

## Original Papers

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# Relationships among Orientation to Exercise, Personality, Well-being, and Self-Efficacy among Recreational Runners

**Abstract:** Participants in the study were recreational runners who completed measures of their orientation to exercise, the Five Factor Model of personality, self-efficacy as a specific adaptation (a socio-cognitive construct of personality) and measures of subjective well-being (life satisfaction) and eudaimonic well-being (life engagement). Consistent with previous research, task-oriented (internally focused) motivation to exercise was positively related to extraversion and to conscientiousness, and ego-oriented (externally focused) motivation was positively related to extraversion. Also consistent with previous research, self-efficacy and measures of well-being were positively related to extraversion and conscientiousness. Mediation analyses found that well-being mediated relationships between task-oriented motives and both extraversion and conscientiousness. Self-efficacy mediated the relationship between ego-oriented motives and extraversion. The implications of these results for the study individual differences in exercise motivation are discussed.

**Keywords:** Exercise motivation, well-being, Self-Determination Theory, diary study, BFI-44

An ongoing concern of research in the psychology of sport has been how basic personality dispositions such as the dispositions that constitute the Five Factor Model (FFM) are manifested in the motivation to exercise and participate in sports. Conspicuously absent from this research has been the role that well-being and related characteristics may play in these processes. Most research assumes that individual differences in personality are manifested in individual differences in motivation (e.g., Brinkman, Weinberg, & Ward, 2016) which are then manifested in individual differences in sport and exercise participation (e.g., Ingledeu & Markland, 2007).

The present study examined if well-being and self-efficacy mediated relationships between personality traits and motivation in sport. The underlying rationale for this model was that well-being and self-efficacy are more general constructs than motivation in sport and exercise, and as such, they should be more proximal or direct outcomes of personality than motivation for sport and exercise is. Although some have conceptualized self-efficacy as an aspect of well-being (e.g. Ryff & Keyes,

1995), for present purposes we conceptualized self-efficacy as a *characteristic adaptation* as described by McAdams and Pals (2006). To our knowledge, how these constructs might mediate relationships between personality traits and motivation in sport has not been considered before.

We examined these processes within a sample of individuals who exercised regularly, recreational runners. We defined recreational runners as individuals who ran frequently, not as a job, but as a form of exercise. We chose recreational runners because running is a popular form of exercise whose popularity has grown in the past decades (e.g., Breedveld, Scheerder, & Borgers, 2015), and so our findings would have more generalizability than if we studied individuals who participated regularly in a less popular sport such as water sports (e.g., Physical Activity Council, 2017). Moreover, there appears to be considerably variability in how often and how much people run (e.g., Paul, 2018), which presumably reflects variability in people's motives.

We measured personality using the BFI-44 (John, Donahue, & Kentle, 1991) a widely used measure of

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the FFM<sup>1</sup>. We collected two measures of well-being, one focusing on hedonic well-being, the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), and one focusing on eudaimonic well-being, the Life Engagement Test (LET; Scheier et al., 2006). As a measure of a characteristic adaptation we collected the Generalized Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). Finally, we measured goal-orientation concerning sport and exercise using the Goal Orientation to Exercise Measure (GOEM; Petherick & Markland, 2008).

### The Logic of mediation

Mediation is a regression-based technique that is used to understand possible causal relationships among a set of variables. For example, MacKinnon, Fairchild, and Fritz (2007) defined mediation as “a chain of relations where an antecedent variable affects a mediating variable, which then affects an outcome variable” (p. 593). Within the nomenclature of mediation, antecedent variables (predictors) are usually designated as  $x$ , outcome variables are usually designated as  $y$ , and mediating variables are usually designated as  $m$ . Although MacKinnon et al. discussed mediation within the context of longitudinal studies and experimental designs in which antecedent variables are manipulated, mediation can also be examined in studies in which data are not collected across time, and in which there is no manipulation, albeit with caveats regarding causality. We address the issue of causality in the discussion.

