

The Oxford Handbook of Self-Determination Theory

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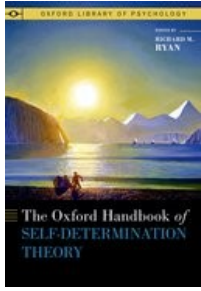
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CHAPTER

10 The Energy behind Human Flourishing: Theory and Research on Subjective Vitality

Christina Frederick, Richard M. Ryan

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Abstract

This chapter reviews the history of theory and research on subjective vitality within self-determination theory (SDT). Research on subjective vitality, defined as the phenomenal experience of aliveness and of having energy available to the self, has demonstrated the centrality of this experience of energy to wellness and flourishing. Research has shown that subjective vitality varies not only with physical conditions but also with different types and conditions of motivation. Generally, more autonomous motives are associated with enhanced vitality, whereas controlled motives diminish subjective energy. Findings also show that satisfaction of basic psychological needs enhances subjective vitality, whereas need frustrations deplete one's sense of energy and aliveness. Experimental work on "ego depletion," in which self-controlling motives are induced, leading to lowered energy, is consistent with this SDT-based theorizing. Subjective vitality has been studied in many domains, beginning with exercise and physical activity and extending to areas such as health and wellness, sleep, energy in the workplace, and the importance of nature to the experience of vitality. Across contexts and characters, subjective vitality remains one of the most phenomenally accessible and predictive indicators of wellness available.

Keywords: [self-determination theory](#), [vitality](#), [motivation](#), [ego depletion](#), [autonomy](#)

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As an organismic perspective, self-determination theory (SDT) is centrally concerned with what characterizes full functioning and thriving. Among the most important variables in that description is the experience of vitality. For over 25 years, *subjective vitality* has been a central construct in SDT research, as

both an aspect of motivational states and an indicator of well-being and flourishing. Ryan and Frederick (1997, p. 530) defined subjective vitality as the “experience of possessing energy and aliveness,” or the feeling of having energy available to the self. In keeping with the overall tenets of SDT, they assumed that subjective vitality would vary with both psychological and physical influences. Especially relevant was the idea that beyond physical factors such as exertion or fatigue, satisfaction of SDT’s basic psychological needs would enhance subjective vitality, whereas basic need frustrations would deplete this resource.

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Across the many years since, subjective vitality has been studied within motivational contexts ranging from sports to the workplace and across varied cultures and age groups. Today we have gained a deeper understanding of the construct itself, as well as its place within SDT. In the current chapter we review the subjective vitality literature, focusing on its conceptualization, operational definition, and integration within SDT’s organismic framework and nomological net. After reviewing illustrative research on vitality in relation to a variety of topics, we discuss the future of vitality-based research and pathways to enhance vitality through changes in one’s inner (e.g., mindfulness) and outer (e.g., natural elements) environments.

Vitality as a Ubiquitous Concept

The general concept of vitality has been discussed for centuries by philosophers, writers, religious scholars, and, more recently, psychologists. The notion of a life energy possessed by individuals that can be mobilized or depleted over time has, for example, long been present in Eastern perspectives. Cleary (1991) notes vitality as a theme in Taoist texts dating back over 2,500 years. The concepts *chi* or *ki* (Jou, 1981), *prana* (Kumagai, 1988), and *bayu* (Wikan, 1989) all describe vitality as a life force or energy both physical in nature and encompassing a subjective experience. As a core concept of Eastern religious traditions, corresponding practices arose to promote the flow of vitality, including, but not limited to, the disciplines of yoga, meditation, tai chi, and acupuncture (Thayer, 1986, 1996).

Within Western psychology, the concept of a life force was present early on in the work of Freud and the ego psychologists, identified as *Eros*, the energy that seeks unity and binding and thus underlies the synthetic or integrative nature of the ego (Freud 1923/1962; Nunberg, 1931; White, 1959). In this dynamic view, psychic conflicts and divisions deplete this energy, whereas unity and freedom from conflict allow for feelings of vitality and the more constructive activities of the ego. Reich (1951) and Lowen (1989), two psychoanalytic practitioners who focused on body psychotherapies, argued that psychic conflict can be redirected into defenses, resulting in energy blocks and rigidities, whereas psychological integration is manifest as vitality.

Conceptualizations of vitality have also emerged in more traditional health-related literatures. Selye (1950, 1956) developed a well-known theory identifying how stressors (psychological, environmental, and medical) are able to chip away at the pool of adaptive energy humans use to remain healthy. When that energy reserve becomes depleted, the results are illness and exhaustion.

