심리학석사 학위논문

# Why Do Happier Individuals Exercise More?: The Role of Beliefs on Physical and Non-Physical Benefits

## 행복할 수록 더 많이 운동하는 이유: 운동의 물리적−비물리적 이득에 대한 믿음의 매개효과

**2023년 8월**

서울대학교 대학원
심리학과 사회심리 전공
정 수 민

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이 논문을 심리학석사 학위논문으로 제출함

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# Abstract

# Why Do Happier Individuals Exercise More?: The Role of Beliefs on Physical and Non-Physical Benefits

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Despite ample evidence linking higher subjective well-being (SWB) to increased engagement in exercise, the underlying mechanisms remain unexplored. To fill this research gap, we conducted four experiential studies (total $N$ = 1125) in South Korea, the United States, and the United Kingdom. Our hypothesis posited that happier individuals have stronger beliefs about exercise benefits. To test this idea, Study 1 developed a scale to measure exercise benefit beliefs, distinguishing between physical and non-physical factors. Study 2 validated the scale and further explored whether those beliefs mediate the relationship between happiness and exercise behaviors. Non-physical benefit beliefs showed a significant full mediating effect, whereas the mediating effect of physical benefits was not significant. To further examine the differential effects between these belief factors and happiness, Study 3 presented challenging scenarios and assess participants' perceptions of exercise effectiveness, providing a more realistic context. Finally, In Study 4, participants wrote persuasive letters to encourage others to exercise, and

their natural language was analyzed to replicate the results. This paper contributes to the theoretical and practical understanding of happiness and exercise research.

**Keywords:** happiness, subjective well-being, exercise, exercise benefit belief

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# Introduction

Physical activity is crucial for overall well-being, encompassing not only physical but also mental, social, and cognitive aspects (Blumenthal et al., 1982; Cooney et al., 2013; Daley, 2008; Heinzelman & Bagley, 1970; Hillman et al., 2008; Marconcin et al., 2022; Scully et al., 1998; Sechrist et al., 1987; Stanton & Reaburn, 2014; Stathopoulou et al., 2006; Teychenne et al., 2020). However, a considerable portion of adults (23%) and adolescents (81%) worldwide fail to meet the physical activity recommendations by the World Health Organization (WHO) (Guthold et al., 2018; WHO, 2021; Wilke et al., 2022). Despite its well-known benefits, why do some individuals choose to exercise while others avoid it?

To address this, this paper explores insights from happy individuals who exercise more than those who are unhappy. Chronic happiness is an individual difference linked to higher exercise engagement (Catellier & Yang, 2013; Cunningham, 1988; Diener et al., 2018; Frey & Gullo, 2021; Kim et al., 2015; Kim et al., 2017; Kushlev et al., 2020; Lyubomirsky et al., 2005; Sabatini, 2014; Steptoe, 2019). However, the underlying reasons for this connection remain unexplored. This study fills this gap by investigating exercise benefit beliefs among happier individuals.

The four empirical studies propose a link between happiness, stronger exercise benefit beliefs, and increased exercise engagement. This paper also explores the varying impacts of exercise benefit belief factors. We hope that the understanding of these relationships contributes to enhancing exercise participation.

## Happy Individuals Exercise More

This paper adopts the term "happiness" to refer to subjective well-being (SWB), which encompasses individuals' cognitive and emotional well-being (Diener, 1984). Happier individuals are more inclined to engage in health-promoting activities, including regular exercise (Diener et al., 2018; Kim et al., 2017; Lyubomirsky et al., 2005). Recent research with large samples of nearly 1.5 million respondents from 166 nations (Diener et al., 2018) and 2.5 million Americans (Kushlev et al., 2020) suggests that happier individuals tend to participate in regular exercise, even after controlling for demographic and health-related variables. Longitudinal research also has indicated that chronic happiness predicts future sports participation (Frey & Gullo, 2021). Experimental studies further support the causal relationship between happiness and exercise behaviors. For example, induced happiness increases interest in sporting events (Cunningham, 1988), whereas increased negative affect decreases exercise intention (Catellier & Yang, 2013).

However, the underlying factors driving this association remain unexplored. Exercise affects happiness through improvements in perceived health (Lera-López et al., 2017), self-confidence, self-image (Fontane, 1996), satisfaction with psychological needs for social support (Newman et al., 2014), and the release of endorphins (Thorén et al., 1990). Nonetheless, the reverse causality needs further investigation. To address this gap, our study aims to explore individuals' lay beliefs about exercise benefits and compare them between individuals with higher and lower levels of happiness. Consequently, we aim to identify factors that contribute to their engagement in frequent exercise.

## How Do Happy Individuals Form Their Exercise Benefit Beliefs?

Lay beliefs are informal beliefs that individuals hold about the objects and phenomena around them (Furnham, 1988). These beliefs influence behaviors (Stamps & Krishnan, 2014), particularly in health and wellness (Ehrlinger et al., 2017; Hughner & Kleine, 2004; Orvidas et al., 2018). When it comes to exercise, beliefs about its benefits play a vital role in motivating individuals to engage in physical activity (Gallagher & Updegraff, 2012; Gray & Harrington, 2011).

Building on previous research, we would propose that happy individuals hold stronger exercise benefit beliefs for several reasons. Firstly, their cognitive processing styles differ, with a positive interpretation of circumstances (Fredrickson, 2000; Lyubomirsky, 2001; Myers & Diener, 1995; Taylor & Brown, 1988) and enhanced receptiveness to external stimuli (Scoffham & Barnes, 2011). These tendencies might lead them to recognize and believe in exercise benefits more.

Secondly, happy individuals utilize exercise as a happiness-increasing strategy, suggesting that they recognize its benefits extend beyond the physical aspects (Tkach & Lyubomirsky, 2006). This broader perspective may contribute to their stronger beliefs in exercise benefits. By exploring the exercise benefit beliefs in happy individuals, we aim to provide valuable insights into how chronic happiness relates to exercise-related beliefs.

## Exercise Benefit Beliefs Include Physical and Non-Physical Domains

To gain a comprehensive understanding, our paper proposes a novel approach that categorizes exercise benefit beliefs into physical and non-physical domains. While this explicit separation is not common in previous literature, some scales and studies hint at this conceptual distinction. Existing scales like the Exercise Benefits/Barrier Scale (EBBS; Sechrist et al., 1987) and Multidimensional Outcome Expectations for Exercise Scale (MOEE; Wójcicki, 2009) already touch on both non-physical (namely, psychological outlook, life enhancement, and social interaction; self-evaluative and social factors) and physical factors (namely, physical performance and preventive health; physical factor).

Empirical evidence also supports the differentiation between these two factors. For example, inactive individuals show less agreement with non-physical benefits like social aspects of exercise ($M$ = 2.5 out of 4), compared to physical benefits ($M$ = 3.25 out of 4) (Lovell et al., 2010). On the other hand, emphasizing non-physical benefits like mental and social benefits has proven more effective in enhancing exercise intention compared to solely focusing on physical benefits (Hevel et al., 2019; Reese et al., 2017; Williamson et al., 2020).

Based on this existing literature, our paper introduces a hierarchical factor model to delve into the multidimensional beliefs about exercise benefits. By explicitly examining these dimensions separately, we seek to uncover unique perspectives held by happy individuals. This approach will contribute to a deeper understanding of the complex relationship between chronic happiness and exercise beliefs.