Examining mediation requires three models. In the first, the predictor is regressed onto the outcome,  $y = x$ . If this relationship is not significant, there is nothing to mediate. Next, the predictor is regressed onto the mediator,  $m = x$ . If this relationship is not significant, then  $m$  cannot mediate relationships between  $y$  and  $x$  because it is not related to  $x$ . Finally, the predictor and the mediator are regressed onto the outcome,  $y = x + m$ . The coefficients from this third model are a critical to determining if mediation has occurred. A statistically significant  $m$  coefficient is a necessary, but not sufficient condition for mediation. Determining if mediation has occurred is contingent upon other considerations including the estimation of “indirect effects,” defined as the extent to which the relationship between  $y$  and  $x$  goes through  $m$ . A full explanation of mediation is beyond the scope of this paper. Interested readers can consult MacKinnon et al. (2007) and Hayes (2017).

For present purposes, goal orientation to participate in sport (GOEM) was the outcome ( $y$ ), dispositional personality (the FFM) was the predictor ( $x$ ), and scores on the LET, SWLS, and GSES were mediators ( $m$ ). Before presenting our specific expectations we review the research

concerning the relationships among these constructs that is relevant to our mediational analyses.

### Relationships between personality and motivation to exercise and participate in sport

The focal relationship of the present study was the relationship between personality and goal orientation to exercise. If this relationship is not significant, then there is no need (or justification) to examine how well-being might mediate it. In research on relationships between personality and the motivation to exercise these two constructs have been defined and measured in various ways.

We measured personality using the BFI-44, a measure of the FFM. Although the BFI-44 has not been widely used in studies of exercise motivation, the NEO-PR and NEO-FFI (Costa & McCrae, 1992) have, and the BFI-44 and NEO measure similar constructs. This means that previous research using the NEO can readily serve as a foundation for the present study. Research on exercise motivation has defined personality also in terms of Eysenck’s three-component model (PEN, Eysenck, & Eysenck, 1991). Although the PEN and the FFM are not completely compatible, their measures of Extraversion and Neuroticism are similar enough to provide a basis for direct comparison (e.g., Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993).

The present study measured motivation using the GOEM. The GOEM has two subscales, task-orientation and ego-orientation. Items on the task-orientation subscale have an internal focus and concern the task per se and success on the task (e.g., I achieve the exercise goal I set for myself). In contrast, items on the ego-orientation subscale have an external focus and concern what others may think (e.g., I can show other exercisers that I’m better than everyone else).

Distinguishing internal and external foci has its origins in Self Determination Theory (SDT; Ryan & Deci, 2000), and SDT is a framework that has been used frequently to understand motivation in sport and exercise. The GOEM was developed in part to provide a more efficient measure of internal and external orientations (motives) than other measures of internal and external regulation such as the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2; Markland & Tobin, 2004), a widely used measure.

In terms of our measure of task-orientation, which is internally focused, previous research suggested that it should be positively related to conscientiousness (Brinkman, Weinberg, & Ward, 2017; Ingledew, Markland, & Sheppard, 2004; Lewis & Sutton, 2011; Ingledew & Markland, 2008), and to extraversion (Brinkman et al., 2016; Courneya & Hellsten, 1998; Ingledew et al., 2004; Lewis & Sutton, 2011), and openness and agreeableness (Brinkman et al., 2016; Ingledew & Markland, 2008). There is also some research suggesting that task-orientation should be negatively related to neuroticism (Brinkman et al., 2016; Courneya & Hellsten, 1998; Ingledew et al., 2004; Ingledew & Markland, 2008; Lewis & Sutton, 2011). Although none of these studies used the GOEM,

<sup>1</sup> We use the term “FFM” when referring to measures of the FFM. Some authors prefer the term “Big Five” to distinguish the measures of the FFM from the model itself. We decided to use only one term to reduce the number of abbreviations in this article under the assumption that readers will be able to distinguish the model from its measurement.

they measured motives in ways that could be classified as internal (e.g., enjoyment).

In terms of our measure of ego-orientation, which is a measure of externally focused motives, previous research suggested that it should be positively related to extraversion (Courneya & Hellsten, 1998; Davis, Fox, Brewer, & Ratusny, 1995) and neuroticism (Courneya & Hellsten, 1998; Davis et al., 1995; Ingledew, Markland, & Sheppard, 2004; Ingledew & Markland, 2008), while being negatively related to conscientiousness and agreeableness (Brinkman et al., 2016; Ingledew et al., 2004; Ingledew & Markland, 2008) and to openness (Ingledew & Markland, 2008).