Interest in subjective energy was also sparked by McNair, Lorr, and Doppleman’s (1971) Profile of Mood States (POMS), which became a widely used measure in both medical (Searight & Montone, 2020) and sport (LeUnes & Burger, 2000) research. The POMS assesses six related areas: tension, depression, anger, vigor, fatigue, and confusion, with the subscale of vigor tapping most directly into energy mood states (O’Connor, 2004). For example, a POMS profile with high levels of vigor and associated low levels of depression, tension, anger, fatigue, and confusion is referred to as the “iceberg profile,” which is more frequent among elite versus less competitive or more casual athletes (Renger, 1993). Vigor has also been associated with sleep quality (e.g., Tsunoda et al., 2017) and even sport performance (e.g., Newby & Simpson, 1996), as well as with our original Subjective Vitality Scale (SVS; Ryan & Frederick, 1997).

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A particularly interesting perspective on energy was developed by Thayer (1989, 2003), who distinguished two types of energy states: calm energy and tense energy. He defined calm energy as the relaxed possession of liveliness and vigor, and it is that state which corresponds to the state of vitality as conceptualized in SDT. Calm energy contrasts with both low energy (e.g., fatigue), and tense energy (e.g., caffeine-induced, pressure-induced) states. In an early experiment with SDT relevance, Thayer and Moore (1972) had students perform an intellectual task under ego-involved and task-involved conditions. The ego-involvement condition was induced by conveying that the task was testing their intelligence, an induction similar to that used by Ryan (1982) as an internally controlling condition to undermine intrinsic motivation. Thayer and Moore (1972) found that this ego-involving condition resulted in greater tension but lower feelings of energy than a condition involving a more task-involving set. In other experiments Thayer (2003) showed that walking (a physical energy-expending activity) could replenish calm energy, similar to findings with the SVS (e.g., Ryan et al., 2010).

SDT's Organismic Model of Vitality

While these historical and health perspectives are of interest, the conceptualization of subjective vitality within SDT draws most directly from organismic thinking (Ryan & Deci, 2017; Ryan & Vansteenkiste, this volume). A fundamental assumption in SDT is that humans are self-organizing creatures who, when healthy, are actively assimilating and integrating life experiences (Ryan, 1995). SDT describes a fully functioning person as actively engaged in the world, curiously learning, observing, connecting, and internalizing. The person is in such moments making what Perls, Hefferline, and Goodman (1951) described as “healthy contact”: their behavior is characterized by both awareness (clear perception) and excitement (energy mobilization). Within SDT subjective vitality represents this experience of positive energy that is within one's possession or available for mobilization.

In this regard there is an intimate link between SDT's concept of autonomy and subjective vitality.

p. 218 Specifically, when a person is acting with autonomy, they can be fully and volitionally engaged. The more autonomy, the less one needs “self-control” (which we view as depleting) and the more energy and excitement are available to the self (Quirin et al., 2021). As we shall review, research confirms that when acting with autonomy, people are more able to mobilize more energy and report greater vitality.

More generally, SDT posits that all three psychological needs—those for competence and relatedness as well as autonomy—impact vitality, with satisfactions enhancing and frustrations diminishing it (Ryan & Deci, 2008). Competence is intrinsically rewarding and motivating, thus it is associated with energy mobilization and with feelings of effectance fueling mobilization. Relatedness differently is intrinsically satisfying and both supports autonomy (as specified in relationships motivation theory; see Knee & Browne, this volume) and is “exciting” in its own right, eliciting energy and engagement.

In short, SDT argues that subjective vitality represents the experience of energy available to the self. It is expressed in terms like “excitement,” “enthusiasm,” and “spirit” that convey not merely arousal but a positive spirit from within. Subjective vitality is affected by a variety of physical factors, especially those affecting sleep and health (see Campbell & Vansteenkiste, 2022, this volume). But the dynamics of personal vitality go well beyond physical factors as they also reflect supports for and satisfactions of the person's basic psychological needs for autonomy, competence, and relatedness. Indeed, physical and psychological factors exert both independent and interactive influences on vitality, as we shall review.

Within SDT theory and research, vitality is used as a descriptor of high-quality engagement, but also as a central indicator of organismic wellness, or, as Ryan and Deci (2017, p. 256) write, “the most general characteristic of a fully functioning person.” This is fitting insofar as the very term “vitality” has etymological roots in the ideas of life and living. Given its centrality, it is also not surprising that vitality is

one of the most phenomenologically accessible and cross-culturally translatable constructs within SDT. People everywhere can readily and reliably rate whether they have energy and spirit, as well as distinguish that state from high arousal (as in anxiety, panic, or anger).

SDT thus sees vitality as fluctuating as a function of physiological factors (e.g., prior exertion, nourishment, sleep, health-related issues) as well as basic psychological need-related experiences. Yet notably, these are not simply additive factors. There are clear examples in life when one is fatigued or hungry, and yet the psychological excitement of pursuing a valued goal sustains high levels of vitality. An elite athlete who has just successfully completed a major competition might objectively define exhaustion as a physical state, yet the feelings of autonomy, competence, and relatedness they feel in the moments after finishing may support elevated perceptions of vitality. In contrast are examples of people rested and nourished who lack a sense of spark and vitality, as in oppressed individuals seeing no purpose in action.

