

exercise & wellbeing, 2018

Some of the research that has emerged on exercise & wellbeing in the last few years:

Cheng, C.-H. E., J. W. Weiss, et al. (2015). **"Personality traits and health behaviors as predictors of subjective wellbeing among a multiethnic sample of university-attending emerging young adults."** *International Journal Of Wellbeing* 5(3): 21-43. <http://www.internationaljournalofwellbeing.org/index.php/ijow/article/view/355>

This study examines the relative contributions of individual characteristics of personality and health behaviors to subjective wellbeing among university-attending emerging young adults. Three dimensions of wellbeing were assessed: affective (positive affect), physical/mental (overall health), and cognitive (quality of life). The sample (N=599) consisted of students of various racial/ethnic backgrounds, including White/non-Hispanic, Hispanic/Latino, Asian/Pacific Islander, and Black/African American from a large public university in Southern California (28% male, 72% female; mean age = 20.85, SD = 1.84). Respondents completed the Student Health Survey, which consisted of items on basic demographics, substance use, health behaviors, Affect Balance Scale, Extraversion and Neuroticism subscales of the Big Five Taxonomy of Personality, Quality of Life scale, and an online food-intake survey for seven days. Descriptive statistics and bivariate correlations were calculated as preliminary analysis and hierarchical regression analyses were conducted to examine how each set of predictors contributes to the overall predictive ability and relative importance on subjective wellbeing. Extraverted individuals reported more positive affect and higher quality of life. Neuroticism was associated with less positive affect, poorer health, and lower quality of life. Physical activity was consistently associated with subjective wellbeing, accounting for 33%, 13%, and 32% of the total variance in positive affect, overall health, and quality of life, respectively. Findings indicate that health behaviors are important correlates of three dimensions of wellbeing over and above the effects of personality traits. Implications for designing health and wellness programs to improve the wellbeing and quality of life among young adults are discussed.

Ciccolo, J. T., N. J. SantaBarbara, et al. (2015). **"Muscular strength is associated with self-esteem in college men but not women."** *Journal of Health Psychology*. <http://hpq.sagepub.com/content/early/2015/07/09/1359105315592051.abstract>

Muscular strength is a well-known predictor of morbidity and mortality. Similarly, self-esteem is a predictor of health and well-being. The relationship between these two variables, however, is currently unknown. This study examined the cross-sectional relationship between maximal muscular strength (i.e. handgrip and one-repetition-maximum (1-RM) squat) and global self-esteem in 126 college students. Significant correlations were found between both measures of muscular strength and self-esteem. Further analyses revealed that these relationships were only significant for men. Based on these results, additional research is needed to further explore the relationship between muscular strength and self-esteem, especially in other demographic groups and longitudinally.

Fink, B., B. Weege, et al. (2016). **"Handgrip strength and the big five personality factors in men and women."** *Personality and Individual Differences* 88: 175-177. <http://www.sciencedirect.com/science/article/pii/S0191886915005863>

(Available in free full text) Physical strength correlates with facial and body morphology, body movement, and sexual behavior, especially in men. Thus, physical strength may signal male quality in the context of intersexual and intrasexual selection. We investigated relationships of handgrip strength (a measure of upper body muscularity) and personality (as assessed via the "Big Five" factors) in a sample of British men (n = 75) and women (n = 86), aged 18 to 42 years. Handgrip strength correlated negatively with neuroticism and positively with extraversion in men, and negatively with agreeableness in women. The relationship of handgrip strength and neuroticism in men remained after controlling for the influence of age and body mass index. We conclude that handgrip strength provides information about male neuroticism. We discuss our findings with reference to recent reports on male quality correlates of strength.

Headey, B. and R. Muffels (2016). **"Towards a theory of medium term life satisfaction: Two-way causation partly explains persistent satisfaction or dissatisfaction."** *Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement* 129(2): 937-960. https://ideas.repec.org/a/spr/soinre/v129y2016i2d10.1007_s11205-015-1146-8.html

