

The Role of Positive Emotion and Ego-Resilience in Determining Men's Physical Activity Following a Workplace Health Intervention

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Abstract

Men are a hard-to-reach group in the promotion of modifiable behaviors such as physical activity. Examining the individual differences among men that might predict positive behavior changes could support customization of health promotion programs. This study examined the role of emotional outlook, positive emotion, and ego-resilience in determining men's physical activity and health-related quality of life following implementation of a gender-sensitive workplace health intervention. Using a pre–post within-subjects design, computer-assisted telephone interviewing (CATI) was used to collect measures of emotion and ego-resilience along with physical activity and health-related quality of life (using the 12-item short form [SF-12]) at baseline ($n = 139$) and after 6 months ($n = 80$) from adult men ($M_{\text{age}} = 43.7$, $SD = 12.5$). Baseline emotional outlook and ego-resilience were both positively related to increased physical activity at follow-up among men. Emotional outlook and positive emotion were positively related to ego-resilience, and ego-resilience mediated the relationship between these and the physical component of health-related quality of life. Workplace health interventions that incorporate the promotion of personal resources hold potential for greater impacts.

Keywords

health promotion, gender, physical activity, emotions, resilience, well-being

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Achieving adequate levels of physical activity can be challenging for many men. In Canada, 18% of men over 18 years were meeting the recommended levels of physical activity (i.e., 150 minutes or more of moderate intensity physical activity per week) in 2014/2015 (Statistics Canada, 2017). In the promotion of modifiable health behaviors such as physical activity that are known to reduce the risk of chronic disease, men are a hard-to-reach (or “unreached”) population (Pringle et al., 2014). Men represent a low proportion of participants in randomized controlled trials of lifestyle interventions (Pagoto et al., 2012), as well as in workplace health promotion interventions (Robroek, van Lenthe, van Empelen, & Burdorf, 2009).

Health promotion interventions that employ gender-sensitive messaging (i.e., considering men's needs based on the social constructions of gender roles and identities;

World Health Organization, 2007), to specifically target and engage men hold promise for promoting lifestyle

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changes among men (Bottorff et al., 2015; Robertson, Witty, Zwolinsky, & Day, 2013). For example, U.K.-based programs offered in conjunction with professional soccer clubs have attracted men to increase physical activity (Gray et al., 2013; Pringle et al., 2013). An Australian weight loss program, Preventing Obesity Without Eating Like a Rabbit (POWER), successfully engaged male shift workers to increase physical activity using humor, pedometers, and friendly competition (Morgan et al., 2012).

In addition to the overall demonstrated success of such interventions, examining individual differences among men that may predict success can also advance understanding and could potentially lead to the development of psychosocial strategies to support greater success among program participants (Baruth et al., 2011). For example, individual differences in ego-resilience, or the capacity to modify one's level of self-control to meet situational demands (Block, 2002), may predict individual likelihood to strive to change targeted health behaviors, such as physical activity, in a health promotion program (Baumeister, Gailliot, DeWall, & Oaten, 2006; Martin et al., 2012). Indeed, ego-resilience was associated with physical activity in African American high school students (Martin et al., 2012). In a sample of U.S. war veterans, resilient men (assessed in this study as being free of psychiatric diagnosis) were more physically active than non-resilient men (Fields, Hoyt, Linnville, & Moore, 2016); however, no research that we are aware of has examined the link between ego-resilience and increases in physical activity among adult men.

Studies have reported a relationship between emotion and health behaviors (e.g., DeSteno, Gross, & Kubzansky, 2013). Emotion and well-being are frequently examined as outcomes; for example, among European adults from 27 countries, men who self-reported meeting recommended levels of physical activity had higher self-rated well-being (Marques et al., 2016). Moderate-intensity physical activity (as measured by accelerometer) was associated with higher psychological well-being among a sample of both women and men in the United States (Panza, Taylor, Thompson, White, & Pescatello, 2017). Emotions may also influence behavior. A recent study identified that higher levels of psychological well-being were related to increases in physical activity over 11 years among both men and women (Kim, Kubzansky, Soo, & Boehm, 2017). The broaden-and-build theory (Fredrickson, 1998) proposes that positive emotions in particular function to broaden thoughts and actions, undo the effects of negative emotion, and build resources over time (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Although little research has examined the relationship between individual differences in positive emotion, well-being, and physical activity among men, in a recent

review, positive affective states were linked to subsequent physical activity (i.e., within a few hours) in three studies with primarily female samples (Liao, Shonkoff, & Dunton, 2015). Among men, body-related pride has been associated with greater physical activity whereas body-related shame linked to lower levels of physical activity (Castonguay, Pila, Wrosch, & Sabiston, 2015). Interestingly, Baruth et al. (2011) reported that a positive emotional outlook (i.e., happiness) predicted greater physical activity among previously sedentary men but not women, providing further support that gender-related factors may be important considerations in understanding this relationship.