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Initial Validation Studies

Our interest in vitality first emerged in research on sport and exercise, through interviews with exercisers and athletes. Many participants spontaneously used the term “vitality” to describe the experience or consequences of physical activity (Frederick, 1991; Frederick & Ryan, 1993). Seeing how central and accessible the idea of vitality was, we began more earnestly measuring it.

Subsequently, Ryan and Frederick (1997) presented the results of six studies validating a seven-item SVS. In Study 1, subjective vitality was examined in relationship to psychological and physiological health outcomes. Results confirmed that higher levels of vitality were associated with positive measures of psychological health and negatively with self-reports of ill-being, such as anxiety and depression. In Study 2 we examined the stability of the vitality construct over an eight-week period in several participant groups. Results showed that SVS scores were positively related to autonomy as well as psychological and physical health indicators. Study 3 focused on exploring subjective vitality as it relates independently to positive affect and negative affect, as well as relating it to the Big Five personality factors (Costa & McCrae, 1985). Here vitality was positively related to extraversion and positive affectivity, and negatively to neuroticism and negative affect. In Study 4 we examined the effects of pain on subjective vitality. Findings showed that patients in a pain clinic reported lower vitality compared to a matched control sample. Among pain clinic patients, vitality was found to be higher among those who experienced pain as disabling or who reported pain fright. Vitality also predicted patients' levels of self-esteem, body functioning, and self-actualization. Study 5 focused on stability of vitality across a two-year period among patients treated for obesity. Subjective vitality was correlated with greater change in body mass index across the program and was also related to internalization of weight loss motivation. Finally, in Study 6 we utilized a diary study method to examine daily fluctuations in perceptions of vitality. Findings showed that vitality was impacted by changes in physical symptomatology, with greater symptomatology serving as a drain on subjective vitality.

These initial validation studies broadly articulated how subjective vitality related with positive and negative affect, with psychological wellness as well as distress, and with physical health and symptomatology. They also revealed that although trait vitality is strongly predictive of an array of psychological and health outcomes, it is a state that fluctuates within a person, to a substantial degree as a function of psychological need dynamics. These initial findings thus set the stage for a broader research agenda on vitality within SDT. However because that literature relies to a large extent on self-reports of vitality, we shall first describe our measure and its modifications over time.

Measuring Subjective Vitality

p. 220 Ryan and Frederick's (1997) original SVS contained seven items, presented in Table 10.1, that had high internal consistency and showed excellent construct validities, relating to differences in physical states and basic psychological need satisfactions. This seven-item scale has subsequently been used in many studies, but further refinements suggested that subsets of these items can provide more internally consistent and efficient scale. Specifically, Bostic, McGartland Rubio, and Hood's (2000) analysis indicated that better psychometrics for the SVS were achieved by eliminating the one negatively worded item (item 2 in Table 10.1). The resulting six-item version of the SVS has also been translated and validated for French (Salama-Younes, et al. 2009), Arabic (Fayad & Kazarian, 2013), and Spanish (Castillo, Tomás, & Balaguer, 2017) populations.

Table 10.1 Trait and State Items from the Subjective Vitality Scale

Trait Items
1. I feel alive and vital.
2. I don't feel very energetic. * +
3. Sometimes I feel so alive I just want to burst.
4. I have energy and spirit.
5. I look forward to each new day. +
6. I nearly always feel alert and wake.
7. I feel energized.
State Items
1. At this moment, I feel alive and vital.
2. I don't feel very energetic right now. * +
3. Currently I feel so alive I just want to burst.
4. At this time, I have energy and spirit.
5. I am looking forward to each new day. +
6. At this moment, I feel alert and awake.
7. I feel energized right now.

* Item removed in 6-item scale (Bostic, McGartland Rubio, & Hood, 2000).

+ Items removed for currently recommended 5-item scale (see Kawabata et al., 2017).

Kawabata et al. (2017) presented a translation and validation of the SVS for Japanese and Singaporean populations. They favored a five-item version of the scale, eliminating items 2 and 5 of the original, in part based on our own advice, because the item "I look forward to each new day" seemed to us to be more about optimism than energy, and this was reflected in the psychometrics. Goldbeck, Hautzinger, and Wolkenstein's (2019) translation of the SVS for a German population also found the five-item scale

exhibited the best overall psychometrics. Thus, although all three versions have shown good reliability and construct validities, the five-item version is recommended.