Long term panel data enable researchers to construct trajectories of life satisfaction (LS) for individuals over time. In this paper we analyse the trajectories of respondents (N = 3689) in the German Socio-Economic Panel who recorded their LS for 20 consecutive years in 1991-2010. Previous research has shown that at least a quarter of these respondents recorded substantial long term changes in LS (Headey et al. in Proc Natl Acad Sci 107.42:17922-17926, 2010a, in Soc Indic Res 112:725-748, 2013). In this paper, graphs of LS trajectories, and subsequent statistical analysis, show that respondents tend to spend multiple consecutive years above and, in other periods, below their own 20-year mean level of LS. They experience extended 'good times' and extended 'bad times'. These results are contrary to set-point theory which views LS as stable, except for short term fluctuations due to life events. In the later part of the paper we attempt to move towards a theory of medium term life satisfaction. We estimate structural equation models with two-way causation between LS and variables usually treated as causes of LS, including health, physical exercise, frequency of social activities, and satisfaction with work and leisure. Results are interpreted as showing positive feedback loops between these variables and LS, accounting for extended periods of high or low LS. The models are based on a modified concept of 'Granger-causation' (Granger in Econometrica 37:424-438, 1969). The main intuition behind Granger-causation is that if x can be shown to be statistically significantly related to y in a model which includes multiple lags of y, then it can be inferred that x is one cause of y.

Headey, B., R. Muffels, et al. (2014). **"Parents transmit happiness along with associated values and behaviors to their children: A lifelong happiness dividend?"** *Social Indicators Research* 116(3): 909-933. <http://dx.doi.org/10.1007/s11205-013-0326-7>

There are strong two-way links between parent and child happiness (life satisfaction), even for 'children' who have grown up, moved to their own home and partnered themselves. German panel evidence shows that transmission of (un)happiness from parents to children is partly due to transmission of values and behaviors known to be associated with happiness (Headey et al. in Proc Natl Acad Sci 107(42):17922-17926, 2010, in Soc Indic Res doi:10.1007/s11205-012-0079-8, 2012). These values and behaviors include giving priority to pro-social and family values, rather than material values, maintaining a preferred balance between work and leisure, active social and community participation, and regular exercise. Both parents have about equal influence on the values and behaviors which children adopt. However, the life satisfaction of adult 'children' continues to be directly influenced by the life satisfaction of their mothers, with the influence of fathers being only indirect, via transmission of values and behaviors. There appears to be a lifelong happiness dividend (or unhappiness dividend) due to parenting. Structural equation models with two-way causation indicate that the life satisfaction of offspring can

significantly affect the satisfaction of their parents, as well as vice versa, long after the 'children' have left home. Data come from 25 waves of the German Socio-Economic Panel Survey (SOEP 1984–2008). SOEP is the only panel survey worldwide in which data on life satisfaction have been obtained from parents and an adequate sub-sample of children no longer living in the parental home.

Johnson, R., W. Robertson, et al. (2017). **"Changes over time in mental well-being, fruit and vegetable consumption and physical activity in a community-based lifestyle intervention: A before and after study."** *Public Health* 146(Supplement C): 118-125. <http://www.sciencedirect.com/science/article/pii/S0033350617300124>

There is a theoretical basis for believing that healthy lifestyle interventions can improve mental well-being and evidence to show that mental well-being is protective of future health. This study contributes to the evidence base by examining changes in mental well-being associated with the One Body One Life (OBOL) healthy lifestyle programme in a community setting in the West Midlands. Quantitative, before and after the evaluation. We conducted a before and after study of the lifestyle intervention 'OBOL', a multi component intervention that includes exercise and healthy eating education. Mental well-being was measured with the Warwick-Edinburgh Mental Well-being Scale. Physical activity and fruit and vegetable consumption were self-reported. Measures were collected before and after the 12-week intervention and three months post completion. Non-parametric tests were used to assess differences between groups, and linear mixed models were used to assess change over time. Four hundred and eighty-one (81% of attendees) adult participants completed a valid Warwick-Edinburgh Mental Well-being Scale before starting OBOL; of whom, 63.8% completed the Warwick-Edinburgh Mental Well-being Scale immediately post intervention and 25.2% at three months. Mental well-being levels increased significantly ($P < 0.001$) over the course of the intervention and were sustained at the three-month follow-up (baseline median Warwick-Edinburgh Mental Well-being Scale score = 48 [interquartile range 41–55], completion = 53 [interquartile range 46–57], 3-month follow-up = 52 [interquartile range 46–56]). Change in mental well-being was clinically significant after accounting for age and gender. Changes in both fruit and vegetable consumption and physical activity appeared to explain some but not all of the variation in mental well-being. We found significant improvements in mental well-being among participants directly after the intervention which were sustained at the three-month follow-up. These findings contribute to a growing body of knowledge on the contribution of lifestyle interventions to promoting and sustaining mental well-being.