## Overview of the Paper

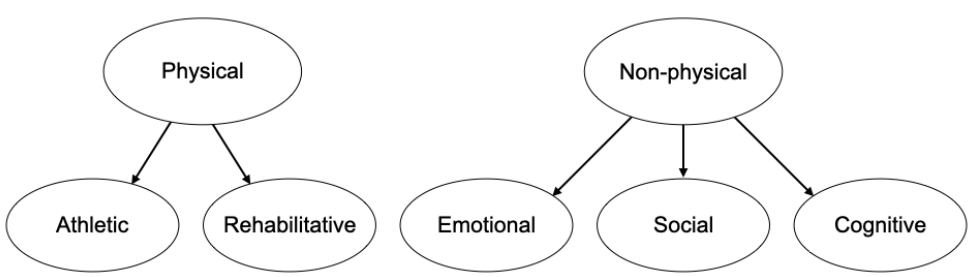
This paper aims to reveal the mediating role of exercise benefit beliefs on the relationship between happiness and exercise behaviors. Four experiential studies were conducted: Studies 1 and 2 developed and validated a measurement for exercise benefit beliefs based on a hierarchical factor model that differentiates physical and non-physical dimensions. Study 2 further explored their mediating role between happiness and exercise behaviors. Studies 3 and 4 tested the differential influences of benefit factors in natural settings using scenario-based and letter-writing tasks, respectively.

# Study 1: Scale Development

In Studies 1 and 2, we developed a hierarchical factor model to measure lay beliefs about exercise benefits (Figure 1). The model includes physical and non-physical factors at the first level, and five sub-factors at the second level: rehabilitative and athletic benefits (physical) and emotional, social, and cognitive benefits (non-physical).

**Figure 1.**

*Conceptual Hierarchical Factor Model for Lay Beliefs about Exercise Benefits*



Study 1 aimed to provide initial evidence for measuring the second level of this model. To construct a preliminary questionnaire, we reviewed existing scales (e.g., perceived benefits from EBBS; outcome expectations from MOEE) and incorporated novel findings from recent research not covered in previous scales. Notably, we included cognitive benefits, such as improved attention (Spitzer & Hollmann, 2013), and academic achievement (Liu et al., 2015), as well as enhanced happiness (Zhang & Chen, 2019), prosocial behaviors (Spitzer & Hollmann, 2013), and close others' exercise habits (Darlow & Xu, 2011). After selecting 100 items based on our hypothesis, we conducted Study 1.

## Participants

An online survey was conducted by Macromill Embrain, a specialized company in online research in South Korea. The survey targeted only those over the age of 19 and data was anonymized by the company before being provided to the authors. We requested and obtained a sample of 320 adults who passed the attention check, with an even distribution across sex and age groups. Table 1 shows participant demographic data.

All studies reported here were approved by the Institutional Review Board (IRB) of Seoul National University (IRB No. 2202/001-008). Prior to the study, every participant provided written informed consent.

**Table 1**

*Participant Demographics in Studies 1 to 4*

| Variable | Study 1 | Study 2 | Study 3 | Study 4 |
|---|---|---|---|---|
| Collected *N* | 320 | 291 | 386 | 126 |
| Sampled *N* | 320 | 275 | 369 | 123 |
| Data Collection Source (Target Residence) | Embrain (South Korea) | MTurk (The U.S.) | MTurk (The U.S.) | Prolific (The U.K.) |
| Language | Korean | English | English | English |
| Age *M* (*SD*) | 39.45 (10.76) | 41.76 (12.41) | 42.24 (12.94) | 41.91 (13.71) |
| Sex (female %) | 50 | 47.64 | 50.41 | 69.84 |
| Ethnicity (%) | | | | |
| White | 0 | 77.09 | 75.07 | 84.92 |
| African American | 0 | 8.72 | 12.20 | 3.97 |
| American Indian or Alaska Native | 0 | 0.36 | 0.27 | 0 |
| Asian or Asian American | 100 | 6.18 | 6.23 | 6.35 |
| Native Hawaiian or Pacific Islander | 0 | 0 | 0.54 | 0 |
| Hispanic or Latino | 0 | 5.45 | 4.33 | 0 |
| Other | 0 | 2.18 | 1.36 | 4.76 |

*Note*. Descriptive statistics for demographic variables here were calculated based on the complete sample (Collected data).

## Procedure and Materials

First, participants rated their agreement with 100 exercise benefits on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*). After eliminating redundant items (e.g., “It helps me to have contact with friends” and “It helps me to meet people”), items with poor content (e.g., “Mental health improved”, “Disposition improved”), and items with low or ambiguous factor loadings, a final set of 25 items (five per factor) was selected.

Next, life satisfaction (SWLS) was measured using a single item "In most ways, my life is close to my ideal" from Diener et al. (1985) on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*). Affective well-being was assessed using the 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; αs = .90 and .89 for positive and negative affect, respectively) on a 5-point scale (1 = *Not at all*, 5 = *Extremely*).

## Analytic Strategy

Two statistical analyses were conducted. First, exploratory factor analysis with oblimin rotation was performed to support our suggested factor model for lay beliefs about exercise benefits. The statistical fit was assessed using a root mean square error of approximation (RMSEA; Steiger & Lind, 1980) and its 90% confidence interval (90% CI). Second, correlational analyses were employed to examine the relationship between exercise beliefs and subjective well-being measures, including life satisfaction, positive affect, and negative affect.

## Results

### *Exploratory Factor Analysis*

As expected, an exploratory factor analysis revealed five distinct factors for lay beliefs about exercise benefits (RMSEA = .04, 90%CI = [0.03, 0.05]), indicating that the model had a good fit (Browne & Cudeck, 1992). Descriptive statistics for the final 25 items, including mean, standard deviation, and factor loadings are presented in Appendix 1. The factors included cognitive ($M$ = 4.45, $SD$ = .99, $\alpha$ = .90), emotional ($M$ = 5.27, $SD$ = .91, $\alpha$ = .90), social ($M$ = 5.23, $SD$ = .89, $\alpha$ = .85), rehabilitative ($M$ = 5.24, $SD$ = .84, $\alpha$ = .81), and athletic benefits ($M$ = 5.80, $SD$ = .76, $\alpha$ = .85).

## *Correlational Analyses*

Table 2 displays the correlations between exercise benefit beliefs and subjective well-being. As expected, life satisfaction had significantly positive correlations with cognitive ($r$ = .35, $p$ < .001), emotional ($r$ = .34, $p$ < .001), social ($r$ = .27, $p$ < .001), and rehabilitative ($r$ = .23, $p$ < .001) factors. However, there was no significant correlation between life satisfaction and the athletic factor ($r$ = .09, $p$ = .12). Positive affect had significant positive correlations with cognitive ($r$ = .50, $p$ < .001), emotional ($r$ = .47, $p$ < .001), social ($r$ = .30, $p$ < .001), rehabilitative ($r$ = .27, $p$ < .001), and athletic ($r$ = .17, $p$ = .002) factors. On the other hand, negative affect exhibited significant negative correlations with cognitive ($r$ = –.12, $p$ = .03), emotional ($r$ = –.15, $p$ = .008), social ($r$ = –.15, $p$ = .006), and rehabilitative ($r$ = –.11, $p$ = .055) factors, whereas there was no significant correlation between negative affect and the athletic factor ($r$ = –.03, $p$ = .56).

