



**Get Active? A Meta-Analysis of Leisure-Time Physical Activity and Subjective Well-Being**

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## Get Active: A Meta-Analysis of Leisure-Time Physical Activity and Subjective Well-Being

### Abstract

National time use data shows that working adults typically spend their leisure time in passive activities (e.g., watching television), which may detrimentally impact worker well-being. While leisure time physical activity (LTPA) can be strenuous, it likely facilitates detachment from work demands, promotes a wide range of psychological needs, and instigates physiological mechanisms, which in turn can lead to higher worker well-being. In this paper, we conducted a systematic review to quantitatively synthesize the strength of effects between LTPA and subjective well-being (SWB; positive affect, negative affect, life satisfaction). We found that LTPA is associated with both positive affect ( $k = 7, n = 2,107, r = .21$ ) and life satisfaction ( $k = 7; n = 2,544; r = .12$ ), but not with negative affect ( $k = 6; n = 2,033; r = -.05$ ). Our results provide evidence for the importance of engaging in LTPA as a way of promoting SWB.

### Keywords

Leisure, Well-Being, Physical Activity, Meta-Analysis, Workers

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Increasingly, organizational psychologists are recognizing the importance of understanding the factors that contribute to workers' overall well-being (Ilies, Schwind, & Heller, 2007). While early research in organizational science primarily emphasized well-being specific to the job context (e.g., job satisfaction, job affect), more contemporary perspectives within organizational science have highlighted the centrality of the worker and his/her experiences apart from organizational goals and needs (Weiss & Rupp, 2011), which has led to a greater consideration of overall worker subjective well-being (SWB; Tay & Harter, 2013).

Employees with greater SWB, defined as positive affective and cognitive evaluations of one's life (Diener, 1984), are not simply happier, but also better employees. Employees with higher levels of well-being are more likely to get along with their fellow coworkers (De Neve, Diener, Tay, & Xuereb, 2013) and less likely to show up late or quit (Pelled & Xin, 1999). Further, an employee's well-being has been linked to increases in productivity, performance ratings, and profitability for the organization (De Neve et al., 2013; Lyubomirsky, King, & Diener, 2005). Altogether, this has led to a more recent interest among organizational psychologists in the nonwork domains (e.g., family, leisure) that contribute to overall SWB of workers (Erdogan, Bauer, Truxillo, & Mansfield, 2012).

Aside from family, which is perhaps the nonwork domain that has the largest impact on workers' well-being, there is a growing interest in the influence of leisure (Wilson & Baumann, 2015). Leisure is a crucial part of a balanced lifestyle and is often described as essential for well-being (e.g., Csikszentmihalyi & LeFevre, 1989; Sonnentag, 2001). Leisure activities are argued to promote SWB through a variety of psychological and physical mechanisms. For example, the DRAMMA model (Newman, Tay, & Diener, 2014) proposes that leisure activities improve SWB through allowing individuals to detach and relax from the stresses of everyday life as well