Lathia, N., G. M. Sandstrom, et al. (2017). **"Happier people live more active lives: Using smartphones to link happiness and physical activity."** *PLOS ONE* 12(1): e0160589. <http://dx.doi.org/10.1371/journal.pone.0160589>

(Available in free full text) Physical activity, both exercise and non-exercise, has far-reaching benefits to physical health. Although exercise has also been linked to psychological health (e.g., happiness), little research has examined physical activity more broadly, taking into account non-exercise activity as well as exercise. We examined the relationship between physical activity (measured broadly) and happiness using a smartphone application. This app has collected self-reports of happiness and physical activity from over ten thousand participants, while passively gathering information about physical activity from the accelerometers on users' phones. The findings reveal that individuals who are more physically active are happier. Further, individuals are happier in the moments when they are more physically active. These results emerged when assessing activity subjectively, via self-report, or objectively, via participants' smartphone accelerometers. Overall, this research suggests that not only exercise but also non-exercise physical activity is related to happiness. This research further demonstrates how smartphones can be used to collect large-scale data to examine psychological, behavioral, and health-related phenomena as they naturally occur in everyday life.

Miller, J. C. and Z. Krizan (2016). **"Walking facilitates positive affect (even when expecting the opposite)."** *Emotion* 16(5): 775-785. <https://www.ncbi.nlm.nih.gov/pubmed/27100368>

Across 3 experiments, we rely on theoretical advancements that connect movement, embodiment, and reward-seeking behavior to test the proposal that walking incidental to routine activity (heretofore referred to as "incidental ambulation")-not specifically "exercise"-is a robust facilitator of positive affect. Experiment 1 reveals that ambulation facilitates positive affect even when participants are blind to the purpose of this activity. Experiment 2 further demonstrates the robustness of this effect of incidental ambulation by documenting its operation under conditions of low interest, as well as its power to override expectations of mood worsening. Experiment 3 replicates the main finding while eliminating the possibility that posture, ambient events, or experimenter bias account for the results. Taken together, the experiments demonstrate that incidental ambulation systematically promotes positive affect regardless of the focus on such movement, and that it can override the effects of other emotionally relevant events such as boredom and dread. The findings hold key implications for understanding the role of movement in shaping affect as well as for clarifying the embodied nature of emotion. (PsycINFO Database Record

Prakash, R. S., M. W. Voss, et al. (2015). **"Physical activity and cognitive vitality."** *Annual Review of Psychology* 66(1): 769-797. <http://www.annualreviews.org/doi/abs/10.1146/annurev-psych-010814-015249>

We examine evidence supporting the associations among physical activity (PA), cognitive vitality, neural functioning, and the moderation of these associations by genetic factors. Prospective epidemiological studies provide evidence for PA to be associated with a modest reduction in relative risk of cognitive decline. An evaluation of the PA-cognition link across the life span provides modest support for the effect of PA on preserving and even enhancing cognitive vitality and the associated neural circuitry in older adults, with the majority of benefits seen for tasks that are supported by the prefrontal cortex and the hippocampus. The literature on children and young adults, however, is in need of well-powered randomized controlled trials. Future directions include a more sophisticated understanding of the dose-response relationship, the integration of genetic and epigenetic approaches, inclusion of multimodal imaging of brain-behavior changes, and finally the design of multimodal interventions that may yield broader improvements in cognitive function.

Segar, M., J. M. Taber, et al. (2017). **"Rethinking physical activity communication: Using focus groups to understand women's goals, values, and beliefs to improve public health."** *BMC Public Health* 17(1): 462. <https://www.ncbi.nlm.nih.gov/pubmed/28521756>