The broaden-and-build theory suggests that positive emotions reinforce an individual's self-regulatory capacity by building psychological resources, leading to greater well-being over time (Fredrickson, 2013). In previous research, positive emotion predicted increased ego-resilience over time, and increases in ego-resilience in turn mediated the relationship between positive emotion and well-being over time (Cohn et al., 2009; Seaton & Beaumont, 2015). In another cross-sectional study, resilience (measured using the Connor-Davidson Resilience Scale) mediated the relationship between perceptions of emotional support (from supervisors) and occupational health among a sample of firefighters; specifically, emotionally supportive relationships at work were linked to greater resilience, which in turn allowed firefighters to cope effectively with stress, resulting in lower levels of exhaustion and cynicism, and higher vigor and dedication (Bernabe & Botia, 2016). Previous research has not examined the potential mediating role of ego-resilience in the relationship between positive emotion and physical activity. More research is needed on the interplay between positive emotion and ego-resilience in health behaviors such as physical activity, especially among men.

The purpose of the present study was to examine the role of individual differences in emotion and ego-resilience in determining men's physical activity following a gender-sensitive workplace wellness program (called POWERPLAY). Physical activity was measured by self-report as minutes of moderate and vigorous physical activity (MVPA), and social-cognitive factors related to physical activity (stages of change for physical activity and self-efficacy for physical activity) were also assessed. Although social-cognitive factors such as self-efficacy are well known to influence physical activity (e.g., Keller, Gellert, Knoll, Schneider, & Ernsting, 2016), less well studied are the personal resources that might be associated with these social-cognitive factors. Health-related quality of life, a measure of well-being associated with physical activity (Bize, Johnson, & Plotnikoff, 2007) was included. The POWERPLAY program was implemented in four male-dominated

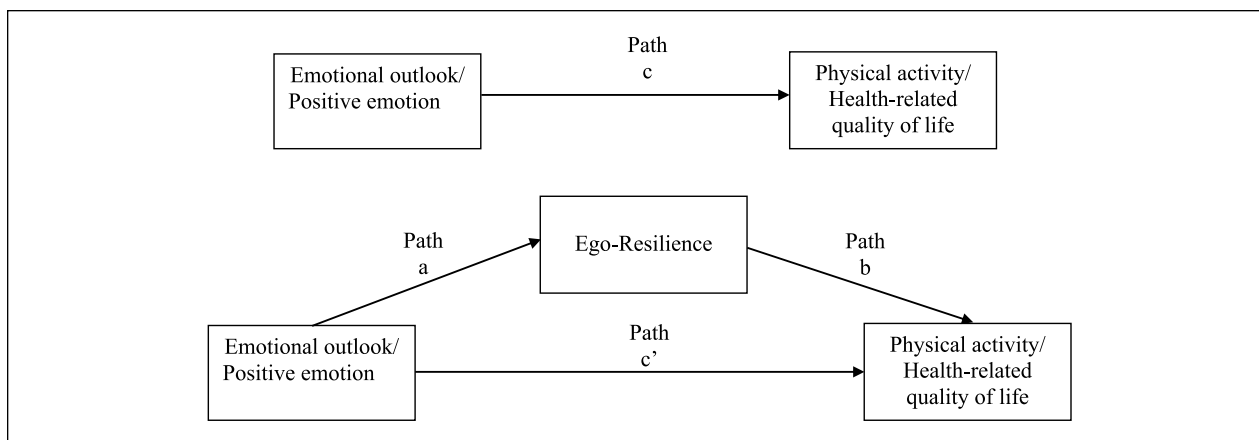


Figure 1. Hypothesized role of ego-resilience in the relationship between emotional outlook/positive emotion and physical activity/health-related quality of life.

worksites in northern British Columbia, Canada, from fall 2014 to spring 2015 (Caperchione et al., 2015). Although the results of the intervention have been published (Johnson et al., 2016), measures of emotion and ego-resilience were collected along with overall program evaluation measures with the expressed purpose of examining whether individual differences in positive emotion and ego-resilience at baseline predicted increases in physical activity among men following delivery of the POWERPLAY program. It was hypothesized that

- 1) Among men, higher levels of emotional outlook/positive emotion and ego-resilience at baseline would be associated with higher levels of physical activity (i.e., MVPA, stage of change, and self-efficacy) and health-related quality of life
- 2) Higher levels of emotional outlook/positive emotion and ego-resilience at baseline would be associated with an increase in men's MVPA following the POWERPLAY intervention, as well as with health-related quality of life at follow-up
- 3) Based on the broaden-and-build theory of positive emotion (Fredrickson, 1998), any relationship between baseline emotional outlook/positive emotion and increased MVPA and health-related quality of life would be mediated by ego-resilience at follow-up (see Figure 1)