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3 as engage in activities that fulfill several psychological needs (autonomy, mastery, meaning,  
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5 affiliation). While there is evidence that engagement in various leisure activities is associated  
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7 with SWB, research on this relationship in working samples has been less conclusive, suggesting  
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9 a need for a more fine-grained approach focused on understanding how workers' SWB depends  
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11 on the extent to which they engage in specific types of leisure activities (Kuykendall, Tay, & Ng,  
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13 2015).  
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17 The present study examines the extent to which one important leisure activity – leisure  
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19 time physical activity (LTPA) – is related to SWB in workers. We focus specifically on LTPA  
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21 because there is uncertainty whether exerting physical resources will promote well-being in  
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23 workers. On one hand, physical activity is inherently resource intensive, demanding both  
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25 physiological and psychological resources. Conservation of Resource theory (Hobfoll, 1998)  
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27 suggests that individuals seek to conserve and protect their existing resources in order to  
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29 maintain their SWB. Recent research suggests that there may be such a thing as too much leisure  
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31 engagement (Schulz, Shulte, Raube, Disouky, & Kandler, 2017) and engaging in LTPA after a  
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33 long day at work may further drain worker resources – lowering SWB.  
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39 On the other hand, LTPA may help directly improve well-being as well as facilitating  
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41 recovery in workers. There is biological evidence that engaging in physical activity promotes  
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43 positive feelings and psychological states (e.g., Matthew & Paulose, 2011). Further, recovery  
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45 does not necessarily occur through stagnation and one must spend resources in order to recover  
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47 (Sonntag, 2001). Effort-recovery theory (Meijman & Mulder, 1998) suggests that leisure  
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49 activities that tap qualitatively different resources used on the job might facilitate resource  
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51 recovery. While, historically, work involved some physical labor (Brown, Bauman, & Owen,  
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53 2009), technological innovations have reduced the need for physical labor in the workforce  
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(Autor, Levy, & Murnane, 2003) leading to an increase in sedentary jobs (Church et al., 2011). If workers are no longer using physical resources on the job, the use of these resources in leisure may help facilitate recovery despite being effortful.

Given increasing concerns of worker's LTPA and questions of whether LTPA can promote SWB, it is critical to systematically evaluate prior research on this issue. Specifically, our goal is to conduct a meta-analysis on the relationships between LTPA and worker SWB. In doing so, we contribute by summarizing the average effect sizes between LTPA and the three components of SWB (positive affect, negative affect, and life satisfaction; Diener, 1984). This allows us to determine whether LTPA homogeneously helps all aspects of SWB, or if there is differential impact. Further, the quantification of the effect can enable us to determine its overall strength compared to other known meta-analytic effect sizes such as marital status and SWB (Haring-Hidore, Stock, Okun, & Witter, 1985).

### **LTPA and Subjective Well-Being**

In the following, we draw on effort-recovery theory (Meijman & Mulder, 1998), need fulfillment in leisure (Newman et al., 2013), and physical mechanisms to posit how LTPA may lead to positive SWB effects for workers.

**Effort-recovery theory and detachment.** According to the effort-recovery theory (Meijman & Mulder, 1998), work is an inherently demanding activity that involves sustained exertion. This exertion leads to fatigue and stress reactions, which, if not regularly alleviated, lead to fatigue and burnout, negatively affecting workers' well-being and satisfaction with their lives (Fritz & Sonnentag, 2005). One of the main ways workers can alleviate fatigue and stress reactions is by engaging in activities that facilitate psychological detachment (i.e., detachment

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3 from work-related thoughts; Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag & Geurts,  
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5 2009), which helps lower fatigue and protect workers from burnout and negative feelings.  
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8 Although psychologically detaching from the work environment can be difficult (Bakker,  
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10 Demerouti, Oerlemans, & Sonnentag, 2013; Sonnentag & Bayer, 2005), engaging in physical  
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12 activities during leisure may help workers take a cognitive respite from work stresses. Given the  
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14 growing proportion of sedentary jobs (Church et al., 2011), LTPA may facilitate psychological  
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16 detachment by requiring qualitatively different resources than what is required on the job.  
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18 Activities that require the same resources as work can impede recovery by drawing out or  
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20 triggering stressful states from work (Demerouti et al., 2009). In contrast, the qualitatively  
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22 different resources demanded by physical activity serve as a distraction from work demands;  
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24 thus providing a cognitive respite from work (Raglin & Morgan, 1985; Yeung, 1996).  
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29 Further, LTPA may help facilitate psychological detachment through engendering states  
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31 of flow (e.g., runner's high; Decloe, Kaczynski, & Havitz, 2009; Jackson & Eklund, 2002), a  
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33 state known to be associated with optimal positive feelings (Nakamura & Csikszentmihalyi,  
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35 2002). Flow occurs when individuals are psychologically and physically engaged in a  
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37 challenging activity, allowing them to completely disengage or detach from other aspects of life.  
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39 Activities that require physical exertion (e.g., exercising, playing sports) help facilitate states of  
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41 flow by requiring individuals to focus completely at the task at hand and have been shown to  
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43 produce flow states (e.g., Mannell, Kaczynski, & Aronson, 2005).  
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48 **Need fulfillment in leisure.** In addition to facilitating psychological detachment, LTPA  
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50 can influence both the affective components (positive and negative affect) and the cognitive (life  
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52 satisfaction) components of SWB through greater need fulfillment. According to the DRAMMA  
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54 model (Newman et al., 2013), apart from psychological detachment, the fulfillment of  
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psychological needs such as autonomy, mastery/competence, meaning, and affiliation are also important for enhancing SWB. In particular, LTPA also has great potential for fulfilling a need for mastery/competence when individuals progress in challenging activities (e.g., run a certain distance, develop an athletic ability). Given the increase in cognitive work demands, workers may not be able to fulfill these needs on the job with respect to the physical domain. Fulfilling this need for competence and restoring self-confidence has been shown to improve life satisfaction (Ryan & Deci, 2001).

