 2, postintervention MVs entered in Step 3, and intervention condition entered in Step 4. The results of the final step of the analysis are summarized in [Table 5](#).

Criterion C set by [Baron and Kenny \(1986\)](#) requires that the relationship between the MV and DV remain significant when the IV is held constant. Time 2 work-culture support significantly predicted work engagement and job satisfaction after controlling for intervention conditions. Similarly, Time 2 strategic alignment significantly predicted work engagement and job satisfaction after controlling for the intervention condition. Finally, Criterion D requires that, when controlling for the effect of the MV, the IV should no longer have a significant effect on the DV. This was the case for all mediation tests, as intervention group no longer predicted work engagement or job satisfaction when the mediators in the analysis were included.

**Table 3.** Bivariate Relationships ( $N = 368$ )

Variable	1	2	3	4	5	6	7
1. Gender (T1)	—						
2. Tenure (T1)	-.27***	—					
3. Rank	-.23***	.80***	—				
4. Job demands (T1)	-.01	.11*	.15**	—			
5. Work culture support (T1)	.08	-.10*	-.08	-.11*	—		
6. Supportive leadership (T1)	.05	-.16**	-.18***	-.09	.63***	—	
7. Strategic alignment (T1)	.02	.15***	.25***	.05	.37***	.27***	—
8. Work engagement (T1)	.06	-.11*	-.05	-.06	.37***	.45***	.37***
9. Job satisfaction (T1)	.10	-.08	-.09	-.15**	.62***	.73***	.36***
10. Turnover intentions (T1)	-.02	.09	.06	.14**	-.37***	-.38***	-.20***
11. Psychological strain (T1)	.01	.11*	.06	.17***	-.27***	-.32***	-.24***
12. Job demands (T2)	-.02	.08	.10	.58***	-.09	-.03	.00
13. Work culture support (T2)	.08	-.01	.02	.02	<b>.65***</b>	.42***	.38***
14. Supportive leadership (T2)	-.02	-.03	-.03	.03	.44***	<b>.52***</b>	.26***
15. Strategic alignment (T2)	-.01	.19***	.23***	.05	.36***	.23***	<b>.66***</b>
16. Work engagement (T2)	.04	-.05	.01	.01	.35***	.32***	.35***
17. Job satisfaction (T2)	.07	-.01	-.01	-.07	.50***	.47***	.32***
18. Turnover intentions (T2)	-.02	-.06	-.06	.06	-.35***	-.31***	-.24***
19. Psychological strain (T2)	.00	.12*	.04	.12*	-.25***	-.17***	-.21***

*Note.* Stability correlations appear in bold. Gender: 0 = Male; 1 = Female. Rank 1 = constable; 2 = senior constable; 3 = sergeant; 4 = senior sergeant; 5 = inspector; 6 = superintendent and above. T1 = Time 1; T2 = Time 2.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

## DISCUSSION

### Leadership-Development Interventions Improve Employee Outcomes for Direct Subordinates

This study aimed to demonstrate improvements in psychosocial work characteristics and psychological outcomes for subordinates whose leaders participated in a leadership-development program. It was hypothesized that the direct subordinates of program participants would report more positive outcomes compared with a control group, seven months after the implementation of the program, while controlling for baseline measures. Positive effects occurred for work-culture support, strategic alignment, work engagement, and job satisfaction. No significant effects occurred for job demands, supportive leadership, turnover intentions, or psychological strain; therefore, Hypothesis 1 was only partially supported.

In addition to these direct effects, a secondary aim of this study was to test a mediated pathway, in which the influence of a leadership-development program predicted changes in psychological outcomes, via changes in psychosocial work characteristics. This hypothesized mediated relationship was based upon the JD-R model (Demerouti et al., 2001); specifically, changes in leadership behaviors play a role in shaping the psychosocial work context,

	8	9	10	11	12	13	14	15	16	17	18	19
—												
.50***	—											
-.42***	-.48***	—										
-.46***	-.42***	.41***	—									
-.01	-.08	.02	.11*	—								
.36***	.47***	-.34***	-.22***	-.06	—							
.32***	.43***	-.25***	-.22***	.02	.60***	—						
.31***	.29***	-.20***	-.18***	.05	.47***	.32***	—					
.69***	.35***	-.35***	-.32***	.08	.46***	.46***	.39***	—				
.43***	.69***	-.38***	-.31***	-.03	.66***	.70***	.37***	.53***	—			
-.34***	-.38***	.65***	.30***	.02	-.52***	-.44***	-.28***	-.49***	-.57***	—		
-.33***	-.27***	.26***	.52***	.16**	-.32***	-.30***	-.21***	-.40***	-.39***	.38***	—	