### Relationships between personality and well-being

There are extensive bodies of research on relationships between personality (defined in terms of the FFM and similar measures) and subjective well-being (SWB) and between personality and self-efficacy. A meta-analysis conducted by Steel, Schmidt, and Shultz (2008) found that SWB was negatively related to neuroticism and was positively related to agreeableness, extraversion, conscientiousness, and openness to experience. Steel et al. defined SWB in hedonic terms, e.g., life satisfaction in terms of the present study. In a meta-analysis reported by Judge, Erez, Bono, and Thoresen (2002) similar relationships were found between the FFM and the GSES. Neither of these reviews concerned eudaimonic definitions of well-being.

We included the LET as a measure more of eudaimonic well-being (EWB) than SWB. Nevertheless, when introducing the LET, Scheier et al. (2006), reported correlations between the FFM and the LET based on 7 samples (total  $N=1565$ ) that were similar to the correlations presented by Steel et al., and Judge et al., i.e., positive correlations with agreeableness, extraversion, conscientiousness, openness to experience, and emotional stability – the inverse of neuroticism. Similarly, Schmutte and Ryff (1997) found that extraversion and conscientiousness were positively correlated with self-acceptance, mastery, and life purpose, usually considered to be measures of EWB, whereas neuroticism was negatively correlated with these measures.

### Expectations for mediational analyses

Considered together, research on relationships between motives to exercise and the FFM has found that extraversion, conscientiousness, and openness are the factors that are the most reliably related to internalized motives to exercise. Although some studies have found relationships between motives and neuroticism and agreeableness, these relationships are not nearly as consistent as relationships with the other factors. Moreover, not all studies have evaluated relationships between motives and the FFM controlling for relationships between the factors as would be done in a multiple regression analyses for example. This means that findings that are not consistent across studies need to be considered cautiously. Given this, we expected to find relationships between

internalized motives and extraversion, conscientiousness, and openness. Moreover, all of the potential mediators we measured have been found to be related to all three of these factors, which is a necessary (but not sufficient) condition for mediation. We consider the conceptual bases for this mediation in the discussion section.

Our expectations for ego-oriented motives (externalized) were similar, but not identical, to our expectations for task-oriented motives. The most important difference is the role of neuroticism. Research has found that neuroticism is negatively related to well-being (no matter how it is defined) and self-efficacy and is positively related to externally focused motivation to exercise. This combination suggested that well-being would mediate relationships between neuroticism and ego-oriented motives.

There is also the issue of the potential overlap among the mediational relationships of the three well-being measures. The measures overlap in terms of their correlations with the factors of the FFM, which leaves open the possibility that if they mediate relationships between the FFM and motives to exercise this mediation might overlap. Given the absence of any relevant theory or research we examined this possibility without any clear expectations.

## Method

### Sample and method

Participants were residents of Poland who were recruited via the internet and running magazines. The calls for participants indicated that we were conducting a study on relationships between running and well-being. Individuals who responded to the calls answered a series of questionnaires using a secure web-site. Participants were not paid, but they were entered into a lottery for which the grand prize was an all-expense paid trip including fees for participating in a race of some kind. The study was approved by the IRB of the authors' home institution.

Initially, 278 people signed up for the study, but only 226 provided sufficient data to be included in the analyses. Of these 278 people, 268 indicated their gender, age, how many days they typically ran each week, and how long they had been running using the following scale: 1 = less than 3 months, 2 = 4–6 months, 3 = up to 1 year, 4 = 2–3 years, 5 = 4–5 years, 6 = 6–10 years, and 7 = more than 10 years. There were no significant differences between individuals who did and who did not complete all the measures in terms of gender ( $\chi^2(1)=2.41, p>.10$ ), age ( $t<1$ ), how often they ran ( $t<1$ ), and how long they had been running ( $t(266)=1.12, p>.25$ ). The final sample consisted of 105 women and 121 men who were an average of 34.2 years old ( $SD=8.05$ ), who reported running an average of 3.59 days per week ( $SD=1.05$ ), and who had been running an average of 2–3 years ( $M=4.30, SD=1.19$ ).