**Physical mechanisms.** In addition to influencing SWB through psychological mechanisms, LTPA also engenders physiological reactions that improve well-being. According to the thermogenic hypothesis (Koltyn, 1997), physical activity may improve mood by simply increasing body temperature. Additionally, through a neurological lens, various forms of physical activity are known to increase norepinephrine, serotonin, and dopamine levels in the brain, which are all associated with feelings of happiness (Matthew & Paulose, 2011). Further, studies show that physical activities likely incite positive feelings (e.g., Kanning & Schlicht, 2010). As the need for physical labor decreases in the workplace, it will be important for workers to experience the positive effects of physical activity during their leisure time. Consequently, we believe that LTPA will engender positive affect and prevent negative affect in workers.

Further, frequent LTPA will also promote physical health, which is associated with greater life satisfaction. Sickness is often associated with lower well-being (Ryan & Deci, 2001) and improved physical health will help prevent chronic sickness by keeping diseases at bay (Fox, 1999). Indeed, those who engage in more LTPA are physically healthier (Vuillemin et al., 2005; Wendel-Vos, Schuit, Tijhuis, & Kromhout, 2004) and less likely to develop chronic diseases such as chronic heart disease (Leon, Connett, Jacobs, & Rauramaa, 1987). As the development

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of these diseases has detrimental consequences for life satisfaction (Rejeski & Mihalko, 2001) and LTPA encourages a healthy lifestyle (Veenhoven, 2008), we believe LTPA promotes a more satisfying life for workers.

### **Expectations**

Based on a review of these theories and mechanisms, past studies appear to also corroborate these ideas, although many of these studies have not specifically examined LTPA of workers. For example, women who engage in physical activity during their pregnancy are much less anxious and depressed than those who are not physically active (Costa, Rippen, Dritsa, & Ring, 2003). Furthermore, LTPA positively affects well-being over time. Participating in physical activity during adolescence has been shown to predict well-being over a decade later (Sacker & Cable, 2005). These effects also appear to be generalizable across cultures, as physical activity has been shown to improve well-being across 21 different countries (Steptoe et al., 1997). Given this, while COR theory suggests that physical activity may be strenuous, we postulate that a quantitative summary of the literature will demonstrate positive effects of LTPA on the different components of worker SWB.

### **Method**

#### **Search Strategies**

We conducted our search using six databases: PsycINFO, Business Source Premier, Hospitality and Tourism Complete, Hospitality and Tourism Index, MEDLINE and PsycARTICLES. We searched for articles containing the two categories of subject terms: 1) Leisure terms ("active leisure" OR recreation OR exercise OR "leisure time physical activit\*" OR "Non-work" OR "Nonwork") 2) well-being terms ("life satisfaction" OR "wellbeing" OR "well-being" OR emotion OR happiness OR "positive feelings" OR "negative feelings" OR



