



Editorial

Positive psychology and health: Well-being interventions in the context of illness[☆]

In the past 20 years, it has become clear that positive affect and related constructs such as optimism, are uniquely related to better psychological and physical health, independent of the effects of negative affect [1–7]. Positive affect is associated with a host of beneficial outcomes including better relationships, more creativity, better quality of work, higher likelihood of prosocial behavior [8], better physical health [9] and even a lower risk of mortality in healthy as well as chronically ill samples [10–14]. Building on these observational studies that demonstrate the potential for positive affective constructs to improve physical and psychological health, researchers have begun to test positive psychological interventions (PPIs) that specifically target positive emotions, cognitions, and behaviors [15]. PPIs have shown efficacy for improving psychological well-being across a number of different samples [16–19] although effects on physical health are just beginning to emerge (e.g., [20–23]).

Despite the promise of PPIs there are a number of questions that have yet to be answered. These include questions of *efficacy* (such as which outcomes are most influenced by practice of PPIs?), *mediators* (what are the mechanisms or pathways through which PPIs may impact physical health?), and *moderators* (Which activities work for whom? Are there other characteristics of interventions such as frequency, dosage, or delivery method that impact the effects of the PPIs?).

A number of theoretical models can help guide research into questions of efficacy and mechanisms or explanatory pathways that link PPIs to outcomes. The Broaden-and-Build Theory of positive emotion [3] describes how positive emotion broadens thinking and behavioral options and posits that repeated experiences of positive emotion build social, intellectual, and physical resources in an adaptive upwards spiral. The revised Stress and Coping Model [1] describes ways positive emotion is beneficial in the context of stress. Positive affect supports coping by providing a psychological “time-out” from stressful experiences and motivating and sustaining ongoing efforts to cope. Specific to physical health, Pressman and Cohen [9] suggest extensions of these models proposing direct and stress buffering effects of positive affect on health. Positive affect influences health through beneficial health behaviors, adaptive physiological effects (e.g., immune and cardiovascular function), as well as through improvements in social and psychological resources. The stress buffering model posits that the health benefits of positive affect arise primarily through the reductions in deleterious physiological reactions to stress [24].

Whereas these models encompass observational studies, Lyubomirsky and Layous proposed the positive activity model [25] focused on PPIs explicitly. The positive activity model posits performance of positive activities increases positive emotions, positive

thoughts, and positive behaviors, and satisfies needs (e.g. relatedness and autonomy) which lead to increased well-being. The positive activity model extends to moderators as well and addresses questions of which characteristics of individuals (e.g., demographics, personality) or programs (dosage, frequency, person-activity fit) lead to better outcomes in response to PPIs.

In Fig. 1, we bring together this previous theoretical work in the *Positive Pathways to Health: Linking Optimal Wellness to Emotion Regulation* (PPHLLOWER) model to guide PPI research in addressing the critical questions of efficacy, mechanistic pathways, and moderators. The PPHLOWER model posits that engaging in the positive activities in PPIs increases the frequency of positive affect. Positive affect has a range of proximal effects such as providing a timeout from stress [26], prompting more adaptive coping strategies [1], broadened attention and cognition and increased behavioral action tendencies [3], reduced emotional reactivity to daily stress, and strengthened social relationships which all lead to reduced stress. In turn, this reduction in stress predicts better physiological functioning (e.g., quicker autonomic recovery after a stressful event) [9,24,27] greater engagement in health behaviors [28,29] which ultimately leads to improved physical and psychological well-being. Individual characteristics such as type of stress (e.g., caregiving stress, coping with the diagnosis of a chronic illness, daily hassles), baseline levels of depression and well-being, sociodemographic characteristics, and dispositional or personality factors constitute one class of potential moderators. Other potential moderators include dosage and frequency of activities [25] the particular positive activity and match to individual [30] and delivery mode (on-line self guided, in person, etc.).

The six papers included in this special section on “Positive Psychology and Health: Well-being Interventions in the Context of Illness” each touch on one or more components of the PPHLOWER model. Although it would be practically impossible for a single study to address all aspects of the model, each of these helps to advance our understanding of PPIs by addressing questions of what works, for whom, and through what mechanisms.

A key issue for efficacy is the selection of outcome on which to determine answers to the question of what works. Painter et al. [31] present data on the preliminary efficacy of a group PPI tailored specifically for people with bipolar disorder. Notable in this study is the careful thought to the selection of outcomes to demonstrate potential efficacy of the intervention in this population. Beyond simply increased positive emotion, the authors differentiate between high and low activation emotions as well as how much participants valued different emotional states. The focus on low activation positive emotions (e.g.,

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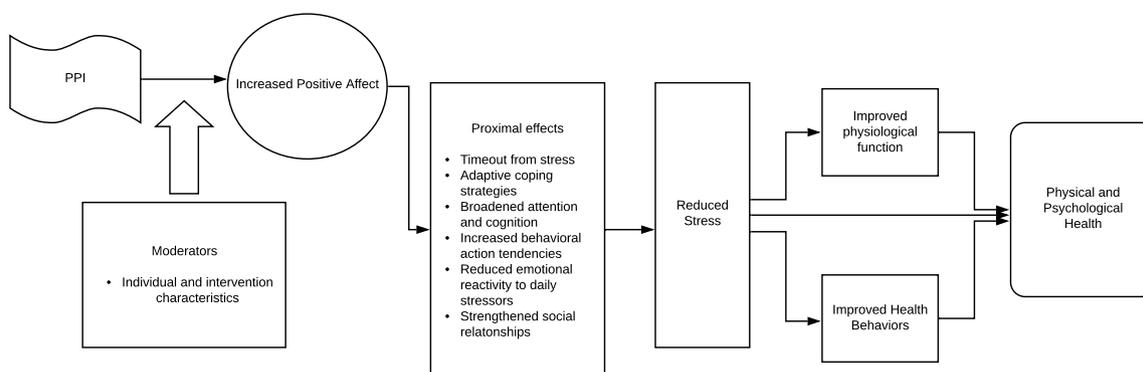


Fig. 1. PPHLOWER model of PPI effects on physical and psychological health.

calm, rested, relaxed, peaceful, serene) is particularly important for people with bipolar disorder given that high activation positive emotions may be a symptom of or trigger for mania.