Methods

Study Design

This study analyzes data collected to evaluate the workplace health promotion program called POWERPLAY. The study received human ethics approval from the

University of British Columbia Research Ethics Board (#H13-02408) and the Northern Health Research Review Committee (RRC-2014-0015). Detailed design and rationale for the study have been previously reported (Caperchione et al., 2015). Briefly, the POWERPLAY workplace program was specifically designed to incorporate men's preferences and interests (i.e., "gender-sensitive"). For example, the program included friendly competition between employees as well as tools (e.g., resources for tracking progress, pedometers) to assist with self-monitoring of physical activity, and educational resources designed with input from focus groups held with men from Northern British Columbia (Olfiffe et al., 2017). Four worksites in Northern British Columbia were offered the POWERPLAY program and they participated in the research. These included a regional municipality with 180 employees (50% men), two trucking companies with 130 and 137 employees (80% and 95% men, respectively), and a shipping terminal with 140 employees (70% men). A pre-post within-subjects design was used to evaluate the POWERPLAY program. Male employees 18 years or older were recruited through on-site launches in September 2014. The men who signed up and provided phone numbers were contacted during September–October 2014 (prior to program implementation) and again at 6-month follow-up, beginning April 2015 (program conclusion), and invited to complete the telephone surveys in exchange for \$20 gift cards. Levels of self-reported physical activity increased post-program implementation (Johnson et al., 2016).

Measures

The measures of emotion and ego-resilience described in the following text were collected along with overall program evaluation measures in order to examine

whether individual differences in positive emotion and ego-resilience at baseline predicted increases in physical activity among men following delivery of the POWERPLAY program. With the exception of demographics, participants completed all measures both at the baseline (pre-implementation) assessment and again at the 6-month follow-up via CATI surveys.

Sociodemographic characteristics and health limits to physical activity. At the baseline assessment, a series of questions were used to gather information about the sample including age, marital status, education, income, ethnicity/race, as well as height and weight used to calculate body mass index (BMI) as kg/m^2 . To assess health limits to physical activity, participants were also asked, “In the past month, to what extent was your participation in physical activities limited by a health condition, injury or disability?” to which they responded on a 6-point scale ranging from *not at all* (1) to *completely* (6).

Emotional outlook. Participants were asked to “please rate your general emotional outlook on life” on a scale ranging from *often very depressed* (1) to *usually very happy and optimistic* (5), with higher scores reflecting a more positive emotional outlook. This single-item measure of positive emotion has been used by others (Baruth et al., 2011; Puett et al., 2014) and was included in order to determine whether the findings of Baruth et al. (2011) could be replicated in a novel context; however, evidence on the reliability and validity of this single-item measure is not available.

Positive emotion. Participants completed the short form Positive and Negative Affect Schedule (PANAS; Thompson, 2007) with instructions to indicate how they normally feel. The short form PANAS includes five positive (alert, inspired, determined, attentive, and active) and five negative (upset, hostile, ashamed, nervous, and afraid) adjectives. Evidence for the validity and reliability of the full PANAS scale has been reported (Watson, Clark, & Tellegen, 1988), and the short form has also demonstrated acceptable psychometric properties, including internal reliability, cross-sample and temporal stability, and convergent and criterion validity (Thompson, 2007). Two additional items (strong, proud) were included for the positive emotion scale from the original 20-item PANAS in order to ensure that a range of male-centric emotions were captured. Participants responded on a scale ranging from *never* (1) to *always* (5), and responses to the seven positive adjectives were summed (possible range of scores 7–35) to create the positive emotions scale (Cronbach’s $\alpha = .78$ for baseline and .84 for follow-up).

Ego-resilience. The ER89 scale (Block & Kremen, 1996) measures the extent to which individuals maintain flexibility in response to changing situational demands. The ER89 includes 14 items (e.g., “I would be willing to describe myself as a pretty ‘strong’ personality”). In previous research the scale has shown internal and test-retest reliability (Block & Kremen, 1996) as well as construct validity (Letzring, Block, & Funder, 2005). Participants responded to these items on a 4-point scale ranging from *does not apply at all* (1) to *applies very strongly* (4). Responses to the 14 items were summed (possible range of scores 14–56), with higher scores reflecting higher levels of ego-resilience (Cronbach’s $\alpha = .82$ for baseline and .80 for follow-up).