Trait versus state measurement.

p. 221 The SVS can be used for state or trait measurement of vitality, based upon the directions provided for completing the items, as well as small ↵ changes in item wording. In the trait version of the scale, respondents are asked to endorse items based on how they feel “in general.” In the state version, respondents are asked to report based on how they feel “right now” (see Table 10.1). Translation of the SVS into other languages and in formats most applicable to specific populations has increased the worldwide viability and interest in the construct of vitality and in using the SVS to examine its psychological correlates across multiple domains.

Table 10.2 Items from the Subjective Vitality/Depletion Scale

Vitality Subscale
1. I feel alive and vital.
2. I have a lot of positive energy and initiative.
3. I feel a sense of liveliness and spark.
Depletion Subscale
4. I seem to have lost my “get up and go.”
5. I feel drained.
6. I feel lifeless and unenthused.

Source: Ryan et al. (2021).

Note: Trait items are t rated for how one has felt “over the past month”; state items are rated for how one feels “at this moment.”

Vitality and depletion.

SDT researchers have increasingly embraced the dual-process model of basic needs in which positive outcomes associated with full functioning are largely accounted for by need satisfactions, negative outcomes associated with ill-being, and defense being accounted for by need frustrations, with expectation that crossover paths are weaker. A similar model is expected for energy dynamics, with the important implication of where to identify and leverage factors that enhance or diminish subjective vitality. To facilitate this, Ryan and colleagues (2021) have recently assembled construct validities suggesting a dual-process measure of vitality and depletion. The new Vitality/Depletion Scale (Table 10.2) is comprised of six items, three for subjective vitality and three for subjective depletion. Several preliminary studies, primarily using cross-sectional or short-term longitudinal assessments, have shown the strong promise of the dual-process approach in this area and the potential independence rather than polarity of vitality and depletion experiences.

SDT Research Using the SVS

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It is not possible to thoroughly review extant vitality research within this chapter, mainly because the SVS has been used in so many different studies in so many different domains and applied settings. Just a cursory examination of the topics of the hundreds of studies we reviewed for this chapter revealed, however, several key areas for vitality research. On the more theoretical side of the research spectrum were articles reporting on scale translation, development, and validation (e.g., Bostic et al., 2000; Castillo et al., 2017; Fayad & Kazarian, 2013; Kawabata et al., 2017; Salama-Younes et al., 2009, Salama-Younes, 2011) and articles focusing on self-regulation and vitality (e.g., Baard, Deci, & Ryan, 2004; Juhl & Routledge, 2015; Nix et al., 1999; Ryan et al., 2005). More numerous were articles that examined the relationships between subjective vitality and *ego depletion*, or energy drains due to self-regulatory exertions (e.g., Ryan & Deci, 2008; Martela, DeHaan, & Ryan, 2016; Muraven, Gagné, & Rosman, 2008; Weinstein, Brown, & Ryan, 2009). A number of articles examined vitality in applied settings, such as work or physical activity (e.g., Frederick & Lazzara, 2020; Karkkola, Kuittinen, & Hintsala, 2019; Karkkola et al., 2018; Pololi et al., 2015) or in relationship to a specific situation, practice, or activity, such as health behaviors, mindfulness practice, enjoying nature, or engaging in goal setting (e.g., Brdar, 2006; Guérin, 2012; Ommundsen et al., 2010; Rijavec, Brdar, & Miljković, 2006). Accordingly, we have chosen to focus attention on a few key areas that are representative of the breadth of vitality research, including vitality's relations with need satisfaction, ego depletion, physical activity and health behaviors, nature, and mindfulness.

Need Satisfaction and Subjective Vitality

Ryan and Deci (2008, 2017) formally placed vitality within basic psychological needs theory (Vansteenkiste, Soenens, & Ryan, this volume), with their Proposition VI stating:

Subjective vitality is based on more than physical nutrients; it also reflects satisfaction versus thwarting of basic psychological needs for autonomy, competence and relatedness. Therefore, both externally controlling and self-controlling states are expected to deplete vitality, whereas basic psychological needs satisfactions are expected to enhance it. (Ryan & Deci, 2017, p. 258)

This reflects Ryan and Frederick's (1997) results showing that vitality is positively related to basic psychological need satisfactions, as well as similar findings by Baard et al. (2004) in the domain of work and Deci et al. (2006) in the domain of close friendships.

In fact, since these early studies, these associations have been repeatedly confirmed. As an illustrative case, Yu et al. (2020) investigated how basic psychological need satisfactions predicted both subjective vitality and *peace of mind*, both considered to be indicators of integrity and wellness, across East Asian and American samples. They found that vitality and peace of mind were positively associated with each other, and moreover that both were predicted by basic psychological needs, without moderation by sample. These results support the view that vitality as measured by the SVS is indeed a positive form of energy and SDT's universality claims, as culture did not moderate the impact of need satisfactions on either vitality or peace of mind.