Our model proposes multiple potential mechanistic pathways through which PPIs may lead to improved health. Hoepfner et al. [32] begins to explore one of these mechanistic pathways: broadened cognition. The authors focus in on the short-term cognitive benefits of different PPI activities in a sample of substance users. Using an experimental design in which participants were randomly assigned to engage in one of five positive activities (3 good things; experiencing kindness; savoring; rose, thorn, bud; or reliving happy memories) the authors examined which activities had the greatest impact on action tendencies – participants' lists of what they would like to do “right now.”

Tirpak et al. [33] examined several positive constructs as indicators of efficacy of CBT compared to a waitlist control in people with anxiety. Outcomes included positive affect, quality of life, and savoring beliefs. Their study highlights the importance of assessing positive emotions, behaviors, and cognitions in interventions that aren't exclusively targeting these constructs given the historical emphasis on negative outcomes alone in treatment studies for anxiety and other disorders. Tirpak et al. begin to examine the question of content of intervention, another potential moderator of efficacy in PPIs. This is an important area of work given the overlap between CBT and many PPIs on activities such as cognitive reappraisal.

Nikrahan et al. [34] describe the impact of an 8-week group PPI in cardiac patients exploring several indicators of efficacy including well-being, depression, positive and negative affect, and optimism. Results indicated that there were no effects on positive or negative affect, although well-being, depression, and optimism all appeared to be responsive to the intervention. There are a number of possible explanations for the lack of impact on affect – was it a measurement issue? Lack of power? Simply no impact on affect in this particular sample? Future work will likely focus on exploring these possibilities.

Lopez-Gomez et al. [35] take a novel approach to examining moderators of PPI and CBT interventions for women with depression. In a previous publication, the authors demonstrated that a PPI and CBT were equally effective in reducing depression in a sample of women. This secondary data analysis applied the personalized advantage index (PAI) to indicate which intervention is optimal for a given individual, based on their particular combination of potential moderators. Even though the main analyses of the RCT indicated that both treatments showed improvements, using the PAI approach, authors demonstrated that for participants who had greater mental and physical comorbidity, prior antidepressant use, higher levels of negative thoughts, and higher personal growth, the PPI was more likely to be effective.

Finally, Duque et al. [36] examined whether positive affect or optimism mediated the effects of a PPI on physical activity, thus addressing the question of how a PPI might impact physical health. Although previous analyses demonstrated that both positive affect and optimism

increased in response to the PPI, only positive affect was associated with better adherence to physical activity recommendations in a sample of patients with acute coronary syndrome. This study is one of the first to explicitly test the health behavior pathway through which PPIs are theorized to impact physical health.

Every study has its limitations, and the studies in this special section are no exception – the samples are not perfectly representative of their target populations; measures are not always optimal, and sample sizes are small. Moving forward, it is important for investigators to carefully consider which questions they aim to answer, guided by theory and previous empirical findings, and then design the studies around those considerations.

With respect to efficacy, it is important to carefully consider how outcomes are operationalized. For example, if positive emotion is hypothesized to be the primary indicator of efficacy (as it is in many of our studies), important considerations include which emotions, specifically, over what time frame would be expected to be influenced by the intervention (e.g., Painter this issue [31]). For example, if the hypothesis is that higher activation positive emotional states are most likely to be impacted by a given PPI, then the PANAS [37] is a logical choice for emotion measure [24,38]. Furthermore, retrospective time frame (e.g., past month, past day, right now) for measurement and looking beyond mean levels to indicators of variability of emotion (e.g., [39,40]) are important areas for future PPI efficacy work.

Investigators are just beginning to examine the pathways that link PPIs to physical and psychological health and there are dozens of mediation questions to be answered as outlined in the “proximal effects,” “reduced stress,” “physiological function,” and “health behavior” boxes outlined in the PPHLOWER model. Full explication of the pathways through which PPIs may impact physical and psychological health will require multiple approaches and interdisciplinary teams: basic lab manipulation of positive affect (e.g., [32,41]); field studies where hypothesized mediators are examined “in the wild,” as well as tests in clinical settings (e.g., [34,36,42]).

Finally, the question of moderators – which PPIs work and for whom – is fertile ground for future studies. It is important that beyond the positive activities themselves being a match for the individual, PPIs should be tailored to be maximally engaging for different populations to best fit with their social and psychological context. Technology allows for PPIs to be more broadly studied (and disseminated) but care should be taken to ensure that online or app-delivered PPIs are as impactful as in-person delivery (e.g., [43,44]). The articles included in this special section demonstrate that PPIs can be efficacious across a wide range of samples (depression, anxiety, bipolar disorder, acute coronary syndrome, substance users). Further explication of moderators will require large sample sizes so within-study moderator analyses are adequately powered.

The articles in this special section add to the burgeoning literature on PPIs and help to advance our understanding of what works, for whom, and through which pathways. Future studies guided by models

such as the one proposed here, will answer questions of efficacy, mediators, and moderators, and ultimately support the broader dissemination and implementation of PPIs to maximally impact psychological and physical health.

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