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3 affect). We additionally searched all text to target studies that focused on workers using the  
4 terms: worker\* OR worker\* or working. This search resulted in 913 articles published between  
5 1887 and September 2016. Additionally, we conducted an ancestral search (e.g., using the  
6 reference section of relevant articles) to supplement the initial search results. A total of 927  
7 articles were found using these methods.  
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### 14 **Inclusion and Exclusion Criteria**

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17 In order to be included in the meta-analysis, articles needed to meet several criteria. First,  
18 the studies needed to include a measure of both SWB and LTPA. In this study, we used Diener's  
19 (1999) tripartite conceptualization of SWB, which includes positive affect, negative affect, and  
20 life satisfaction. Specifically, we only included studies that measured context-general measures  
21 of these three components, as we were interested in assessing how LTPA influences overall  
22 SWB rather than domain-specific SWB. Additionally, measures of SWB were only included if  
23 they captured the entire construct space. Consequently, measures that solely assessed sub-  
24 dimensions (e.g., sadness, anxiety, joy, excitement) of SWB were excluded.  
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37 Studies also needed to include a measure of LTPA. LTPA was conceptualized as any  
38 physical activity (i.e., bodily movement that results in energy expenditure; Caspersen, Powell, &  
39 Christenson, 1985) during leisure, which can represent a variety of behaviors including outdoor  
40 physical activities (e.g., hiking), sports, recreation, as well as exercising (Sonnetag, 2001).  
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45 Additionally, we included all scales that measured participation in these activities. That is, both  
46 subjective (e.g., Likert-scales) and objective (e.g., time spent, number of exercise classes  
47 attended) measures were included. For example, the frequency of exercise could be reported in a  
48 subjective manner by indicating how often they exercise on a five point scale (1 = seldom; 5 =  
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very often) or on an objective scale by indicating the number of hours they participated in physical activities.

Second, the sample of the study needed to strictly be working adults. Hence, we excluded any studies that included minors, non-working adults, or retirees. Third, we excluded all studies that manipulated the variables of interest, as we were only concerned with the naturalistic relationship between LTPA and SWB. However, if baseline data were reported that included the correlation—or sufficient information for computing the correlation—between LTPA and SWB, then we could include those effects in the analyses. Fourth, we excluded studies that did not provide a Pearson's  $r$  or enough information to compute a Pearson's  $r$ . It should be noted that if the study measured both the variables of interest in working adults, but did not report the necessary effect sizes, we requested information on the effect size from the corresponding author. Lastly, we excluded any meta-analytic investigations, but these articles were included in the ancestral search we used to identify additional articles.

### Statistical Methods

All of the studies included in this analysis reported a Pearson's  $r$ . Additionally, we reasoned that it was inappropriate to correct effect sizes for unreliability. Although some LTPA measures reported reliability estimates, many did not as they were reports of frequency of participation (e.g., # of classes attended, # of times a week in LTPA). To ensure that the effect sizes were comparable, we also did not correct for unreliability in the SWB metrics (Lipsey & Wilson, 2001).

Meta-analytic effect sizes were calculated using the Hedges and Olkin's (1985) method. Specifically, the results reported in this paper are derived from the random effects models from the Comprehensive Meta-Analysis Software (Borenstein et al., 2005). We chose to use the

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random effects model as we believed that the true effect size between LTPA and SWB varied between each study (Borenstein, et al., 2005). That is, the observed effect sizes were influenced by not only sampling error, but also other sources of error.

Using the Hedges and Olkin's approach, the effect size of each study is weighted by the inverse of its variance. Because we are using a random effects model, the variance of each study is representative of both within- and between- studies variances. We report both 95% confidence and prediction intervals. The former represents the accuracy of the current results, whereas the latter represents the certainty in which results from a new study would fall. We also report two heterogeneity statistics:  $Q$  and  $I^2$ . A test of the  $Q$  statistic will reveal whether or not the true effect sizes vary substantially enough to warrant investigation into potential moderators. If a  $Q$ -test is significant, it is important to also look at the  $I^2$  statistic, which represents the proportion of the observed variance not due to random error. A higher  $I^2$  value suggests that the differences between studies are due to real differences.