**Table 2.**

*Correlations and Descriptive Statistics of Exercise Benefit Beliefs Factors and Subjective Well-being Factors*

| | | *M* (*SD*) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Cognitive Benefit | 4.45 (0.99) | – | .64*** | .53*** | .57*** | .35*** | .35*** | .50*** | –.12* |
| 2 | Emotional Benefit | 5.27 (0.91) | | – | .57*** | .62*** | .52*** | .34*** | .47*** | –.15** |
| 3 | Social Benefit | 5.23 (0.89) | | | – | .50*** | .52*** | .27*** | .30*** | –.15** |
| 4 | Rehabilitative Benefit | 5.24 (0.84) | | | | – | .61*** | .23*** | .27*** | –.11 |
| 5 | Athletic Benefit | 5.80 (0.76) | | | | | – | .09 | .17** | –.03 |
| 6 | Life Satisfaction | 4.07 (1.43) | | | | | | – | .66*** | –.39*** |
| 7 | Positive Affect | 3.23 (0.69) | | | | | | | – | –.38*** |
| 8 | Negative Affect | 2.59 (0.79) | | | | | | | | – |

*Note*. *M* = mean. *SD* = standard deviation. Each factor score was determined by computing the average of corresponding items. ***$p$ <.001; **$p$ < .01; *$p$ < .05.

## Discussion

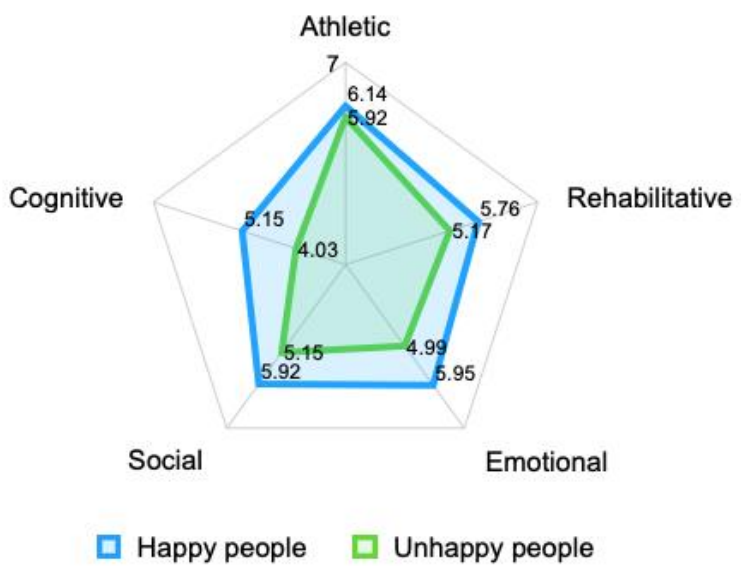
Study 1 developed a 25-item scale to assess exercise benefit beliefs through exploratory factor analysis. Participants showed higher agreement with athletic benefits (*M* = 5.80) and lower agreement with cognitive benefits (*M* = 4.45), which aligned with previous research indicating that individuals perceive physical benefits most strongly (Lovell et al., 2010).

Moreover, as we anticipated, our findings revealed positive correlations between exercise benefit beliefs and subjective well-being, while negative affect

showed negative correlations. Interestingly, happier individuals demonstrated a stronger belief in exercise benefits, whereas we did not observe a significant correlation between the athletic factor and life satisfaction/negative affect (see Figure 2). However, as this paper's main focus was on examining the mediating role of exercise benefit beliefs on the relationship between SWB and exercise behaviors, Study 2 conducted mediation analyses as well as validated the developed scale.

**Figure 2.**

*Comparison of Exercise Benefit Beliefs Profiles between Happy and Unhappy Individuals*




*Note*. The happy people profile was derived from the average scores of individuals whose life satisfaction was higher than the mean + 1*SD* (*N* = 48), while the unhappy people profile was based on the average scores of individuals whose SWLS was lower than the mean + 1*SD* (*N* = 45). For clarity, the minimum value

on the graph was set at 3, while the maximum value was set at 7. The original scale ranges from 1 to 7.

# Study 2: Mediation Analysis

Study 2 had two objectives. First, we validated the proposed hierarchical factor model of exercise benefit beliefs across different cultural backgrounds. Second, we explored the mediating role of these beliefs in the relationship between SWB and exercise behaviors using parallel mediation analyses.

## Participants

We recruited 291 participants who resided in the United States from MTurk to take part in the survey in exchange for $0.75. This participant pool has been validated by previous research as a reliable source (Buhrmester et al., 2011; Goodman et al., 2013). Table 1 shows participant demographic data.

## Procedure and Materials

Participants rated their agreement with 25 exercise benefits on a 5-point scale (1 = *Strongly disagree*, 5 = *Strongly agree*), selected based on Study 1's exploratory factor analysis. SWB was then measured using the 5-item SWLS (Diener et al., 1985; $\alpha = .94$) on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*) and the 20-item PANAS (Watson et al., 1988; $\alpha$s = .93 and .93 for positive and negative affect, respectively) on a 5-point scale (1 = *Not at all*, 5 = *Extremely*). The final SWB score was calculated by adding the z-scored life satisfaction and z-scored positive affect and then subtracting the z-scored negative affect (Sheldon & Elliot, 1999).

Exercise behaviors were measured in three ways. First, we used the Godin scale (2011) for exercise frequency. Participants reported weekly exercise

frequency for strenuous, moderate, and mild/light exercise, and we calculated a total score by multiplying each type's frequency by corresponding weights (9 for strenuous, 5 for moderate, and 3 for light), then summing the results. Second, we used two items for exercise intention, which was adapted from Bruijn et al. (2009), including "*I intend to engage in vigorous exercise*" and "*I am sure I will engage in vigorous exercise*" on a 5-point scale (1 = *No, definitely not*, 5 = *Yes, definitely*) (α = .94). Lastly, we created and utilized a single item for exercise encouragement, "*How much do you want to encourage people around you to exercise?*" on a 5-point scale (1 = *Not at all*, 5 = *Very much*).

Demographic variables and exercise experience were collected as covariates. Participants provided age, sex, and months of regular exercise (with 0 for non-regular exercisers). Two attention check items were also included, with 16 respondents excluded for failing either item, leaving a sample of 275 participants for our analysis.

## Analytic Strategy

To test our hypotheses, we conducted statistical analyses in two steps. First, we performed a confirmatory factor analysis (CFA; *Lavaan* package in R version 4.1) using maximum likelihood estimation to confirm our proposed hierarchical factor model of exercise benefit beliefs (Figure 1). We assessed model fit using RMSEA with its 90% CI and the comparative fit index (CFI; Bentler, 1990).

Next, we conducted three parallel mediation analyses using the *PROCESS macro* (SPSS version 24; Hayes & Preacher 2014) to test the mediation hypotheses. The dependent variables were exercise frequency, intention, and

encouragement, with mediating variables as physical and non-physical exercise benefit beliefs. We controlled sex, age, and exercise experience as covariates.

# Results

## *Confirmatory Factor Analysis*

As expected, our proposed model showed a reasonable fit: RMSEA = .07 [90% CI: .07, .08]; CFI = .874; $\chi 2(272) = 664.67$. At the first level, the model included non-physical ($M$ = 3.63, $SD$ = .72, α = .91) and physical ($M$ = 4.31, $SD$ = .50, α = .82) factors. The latent correlation between physical and non-physical factors was 0.17 ($p$ <.001). The second level had nested factors within the non-physical factor: emotional ($M$ = 4.10, $SD$ = .71, α = .81), social ($M$ = 3.39, $SD$ = .93, α = .86), and cognitive ($M$ = 3.40, $SD$ = .91, α = .86) factors, and within the physical factor: athletic ($M$ = 4.53, $SD$ = .55, α = .81), and rehabilitative ($M$ = 4.09, $SD$ = .62, α = .74) factors. Every factor had acceptable or good internal consistency as indicated by Cronbach's alpha values of 0.7 or higher (Nunnally, 1978).