Goal contents theory.

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Kasser and Ryan (1996) showed that this principle extended to intrinsic and extrinsic goal contents. Relative valuing and accomplishment of intrinsic goals was significantly associated with greater subjective vitality, presumably as a function of the positive effects of intrinsic goals on need satisfaction (see also Schmuck, Kasser, & Ryan, 2000). In fact a large number of studies have linked goal contents with vitality (see Bradshaw et al., 2021).

Ego Depletion Research

Muraven (2012), and Baumeister et al. (1998) brought the idea of ego depletion prominently into the literature. Although controversial in terms of the reliability of the effects (Hagger et al., 2017; Inzlicht & Friese, 2019; Vohs et al., 2021), the work on ego depletion has implications for SDT's approach to vitality, and thus there have been several experiments at the interface between the two theories.

First, the general predictions of the depletion model overlap with those of SDT in suggesting that self-controlling activities, those where one must "make" oneself act in certain ways, would be vitality-depleting. This is consistent with the autonomy-undermining effects found from both internally controlling and externally controlling events. SDT further adds the differentiation that truly autonomous activities would be less depleting (Quirin et al., 2021).

One controversy entered the picture, however, with the claim by Baumeister et al. (1998) that choice was itself depleting because it requires self-regulatory capacities to enact. In order to clarify that this was not contrary to SDT's position on energy, Moller et al., (2006) showed that when a person's "choices" were subtly pressured, as was done in Baumeister et al.'s experiments, there was indeed a depletion effect on vitality and performance. However, when participants were given a true choice condition, the ego-depletion phenomenon did not occur. That is, autonomy moderated the observed depletion effects, as predicted by SDT.

Muraven, Rosman, and Gagné (2007) and Muraven (2008) presented experimental evidence showing that the ego-depletion effects depend on relative autonomy. Specifically, it was shown that when self-control was perceived as autonomous, it was less energy-depleting than when it was controlling in nature. Based on this work, Muraven et al. (2008) examined the role of subjective vitality in the relationship between self-control and ego depletion. They placed participants in autonomy-supportive, neutral, or controlling conditions and requested they exert self-control by asking them not to think of a white bear while they were asked to write down any thoughts that came to mind in a five-minute period. Afterward, participants completed a set of motivation inventories and the SVS. Last, participants performed a response-inhibition task, which served as a measure of ego depletion. Results showed that those in the autonomy-supportive condition reported higher levels of vitality and performed better on the response-inhibition task, indicating less ego depletion. Those in the controlling condition had lower levels of subjective vitality and evidenced worse performance on the response-inhibition task.

p. 224 Rouse, Ntoumanis, and Duda (2013) examined how motivational climate (autonomy-supportive versus controlled) interacted with an ego-depletion condition to predict subjective vitality. Ego depletion was achieved by having participants engage in a cognitively fatiguing task. Results revealed that a high autonomy-supportive environment and an environment low in control was related to higher subjective vitality, regardless of whether or not participants were in the ego-depletion condition. Notably, the combined results of these two studies speak to the importance of autonomy-supportive environments on the experience of subjective vitality.

It is noteworthy that the ego-depletion model is built on the idea that the energy of willpower is a limited resource (see Baumeister et al., 1998), whereas SDT looks at vitality as a dynamic process within an open system. Yet because many forms of self-regulation are self-controlling, in those cases SDT predicts depletion, whereas opportunities for autonomy enhance vitality. Interesting in this regard is a longitudinal study by Sieber et al. (2019) showing that more autonomous goal striving predicts endorsement of belief that willpower is not a limited resource, a relation mediated by vitality. Put differently, whether people think their willpower is limited or not limited reflects how much vitality they are experiencing in everyday life, itself related to their autonomous strivings.

Physical Activity/Exercise

A key area of applied research involving subjective vitality has been the domain of physical activity—sport and exercise—with articles utilizing samples of young sport participants and PE students, individual and team athletes, and adult exercisers.

In work with youth athletes, research attention focused on how motivational climates and subjective motivational states influence levels of subjective vitality. Gagné, Ryan, and Bargmann (2003) studied youth gymnasts using a diary study format. Measures of subjective vitality were collected before and after practice to determine if vitality related to motivational style. Results of analysis showed that at a within-person level of analysis, ratings of vitality were negatively and significantly related to amotivation and positively and significantly related to intrinsic motivation.

Ommundsen et al. (2010) also examined well-being in youth athletes as influenced by motivational climate. Youth soccer players completed measures of motivational climate, basic psychological needs, and subjective vitality. The authors found that players with higher SVS scores reported a mastery climate and had higher levels of autonomy and intrinsic motivation. They also found that each of SDT's three basic psychological needs was a significant predictor of vitality, combining to explain 24% of the variance in the SVS.