### Results

After applying these criteria, 12 articles were included in the final analysis. Table 1 provides a summary of why these studies were rejected. Table 2 provides information on each of the studies included in the meta-analysis.

[INSERT TABLE 1 NEAR HERE]

[INSERT TABLE 2 NEAR HERE]

Using the aforementioned approach we generated three different effect sizes between the three components of SWB (positive affect, negative affect, life satisfaction) and LTPA. As noted in Table 3, LTPA was associated with higher levels of positive affect ( $r = .21$ , 95% CI [.17, .25]) and life satisfaction ( $r = .12$ , 95% CI [.07, .16]). As the confidence interval excluded zero, these

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3 can be interpreted as significant effects. The relationship between negative affect and LTPA ( $r =$   
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6  $-.05$ , 95% CI  $[-.14, .03]$ ), however, did include zero – suggesting negative affect and LTPA may  
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8 not influence one another. It is important to note, however, that the  $Q$  statistic is significant and  
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10 that non-random variance accounted for over 60% of the total variance. This suggests that there  
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12 are potential moderators between negative affect and LTPA. Unfortunately, with such a small  $K$   
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14 (number of effect sizes), we were unable to examine moderators.  
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### 20 Discussion

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22 There is a growing interest in enhancing worker SWB apart from enhancing their work  
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24 experiences due to a change in organizational perspectives on workers and a growing number of  
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26 studies showing the salutary effects of worker SWB. One critical aspect to consider when  
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28 seeking to enhance worker SWB is the leisure domain and whether physically active choices are  
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30 associated with greater SWB. On one hand, LTPA may be strenuous and burdening, leading to  
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32 lower SWB. On the other hand, effort-recovery, need-fulfillment, and physical mechanisms  
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34 suggest that LTPA would lead to higher SWB. In order to determine the overall effect, we  
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36 systematically reviewed and quantified the relationship between LTPA and different components  
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38 of worker SWB. In line with expectations, engaging in more physical activity during leisure time  
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40 was significantly associated with two components of worker SWB (positive affect, life  
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42 satisfaction). This corroborates past findings where physical activity and SWB have been  
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44 positively linked in other contexts (Fox, 1999; Netz, et al., 2005; Penedo & Dahn, 2005).  
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46 However, our meta-analytic results also revealed that the inverse relation between LTPA and  
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48 negative affect was not significant.  
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**Comparison with other correlates of SWB.** Other meta-analyses have sought to demonstrate the importance of leisure to SWB. In a recent meta-analysis, Kuykendall et al., (2015) investigated the relationship between leisure engagement (irrespective of the type of leisure activity) and SWB across many samples. For worker samples, the authors found that leisure did not predict SWB ( $r = .08$ ). However, the authors noted that general leisure engagement may not be associated with worker SWB because measures of general leisure engagement include activities that likely have limited benefits for SWB, and recommended that future research examine the effects of specific types of leisure that may benefit SWB. We addressed this need by focusing specifically on leisure time physical activity, and—in contrast to the findings on general leisure engagement—we found that LTPA influences worker SWB. These findings suggest that the relationship between specific leisure activities and SWB may differ between populations.

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Regarding the magnitude of the association between LTPA and SWB, the effects we found, while somewhat small, are comparable to other important correlates of SWB. For instance, the relationship between LTPA and aspects of SWB (i.e., life satisfaction and positive affect) is comparable to that of marital status ( $r = .14$ ; Haring-Hidore, et al., 1985), work status ( $r = .18$ ; Haring, Okun, & Stock, 1984), education ( $r = .14$ ; Witter, Okun, & Haring, 1984), and Big Five personality traits ( $r = -.22-.21$ ; DeNeve & Cooper, 1998). Consequently, we believe that our results significantly contribute the literature on correlates of SWB.