Table 3 shows significantly positive correlations between exercise benefit beliefs, SWB, and exercise behaviors, ranging from small (lowest = .14) to modest (largest = .53), except for the correlation between physical factor and exercise frequency ($r$ = .09, $p$ = .14). Stronger beliefs in exercise benefits were associated with higher SWB and exercise behaviors.

**Table 3**

*Correlations and Descriptive Statistics of the Beliefs about Exercise Benefits, SWB, and Exercise Behaviors*

| Variable | *M* (*SD*) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | Non-physical Benefit | 3.63 (0.72) | — | .53*** | .41*** | .22*** | .44*** | .53*** |
| 2 | Physical Benefit | 4.31 (0.50) | | — | .30*** | .09 | .32*** | .33*** |
| 3 | Subjective Well-Being | 0.00 (0.74) | | | — | .14* | .29*** | .24*** |
| 4 | Exercise Frequency | 53.48 (64.30) | | | | — | .30*** | .19** |
| 5 | Exercise Intention | 3.69 (1.32) | | | | | — | .26*** |
| 6 | Exercise Encouragement | 3.90 (1.06) | | | | | | — |

*Note*. The non-physical benefit was determined by computing the average of cognitive, emotional, and social factors, while the physical benefit was determined by computing the average of rehabilitative and athletic factors. ***$p$ <.001; **$p$ < .01; *$p$ < .05.

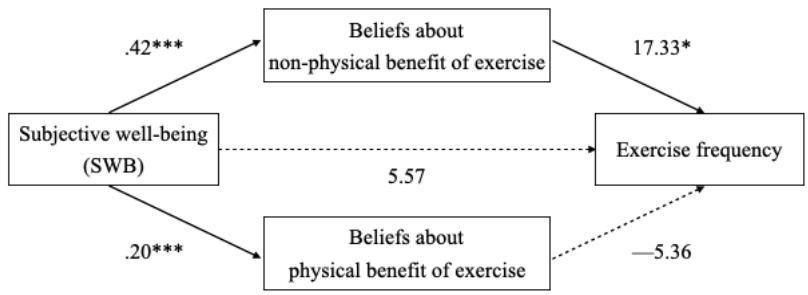
## *Parallel Mediation*

Figure 3 presents the results from three parallel mediation analyses.

**Figure 3**

*Models of SWB as a Predictor of (a) Exercise Frequency (b) Exercise Intention and (c) Exercise Encouragement, Mediated by Non-physical and Physical Factors of Beliefs about Exercise Benefits*

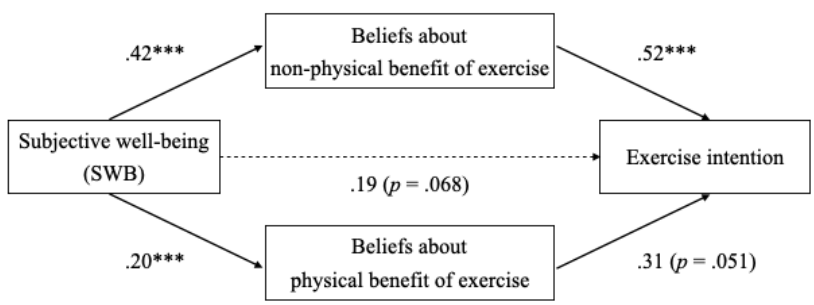
(a)




Total effect: $b = 11.70$, $SE = 5.32$, $p = .03$
Direct effect: $b = 5.57$, $SE = 5.85$, $p = .34$

Total indirect effect: $b = 6.13$, $SE = 2.72$, *95% CI* = [1.86, 12.47]
Indirect effect via beliefs about non-physical benefit of exercise: $b = 7.19$, $SE = 3.70$, *95% CI* = [1.61, 15.56]
Indirect effect via beliefs about physical benefit of exercise: $b = —1.06$, $SE = 1.82$, *95% CI* = [—5.05, 2.12]

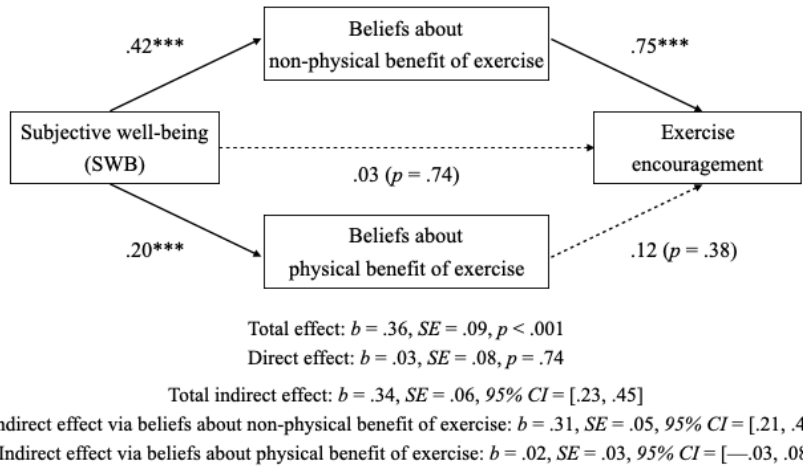
(b)




Total effect: $b = .47$, $SE = .10$, $p < .001$
Direct effect: $b = .19$, $SE = .10$, $p = .068$

Total indirect effect: $b = .28$, $SE = .06$, *95% CI* = [.17, .40]
Indirect effect via beliefs about non-physical benefit of exercise: $b = .22$, $SE = .06$, *95% CI* = [.10, .35]
Indirect effect via beliefs about physical benefit of exercise: $b = .06$, $SE = .04$, *95% CI* = [—.01, .13]

(c)




*Note*. Sampled $N = 275$. $b$ = unstandardized coefficient, $SE$ = standard error, $p$ = p value, $CI$ = confidence level. Solid lines indicate significant paths, while dotted lines indicate non-significant paths. The significant levels are denoted as ***$p$ <.001; **$p$ < .01; *$p$ < .05.

***DV (1): Exercise Frequency.*** The total effect of SWB on exercise frequency was significant ($b = 11.70$, $SE = 5.32$, $p = .03$). Higher SWB was associated with higher beliefs about non-physical benefits ($b = .42$, $SE = .05$, $p < .001$), which predicted higher exercise frequency ($b = 17.33$, $SE = 6.81$, $p = .01$). The indirect link between SWB and exercise frequency via beliefs about non-physical benefits was significant ($b = 7.19$, $SE = 3.70$, *95%CI* = [1.61, 15.56]), while the direct link was not significant after adjusting for the mediators ($b = –5.57$, $SE = 5.85$, $p = .34$), supporting a full mediation model.

In contrast, higher SWB was associated with higher beliefs about physical benefits ($b = .20$, $SE = .04$, $p < .001$), but not linked to exercise frequency ($b = –5.36$, $SE = 9.06$, $p = .55$). The indirect link between SWB and exercise frequency via beliefs about physical benefits was not significant ($b = –1.06$, $SE = 1.82$, *95%CI* = [–5.05, 2.12]), indicating no mediation relationship.