which in turn influences psychological ill health and work engagement. The results demonstrated that the effects of intervention participation on post-intervention engagement and job satisfaction were mediated by perceptions of work-culture support and strategic alignment. These results provide a direct test of theoretical associations between the psychosocial work context and employee outcomes, via a quasi-experimental research design. They also demonstrate a rarely tested mediated process, in which changes to proximal outcomes (i.e., increased work-culture support and strategic alignment) mediated the impact of intervention participation on distal outcomes (i.e., job satisfaction and work engagement; Nielsen, Randall, Holten, & González, 2010). Much of the research to date has considered significant changes to distal outcomes only (Griffiths, 1999).

### Implications of This Research for Occupational Health Theory and Management

It is widely recognized that organizational leaders influence psychosocial work characteristics, such as the organizational alignment, meaningfulness of work, and supportive resources, and that these work conditions influence employee health, motivation, and attitudes (Brough et al., 2009; Nielsen et

**Table 4.** Direct Effect of Intervention on Outcomes ( $N = 368$ )

Dependent variables	Independent variables	$\beta$	$\Delta R^2$	$R^2$
Job demands (T2)				
Step 1	Job demands T1	.58***	.34***	
Step 2	Job demands T1	.58***		
	Intervention group	.01	.00	.34***
Work culture support (T2)				
Step 1	Work culture support (T1)	.65***	.42***	
Step 2	Work culture support (T1)	.66***		
	Intervention group	.10**	.01*	.43***
Supportive leadership (T2)				
Step 1	Supportive leadership (T1)	.52***	.27***	
Step 2	Supportive leadership (T1)	.51***		
	Intervention group	.02	.00	.27***
Strategic alignment (T2)				
Step 1	Strategic alignment (T1)	.66***	.43***	
Step 2	Strategic alignment (T1)	.66***		
	Intervention group	.09*	.01*	.44***
Work engagement (T2)				
Step 1	Work engagement (T1)	.69***	.47***	
Step 2	Work engagement (T1)	.69***		
	Intervention group	.08*	.01*	.48***
Job satisfaction (T2)				
Step 1	Job satisfaction (T1)	.69***	.48	
Step 2	Job satisfaction (T1)	.70***		
	Intervention group	.07*	.01*	.49***
Turnover intentions (T2)				
Step 1	Turnover intentions (T1)	.65***	.42***	
Step 2	Turnover intentions (T1)	.65***		
	Intervention group	-.06	.00	.43***
Psychological strain (T2)				
Step 1	Psychological strain (T1)	.52***	.27***	
Step 2	Psychological strain (T1)	.52***		
	Intervention group	.04	.00	.27***

Note. Group: 0 = control group; 1 = intervention colleagues.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

al., 2008). Following this rationale, it is reasonable to assume that leadership-development interventions aiming to modify leadership behavior will change actual or perceived work conditions, which will subsequently influence occupational health outcomes (Skakon et al., 2010). However, leadership-development programs are seldom considered “a viable and effective primary intervention in occupational health psychology” (Kelloway & Barling, 2010, p. 261). The results of this study contribute to the limited evidence that investing in support and training for executive-level leaders produces significant improvements in some aspects of the psychosocial work environment for the leader’s direct subordinates.

The positive impact of the leadership-development intervention on the immediate colleagues of the program participants is of particular importance, as leadership-development strategies primarily target the subordinates of the