Physical activity and related psychosocial measures. Measures of physical activity and social-cognitive factors related to physical activity were included. First, to assess MVPA, the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) was used. The GLTEQ contains three self-report questions that assess both the average frequency and duration (in min) of mild, moderate, and vigorous activities during free time over a typical week. Moderate and vigorous physical activity was summed to obtain MVPA (in min per week) at baseline and follow-up. Increase in physical activity was calculated by subtracting baseline from follow-up MVPA minutes. The GLTEQ has been validated with objective measures (e.g., accelerometer, maximal oxygen uptake [VO_2max], body fat percentage), as well as other self-report measures of physical activity (Jacobs, Ainsworth, Hartman, & Leon, 1993). Using a cutoff of $z > 3.29$ (Tabachnick & Fidell, 2001), one individual was removed from the baseline MVPA scale (6,090 min, $z = 9.63$) and one individual was removed from the follow-up MVPA scale (1,080 min, $z = 3.63$). Second, stages of change for physical activity, based on the Transtheoretical Model of behavior change (Prochaska & DiClemente, 1983), was assessed by asking participants a series of four questions pertaining to engaging in “regular physical activity” (defined as at least 150 min of moderate activity each week) with different branching options depending on response (Dumith, Gigante, & Domingues, 2007; Nigg, 2005). Response options categorized participants into one of five groups: pre-contemplation (“No, and I don’t intend to within the next six months”); contemplation (“No, but I intend to within the next six months”); preparation (“No, but I intend to within the next 30 days”); action (“Yes, and I have for less than six months”); and maintenance (“Yes, and I have for more than six months”). These groupings were used as a scale ranging from 1 (*pre-contemplation*) to 5 (*maintenance*). Finally, self-efficacy for physical activity was assessed by asking participants, “Over the next six months, how

confident are you that you can participate in regular physical activity?" (Plotnikoff, Hotz, Birkett, & Courneya, 2001). Participants responded on a scale ranging from *not at all confident* (1) to *extremely confident* (5).

Health-related quality of life. The SF-12 health-related quality of life survey (Ware, Kosinski, & Keller, 1996) includes items (e.g., "How much did pain interfere with your normal work, including both work outside the home and housework?") that assess both the physical and mental components of health-related well-being. Participants respond in terms of how they felt during the past 4 weeks using several different response scales (e.g., categorical, yes/no, and ordinal scale ranging from *not at all* to *extremely*). The items are weighted and SF-12 is scored using an age- and sex-adjusted algorithm to create physical and mental health component scales, each standardized to a mean of 50 ($SD = 10$).

Analysis

All analyses were conducted in IBM SPSS Statistics 25. Sociodemographic characteristics were compared between individuals who did and did not complete the follow-up data collection using Fisher's exact analyses for ethnicity and marital status, Mann Whitney U for income, education, and health limits to physical activity, and t-tests for age, height, weight, and BMI. Given the ordinal nature of some scales, Kendall's tau-B correlations were used to assess the relationship between baseline emotion, ego-resilience, physical activity, and well-being measures. All the variables were measured on an ordinal or continuous scale, and we were interested in testing the monotonic (i.e., as one increases, so does the other) relationship between pairs of variables, so the assumptions of Kendall's tau-B analyses were deemed to be met. Hierarchical linear regressions were used to assess the relationships between baseline emotional outlook, positive emotion, and ego-resilience (independent variables) and change in MVPA and health-related quality of life (physical and mental components) at follow-up (dependent variables), controlling for age, BMI, and health limits to physical activity (follow-up emotional outlook, positive emotion, and ego-resilience were also controlled in each model). Because the use of four separate worksites could possibly introduce clustering effects, potentially violating the assumption of independence for errors, we ran all regression analyses with dummy variables to represent each of the four workplaces (coded as 0 or 1) entered first as control variables. Although the means were on the high end for the emotional outlook, positive emotion, and ego-resilience scales, an assumption of linear regression is that errors be normally distributed, as opposed to requiring all the

variables themselves to be normally distributed (Williams, Gomez Grajales, & Kurkiewicz, 2013). Preliminary screening produced normally distributed standardized residuals for all three regression models. Plots of the standardized predicted values against the standardized residual values indicated homoscedasticity in that the variance of the residuals was evenly distributed across all points of the model for each. The assumption that the relationship between the independent variables and dependent variables is linear was also deemed to be met after examining each independent variable and dependent variable combination individually using scatterplots. Mediation analyses were conducted by examining the significance of the indirect effect of both positive emotion and emotional outlook (X) on physical activity and health-related well-being as outcome variables (Y) through ego-resilience as the proposed mediator, controlling for workplace and using bootstrapping procedures with 10,000 resamples (Preacher & Hayes, 2008). The SPSS macro INDIRECT (available from: <http://afhayes.com/spss-sas-and-mplus-macros-and-code.html>) was used to conduct these analyses in SPSS (Version 25). A p value of less than .05 (two sided) was considered statistically significant.