***DV (2): Exercise Intention.*** The total effect of SWB on exercise intention was significant ($b$ = .47, $SE$ = .10, $p$ < .001). Higher SWB was correlated with higher beliefs about non-physical benefits ($b$ = .42, $SE$ = .05, $p$ < .001), which, in turn, related to higher exercise intention ($b$ = .52, $SE$ = .12, $p$ <.001). The indirect link between SWB and exercise intention via beliefs about non-physical benefits was significant ($b$ = .22, $SE$ = .06, *95%CI* = [.10, .35]) and the direct link between SWB and exercise intention was slightly significant after adjusting for the mediators ($b$ = .19, $SE$ = .10, $p$ = .07), supporting a partial mediation model.

Similarly, higher SWB was associated with higher beliefs about physical benefits ($b$ = .20, $SE$ = .04, $p$ < .001), and in turn, it was linked to higher exercise intention ($b$ = .31, $SE$ = .16, $p$ = .05). However, the indirect link between SWB and exercise intention via beliefs about physical benefits was not significant ($b$ = .06, $SE$ = .04, *95%CI* = [–.01, .13]), suggesting no mediation relationship.

***DV (3): Exercise Encouragement.*** The total effect of SWB on exercise encouragement was significant ($b$ = .36, $SE$ = .09, $p$ < .001). Higher SWB was associated with higher beliefs about non-physical benefits ($b$ = .42, $SE$ = .05, $p$ < .001) and in turn linked to higher exercise encouragement ($b$ = .75, $SE$ = .10, $p$ <.001). The indirect link between SWB and exercise encouragement via beliefs about non-physical benefits was significant ($b$ = .31, $SE$ = .05, *95%CI* = [.21, .43]), whereas the direct link between SWB and exercise encouragement was not significant after adjusting for the mediators ($b$ = .03, $SE$ = .08, $p$ = .74), supporting a full mediation model.

Conversely, higher SWB was associated with higher beliefs about physical benefits ($b$ = .20, $SE$ = .04, $p$ < .001), but not linked to exercise encouragement ($b$ = .12, $SE$ = .13, $p$ = .38). The indirect link between SWB and exercise

encouragement via beliefs about physical benefits was not significant ($b$ = .02, $SE$ = .03, $95\%CI$ = [–.03, .08]), indicating no mediation relationship.

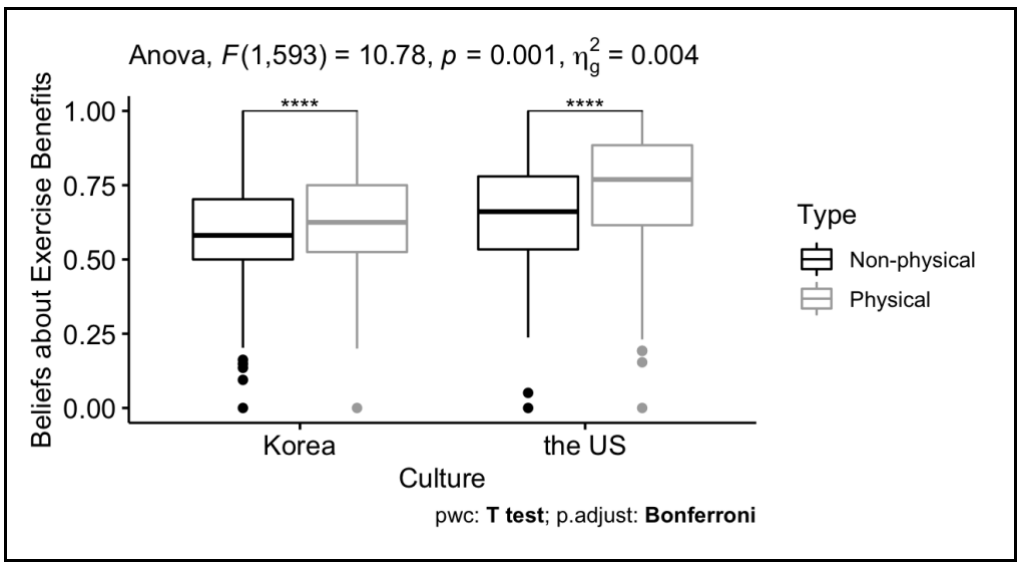
## *Additional Analysis*

To compare beliefs about exercise benefits between South Korea (Study 1) and the United States (Study 2), we conducted a 2 (benefit type: physical vs. non-physical) x 2 (culture: Korea vs. the US) mixed ANOVA using *rstatix* package in R version 4.1. To address the different scale ranges in each study, we used min-max normalization for each scale using the formula: (X – min(X)) / (max(X) – min(X)).

As shown in Figure 4, the 2-way mixed ANOVA, $F(1, 593) = 10.78$, $p < .001$, $\eta 2 = .004$, showed significant main effects for benefit type, $F = 86.48$, $p < .001$, and culture, $F = 39.14$, $p < .001$, along with a significant interaction between them, $F = 10.78$, $p = .001$. Post-hoc pairwise comparisons indicated that both Koreans ($t = 5.13$, $p < .001$) and Americans ($t = 7.53$, $p < .001$) agreed more with physical benefits than non-physical benefits. Americans showed higher agreement with both physical benefits ($t = 6.75$, $p < .001$) and non-physical benefits ($t = 4.27$, $p < .001$) compared to Koreans.

**Figure 4**

*Cross-Cultural Comparison of Exercise Benefit Beliefs Between South Korea and the US*




*Note*. Sampled *N* of Korea = 320. Sampled *N* of the US = 275. The value of the y-axis was calculated by a normalized score using min-max normalization: (X – min(X)) / (max(X) – min(X)).

## Discussion

In Study 2, we validated our hierarchical factor model and found stronger associations between non-physical beliefs, SWB, and exercise behaviors compared to physical beliefs. Moreover, SWB influenced exercise behaviors through non-physical benefit beliefs, while physical benefit beliefs had no mediating effect.

However, Studies 1 and 2 had limitations. First, we relied on self-report measures for exercise benefit beliefs and behaviors, potentially affecting ecological validity. To address this, Study 3 utilized a scenario-based task, allowing participants to express their exercise intentions in a more realistic context. Second, in Studies 1 and 2, we explored the difference between physical and non-physical

factors of exercise benefit beliefs without a specific hypothesis. In Study 3, we aimed to replicate and further examine the relationship between SWB and exercise benefit beliefs, with a clear hypothesis observed in Study 2.

# Study 3: A Scenario-based Task

In Study 3, our main objective was to test our hypothesis of the relationship between SWB and exercise benefit beliefs using a scenario-based task. We expected that SWB would be more strongly associated with perceived non-physical benefits compared to physical ones.

## Participants

386 participants were recruited from MTurk to take part in the survey in exchange for $0.75. Table 1 presents participant demographic data.

## Procedure and Materials

Participants rated the perceived effectiveness of exercising in eight scenarios, with four requiring physical benefits and four involving non-physical benefits (Situation list, see Appendix 2) on a 7-point scale (1 = *Very slightly or not at all*, 4 = *Moderately*, 7 = *Extremely*). The scenarios were adjusted based on the validated scale from Studies 1 and 2. To minimize the influence of social cues and prevent forming hypotheses about our study's focus, participants also rated the perceived effectiveness of other eight activities, including taking a trip, socializing or dating, volunteering, eating or cooking, reading, writing, meditating, and sleeping.

Participants' SWB was assessed using the same approach as in Study 2 ($\alpha$ = .93, .94, and .93 for life satisfaction, positive and negative affect, respectively). Age, sex (0 = *male*, 1 = *female*), exercise experience (months), and exercise

frequency (Godin, 2011) were collected as covariates, and an attention check item was included. After excluding 17 respondents who failed the attention check, the subsequent analysis included a total of 369 participants

## Analytic Strategy

We computed the average perceived effectiveness of exercise for non-physical ($n$ = 4, α = .80) and physical ($n$ = 4, α = .80) scenarios with acceptable fit in confirmatory factor analysis (RMSEA = .088, 90%CI = [.067, .109], CFI = .954, TLI = .932; Browne & Cudeck, 1993; Bentler & Bonett, 1980).