**Table 5.** Mediated Effect of Intervention on Outcomes (*N* = 368)

Dependent variables	Independent, mediating, and control variables	$\beta$	$\Delta R^2$	$R^2$
T2 Work engagement (DV)				
Step 1	T1 work engagement	.69***	.48***	
Step 2	T1 work engagement	.65***	.01**	
Step 3	T1 work culture support	.11***		
	T1 work engagement	.61***		
Step 4	T1 work culture support	-.05***		
	T2 work culture support (MV)	.27***	.04***	
	T1 work engagement	.61***		
	T1 work culture support	-.04***		
	T2 work culture support (MV)	.26***		
	Intervention group (IV)	.07	.00	.54
T2 Work engagement (DV)				
Step 1	T1 work engagement	.69***	.48***	
Step 2	T1 work engagement	.65***	.01**	
Step 3	T1 strategic alignment	.12***		
	T1 work engagement	.63***	.02***	
Step 4	T1 strategic alignment	-.01***		
	T2 Strategic alignment (MV)	.20***		
	T1 work engagement	.63***	.00	
	T1 strategic alignment	-.01***		
	T2 Strategic alignment (MV)	.20***		
	Intervention group (IV)	.06		.52
T2 Job satisfaction (DV)				
Step 1	T1 job satisfaction	.69***	.48***	
Step 2	T1 job satisfaction	.63***	.01*	
Step 3	T1 work culture support	.10***		
	T1 job satisfaction	.57***	.15***	
Step 4	T1 work culture support	-.20***		
	T2 work culture support (MV)	.52***		
	T1 job satisfaction	.57***	.00	
	T1 work culture support	-.20***		
	T2 work culture support (MV)	.51***		
	Intervention group (IV)	.03		.64
T2 Job satisfaction (DV)				
Step 1	T1 job satisfaction	.69***	.48***	
Step 2	T1 job satisfaction	.66***	.01*	
Step 3	T1 strategic alignment	.10***		
	T1 job satisfaction	.65***	.03***	
Step 4	T1 strategic alignment	-.05***		
	T2 Strategic alignment (MV)	.21***		
	T1 job satisfaction	.66***	.00	
	T1 strategic alignment	-.04***		
	T2 Strategic alignment (MV)	.20***		
	Intervention group (IV)	.05		.52

Note. IV = independent variable; MV = mediating variable; DV = dependent variable.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

program participants, whereas positive outcomes for the participants comprise a secondary aim (Kelloway & Barling, 2010). Although positive outcomes for job satisfaction, work engagement, perceptions of work-culture support, and strategic alignment were demonstrated, the amount of variance

accounted for by the intervention in the multiple hierarchical regression was small. Furthermore, no significant effects were demonstrated on other variables such as job demands, turnover intentions, or psychological strain. One likely explanation is that the time lag employed in this study did not adequately correspond to the actual time required for the effects of the intervention on immediate colleagues to transpire. To allow for changes in the program participants' own behaviors and work-related attitudes to transpire and to subsequently affect the attitudes and behaviors of their subordinates, it is possible that the actual span of time necessary for the intervention to have had an impact on colleagues/subordinates was longer than the seven-month time lag employed in this study. Alternatively, it is also plausible that the time lag was too long. Although it is recommended that time lags be theoretically derived (e.g., De Lange, Taris, Kompier, Houtman, & Bongers, 2003), the limited theorizing and research on the effects of leadership-development interventions on occupational health outcomes means that the exact nature of the required time lag is not yet fully understood (Kelloway & Barling, 2010). It has been recommended that multiple follow-up evaluations be conducted to determine the longevity of intervention effects, although this strategy is also likely to exacerbate biases associated with common method variance and sample attrition (Semmer, 2003). This is a recommended point of enquiry for further research.

By assessing both direct and indirect intervention effects, the results of this study provided a direct test of the revised JD-R model (Demerouti et al., 2001; Dollard & Bakker, 2010). Specifically, participation in a leadership-development intervention provided upstream organizational resources that were associated with greater job satisfaction and work engagement through the mediating influence of perceived workplace support and strategic alignment. This is consistent with the motivation process within the JD-R model. The results suggest that providing leaders with a development program that encourages supportive, empowering, and strategic/visionary leadership practices is associated with greater supportive resources and internalization of organizational goals and strategic priorities, and perceptions that work is meaningful, satisfying, and engaging (Bakker et al., 2011; Dvir, Eden, Avolio, & Shamir, 2002). In particular, the results support recent theorizing that interventions aiming to enhance supportive leadership behaviors, promote transformational leadership styles, and increase resources are suited to work engagement (e.g., Bakker et al., 2011). Overall, evidence obtained from this aspect of the research not only provides support for the motivational process of the JD-R model, but also provides evidence for the effectiveness of leadership development as an occupational health intervention to promote positive outcomes; the majority of interventions have predominantly focused on ill-health reduction.



The intervention had no demonstrable impact on job demands and psychological strain, which represent the energy—or health-impairment—process within the JD-R model (Demerouti et al., 2001). It is possible that leadership development may be a more effective intervention strategy for enhancing work resources and engagement than for mitigating demands and ill health. Theorell, Emdad, Arnetz, and Weingarten (2001), for example, demonstrated that an intervention to improve managerial effectiveness improved decision-making authority but did not have an impact on demands. Also, in occupations such as policing, in which demands are largely driven by external factors and strict adherence to procedures is required, leaders typically have limited influence over the allocation of tasks and job demands and can more effectively impact outcomes by enhancing supportive resources and increasing strategic alignment (Brough & Biggs, 2010).