BACKGROUND: Communication about physical activity (PA) frames PA and influences what it means to people, including the role it plays in their lives. To the extent that PA messages can be designed to reflect outcomes that are relevant to what people most value experiencing and achieving in their daily lives, the more compelling and effective they will be. Aligned with self-determination theory, this study investigated proximal goals and values that are salient in everyday life and how they could be leveraged through new messaging to better support PA participation among women. The present study was designed to examine the nature of women's daily goals and priorities and investigate women's PA beliefs, feelings, and experiences, in order to identify how PA may compete with or facilitate women's daily goals and priorities. Preliminary recommendations are proposed for designing new PA messages that align PA with women's daily goals and desired experiences to better motivate participation. METHODS: Eight focus groups were conducted with White, Black, and Hispanic/Latina women aged 22-49, stratified by amount of self-reported PA (29 low active participants, 11 high active participants). Respondents discussed their goals, values, and daily

priorities along with beliefs, feelings about and experiences being physically active. Data were collected, coded, and analyzed using a thematic analysis strategy to identify emergent themes. RESULTS: Many of the goals and values that both low and high active participants discussed as desiring and valuing map on to key principles of self-determination theory. However, the discussions among low active participants suggested that their beliefs, feelings, experiences, and definitions of PA were in conflict with their proximal goals, values, and priorities, also undermining their psychological needs for autonomy, competence, and relatedness. CONCLUSIONS: Findings from this study can be used to inform and evaluate new physical activity communication strategies that leverage more proximal goals, values, and experiences of happiness and success to better motivate PA among ethnically diverse low active women. Specifically, this research suggests a need to address how women's daily goals and desired experiences may undermine PA participation, in addition to framing PA as facilitating rather than competing with their daily priorities and desired leisure-time experiences.

Segar, M. L. and C. R. Richardson (2014). **"Prescribing pleasure and meaning: Cultivating walking motivation and maintenance."** *Am J Prev Med* 47(6): 838-841. [http://www.ajpmonline.org/article/S0749-3797\(14\)00327-4/abstract](http://www.ajpmonline.org/article/S0749-3797(14)00327-4/abstract)

(Available in free full text) Regular physical activity such as daily walking has numerous health benefits. Walking is a simple type of physical activity that can be done almost anywhere and is the most commonly reported form of physical activity among adults. CDC data show that people who walk are three times more likely to meet the physical activity guidelines than those who do not. Encouraging inactive individuals to integrate walking into their daily routine has the potential to yield significant public health benefits. To promote walking among Americans and achieve these benefits, new population-wide initiatives are being launched, including an upcoming Surgeon General's Walking Call to Action (planned release Fall 2014) and the EveryBody Walk! initiative. How health professionals and organizations communicate about walking brands it to the public and will influence the ultimate success of this new walking movement. Messages to promote walking that deliver accurate health information but ignore evidence-based principles of motivation and decision making, the underlying mechanisms of behavioral sustainability, will inadvertently undermine these population-level initiatives. To optimize the behavioral impact of these national initiatives, the messaging to promote walking delivered in communities and health clinics should be informed by relevant affective and behavioral science. It is important to shift from a medical to a marketing paradigm to move beyond simply delivering health education to actually motivating consistent walking behavior. Although counterintuitive, the benefits of walking typically emphasized by clinicians and social marketing, such as "better health" and "disease prevention," are not the same ones that will optimally motivate inactive individuals. This Current Issue reviews key evidence-based concepts to reframe the motivation for walking and inform more strategic walking messages to deliver in apps, interventions, clinical visits, and population-level health initiatives. Adherence Through Autonomy: Self-determination theory (SDT) addresses how to foster optimal types of motivation and investigates how "controlled" and "autonomous" types of motivation distinctly influence behavioral adherence. Controlled motivations reflect when people consider walking as a "should"—something they need to do to avoid a punishment (e.g., higher healthcare premiums) or comply with an external pressure (e.g., following a clinician prescription to lose weight). By contrast, when people have autonomous motivations, they deeply value the benefits they get from walking or the inherent pleasure and satisfaction that walking brings. Having autonomous motivation for physical activity results in better behavioral pursuit, self-regulation, and sustainability. A systematic review of SDT and physical activity found consistent support for a positive relationship between more autonomous forms of motivation and physical activity. It also reported that controlled forms of motivation were positively, negatively, or had no association with participation. Although having a controlled form of motivation cannot motivate people to start exercising, in general, it has less consistent and often negative relationships with ongoing participation compared to autonomous motivation. In other words, when people's core needs and goals drive their decision to walk, they have higher-quality motivation and are more likely to maintain it compared to walking to comply with external mandates or "shoulds." Furthermore, this review suggested that "intrinsic" motivation, or being active for the inherent pleasure it brings, was the type of motivation most strongly associated with sustainability. Thus, walking messages promoting autonomy and intrinsic experiences such as pleasure will better motivate regular walking.