Our primary objective was to examine the relationship between SWB and perceived exercise effectiveness in challenging scenarios, moderated by the situation type. We employed a linear mixed-effects model (LMM; Fitzmaurice et al., 2004) using *lme4* package in R version 4.1 (Bates et al., 2015; Brown, 2021). This allowed us to account for both within and between-participant variability in a nested design within each participant ($N$ = 369). We predicted perceived exercise effectiveness with SWB as the predictor, including random intercepts by participants and fixed effects for SWB, situation type (0 = *non-physical factor*, 1 = *physical factor*), and their interactions. Covariates included sex, age, exercise experience, and exercise frequency.

## Results

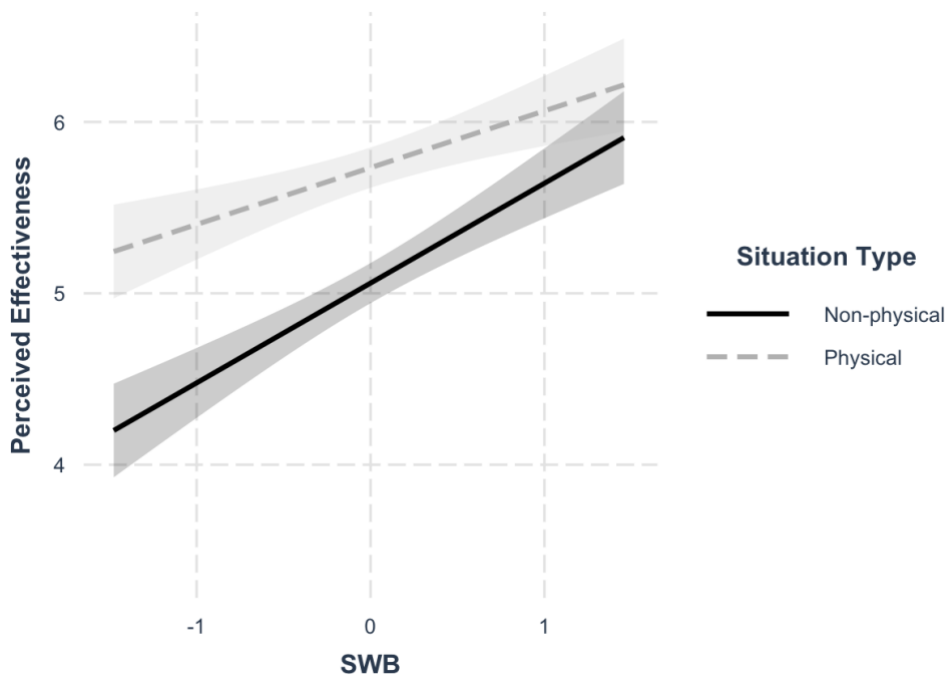
As predicted, SWB positively influenced the perceived exercise effectiveness in difficult situations ($b$ = .58, $SE$ = .09, $p$ < .001), suggesting that happier individuals saw exercise as more effective in overcoming challenges. The situation type also had a main effect on perceived effectiveness ($b$ = .67, $SE$ = .05, $p$ < .001), with exercise perceived as more effective in addressing physical

difficulties ($M$ = 5.73, $SD$ = 1.14) than non-physical difficulties ($M$ = 4.94, $SD$ = 1.28).

Furthermore, the situation type moderated the relationship between SWB and perceived exercise effectiveness ($b$ = –.25, $SE$ = .07, $p$ = .001). A simple slope test suggested that the association between SWB and perceived exercise effectiveness was stronger in situations requiring non-physical benefits ($b$ = .58, $SE$ = .09) compared to those requiring physical benefits ($b$ = .33, $SE$ = .09). Figure 5 shows the moderation plot.

**Figure 5**

*Interaction between SWB and Situation Type on Perceived Exercise Effectiveness in Study 3*




*Note*. The range of the y-axis is from 1 to 7.

## Additional Analysis

To determine whether the tendency of our findings was unique to exercising or if it could be generalized to other activities, we conducted separate analyses for each activity. As shown in Table 4, we found a positive main effect of SWB on the perceived effectiveness of all activities ($p < .05$). However, the negative interaction effect between SWB and situation type was unique to our focal activity, while others showed positive interactions (for taking a trip, socializing or dating, and volunteering) or no interaction.

**Table 4**

*Separate Linear Mixed-effects Models for Perceived Effectiveness of Each Activity in Study 3*

| Activity | SWB | | | SWB x Situation Type | | |
|---|---|---|---|---|---|---|
| | *b* | *SE* | *p* | *b* | *SE* | *p* |
| exercising or taking a walk | .58 | .09 | <.001 | **–.25** | .07 | .001 |
| eating or cooking | .40 | .11 | <.001 | –.02 | .07 | .80 |
| sleeping | .29 | .10 | .01 | –.01 | .07 | .87 |
| reading | .42 | .11 | <.001 | .01 | .08 | .95 |
| meditating | .49 | .11 | <.001 | .01 | .07 | .92 |
| writing | .30 | .12 | .01 | .09 | .08 | .28 |
| socializing or dating | .34 | .10 | .001 | .14 | .08 | .09 |
| volunteering | .28 | .11 | .01 | .20 | .07 | .003 |
| taking a trip | .34 | .11 | .002 | .22 | .08 | .004 |

*Note*. *N* for analysis = 369. *b* = unstandardized coefficients. *SE* = standard error. *p* = p value. The analysis controlled for sex, age, exercise experience, and exercise frequency. Situation type was coded as 0 for *non-physical* and 1 for *physical* factors. The negative value of the interaction between SWB and situation type

indicates that the relationship between SWB and perceived exercise effectiveness is stronger in non-physical situations.

## Discussion

Study 3 confirmed that happier individuals not only recognized exercise benefits in managing physical challenges but also acknowledged its advantages in addressing non-physical difficulties. In contrast, unhappier individuals were less aware of non-physical benefits compared to happier individuals. Furthermore, our additional analysis of various activities strengthened our findings, as exercise was the only activity that exhibited a negative interaction pattern.

However, Study 3 had still limitations. In Studies 1 and 2, we directly measured exercise benefits, while in Study 3, we used scenarios implying exercise benefits. Study 4 collected natural language, allowing participants to write about exercise benefits without specific cues. This approach tested our hypothesis in a real-world context, strengthening the validity of our findings. In Study 4, participants expressed exercise encouragement through a letter-writing task, providing direct evidence of the relationship between SWB and exercise benefit beliefs.

# Study 4: Writing a Persuasive Letter Task

## Participants

To enhance the diversity of our sample, we recruited 126 participants residing in the United Kingdom through a Prolific online research platform. They took part in our survey in exchange for €0.80. Table 1 displays participant demographic data.

## Procedure and Materials

We assessed participants' SWB (αs = .92, .93, and .92 for life satisfaction, positive and negative affects, respectively) using the same approach as in Studies 2 and 3. Participants were then instructed to write a persuasive letter encouraging exercise to one of their acquaintances by highlighting exercise benefits with a minimum length of 300 characters.