Results

Participants

Prior to the program implementation, 203 eligible participants agreed to be contacted by researchers. At baseline, 139 men completed telephone surveys (response rate 68.5%). All participants provided verbal informed consent, which was entered as a "yes" into the computer by the survey interviewer before proceeding. The sociodemographic characteristics of men who completed the baseline survey only versus those who completed both the baseline and follow-up surveys are reported in Table 1.

Preliminary Data Screening

The means, standard deviations, and correlations of all scales at baseline are presented in Table 2.

Compared to baseline, emotional outlook was not significantly higher at follow-up ($M = 4.10$, $SD = .76$), $t(79) = .51$, $p = .615$, and neither was positive emotion ($M = 25.51$, $SD = 4.30$), $t(79) = -.48$, $p = .634$. Likewise, ego-resilience was not significantly higher at follow-up ($M = 44.75$, $SD = 5.90$), $t(79) = -.85$, $p = .399$. Although means were high for MVPA, a good distribution of scores was present, making ceiling effects unlikely. A comparison of baseline and 6-month follow-up physical activity scores has been conducted previously as part of the overall program evaluation (Johnson et al., 2016).

Table 1. Comparison of Sociodemographic Characteristics of Participants Who Did and Did Not Complete Follow-Up Surveys.

	Participants with only baseline data (n = 59)		Participants with baseline and follow-up data (n = 80)		Fisher's exact	p
	n	%	n	%		
Marital status					9.41	.031
Single	19	32.2	13	16.3		
Married	35	59.3	64	80.0		
Divorced	5	8.5	2	2.5		
Widowed	0	0.0	1	1.3		
Ethnicity					9.16	.052
Caucasian	50	84.7	66	82.5		
First Nations	4	6.8	2	2.6		
Metis	0	0.0	6	7.5		
Asian	1	1.7	0	0.0		
Other	5	6.8	6	7.5		
	n	%	n	%	U	p
Household income					1885.00	.268
<\$19,999	0	0.0	0	0.0		
\$20,000–39,999	1	1.8	3	4.0		
\$40,000–59,999	4	7.1	3	4.0		
\$60,000–79,999	14	25.0	13	17.3		
\$80,000–99,999	9	16.1	11	14.7		
>\$100,000	28	50.0	45	60.0		
No response	3		5			
Education					2030.00	.137
Less than high school	5	8.6	11	13.8		
Completed high school	15	25.9	30	37.5		
Trades certification/ college degree	29	50.0	28	35.0		
Some university	2	3.4	4	5.0		
University degree	7	12.1	7	8.8		
No response	1		0			
	Median	IQR	Median	IQR	U	p
Health limits to PA	1.00	2.00	1.00	1.00	2264.50	.632
	Mean	SD	Mean	SD	t	p
Age	41.86	11.04	45.08	13.40	-1.55	.124
Height (meters)	1.78	.07	1.79	.07	-.81	.421
Weight (kg)	89.87	14.42	93.69	15.85	-1.46	.147
BMI (kg/m ²)	28.18	4.03	29.08	4.59	-1.20	.232

Note. IQR = interquartile range; PA = physical activity; BMI = body mass index.

**Analyses Related to Hypothesis #1:
Correlations at Baseline**

Supporting hypothesis 1, the pattern of correlations in Table 2 suggested that men’s emotional outlook at baseline was positively related to MVPA, to stages of change and self-efficacy for physical activity, and to the physical component of health-related quality of life. Men’s positive emotion at baseline was positively related to stages of change and self-efficacy for physical activity and the physical component of health-related quality of life, though not to MVPA. Finally, men’s ego-resilience at baseline was positively related to stages of change for

physical activity and the physical component of health-related quality of life.

**Analyses Related to Hypothesis #2:
Regressions to Assess Associations With
Increased MVPA and Health-Related Quality
of Life at Follow-Up**

To test the second hypothesis that baseline emotional outlook, positive emotion, and ego-resilience would be associated with increases in MVPA from baseline to follow-up and to levels of health-related quality of life at follow-up, three separate hierarchical regressions were conducted.

Table 2. Means, Standard Deviations, Medians, Interquartile Range, and Correlations Between Emotional Outlook, Positive Emotion, and Ego-Resilience and All Scales at Baseline.