### Measures

Participants completed Polish language versions of the following measures: the BFI-44 (Strus, Ciecuch, & Rowiński, 2014), the SWLS (Jankowski, 2015), the GSES (Schwarzer, Jerusalem, & Juczynski, 2008), the LET

(Oleś & Jankowski, 2015), and the GOEM. The Polish language version of the GOEM was created by a team whose members were fluent in English and Polish and was translated and back-translated to maximize the similarity of the Polish version to the original English version. Also, items on the GOEM that referred to exercise were reworded to refer specifically to running. For example, the original item “I exercise to the best of my ability” was reworded to “I run to the best of my ability.”

Responses to the BFI-44 and the LET were made using a 5-point response scale with endpoints labeled 1 = definitely don’t agree and 5 = definitely agree. Responses to the SWLS and the GOEM were made using a 7-point response scale with endpoints labeled 1 = definitely don’t agree and 7 = definitely agree. Responses to the GSES were made using a 4-point response scale labeled 1 = no, 2 = rather not, 3 = rather yes, and 4 = yes. Copies of these measures are available on the Open Science Framework, <https://osf.io/hku4n/>.

## Results

### Descriptive statistics

Before conducting the primary analyses of the study, we examined the means, standard deviations, reliabilities, and correlations among the measures we collected. These summary statistics are presented in Table 1. As can be seen

from these statistics, all the scales had at least moderate reliability (.61 to .80), and most had substantial reliability (.81 and above), according to guidelines offered by Shrout (1998). Moreover, the means and standard deviations did not suggest that floor or ceiling effects or a lack of variability would influence the results of the analyses. The raw data for this study are available on the Open Science Framework, <https://osf.io/hku4n/>.

### Relationships between motivation and personality

The first set of analyses we conducted examined relationships between the GOEM and the BFI-44. These were regression analyses in which all five BFI-44 scores were entered initially as predictors of GOEM scores (separate analyses for task- and ego-orientation), and predictors were eliminated using a backward-stepping algorithm. The significance tests for the model and the coefficients for the initial and final models are shown in Table 2.

We conducted these analyses because we wanted to know the relationships between each of the individual factors of the FFM and the GOEM controlling for the correlations between the factors of the FFM. As can be seen from the correlations presented in Table 1, there were numerous significant correlations between the scores on the BFI-44, which called into question the uniqueness of the variance shared between a GOEM score and a single BFI-44 measure. Moreover, by using the results of these

**Table 1. Descriptive statistics and zero-order correlations for measures**

	<i>M</i>	<i>SD</i>	<i>α</i>	Ego	LET	SWLS	GSES	A	E	C	O	N
GOEM Task	4.79	.75	.84	.28**	.36**	.34**	.27**	.11*	.23**	.18**	.19**	-.17**
GOEM Ego	2.30	1.03	.86		.03	.13*	.15*	-.01	.14*	-.02	-.04	-.08
LET	4.00	.68	.81			.62**	.47**	.40**	.45**	.52**	.34**	-.45**
SWLS	4.52	1.12	.89				.42**	.31**	.42**	.43**	.26**	-.45**
GSES	3.11	.42	.90					.39**	.37**	.43**	.36**	-.54**
Agreeableness	3.73	.55	.76						.27**	.38**	.18**	-.49**
Extraversion	3.06	.72	.80							.23**	.24**	-.34**
Conscientiousness	3.79	.59	.85								.31**	-.37**
Openness	3.66	.56	.89									.18**
Neuroticism	2.65	.84	.78									

Coefficients accompanied by \*  $p < .05$ , \*\*  $p < .01$ .

**Table 2. Multiple regression analyses of BFI-44 scores on GOEM scores**

GOEM	Analysis	A	E	C	O	N	F	df
Task	Initial	-.03	.17*	.10	.11	.07	4.17**	5,225
	Final		.20**	.14*			8.71**	2,225
Ego	Initial	.07	.15*	-.04	-.07	-.09	1.48	5,225
	Final		.14*				4.17*	1,225

Column labels: A = Agreeableness, E = Extraversion, C = Conscientiousness, O = Openness, N = Neuroticism