Afterward, they responded to questionnaires on closeness to the recipient (e.g., "*How close do you feel to the person whom you imagined?*", "*How important do you value the relationship with whom you imagined*?"), encouragement strength (e.g., "*How important do you think it is for them to exercise regularly?*", "*How strongly do you encourage them to make exercise a part of their routine?*"), and personal agreement (e.g., "*How persuasive do you think your writing is?*", "*How strongly do you believe in the value of regular exercise for their well-being?*") (correspondingly, αs = .92, .79, and .64). Age, sex (0 = *male*, 1 = *female*), and an attention check were included as covariates. All participants passed the attention check and were included in the analysis.

## Analytic Strategy

We hired a research assistant (RA), who was unaware of our hypotheses, to review and extract exercise benefits from the letters. To ensure clarity, sentences with multiple factors were separated into distinct sentences. For instance, "Taking exercise is very good for your physical and mental well-being" was divided into two sentences: "Good for your physical well-being" and "Good for your mental well-being." However, three participants did not mention specific exercise benefits, so their data were excluded, leaving us with a sample of 123 participants for analysis.

We then employed independent three RAs and GPT-3.5 (OpenAI) to categorize each sentence into physical or non-physical factors. On June 30th, 2023, the GPT model was provided with the description of our validated scale and the following prompt: "*I will give you several sentences about exercise benefits generated by the participants. Could you categorize each sentence into one of the non-physical or physical factors?*" An agreement was made using three human RA labels and the GPT prediction (*N* of raters = 4; *ICC* = .70). Majority rule was followed, and researchers established criteria on sentences with a 2:2 split in opinions. Confusing sentences were related to appearance, sleep, feeling energized, skin (physical), and endurance (non-physical). Consequently, we achieved a consensus and categorized all 595 sentences from 123 participants.

Subsequently, we calculated the ratio of non-physical to physical benefits (dependent variable) in each letter, using the formula: {(*N* of non-physical benefits) + 1} / {(*N* of physical benefits) + 1}. By adding 1 to the numerator and denominator, we prevented potential issues when either is zero.

The main analysis was then conducted with a multivariate multiple regression model, where the ratio of non-physical to physical benefits was predicted by SWB (independent variable). Covariates included sex, age, closeness to the recipient, encouragement strength, personal agreement, and sum of written benefits.

## Results

As expected, SWB had a positive influence on the ratio of non-physical benefits to physical benefits written in the letters ($b$ = .25, $SE$ = 0.14, $p$ = 0.07), although it did not reach the conventional levels of statistical significance.

## Discussion

Study 4 replicated the difference in exercise benefit beliefs between happy and unhappy individuals. Using natural language generation tasks, we directly compared their beliefs with a ratio measure. The result showed a higher ratio of non-physical benefit beliefs to physical benefit beliefs in happy individuals, even with a small sample size of 123 participants.

Contrary to the prevailing notion of fewer non-physical beliefs than physical ones, here we found a higher number of non-physical beliefs regardless of happiness. Possible explanations for this discrepancy could be sample (UK) characteristics, the context (persuading others), or a wider range of non-physical benefits. However, our main goal of exploring the relative abundance of non-physical beliefs compared to physical beliefs in happy individuals was achieved.

# General Discussion

We expect and test two hypotheses. First, we deductively hypothesize that happier individuals hold more robust beliefs about exercise benefits. Second, we inductively expect that the difference in these beliefs between happy and unhappy individuals is more pronounced in the non-physical dimensions of exercise benefits compared to the physical domains. We interpret this distinction as a key factor contributing to exercise behaviors among happy individuals.

Across four studies with diverse samples, we present compelling evidence supporting the impact of exercise benefit beliefs on the relationship between chronic happiness and exercise behaviors. In Studies 1 and 2, our scale development and validation establish the differentiation of exercise benefit beliefs into physical and non-physical dimensions. Interestingly, parallel mediation

analyses in Study 2 further reveal that exercise behaviors are primarily linked to non-physical benefit beliefs, while beliefs about physical benefits do not significantly mediate the relationship between happiness and exercise behaviors (frequency, intention, and encouragement). Study 3 shows that happy individuals recognize exercise as effective for both physical and non-physical challenges, while unhappy individuals primarily associate exercise with physical benefits. Study 4 emphasizes that happy individuals prioritize non-physical benefits over physical benefits when encouraging others to engage in exercise. Overall, our findings indicate that happier individuals uniquely value exercise's non-physical benefits, leading to higher exercise behaviors.

## Interpretations

Studies 2 to 4 indicate that happier individuals recognize not only physical, but also non-physical exercise benefits, including emotional, social, and cognitive well-being, while unhappier individuals primarily focus on physical benefits and may overlook non-physical benefits. Additional analyses from Study 3 validate these patterns, as they do not emerge in other activities apart from exercising.

These findings align with previous research on cognitive processing in happy individuals, who are absorbed in activities (Csikszentmihalyi, 1999; Kashdan et al., 2004). This inclination may lead them to explore the connections between physical activity and its non-physical benefits. Moreover, happy individuals engage in exercise to enhance their happiness (Tkach & Lyubomirsky, 2006), supporting their broader beliefs about the multifaceted exercise benefits. It seems that beliefs about non-physical benefits might be key to increasing exercise

engagement. However, more research is needed to understand why they enhance exercise engagement.

## Theoretical and Practical Contributions

Our paper makes several significant contributions. First, our study contributes to the understanding of how chronic happiness influences exercise behaviors. Happy individuals might have stronger beliefs in physical and non-physical exercise benefits, suggesting that non-physical benefits might be key to increased exercise engagement. To our knowledge, while the positive impacts of exercise on happiness are well-documented (Fontane, 1996; Lera-López et al., 2017; Newman et al., 2014; Thorén et al., 1990; Zhang & Chen, 2019), this paper is the first to propose an explanation for why happy individuals exercise more.

Second, our study extends the Theory of Planned Behavior (Azjen & Fishbein, 1980, 2005) by suggesting that exercise benefit beliefs influence both intentions and behaviors. We identify distinct exercise benefit beliefs, including athletic, rehabilitative, emotional, social, and cognitive benefits. Future studies could further explore the differences between these five factors or the physical and non-physical domains.

Third, our findings contribute to the health message domains focused on promoting exercise intentions and behaviors (e.g., Bergeron et al., 2019; Hevel et al., 2019; Reese et al., 2017; Williamson et al., 2020). We highlight the advantage of emphasizing non-physical benefits in exercise promotion messages instead of solely focusing on physical benefits. This approach can be valuable for practitioners developing interventions to motivate exercise engagement, by

offering a novel pathway to facilitate exercise behaviors. Further research could explore these promising areas.

## Limitations and Future Research

One limitation of our study is its correlational nature, preventing us from establishing causality between happiness and exercise beliefs. Future research could manipulate happiness levels and observe the effects on exercise beliefs. However, manipulating chronic happiness may be methodologically challenging and ethically sensitive (Lyubomirsky, 2001). Alternatively, researchers could manipulate exercise benefit beliefs to explore their impact on the relationship between happiness and exercise behaviors.

Another limitation is the potential presence of additional factors influencing exercise benefit beliefs beyond the physical and non-physical categories. For example, appearance-related beliefs (e.g., “exercise makes me look good”) and lifestyle-related beliefs (e.g., “exercise reduces phone-use time”) were considered but excluded as they did not align as expected. Appearance-related beliefs may involve physical benefits but could also be intertwined with positive emotions or improved social relationships. Similarly, lifestyle-related beliefs may affect physical energy levels but are predominantly considered non-physical.