Baseline measures	Mean	SD	Median	IQR	Baseline emotional outlook		Baseline positive emotion		Baseline ego-resilience	
					<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Emotional outlook	4.14	0.73	4.00	1.00	–	–				
Positive emotion	25.28	4.41	25.00	5.00	.30	<.001	–	–		
Ego-resilience	44.31	6.25	45.00	9.00	.34	<.001	.38	<.001	–	–
MVPA (min per week)	304.84	339.81	210.00	296.25	.22	.001	.10	.094	.07	.228
Stage of change for PA	4.02	1.26	5.00	2.00	.15	.046	.16	.017	.18	.009
Self-efficacy for PA	4.14	.97	4.00	2.00	.15	.043	.13	.057	.03	.634
Health-related quality of life—physical component	51.41	7.36	52.96	8.73	.20	.003	.30	<.001	.22	<.001
Health-related quality of life—mental component	49.83	5.36	51.09	4.45	.04	.597	–.01	.829	–.10	.082

Note. $N = 139$ for all variables except those with MVPA, where $N = 138$. Kendall tau-B coefficients are reported. IQR = interquartile range; MVPA = moderate and vigorous physical activity; PA = physical activity.

Workplace, BMI, age, and health limits were entered in all the regressions first as covariates (these were unrelated to increases in MVPA). Follow-up emotional outlook, positive emotion, and ego-resilience were then entered in their respective regressions as control variables, so that the unique contribution of baseline emotional outlook, positive emotion, and ego-resilience could be ascertained. Results, presented in Table 3, suggested that both emotional outlook and ego-resilience at baseline were related to increases in MVPA; however, positive emotion was not.¹ Although the regressions involving health-related quality of life were both significant overall, none of the predictor variables made significant independent contributions except BMI, and health limits to physical activity were negatively related to the physical component of health-related quality of life.

Analyses Related to Hypothesis #3: The Role of Ego-Resilience as a Mediator

Finally, the hypothesis that ego-resilience (at follow-up) would mediate the relationship between emotion and increased MVPA as well as health-related quality of life at follow-up was tested by examining indirect effects using bootstrapping ($k = 10,000$) procedures (Preacher & Hayes, 2008). The relevant paths as well as the bootstrap results for the indirect effects are reported in Table 4. The bias-corrected confidence intervals were considered significant if they did not include zero (Preacher & Hayes, 2008).

Moderate and vigorous physical activity. Baseline emotional outlook was significantly related to follow-up ego-resilience, though not to increased MVPA; follow-up

ego-resilience was not significantly related to increased MVPA, and the indirect effect coefficient was not significant, suggesting that mediation was not present.

Baseline positive emotion was significantly related to follow-up ego-resilience, though follow-up ego-resilience was not significantly related to increased MVPA and the indirect effect coefficient was not significant, suggesting that mediation was not present.

Health-related quality of life. In the model with emotional outlook, follow-up ego-resilience was not significantly related to the physical component of health-related quality of life at follow-up, although this path was nearly statistically significant ($p = .075$); however, the indirect effect coefficient was significant, suggesting that mediation was present. In the model with positive emotion, follow-up ego-resilience was not significantly related to the physical component of health-related quality of life at follow-up, and the indirect effect coefficient was not significant, suggesting that mediation was not present.

Follow-up ego-resilience was not significantly related to the mental component of health-related quality of life at follow-up, although both baseline emotional outlook and baseline positive emotion were. Neither indirect effect coefficient was significant, suggesting that mediation was not present.

Discussion

The purpose of this study was to explore whether individual differences in emotional outlook, positive emotion, and ego-resilience were associated with physical activity and health-related quality of life among men following a workplace health intervention. It was hypothesized that

Table 3. Relationships Between Baseline Emotional Outlook, Positive Emotion, and Ego-Resilience and Increase in MVPA and Health-Related Quality of Life at Follow-Up.

Outcome variable	Control variables						Predictor variables						Full model						
	Age		BMI		Health limits		Baseline emotional outlook		Baseline positive emotion		Baseline ego-resilience		F	p	R ²				
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI							
Increase in MVPA minutes (from baseline to follow-up)	-.05	[-5.31, 3.35]	-.08	[-16.75, 8.60]	.523	[-60.52, 42.79]	.733	.32	[3.90, 221.74]	.043	-.24	[-32.30, 5.48]	.161	.49	[4.64, 31.28]	.009	2.21	.021	.29
Follow-up health-related quality of life—physical component	.05	[-.08, .12]	-.29	[-.68, -.11]	.007	[-2.82, -.54]	.004	-.15	[-4.04, 1.36]	.326	.01	[-.46, .47]	.971	.00	[-.33, .34]	.983	2.14	.025	.28
Follow-up health-related quality of life—mental component	.06	[-.09, .14]	.06	[-.24, .41]	.606	[-2.19, .42]	.182	.12	[-1.67, 3.86]	.433	.25	[-.13, .83]	.146	-.07	[-.40, .28]	.720	2.00	.038	.26