Standardized coefficients accompanied by \*  $p < .05$ , \*\*  $p < .01$

**Table 3. Multiple regression analyses of BFI-44 scores on well-being scores**

Well-being	Model	A	E	C	O	N	F	df
SWLS	Initial	-.01	.26**	.23**	.07	-.26**	22.85**	5,225
	Final		.27**	.25*		-.26**	37.77**	3,225
LET	Initial	.11	.26**	.32**	.12*	-.17**	35.76**	5,225
	Final		.27**	.34**	.13*	-.21**	43.29**	4,225
GSES	Initial	.06	.15**	.19**	.19**	-.36**	33.11**	5,225
	Final		.15**	.20**	.19**	-.38**	41.10**	4,225

Column labels: A = Agreeableness, E = Extraversion, C = Conscientiousness, O = Openness, N = Neuroticism

Standardized coefficients accompanied by \*  $p < .05$ , \*\*  $p < .01$ .

analyses rather than the zero-order correlations presented in Table 1 as the basis for the mediational analyses presented below we reduced the number of analyses which reduced the chances of making a Type I error.

The results of these analyses were quite clear. Scores on the task-orientation scale of the GOEM, which measures internally focused motivation, were positively related to extraversion and conscientiousness, relationships that are consistent with previous research. Scores on the ego-orientation scale of the GOEM, which measures externally focused motivation, were positively related to extraversion, a finding that is also consistent with previous research. We did not find a relationship between ego-oriented motives and neuroticism or conscientiousness, an issue we consider in the discussion section.

#### Relationships between personality and well-being

The previous analyses established the fact that personality (the predictor or  $x$  variable) was related to motivation (the outcome or  $y$  variable). The next step in a mediational analysis is to determine if a mediator (the  $m$  variable or well-being in the present case) is related to the predictor ( $x$ , personality). We examined such relationships using a series of backward-stepping multiple regressions in which initially the five scores from the BFI-44 were regressed

onto our three potential mediators, SWLS, LET, and GSES. The significance tests for the model and the coefficients from the initial and final models are presented in Table 3.

The results of these analyses were straightforward. All three potential mediators were positively related to extraversion and conscientiousness and was negatively related to neuroticism. Openness was significantly related to LET and GSES. These results are largely consistent with previous research.

#### Mediational relationships

We examined mediation using techniques described by Hayes (2017). Given the relationships we found in the previous analyses, we examined the following combinations. For the relationships between task-orientation and extraversion and between task-orientation and conscientiousness, we examined if all three proposed mediators (SWLS, LET, and GSES) mediated relationships between the FFM and GOEM when considered separately and in combination when more than one was found to be a mediator. For the relationship between ego-orientation and extraversion, we examined if all three measures (SWLS, LET, and GSES) were mediators separately and in combination when more than one was found to be a mediator. The results of these analyses are presented in Table 4.

**Table 4. Summary of how well-being mediated relationships between personality and motives to exercise**

Outcome	Predictor	Mediator	Direct Effects		Indirect Effect
			$x$	$m$	(95% CI)
Task	Extraversion	SWLS	.12	.20	.13 (.06 – .22)
		LET	.10	.35	.15 (.08 – .25)
		GSES	.17*	.38	.08 (.02 – .16)
	Conscientiousness	SWLS	.06	.22	.18 (.09 – .29)
		LET	.00	.39	.24 (.12 – .38)
		GSES	.11	.41	.13 (.03 – .26)
Ego	Extraversion	SWLS	.14 <sup>b</sup>	.09 <sup>b</sup>	.06 (-.02 – .15)
		LET	.22*	-.06 <sup>b</sup>	-.02 (-.12 – .07)
		GSES	.13	.29 <sup>a</sup>	.06 (-.01 – .15)

Note. Column labels,  $x$  = predictor,  $m$  = mediator. All direct effects from mediators were significant at  $p < .001$ , except <sup>a</sup>  $p < .10$  and <sup>b</sup> ns. All direct effects from predictors were not significant at  $p > .10$ , except \*  $p < .05$ .