Moreover, the dichotomy between physical and non-physical exercise benefits might spark ongoing debate about their interconnected nature and the possibility of reducing them to purely physical phenomena (reductionism) (Harden, 2023). However, our study focus on lay beliefs, which may not always align with objective facts (Furnham, 1988). Therefore, from this epistemological perspective, differentiating between physical and non-physical factors remains meaningful in

understanding lay perceptions of exercise benefits. Future research could explore and validate this dichotomy in lay beliefs.

# Conclusion

Despite well-documented exercise benefits, many adults (23%) worldwide still have inadequate exercise frequency. To tackle this, we explore insights from happy individuals who exercise more. Our paper proposes an unexplored route from chronic happiness to exercise behaviors: beliefs about exercise benefits. We found that happy individuals strongly believe in exercise benefits, motivating their physical activities. Addressing these beliefs could be crucial in increasing exercise participation. Practitioners can utilize this knowledge to inspire individuals and promote exercise habits.

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**Appendix 1. Items for Beliefs about Exercise Benefits (Studies 1 and 2) and the Statistics for Each Item in Study 1**

| Factor | Item | *M* | *SD* | Factor Loading F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|---|---|---|
| Cognitive (.90) | Exercise makes me more intelligent | 4.04 | 1.25 | .01 | .06 | **.88** | –.06 | –.09 |
| | Exercise improves my memory ability | 4.48 | 1.20 | .00 | .11 | **.73** | .06 | .08 |
| | Exercise helps me come up with a new idea | 4.36 | 1.13 | .15 | –.09 | **.62** | .13 | .16 |
| | Exercise enhances creativity | 4.30 | 1.25 | .08 | –.09 | **.71** | .13 | .09 |
| | Exercise improves my work performance | 5.07 | 1.05 | .35 | .06 | **.38** | .09 | .09 |
| Emotional (.90) | I have improved feelings of well-being from exercise | 5.46 | .98 | **.62** | .11 | .04 | .09 | .10 |
| | Exercise reduces anxiety | 5.05 | 1.12 | **.70** | –.02 | .07 | –.03 | .09 |
| | Exercise helps me forget daily worries for a while | 5.54 | 1.05 | **.69** | .13 | –.13 | .10 | .00 |
| | Exercising makes me emotionally stable | 5.20 | 1.10 | **.83** | –.07 | .06 | .06 | .01 |
| | Exercise makes me happy | 5.11 | 1.14 | **.81** | .03 | .12 | –.04 | –.02 |
| Social (.85) | Exercising can be a conversation topic, and it helps me network with others | 5.28 | 1.06 | .23 | .11 | .06 | **.58** | –.15 |
| | I am able to cooperate with people who exercise together | 5.23 | 1.05 | .11 | .06 | –.03 | **.57** | .06 |
| | Exercise creates an easy way to form a new relationship | 5.35 | 1.14 | .10 | .05 | –.03 | **.75** | .01 |
| | Exercising is a good way for me to meet new people | 5.10 | 1.26 | –.15 | –.02 | .16 | **.68** | .11 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | My partner will exercise and become healthy together | 5.18 | 1.22 | –.03 | .11 | .15 | **.53** | .03 |
| Rehabilita-tive (.81) | Exercising improves the functioning of my immune system | 5.62 | .95 | .25 | .26 | –.03 | .18 | **.32** |
| | Exercise improves my flexibility | 5.45 | 1.00 | –.09 | .26 | .07 | .04 | **.58** |
| | Exercise helps me maintain the right posture | 5.16 | 1.14 | .07 | .01 | .00 | .14 | **.61** |
| | Exercise decreases the risk of injury | 4.79 | 1.29 | .15 | –.09 | .15 | .00 | **.55** |
| | Exercise helps the pain in the body (shoulder, back, menstrual pain, etc.) relieved | 5.19 | 1.14 | .23 | .22 | .04 | –.14 | **.48** |
| Athletic (.85) | Exercise strengthens my core muscle | 5.78 | .92 | –.01 | **.62** | .01 | –.02 | .20 |
| | Exercise increases my stamina | 5.50 | 1.01 | –.02 | **.74** | .16 | –.10 | .00 |
| | Exercising increases my level of physical fitness | 6.09 | .90 | .04 | **.69** | –.07 | .18 | .00 |
| | Exercise increases my muscle strength | 6.07 | .86 | .03 | **.79** | –.01 | .09 | .02 |
| | Exercise helps me lose weight | 5.58 | 1.08 | .23 | **.49** | –.04 | .06 | .04 |

*Note*. Sampled $N = 320$. The result was from an exploratory factor analysis of final twenty-five items with oblimin rotation, assuming that there are correlations among factors. The Internal validity of the factors in parentheses.

**Appendix 2. Details of Difficult Situations Presented in Study 3**

| Situation Type | Situation Detail |
|---|---|
| Non-physical Benefit (.80) | (a) You may be experiencing a decline in your overall happiness, coupled with a lack of motivation and feelings of depression. |
| | (b) In two months, you have a crucial exam that you have been preparing for, and your anxiety may be intensifying. |
| | (c) Recently, you have been experiencing mental blocks, and struggling to generate creative ideas or new thoughts. |
| | (d) Since transitioning to remote work, you may be spending most of your time alone at home, which could leave you with limited chances to socialize and collaborate with others. |
| Physical Benefit (.80) | (e) Recently, you have noticed a decrease in your physical energy levels. |
| | (f) Lately, you have observed a decline in your overall physical fitness and an increase in your weight. |
| | (g) You have been feeling sluggish and weighed down, and you need a boost of energy. |
| | (h) Recently, you have noticed a decline in your posture, and your shoulders and back often feel stiff and tense. |

*Note*. The internal validity values are presented in parentheses. Situations were presented in random order.

# 국문초록

# 행복할 수록 더 많이 운동하는 이유: 운동의 물리적-비물리적 이득에 대한 믿음의 매개효과

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주관적 웰빙 (SWB)이 높은 사람들이 평소에 운동을 많이 하고 있다는 인과관계가 밝혀졌으나, 그 기저에 있는 원인에 대한 탐색은 부족하다. 이러한 연구 공백을 채우기 위해 한국, 미국, 영국에서 총 1125 명을 대상으로 네 가지 경험적 연구를 수행하였다. 본 연구의 가설은 행복할 수록 운동 이득에 대해 더 강한 믿음을 가지고 있다는 것이다. 이를 검증하기 위해 연구 1 에서는 운동 이득에 대한 믿음을 측정하는 척도를 개발하였고, 운동 이득이 물리적 이득과 비물리적 이득 두 가지의 차원으로 나뉘는 것을 확인하였다. 연구 2 에서는 척도를 타당화하고, 행복과 운동 행동 간의 관계를 운동 이득 믿음이 매개하는 것을 검증하였다. 믿음 중에서도 특히 비물리적 이득에 대한 믿음이 유의미한 완전 매개 효과를 보인 반면, 물리적 이득의 매개효과는 통계적으로 유의미하지 않았다. 이러한 믿음 요인과 행복 간의 차별적 효과를 재검증하기 위해, 연구 3 에서는 물리적, 비물리적 고민 상황을 시나리오로 제시하고 운동을 해결책으로 인식하는지를 확인함으로써 더욱 현실적인 맥락에서 결과를 재검증하였다. 마지막으로, 연구 4 에서는 피험자에게 타인이 운동을 하도록 설득하는 편지를 작성하도록 하고 자연어를 수집 및 분석하여 결과를 반복 검증하였다. 본 연구 결과는 행복과 운동 연구 장면에 있어 이론적 측면과 실용적 함의에 기여한다.

**주요어 :** 행복, 주관적 웰빙, 운동, 운동 이득 신념

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