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Considering the magnitude of the associations of each component of SWB, it is interesting to note there was a stronger relationship between LTPA and positive affect than for life satisfaction and LTPA. It could be that LTPA has a more immediate and visceral effect on SWB as physical activity is more closely linked to the physiological processes known to promote

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3 positive affect than the cognitive evaluations associated with life satisfaction. Yet, this was not  
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5 the case with respect to negative affect.  
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8       **The case of negative affect.** Our results also indicated that LTPA might not be  
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10 associated with negative affect. Given that need fulfillment is one of the key mechanisms likely  
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12 linking LTPA with SWB, the lack of an association with negative affect may be partially  
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14 attributable to differential effect of need fulfillment on positive affect and negative affect.  
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16 Specifically, prior research has shown that the fulfillment of needs such as autonomy and  
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18 mastery—needs which are likely provided by LTPA (Newman et al., 2013)—are more strongly  
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20 associated with positive affect than with negative affect (Tay & Diener, 2011). To the extent that  
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22 LTPA influences affective well-being by fulfilling needs such as mastery and autonomy, it is  
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24 reasonable to expect that the effects would be stronger for positive affect than negative affect.  
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29       Further, another reason LTPA may not be associated with negative affect may be because  
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31 LTPA may function primarily to protect or mitigate negative affect in the face of excessive work  
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33 demands rather than to directly decrease negative affect. If LTPA influences negative affect  
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35 primarily by protecting negative affect in the face of excessive work demands, main effects on  
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37 negative affect may not emerge.  
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41       **Practical implications.** Practically, we believe that engaging in physical activity during  
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43 leisure is a strategic goal for workers looking to improve well-being. In contrast to the work  
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45 environment, individuals have more autonomy in how they spend their leisure time and,  
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47 consequently, can choose to pursue well-being enriching leisure activities (Diener, Suh, Lucas, &  
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49 Smith, 1999). Our results suggest that workers looking to improve well-being may be happier if  
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51 they chose to spend their leisure time engaged in physical activity. However, according to a  
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53 nationally-representative time use study, U.S. workers spend less than 10% of their free time  
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engaged in physical activities (e.g., playing sports, exercising; The Bureau of Labor Statistics, 2015). Hence, there is great potential for workers to incorporate our results into their everyday lives. While no studies to our knowledge have examined the effects of changes in workers' leisure time physical activity in changes in their SWB, such studies would be an important next step in establishing the importance of LTPA for workers' SWB.

**Study limitations.** When interpreting the results, it is important to consider some limitations. First, our results are based upon a relatively low  $K$ . The importance of leisure time in the organizational setting is a recent development and the research on the subject is just beginning. Out of the 13 studies included in our meta-analysis, only one was published before 1990, with the majority taking place in the last decade. Additionally, we rejected several studies that did not provide enough information about the LTPA variable. That is, we were unable to determine when the physical activity took place and whether it was voluntary.

A consequence the small  $K$  was that we were unable to test any moderating variables. This is especially critical regarding negative affect. Our results suggest that, although we did not find a direct effect, the relationship between negative affect and LTPA could be moderated by a third variable. Although our aforementioned explanation highlighted why LTPA might not influence negative affect, it is also possible that there are potential moderating variables. For example, we collapsed across all different forms (e.g., subjective/objective) of LTPA. Hence, it is possible that only certain physical activities are associated with negative affect. Courneya and McAuley (1996) found a strong relationship between negative affect and the number of exercise classes attended, whereas Jiang et al. (2011) did not find this relationship when operationalizing LTPA as a composite of activities (swimming, playing, climbing). Additional research on this topic will help to illuminate when negative affect is associated with LTPA and when it is not.