Attention has also been paid to the study of exercise and physical activity in adult populations. Vlachopoulos and Karavani (2009) studied exercise participants in Greece, finding that autonomy support was a direct predictor of subjective vitality. Couto et al. (2017) showed that the relation between being physically active and exhibiting higher levels of vitality was present in older adults in Portugal. In a study with a general group of fitness center participants, Wilson et al. (2006) measured motivation and vitality before and after a 12-week program. Both perceptions of autonomy and competence were related to vitality at the time 1 assessment, but only competence was related to vitality at time 2. However, increases in both autonomy and competence over the course of the study resulted in corresponding increases in subjective vitality. Reinboth and Duda (2006) examined changes in need satisfaction and vitality over time within a sample of university athletes followed over the course of a competitive season. Using hierarchical regression, Reinboth and Duda reported that two variables, satisfaction of the need for autonomy and feelings of relatedness to the coach, were significant predictors of subjective vitality. Kinnafick et al. (2014) further showed that success in enhancing fitness in specific populations (e.g., inactive adults) can be achieved by providing an autonomy-supportive environment, which then leads to greater vitality and enhanced physical fitness. Rouse et al. (2015) showed the usefulness of the SVS as a measure of well-being in adults suffering from rheumatoid arthritis. This study also showed that higher levels of vitality were associated with better physical function and negatively related to perceptions of fatigue.

When examined as a group, these studies in the physical activity domain document the significant link between autonomy and competence and subjective vitality. In these studies, an environment that is perceived as supporting autonomy as well as individual perceptions of competence were related to levels of vitality. These studies also provide evidence that subjective vitality is related to positive psychological and physical performance outcomes, regardless of age of participant. Nonetheless, it is apparent that work in this area is in its early stages, and there is much more to know about how vitality is supported in physical activities, as well as how vitality may support long-term participation in exercise and physical activity.

Exposure to Nature

Several studies based in SDT have examined how physical environments impact vitality. Ryan et al. (2010) explored how outdoor space and nature affected vitality in a series of studies. Findings provided strong support for the hypothesis that being outside and in the presence of nature enhanced subjective vitality, even controlling for physical activity and social interactions. The study also found that subjective vitality was increased by viewing pictures of natural settings versus pictures of buildings and artifacts (see also Weinstein, Przybylski, & Ryan, 2009). However, not all outdoor spaces have this effect. For example, arid landscapes versus those with water were found to engender less vitality (Shalev, 2016).

Combining physical activity with nature may be especially vitality-boosting. Whereas even a brief walk can amplify feelings of vitality (Thayer, 2003), Takayama et al. (2014) suggested this positive effect is enhanced by being in a forest environment. However, Janeczko et al. (2020) found that both suburban and forest walks increase vitality. Thus, whether there is a robust incremental effect of nature on exercise-engendered energy will require further research.

Vitality and Mindfulness

Bishop et al. (2004) defined mindfulness as a state of consciousness that is comprised of two components: heightened or sustained *attention* and *awareness* of current internal and external events. Brown and Ryan (2003, p. 824), in their research validating the Mindful Attention Awareness Scale, also articulated the connection mindfulness has to SDT, arguing that “mindfulness may facilitate well-being through self-regulated activity.” Brown and Ryan found that mindfulness predicted autonomy at both state and trait levels of analysis.

In support of this premise, Brown and Ryan (2003) found that vitality was positively and significantly related to mindfulness in three separate samples. In a second study (Brown & Ryan, 2004), the relations between two aspects of mindfulness, presence and acceptance, was examined in relation to vitality. “Presence” referred to a state of current attention and awareness, while “acceptance” referred to a nonjudgmental review of emotional states. In this study, vitality related positively and strongly to presence but was unrelated to acceptance.

Since Brown and Ryan’s (2003, 2004) work, other studies have examined SVS in relation to mindfulness. Visser et al. (2015), examined the mediational role sleep quality may have in explaining how mindfulness predicts perceptions of vitality. As vitality is comprised of both psychological and physical elements of energy, lack of or poor-quality sleep can tax individuals’ physical resources, so even when mindfulness is present, perceptions of vitality may be lower. Results of this study found that only two variables mediated the relationship between mindfulness and vitality: habitual sleep efficiency and daytime disruption. To the extent that mindfulness can lessen the inability to fall or remain asleep, and also lessen inattention and attentional lapses during the day, it allows for more energy to be available to the self, and then results in higher levels of subjective vitality.

In a similarly formatted study, Wu and Buchanan (2019) examined the effects of coping factors on the relationship between mindfulness and subjective vitality. This study found that two coping strategies, being able to suppress emotion and directly addressing problems, mediated the relations between mindfulness and subjective vitality. The authors explain that mindfulness may allow for enactment of positive coping strategies, which in turn allow for increased levels of subjective vitality.