Note. N = 78. Separate regressions were conducted for each of the outcome variables: (a) increases in MVPA on baseline emotional outlook, positive emotion, and ego-resilience controlling for follow-up emotional outlook, positive emotion, and ego-resilience; (b) follow-up health-related quality of life—physical component on baseline emotional outlook, positive emotion, and ego-resilience controlling for follow-up emotional outlook, positive emotion, and ego-resilience; (c) follow-up health-related quality of life—mental component on baseline emotional outlook, positive emotion, and ego-resilience controlling for follow-up emotional outlook, positive emotion, and ego-resilience; all regressions also included workplace, age, BMI, and health limits as control variables. Adjusted standardized beta (β) coefficients are reported for each predictor variable. MVPA = moderate and vigorous physical activity; BMI = body mass index.

Table 4. Ego-Resilience as a Mediator in the Relationship Between Emotional Outlook/Positive Emotion and Physical Activity as well as Health-Related Quality of Life.

Outcome variable	Predictor variable	R^2	Path c		Path a		Path b		Path c'		Indirect effect (a × b)
			β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>	95% CI
Increase in MVPA minutes (from baseline to follow-up)	Emotional outlook	.11	.17 (.09)	.065	.40 (.08)	<.001	-.15 (.13)	.243	.23 (.10)	.03	[-.22, .06]
	Positive emotion	.05	-.00 (.08)	.969	.33 (.08)	<.001	-.01 (.13)	.950	-.00 (.09)	.995	[-.10, .11]
Health-related quality of life—physical component	Emotional outlook	.08	.07 (.09)	.457	.40 (.08)	<.001	.24 (.13)	.075	-.03 (.10)	.804	[.02, .20]
	Positive emotion	.08	.11 (.08)	.210	.33 (.07)	<.001	.19 (.13)	.129	.04 (.09)	.660	[.00, .17]
Health-related quality of life—mental component	Emotional outlook	.12	.27 (.09)	.003	.40 (.08)	<.001	.07 (.13)	.586	.25 (.10)	.018	[-.05, .12]
	Positive emotion	.13	.26 (.08)	.002	.33 (.07)	<.001	.08 (.12)	.507	.23 (.09)	.013	[-.04, .11]

Note. $N = 78$ for models with MVPA and $N = 80$ for models with health-related quality of life. The predictor variables (emotional outlook and positive emotion) were standardized (by subtracting the mean and dividing by the standard error) prior to analyses so standardized beta (β) coefficients are reported for each path. Bias-corrected confidence intervals (95%) calculated with 10,000 bootstrap samples were considered significant if they did not include zero. Workplace was included as a statistical control in each model. MVPA = moderate and vigorous physical activity. c' = The apostrophe refers to the c path AFTER the mediator has been included in the model (see Figure 1).

emotional outlook/positive emotion and ego-resilience at baseline would be positively associated with physical activity and health-related quality of life as well as increased MVPA among men following the implementation of a workplace health intervention. Furthermore, it was hypothesized that ego-resilience would mediate the relationship between baseline emotional outlook/positive emotion and increased MVPA and follow-up health-related quality of life. These hypotheses were partially supported.

In this study, a positive emotional outlook on life among men was related to increased MVPA in the context of a novel health promotion program designed for men, consistent with the findings of Baruth et al. (2011). In addition, the single-item measure of emotional outlook was related to stage of change for physical activity, suggesting that men with a more positive emotional outlook were in a higher stage of change for physical activity at baseline and, thus, more ready to adopt a positive change in physical activity. However, adjusting for stage of change in the regression model did not change the relationship between emotional outlook and change in moderate-to-strenuous physical activity. Adapting the PANAS with additional items (speculated to capture male-centric emotions) provided additional support for these findings. At baseline, men with higher positive emotion had a higher stage of change for physical activity. The adaptation of the PANAS measure is novel and is supported by growing recognition that differences in the experience and expression of emotions such as distress among men

and women need to be examined (Ridge, Emslie, & White, 2011; White, 2006). Baruth et al. (2011) suggested that interventions targeting physical activity for men may be more successful if they first aim to increase happiness. Although the POWERPLAY intervention was not designed to increase happiness, the present results provide further evidence for their suggestion.

Higher levels of ego-resilience at baseline were related to a higher stage of change for physical activity among men, and higher baseline ego-resilience was related to increased physical activity among men following the intervention. Yet follow-up ego-resilience was unrelated to change in physical activity, and individual differences in ego-resilience at follow-up did not mediate the link between emotion and increased physical activity contrary to predictions. Interestingly, physical activity has been linked to increases in psychosocial resources over time, suggesting emotional and mental benefits of becoming active (Hogan, Catalino, Mata, & Fredrickson, 2015). The present research suggests that both positive emotion and ego-resilience may independently contribute to increasing physical activity following a health intervention for men. It seems possible that positive emotion/psychosocial resources and physical activity may have reciprocal effects on one another.