For the analyses of task-orientation and conscientiousness, the results were very clear. All three of our proposed mediators fully mediated the relationship between conscientiousness and task-orientation. In each case, when a measure of well-being and conscientiousness were regressed onto task-orientation, conscientiousness was not significant and the mediator was (direct effects). In addition, in each case the 95% confidence interval of the indirect effect for conscientiousness did not include 0. In a follow-up analysis in which all three of our proposed mediators were included simultaneously SWLS and LET remained mediators (i.e., significant direct effects and 95% confidence intervals for indirect effects of conscientiousness that did not include 0), whereas GSES, a measure of characteristic adaptation, did not (i.e., direct effect was not significant, 95% confidence interval for indirect effect included 0).

The results of the analyses of task-orientation and extraversion were also clear. SWLS and LET fully mediated the relationship between extraversion and task-orientation. In both cases, when a measure of well-being and extraversion were regressed onto task-orientation, extraversion was not significant and the mediator was (direct effects). In addition, in both cases, the 95% confidence interval of the indirect effect for extraversion did not include 0. In a follow-up analysis in which all SWLS and LET were included simultaneously as predictors, both remained mediators (i.e., significant direct effects and 95% confidence intervals for indirect effects of extraversion that did not include 0).

In isolation, GSES scores partially mediated relationships between extraversion and task-orientation. The direct effect for GSES was significant as was the direct effect for extraversion, and the 95% confidence interval for the indirect effect for extraversion did not include 0. In a follow-up analysis in which all three measures of well-being were included simultaneously as predictors SWLS and LET remained mediators (i.e., significant direct effects and 95% confidence intervals for indirect effects of extraversion that did not include 0), whereas GSES did not (i.e., direct effect was not significant, 95% confidence interval for indirect effect included 0).

For the analyses of ego-orientation, the only significant predictor from the multiple regression analyses was extraversion, and so we conducted a series of analyses similar to those described previously with ego-orientation as an outcome and extraversion as a predictor. These analyses found no clear support for SWLS and LET as a mediator of the relationship between ego-oriented motives and extraversion. There was some support for the mediating role of GSES. The direct effect of GSES on ego-oriented motives was marginally significant ( $p < .10$ ), and although the 95% confidence interval for the indirect effect of extraversion included 0, the lower bound for this interval was barely below 0 (-.0075).

## Discussion

As expected, we found that well-being mediated relationships between task-oriented motives to exercise

and extraversion and conscientiousness. This mediation occurred for a more hedonically focused measure of well-being (SWLS), for a more eudaimonically focused measure of well-being (LET), and for a measure of a characteristic adaptation (GSES). Mediation of the relationship between ego-oriented motives and extraversion was not as clear. Only one measure, the GSES, mediated this relationship, and the support for this mediational relationship was not as strong as it was for the other mediational relationships we found.

Regardless, the present results suggest that both hedonic and eudaimonic well-being are more proximal influences on task-focused motives to exercise as measured by the GOEM than basic personality dispositions are. These results suggest that in terms of motives to exercise, well-being subsumes extraversion and conscientiousness and that it is well-being that determines task-orientation. Such a possibility is consistent with how Petherick and Markland (2008) conceptualized task-orientation. Based upon Self Determination Theory (Ryan & Deci, 2000), they presented task-orientation as a manifestation of intrinsic and internalized motives. Within the framework of SDT this means that task-orientation should be positively related to well-being because well-being is positively related to the strength of internalized motives.

According to SDT, externalized motives tend to be negatively related to well-being unless they are internalized in some way (the organismic integration theory component of SDT). Nevertheless, the external motives that are typically considered in SDT studies are much broader in focus and scope than the ego-orientation scale of the GOEM. This means that our broad focused measures of well-being may not have overlapped with ego-orientation because of its narrow focus on social comparison as much as they did with the more relevant (in terms of well-being) focus of task-orientation. In support of this contention is the fact that the zero-order correlations (presented in Table 1) between well-being and task-orientation were stronger than the correlations between well-being and ego-orientation.

## Self-efficacy as a characteristic adaptation

Although ego-orientated motives as measured by the GOEM may not be as closely related to well-being as are task-oriented motives, we found that self-efficacy (and only self-efficacy) mediated the relationship between extraversion and ego-oriented motives. In contrast, when considered simultaneously with satisfaction with life and life engagement, self-efficacy did not mediate relations between task-orientation and extraversion and conscientiousness. This difference between the mediating roles of well-being and self-efficacy supports our contention that self-efficacy represents a somewhat different construct than well-being. McAdams and Pals (2006) discussed the importance of characteristic adaptations, constructs that are combinations of motives and cognitive orientations that are some type of middle level construct that exist between traits and behaviors.