Alternatively, methodological issues such as the specificity of measurement and the time lag employed may explain these nonsignificant effects. For instance, the psychological strain measure assesses context-free strain, and it has been previously observed that work-specific measures may more effectively depict the occupational stress process (e.g., Brough et al., in press). Further research is recommended to consider this issue in greater detail.

### Research Limitations

Preliminary analyses indicated some preexisting differences between the intervention subordinates and the control group prior to intervention implementation, which may have influenced the results. This is a limitation of quasi-experimental designs, where allocation to intervention conditions is nonrandom, resulting in disparate groups (Lipsey & Cordray, 2000). However, quasi-experimental research designs are more appropriate than true experimental designs in applied organizational research settings (Adkins & Weiss, 2003; Brough & O'Driscoll, 2010). We also note that, even in experimental designs that include random allocation to intervention conditions, extraneous factors of influence can remain and equivalent preintervention groups are not guaranteed (Adkins & Weiss, 2003; Salmela-aro, Näätänen, & Nurmi, 2004).

Exclusion criteria were applied to eliminate threats to the internal validity of the results (i.e., civilian staff, police officers who changed regions, participants in concurrent interventions, and the intervention participants were all excluded from this study), possibly to the detriment of the external validity (Blair & Zinkhan, 2006). Further research testing of this leadership intervention in nonpolice samples is, of course, recommended. We acknowledge that this paper reports only the first, but promising, test of this specific leadership intervention.

The response rate was less than optimal, which is a common limitation of longitudinal organizational research (Baruch & Holtom, 2008; e.g., Brough & O'Driscoll, 2010; Zapf, Dormann, & Frese, 1996). The potential sample bias may have been buffered by the theoretical nature of the research (Blair & Zinkhan, 2006): Specifically, this research directly tested and provided support for a theoretical occupational health psychological model (i.e., JD-R model), which has been validated in a wide variety of research samples, including police samples (e.g., Biggs et al., *in press*; Hall, Dollard, Tuckey, Winefield, & Thompson, 2010). We also acknowledge that the response rate reported in this research is comparable with response rates reported by other intervention studies conducted within high-risk stressful occupations (e.g., Brough, 2004; Tuckey, Chrisopoulos, & Dollard, 2012).

The data-collection method was comprised solely of self-report measures, which may have biased the results due to common method variance. The temporal separation of the intervention and measurement points; the focus on the subordinates, rather than the actual intervention participants; the use of valid and reliable measures; and the emphasis on confidentiality in the survey are factors likely to have minimized this bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Nonetheless, the potential bias may have been further minimized by the use of more objective measures for some of the outcome variables (Podsakoff et al., 2003).

Finally, we acknowledge the potential information bias that may have impacted the results of the study due to participants being aware that an intervention was conducted to modify psychosocial work characteristics and psychological outcomes (i.e., Hawthorne effect; Bourbonnais, Brisson, & Vézina, 2011). Although a Hawthorne effect is a major limitation of organizational intervention evaluations in applied settings, we believe that such an effect was unlikely to explain the results of the present study, as this research focused on the subordinates of the intervention participants, not the participants themselves, and the postintervention survey occurred seven months after the intervention (Bourbonnais et al., 2010).

## Conclusion

Ongoing evaluation of occupational health interventions is essential for theory refinement and validation, as well as the development of evidence-based strategies that assist employers in meeting their legislative obligations to manage psychological risks at work. To this end, the present quasi-experimental research contributed to the development of occupational health-related knowledge in several important ways. Specifically, the results indicated that organizational-level interventions comprising leadership-development strat-

egies effectively enhance perceptions of work-related resources and employee outcomes associated with the motivation process of the JD-R model, particularly supportive work resources and work engagement. It also explored mediated relationships explaining the effect of intervention participation on targeted outcomes. In doing so, this research provided a rare experimental test of the processes depicted within the JD-R model. The effect of the intervention on work engagement is particularly pertinent: Despite the recognized value in maintaining an engaged workforce, few studies have attempted to develop evidence-based intervention strategies to enhance work engagement. Overall, this research implies that a comprehensive occupational health management strategy that dually improves work engagement and reduces psychological strain can be achieved by integrating leadership development strategies into existing stress-management programs.

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### **Correction to Biggs, Brough, and Barbour (2013)**

In the article “Enhancing Work-Related Attitudes and Work Engagement: A Quasi-Experimental Study of the Impact of an Organizational Intervention” by Amanda Biggs, Paula Brough, and Jennifer P. Barbour (*International Journal of Stress Management*, Advance online publication, November 4, 2013. doi: 10.1037/a0034508), the following Editor’s note was missing: Sheena Johnson served as the action editor for this article.

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