At this point many studies have confirmed the connections between mindfulness and subjective vitality (see Ryan, Donald, & Bradshaw, 2021). Indeed, a recent meta-analysis (Donald et al., 2020) showed how SDT’s taxonomy of motives was systematically related to mindfulness, such that the higher the degree of

p. 227 autonomy, the greater the association with mindfulness. Insofar as mindfulness serves to support or enhance autonomy, thereby ↪ freeing the flow of psychological energy needed to engage in life activities, it may also increase feelings of well-being, including subjective vitality.

Subjective Vitality and Health-Related Behaviors

Subjective vitality is a facet of well-being that encompasses both physical and psychological states. It is a natural assumption, then, to assume vitality is related to more optimal physical states, in much the same way positive emotion has been shown to relate to better health and the ability to ward off illness (Cohen et al., 2006). Hirsch et al. (2015) explored how vitality relates to physical, emotional, and social health factors. In this study of adults in a primary care setting, those who believed in a positive future orientation about their health exhibited higher levels of vitality, which in turn predicted higher self-reported levels of physical health, mental health, and social functioning. The results of this study suggest that vitality is closely tied to a sense of optimism and health.

A more recent study, by Arslan, Yıldırım, and Aytaç (2020), focused on attitudes toward coronavirus and how vitality may be associated with lower worry about the virus. Arslan et al. measured coronavirus anxiety, subjective vitality, loneliness, and rumination in a sample of young Turkish adults. “Rumination” was defined as chronic, negative thoughts and affect. The authors found that subjective vitality mediated the relation between present-state coronavirus anxiety and the longer-term outcome of rumination. Higher anxiety predicted a lower level of subjective vitality and a higher level of loneliness, which in turn predicted higher levels of rumination. Arslan et al.’s results supported prior findings linking subjective vitality with persistent health concerns.

Vitality has also been identified as a variable of interest in sleep research. For example, Visser et al. (2015) used vitality as an outcome related to mindfulness and sleep quality in older adults. Vitality was positively correlated with both mindfulness and sleep quality. In their path model, adults exhibiting higher levels of mindfulness experienced more sleep efficiency and less daytime dysfunction related to tiredness. In turn, these variables that are indicative of better sleep quality predicted higher levels of vitality. More recently, Campbell and colleagues (2014; Campbell & Vansteenkiste, this volume) showed that SDT’s basic need satisfactions predicted better sleep, and that both need satisfaction and sleep quality predicted daytime vitality.

Vitality in the Workplace

SDT has been of interest in many applied areas, including the work environment. Ryan et al. (2010) showed the importance of the fulfillment of basic psychological needs in enhancing vitality across both work and nonwork activities. Interestingly, for most workers vitality is lower at work and as a function of lower autonomy and relatedness in work settings.

p. 228 As it relates to the workplace, a key question is thus how the basic psychological needs of autonomy, competence, and relatedness are supported or thwarted at work, and ↪ how this affects employees’ energy and vitality. For example, Vansteenkiste et al. (2007) reported that extrinsic and intrinsic work environments differentially affect vitality, with on-the-job vitality levels being higher in intrinsic work environments. This study also showed that extrinsic environments thwart fulfillment of the basic psychological needs. Although this study did not use the SVS to measure vitality, a similar measure was used, supporting the idea that fulfilling basic needs at work contributes directly to perceptions of vitality (see also Nerstad et al., 2020).

Studies using the SVS have also examined how basic psychological need satisfactions in the workplace contribute to perceptions of vitality (Barati, Oreyzi, & Shahir, 2020; Karkkola et al., 2018, 2019). Karkkola et al. (2018) examined the relations between social support and subjective vitality at work, including social support from peers as well as supervisors. Relevant here is that all three of SDT's basic psychological needs predicted subjective vitality. In a similar study, Karkkola et al. (2019) again examined vitality, this time examining the relations between role clarity versus role conflict, basic needs, and vitality. When roles are clear, an employee can focus on and attain goals, creating a positive motivation environment. In role conflict, there is confusion about work demands and expectations, creating frustration and a negative motivational environment not conducive to fulfillment of needs or to vitality. Findings showed that in a work environment where role clarity was higher, so was subjective vitality, with autonomy and competence mediating this association. In contrast, the experience of role confusion negatively predicted autonomy and relatedness, which in turn predicted vitality.

A novel study by Op den Kamp et al. (2018) assumed that individuals play a role in managing their own energy (vitality) levels in the workplace and that such active energy management may in turn lead to more or less creative work performance. Vitality management was measured once a week for three weeks, as was creative work performance, a self-reported belief that workers produced creative solutions to work problems. Individuals who exhibited better vitality management also reported more creative work performance. This relation was especially robust for individuals with greater levels of self-insight and in work environments that provide social support for creativity.