In these terms, self-efficacy, with its focus on achieving goals and self-perceptions of mastery, is

qualitatively different from our measures of SWLS and LET were. In the present context, self-efficacy represents the type of combination that McAdams and Pals described. It directly measures self-evaluations of cognitively focused abilities (e.g., “I can always manage to solve difficult problems if I try hard enough) and other skills that refer to motivation and maintaining motivation (e.g., “It is easy for me to stick to my aims and accomplish my goals”). Moreover, self-efficacy is defined in part in terms of overcoming challenges to succeed. The fact that self-efficacy mediated relationships between extraversion and ego-orientation makes sense if the accomplishments of others are viewed as a challenge, which it appears ego-orientation considers them to be.

### Lack of relationships between ego-orientation and neuroticism and conscientiousness

Although relationships between the GOEM and the FFM were not the primary focus of our study, some of our results about these relationships merit discussion. In contrast to previous studies that have examined externally focused motivation (Brinkman et al., 2016; Courneya & Hellsten, 1998; Davis et al., 1995; Ingledew, Markland, & Sheppard, 2004; Ingledew & Markland, 2008), we did not find a significant positive relationship between ego-orientation and neuroticism nor a significant negative relationship between ego-orientation and conscientiousness. The failure to find significant relationships can occur due to a lack of statistical power. Although such a possibility cannot be completely ruled out for the present study, the present sample of 226 provided a power of .92 to detect a correlation of .2 or greater (G\*Power; Faul, Erdfelder, Lang, & Buchner, 2007).

The more likely reason for this difference is the difference between our measure of externally-focused motivation, ego-orientation, and the measures used in previous research. Ego-orientation refers to comparison processes regarding only performance, whereas other measures of external motivation have concerned appearance or external factors. These other measures typically focus on broader self-evaluative concerns that can be associated with public self-consciousness (Fenigstein, Scheier, & Buss, 1975), which is positively related to neuroticism (e.g., Trapnell & Campbell, 1999). Ego-orientation was not strongly related to well-being, perhaps because of the strong emphasis of ego-orientation on social comparison. Other measures of externally focused motives may include a broader domain of constructs, domains that are more likely to include the broad range of measures of well-being that have been found to be related to conscientiousness (e.g., Steel et al., 2008).

### Limitations and future directions

The generalizability of most studies is limited by the methods they use and the sample they study, and the present study is no exception to this. We studied recreational runners, and although we have no explicit reason to believe so, the results we found may not have occurred if we had studied individuals whose primary exercise was a team

sport such as football or an explicitly competitive sport such as tennis. Running is often a solitary exercise and team and competitive sports may be contexts in which individual differences in personality are manifested in different ways than they are among runners because of the interpersonal factors that are involved. We also measured motivation to exercise in a specific fashion. Other measures of this construct may have produced different results. Finally, we conceptualized personality in terms of the Five Factor Model. Well-being and self-efficacy may not have mediated relationships between motivation and other types of individual differences. The same can also be said of our measures of well-being and self-efficacy – different measures of these constructs may have produced different results.

The present study assumed a causal sequence from traits to well-being/self-efficacy to motivation. This causal sequence is similar to the sequence assumed in much previous research; however, the data we collected did not provide a basis for verifying it. Nevertheless, it may be difficult to think of a causal link from well-being and self-efficacy to personality because traits are meant to be relatively enduring across time. It may be easier to think that motives for exercising may influence well-being and self-efficacy (rather than the reverse) for people who are active sportsmen and sportswomen. Examining such causal sequences will require studies that have been explicitly designed to do this.

Despite these shortcomings, we believe the present results extend our understanding of the relationships among individual differences in personality, well-being, and motivation. Researchers have often assumed a direct relationship between personality traits and motivation, and although this may be the case, the present results suggest that there may be intervening constructs. Personality may manifest itself in people’s sense of their well-being and in their perceptions of self-efficacy, which in turn manifests itself in terms of motivation. Clearly, more research needs to be done to determine if, when, and why this is the case.

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