Stephan, Y., A. R. Sutin, et al. (2018). **"Physical activity and personality development over twenty years: Evidence from three longitudinal samples."** *Journal of Research in Personality*. <http://www.sciencedirect.com/science/article/pii/S0092656618300175>

A physically inactive lifestyle is associated with maladaptive patterns of personality development over relatively short follow-up periods. The present study extends existing research by examining whether this association persists over 20 years. Participants (total N = 8723) were drawn from the Wisconsin Longitudinal Study Graduates and Siblings samples and the Midlife in the United States Study. Controlling for demographic factors and disease burden, baseline physical inactivity was related to steeper declines in conscientiousness in all three samples and a meta-analysis ($\beta = -0.06$). The meta-analysis further showed that lower physical activity was associated with declines in openness ($\beta = -0.05$), extraversion ($\beta = -0.03$), and agreeableness ($\beta = -0.03$). These findings provide evidence that a physically inactive lifestyle is associated with long-term detrimental personality trajectories.

Tarr, B., J. Launay, et al. (2015). **"Synchrony and exertion during dance independently raise pain threshold and encourage social bonding."** *Biology Letters* 11(10). <http://rsbl.royalsocietypublishing.org/roybiolett/11/10/20150767.full.pdf>

(Available in free full text) Group dancing is a ubiquitous human activity that involves exertive synchronized movement to music. It is hypothesized to play a role in social bonding, potentially via the release of endorphins, which are analgesic and reward-inducing, and have been implicated in primate social bonding. We used a 2×2 experimental design to examine effects of exertion and synchrony on bonding. Both demonstrated significant independent positive effects on pain threshold (a proxy for endorphin activation) and in-group bonding. This suggests that dance which involves both exertive and synchronized movement may be an effective group bonding activity. (See too further detail at <http://qz.com/538034/science-says-dancing-with-friends-is-good-for-your-health/>).

Toups, M., T. Carmody, et al. (2017). **"Exercise is an effective treatment for positive valence symptoms in major depression."** *Journal of Affective Disorders* 209: 188-194. <http://www.sciencedirect.com/science/article/pii/S0165032716308618>

Introduction Measurement of symptoms domains and their response to treatment in relative isolation from diagnosed mental disorders has gained new urgency, as reflected by the National Institute of Mental Health's introduction of the Research Domain Criteria (RDoC). The Snaith Hamilton Pleasure Scale (SHAPS) and the Motivation and Energy Inventory (MEI) are two scales measuring positive valence symptoms. We evaluated the effect of exercise on positive valence symptoms of Major Depressive Disorder (MDD). Methods Subjects in the Treatment with Exercise Augmentation for Depression (TREAD) study completed self-reported SHAPS and MEI during 12 weeks of exercise augmentation for depression. We evaluated the effect of exercise on SHAPS and MEI scores, and whether the changes were related to overall MDD severity measured with the Quick Inventory of Depression Symptomatology (QIDS). Results SHAPS and MEI scores significantly improved with exercise. MEI score change had larger effect size and greater correlation with change in QIDS score. MEI also showed significant moderator and

mediator effects of exercise in MDD. Limitations Generalizability to other treatments is limited. This study lacked other bio-behavioral markers that would enhance understanding of the relationship of RDoC and the measures used. Conclusions Positive valence symptoms improve with exercise treatment for depression, and this change correlates well with overall outcome. Motivation and energy may be more clinically relevant to outcome of exercise treatment than anhedonia.

Wiese, C. W., L. Kuykendall, et al. (2018). **"Get active? A meta-analysis of leisure-time physical activity and subjective well-being."** *The Journal of Positive Psychology* 13(1): 57-66. <https://doi.org/10.1080/17439760.2017.1374436>

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 ($k = 7$, $n = 2,107$, $r = 0.21$) and life satisfaction ($k = 7$; $n = 2544$; $r = 0.12$), but not with negative affect ($k = 6$; $n = 2033$; $r = -0.05$). Our results provide evidence for the importance of engaging in LTPA as a way of promoting SWB. [Note this seems to show association, not causation].