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3 Although we found an association between LTPA and worker well-being, we did not  
4 provide enough evidence to assert a causal relationship as we only included correlational studies.  
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6 Experimental work on this topic is sorely needed. Contemporary organizations have already seen  
7 the value in encouraging high-quality leisure time—with many companies such as IBM, Netflix,  
8 and Volkswagen instituting policies that promote disconnecting from work during non-work  
9 hours (Friedman, 2014). Further, organizations are implementing interventions designed to  
10 encourage certain types of behavior during leisure (Malik, Blake, & Suggs, 2013). Without  
11 experimental evidence demonstrating a causal relationship, we presently cannot state that these  
12 interventions will improve worker well-being. Given that workers may feel pressured to  
13 participate in these programs as there are often monetary benefits (e.g., reductions in insurance  
14 cost), there is a pressing need for future experimental research.  
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29 There is also a pressing need for longitudinal research on this topic. It is important to  
30 acknowledge that without longitudinal studies we are unable to assess the causal direction of the  
31 relationship between LTPA and SWB. There is reason to believe that the relationship is likely bi-  
32 directional, as prior studies have proposed that physical activity both influences (Netz et al.,  
33 2005)—and is influenced by (Fredrickson, 1998)—well-being. Future studies examining how  
34 changes in LTPA improve workers' well-being would help further establish the importance of  
35 LTPA for enhancing worker well-being. Further, we were unable to address how this  
36 relationship may change overtime. It could be that some of the effects of consistent LTPA on  
37 SWB may take time to emerge. For example, while meeting immediate/daily goals may have a  
38 strong effect on positive affect, reaching distal challenging goals associated with LTPA may  
39 produce strong effects for life satisfaction. Therefore, we believe that there should be more  
40 research on the longitudinal dynamics between leisure and SWB.  
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**Future research.** We believe that engaging in physical activities during leisure time effectively fosters recovery and well-being. However, physical activity is not the only way employees may choose to spend their leisure. Employees can choose to spend their time in more passive (e.g., watching tv, reading a book) or social (e.g., going out with friends) activities, which have been associated with SWB. However, in order to make clearer recommendations concerning which leisure activity an employee should engage in, it is crucial that future research investigates the differential effects of leisure activities on worker SWB.

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Additionally, future research is needed to fully understand the relationship between LTPA and negative affect. In this discussion, we provided two perspectives on our results of this relationship: 1) The true relationship may be weak and 2) There may be moderating variables. Despite our rationale, only more empirical evidence can provide clarity on the true relationship between LTPA and negative affect in workers.

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Further, we suggested several mechanisms through which LTPA influences SWB and future research should seek to test these assumptions. For example, we suggested that LTPA influences SWB through feelings of mastery/competence, yet this information is often not reported. As the specific goals/challenges that individuals set for themselves are idiosyncratic, assessing how satisfied workers feel with their leisure activity may serve as a proxy for this mechanism. Leisure satisfaction is an important mediating mechanism between leisure engagement and SWB (Kuykendall et al., 2015), but this relationship has only been demonstrated irrespective of the specific leisure activity. Future research should focus on illuminating why LTPA influences SWB by directly testing for mediating mechanisms.

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**Conclusion.** Today, workers are more interconnected than ever work stresses during non-work hours and are spending less time engaging in leisure activities (Sonnentag, 2012). If

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3 workers are disconnecting from work less often, it is crucial to understand what activities are  
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5 most effective in facilitating recovery. The absence of leisure time can have detrimental  
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7 consequences for a worker's well-being (de Jonge, et al., 2000; Schaufeli, et al., 2008). As noted  
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9 in this study, our results suggest that physical activity may be an effective way to spend one's  
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11 leisure time as it was associated with well-being.  
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Table 1. Summary of exclusion from current meta-analysis

Category	Definition	% Rejected
No Effect Sizes	Manuscript was purely qualitative	39%
No SWB Variable	Did not measure any SWB variables	17%
No LTPA Variable	Did not measure any LTPA variables	17%
Not Working Professionals	Study did not investigate working professionals	14%
Manipulated SWB/LTPA	The study manipulated either SWB or LTPA	1%
No Valid Effect Sizes	The study measured SWB and LTPA, but did not contain the needed effect sizes	10%
Meta-Analysis	Manuscript was a meta-analysis	2%