Wohlers et al. (2019) looked at how the physical environment in the workplace affects vitality. They found that environments built to facilitate undisturbed work are associated with enhanced vitality and improved job-related attitudes. This is suggestive of how workplace studies can identify factors to enhance, or decrease the draining of, employees' energy levels.

Future Directions in the Study of Vitality

Vitality and the physical environment.

One future direction for vitality research is exploring with greater specificity how physical environments affect perceptions of vitality. As this chapter is being written, the COVID-19 pandemic is in full swing. People's typical activities and movements are restricted, and more time is spent indoors. There is ample evidence that people are now paying more attention to both indoor and outdoor environments. Home remodels are booming (CNBC, 2020), as people are assessing and paying more attention to the function and form of their interior spaces. In addition, engagement in outdoor activities during the pandemic has increased (OIA, 2020; News Medical Life Sciences, 2020). Our relationship to our indoor and outdoor spaces resulting from COVID restrictions is changing, and yet we don't know very much about how our physical environments impact vitality.

Studies, some of which we described above, show strong support for the hypothesis that physical environments, indoor and outdoor, can differentially influence our experience of vitality. Many lines of research can be explored to more deeply examine these relationships and how specific aspects of indoor or outdoor spaces can facilitate or suppress feelings of vitality. For example, Smolders, De Kort, and van den Berg (2013) specifically examined the role of light exposure in enhancing vitality. They showed that light exposure, especially when experienced in the morning and during times of the year when it is darker, enhanced subjective vitality. Factors such as size of rooms, number of windows, amount of natural light, height of ceilings, open versus closed floor plans, and the proportion of personal to public or group space in a structure are all environmental aspects worth studying in relationship to vitality. As we spend

considerable amounts of time in our indoor spaces, it is important to determine how those spaces impact our sense of energetic well-being. Outdoor environments differ as well (e.g., arid vs. green landscapes, managed vs. wild nature) in the affordances that may spark, or douse, feelings of vitality (e.g., see Janeczko et al., 2020; Shalev, 2016; Takayama et al., 2014).

Neurological and physiological mechanisms of vitality/depletion effects.

Whenever people discuss vitality, the joint influences of psyche and soma are clear, but the underlying mechanisms, both neurologic and physiologic, for how energy is unregulated or seemingly drained represent their own “mysterious leaps” from mind to body, to paraphrase Freud. How energy is differentially mobilized in autonomous versus controlled motivational contexts may, however, shed light on mechanisms. Lane et al. (2011) suggested that mobilization and depletion of energy is an issue of glucose allocation, in which glucose transport mechanisms respond to the subjective importance or value of events. Applying this idea and drawing from both personality systems interaction theory and SDT, Kazen, Kuhl, and Leicht (2015) found that relative to people performing under controlling regulation, those acting autonomously showed increased allocations of blood glucose, thereby invigorating performance. Those doing the task in an autonomous way also performed better and experienced it as less effortful. The study is provocative in suggesting glucose allocation as a bidirectional influence, conditional on autonomous versus controlled motivation.

p. 230 Although how the body fuels itself is well understood, how psychological mechanisms amplify or deplete available energies is less so. This is a place where mind-body interaction—or more rightfully, an organismic perspective—has rich territory to explore. Especially given the increasing understanding of how need satisfactions are represented neurologically (see Lee, this volume; Di Domenico & Ryan, this volume), we are converging toward new models of motivation and its energization. Just as important would be studies of cardiovascular dynamics (blood pressure, pulse rate, heart rate variability) in states of vitality, as well as hormonal dynamics (e.g., cortisol changes).

Connection and love as basic sources of vitality.

A good deal of research has established that subjective vitality fluctuates as a function of autonomy and control. Evidence with respect to other basic needs is less common. Important especially is a better understanding of how relationships and their various qualities impact vitality. We all know the anecdotes of falling in love leaving people bursting with energy, and rejection and exclusion having depleting effects. But how and why this occurs deserve more research attention.

Conclusion

The subjective energy we have to act, to cope, and to thrive fluctuates not only with physical factors such as sleep, nutrition, and exercise but also with psychological factors, including variations in autonomous and controlled motivations and psychological need satisfactions and frustrations. In this chapter we presented an incomplete overview of nearly 25 years of research on subjective vitality attesting to these dynamics. Our review shows the vibrancy of subjective vitality research within SDT, through studies validating the SVS and examining the import of subjective vitality in multiple life domains, including work, sport, and love. There are many future avenues for vitality research, including better specification of environmental catalysts of energy, more research on physiological and neurological mechanisms underlying perceived energy, and further studies on the best self-regulatory and self-management styles to maintain and enhance one's vitality. There is little doubt that vitality will remain a central construct within SDT and that theory and research on the energy available to the self will continue to evolve.

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