Since emotional outlook and positive emotions were also positively related to ego-resilience and health-related quality of life at baseline, support was also garnered for Fredrickson's broaden-and-build theory (Fredrickson, 1998). In previous research, positive emotions have also

been reported to reinforce an individual's self-regulatory capacity by building resources over time, contributing to enduring individual differences such as ego-resilience (Cohn et al., 2009; Seaton & Beaumont, 2015). The correlation and mediation analyses suggested that ego-resilience (not the emotion variables) was related to the physical component of health-related quality of life at follow-up, whereas emotional outlook and positive emotion (not ego-resilience) were related to the mental component of health-related quality of life. Although more research examining interventions designed to increase (as opposed to examining individual differences in) positive emotion is needed, in other research, a loving-kindness meditation program increased both positive emotions and life satisfaction over time (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). The present results provide a preliminary indication that both emotion and ego-resilience may be important for health-related quality of life, providing further support that the ability to effectively problem-solve, regulate emotion, and change perspective makes ego-resilience a valuable personal resource worth building (Cohn et al., 2009).

Developing ways to increase the impact of health promotion programs could assist in reaching men and translate into improved health outcomes. The findings presented here form a theoretical basis for a novel approach to the development of gender-sensitive programs. The demonstrated linkage between emotional outlook, ego-resilience, and physical activity can be a driver for future health-based interventions for men, such as integrating mental health and chronic disease components in all-encompassing holistic program development. Workplace wellness programs that promote physical activity have demonstrated financial benefits, with a healthier workforce translating into reduced absenteeism and medical costs (van Dongen et al., 2011). Employee mental wellness has been identified to be among the largest contributors to work-related costs such as those attributed to presenteeism (Collins et al., 2005), suggesting that a comprehensive program that includes the promotion of employee well-being has the potential to not only impact physical activity but also directly reduce such costs.

Limitations and Strengths

This research represents an initial attempt to assess the role of individual differences in positive emotion and ego-resilience in promoting men's physical activity and health-related quality of life. Three limitations deserve mention. First, the gender-sensitive workplace wellness intervention was targeted at improving physical activity, not emotion or resilience; thus, the causal role of emotional outlook and ego-resilience in increasing physical

activity needs to be confirmed in future studies. Despite this limitation, the results are based on 6-month follow-up study, with hypotheses that were generated in advance of data collection. Future research should continue to explore the potential mediating role of resilience and consider determining directional causality of emotional outlook so that the impact of promoting these individual resources on specific health and well-being outcomes could be better understood. Second, male-dominated industries were targeted for recruitment in the POWERPLAY program and this research was based on a sample of largely Caucasian men with middle/high incomes participating in a workplace wellness intervention. More research is needed with men in other contexts, such as those with lower income jobs and those working in other industries. Work conditions, supervisor-employee relations, and other factors linked to employee well-being may influence workers differentially in different workplaces and should be explored in future research. Similarly, these findings may not be generalizable to men outside the workplace (e.g., unemployed or retired). Yet, engaging men in the workplace was also a strength of the present program. Other research has suggested that men experience gender role strain, prioritizing their role as providers above being more physically active (Griffith, Gunter, & Allen, 2011), so support to increase physical activity in the workplace works with, rather than against, the gender role as provider. Third, and finally, although both physical activity and socio-cognitive factors related to physical activity were assessed, the data were collected via self-report and may have been subject to recall or response bias. Objective measures of physical activity (e.g., accelerometers) and health data (e.g., blood pressure) could be considered in the future.

Conclusions

In conclusion, emotional outlook and ego-resilience were both related to increases in physical activity among men following a workplace wellness program, suggesting that the effectiveness of interventions promoting physical activity may be enhanced if a positive emotional outlook is also supported. Although ego-resilience at follow-up did not mediate the link between emotion and change in physical activity, it was related to health-related quality of life, so it may still be an important personal resource to consider building in health promotion interventions. Evidence is accumulating in support of the notion that positive emotions are important for both building resources as well as well-being over time (Cohn et al., 2009). The results of the present research provide an important addition to the literature in this area.

Declaration of Conflicting Interests

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Note

1. We examined one additional model in which stage of change for physical activity was included along with the control variables; however, stage of change was unrelated to change in moderate-to-strenuous physical activity at follow-up in the regression model. The coefficients for the predictor variables (emotional outlook, positive emotion, and ego-resilience) remained unchanged in interpretation, and the overall R^2 for the model was only slightly higher (from .214 to .216).

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