Note. SWB = Subjective Well-Being; LTPA = Leisure-Time Physical Activity

Table 2.  
Studies Included in Meta-Analysis

Authors (year)	<i>N</i>	<i>r</i>	Subjective Well-Being	Leisure-Time Physical Activity
Goldstein et al. (1995)	179	-.13	Negative Affectivity (NA)	Exercise Participation
Goldstein et al. (1995)	179	-.13	Life Dissatisfaction (LS)	Exercise Participation
Richison (1986)	171	.11	Life Satisfaction (LS)	Sports and Fitness Activities
Richison (1986)	171	.01	Life Satisfaction (LS)	Seasonal Outdoors Activities
Courneya & McAuley (1996)	105	.36	Positive Affect (PA)	# of exercise classes attended
Courneya & McAuley (1996)	105	-.31	Negative Affect (NA)	# of exercise classes attended
LeGro (2005)	119	.28	Life Satisfaction (LS)	Questionnaire on exercise frequency
Selkirk (2008)	116	.10	Satisfaction with Life (LS)	Regularity of Exercise
Moradi et al. (2014)	110	.08	Positive Affect (PA)	Exercise Frequency
Moradi et al. (2014)	110	.01	Negative Affect (NA)	Exercise Frequency
Moradi et al. (2014)	110	.15	Life Satisfaction (LS)	Exercise Frequency
Moradi et al. (2014)	110	-.03	Positive Affect (PA)	Exercise Intensity
Moradi et al. (2014)	110	-.01	Negative Affect (NA)	Exercise Intensity
Moradi et al. (2014)	110	.06	Life Satisfaction (LS)	Exercise Intensity
Gauvin et al. (1996)	86	.16	Positive Affect (PA)	Frequency of acute physical activity
Gauvin et al. (1996)	86	.07	Negative Affect (NA)	Frequency of acute physical activity
Vanhala & Tuomi (2003)	1389	.07	General Satisfaction (LS)	Exercise during leisure time
Kelsey et al. (2006)	1093	.22	Positive Affect (PA)	Frequency of Exercise Activities
Kelsey et al. (2006)	1093	.04	Negative Affect (NA)	Frequency of Exercise Activities
van Hooff et al. (2011)	133	.05	Pleasure at Work (PA)	Active Leisure
van Hooff et al. (2011)	133	.24	Pleasure at Home (PA)	Active Leisure
Nägel et al. (2003)	120	.30	PA after Work (PA)	Exercise
Nägel et al. (2003)	120	.20	PA at Bed (PA)	Exercise
Jiang et al. (2011)	460	.21	Positive Affect (PA)	Physical Recreation Activities
Jiang et al. (2011)	460	.04	Negative Affect (NA)	Physical Recreation Activities
Jiang et al. (2011)	460	.16	Life Satisfaction (LS)	Physical Recreation Activities

Note. PA = Positive Affect; NA = Negative Affect; LS = Life Satisfaction

## GET ACTIVE?

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Table 3.  
*Meta-Analytic results between SWB and LTPA*

	Sample		Mean Effect Size				Heterogeneity		
			95% CI		95% PI		<i>Q</i>	<i>I<sup>2</sup></i>	
	<i>K</i>	<i>N</i>	<i>r</i>	LL	UL	LL	UL		
Positive Affect	7	2107	.21	.17	.25	.05	.36	7.66	21.67
Negative Affect	6	2033	-.05	-.14	.03	-.31	.21	13.57*	63.15
Life Satisfaction	7	2544	.12	.07	.16	.00	.23	7.54	20.45

*Note.* *r* = Sample Weighted Mean Correlation; *K* = Number of effect sizes; *N* = Total Number of Participants; LL = Lower Limit; UL = Upper Limit; CI = Confidence Interval; PI = Prediction Interval.

\*  $p < .05$