



The cascade of positive events: Does exercise on a given day increase the frequency of additional positive events?



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ABSTRACT

Research suggests exercise promotes well-being while reducing the risk and symptoms of certain psychiatric disorders. Similarly, positive events improve quality of life and may minimize the impact of negative life events; a dearth of positive events is also associated with increased psychiatric symptoms. Thus, increasing physical exercise and the occurrence of positive events is central to well-being promotion. Behavioral activation theory suggests the occurrence of one positive event increases the likelihood of engaging in subsequent positive events. We used a daily diary approach to examine this possible positive cascade, exploring relationships between exercise and positive social and achievement events. For three weeks, participants ($N = 179$) completed questionnaires at the end of each day. Multi-level modeling analyses revealed that daily exercise predicted increased positive social and achievement events on the same day. Exercise on one day also predicted greater positive social events on the subsequent day. Positive events did not affect exercise on the next day. Findings suggest that exercise creates a positive cascade, increasing positive social and achievement events experienced on the same day and positive social events on the following day.

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1. Introduction

Growing interest in the mechanisms underlying subjective well-being has prompted increased investigation of positive events in daily life. Existing research has linked positive daily events to a plethora of well-being indicators, including increased life satisfaction (McCullough, Huebner, & Laughlin, 2000), positive affect (e.g., Watson, 1988), self-esteem (Nezlek, 2005), and meaning in life (Machell, Kashdan, Short, & Nezlek, 2015). Relatedly, a lack of positive daily events often co-occurs with various psychopathology symptoms, such as depression and anxiety (Cuijpers, van Straten, & Warmerdam, 2007; Kashdan & Steger, 2006). While the benefits of regular positive events are manifold, the strategies to increase day-to-day positive events remain poorly understood. The present study sought to address this gap by examining the benefits of one particular, controllable positive event, daily exercise, as a precursor to subsequent positive events.

1.1. The benefits of exercise

Exercise, defined as “bodily exertion for the sake of developing and maintaining physical fitness” (Merriam-Webster, 2015), significantly benefits both physical and psychological health. Exercise can serve as a protective factor against heart disease, stroke, type 2 diabetes, hypertension, obesity, and some cancers (CDC, 2015), and it is often used as a first-line intervention for better physiological health. A wealth of literature also supports a link between exercise and increased positive mood, reduced depression and anxiety, and greater well-being (for a review, please see Stathopoulou, Powers, Berry, Smits, & Otto, 2006). Individuals who report higher psychological well-being tend to exercise more frequently than those with low well-being (Lox, Burns, Treasure, & Wasley, 1999), and exercise is associated with lower emotional distress (Steptoe & Butler, 1996). A large number of studies illustrate the effectiveness of physical exercise for reducing depressive symptoms in both clinical (e.g., Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005) and community (e.g., DiLorenzo et al., 1999) samples. Even brief, low-intensity episodes of physical activity, such as walking, can result in significant same-day mood improvements (Kanning & Schlicht, 2010), and there is empirical support for significant associations between exercise

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and lower rates of social anxiety disorder, specific phobias, and agoraphobia (Goodwin, 2003). Not only does exercise contribute to physical and psychological well-being, but it may also reduce the symptoms associated with certain psychiatric disorders.

1.2. Exercise as a positive event

Considering the established physical and psychological benefits of exercise, it is unsurprising that exercise might be categorized as a positive event within the context of an individual's day-to-day life. Indeed, exercise frequently appears on measures of positive events, such as the Daily Events Survey (Butler, Hokanson, & Flynn, 1994) and the Positive Events Scale (MacPhillamy & Lewinsohn, 1982). Evidence from daily diary studies upholds this inclusion, linking exercise to improved mood on a given day (Giacobbi, Hausenblas, & Frye, 2005), while research using ecological momentary assessment has demonstrated immediate and sustained increases in positive affect following exercise (e.g., Wichers et al., 2012). In addition, recent work by Kanning and Schlicht (2010) provides evidence of increased feelings of contentment, energy, and calmness following periods of physical activity in daily life. Research indicates that affective responses significantly influence whether an event is judged as positive or negative (Brendl & Higgins, 1996). Given the positive affective response associated with exercise, its categorization as a positive event is supported.

1.3. The benefits of positive events

There is extensive research supporting the influence of positive events, such as exercise, on well-being. In one study, college students engaged in either two or twelve enjoyable events, including exercise, during a 1-month period (Reich & Zautra, 1981). Participants in the experimental groups reported greater quality of life compared to controls, who were not encouraged to engage in positive events. Further, more positive events led to better outcomes, as participants who reported more initial negative events exhibited lower distress when instructed to engage in twelve activities rather than two or none.

Research has traditionally classified positive events into two subcategories: social and achievement events. The two represent conceptually distinct domains, with the former referring to events involving a successful or enjoyable interaction with others (e.g., a pleasant conversation with friends), while the latter involves events that promote goal-achievement (e.g., completing a project). Daily positive achievement events have been linked to greater daily well-being, and daily positive social events to increased self-esteem (Nezlek, 2005). More recent research found that both positive daily social and achievement events were related to greater daily meaning in life, above and beyond the contributions of daily positive and negative affect (Machell et al., 2015). Given the empirical support for the association between these types of positive events and various indicators of well-being, we opted to assess the daily occurrence of both positive achievement and social events, as a better understanding of how to increase positive events on a daily basis may improve efforts to enhance well-being.

1.4. The generation of positive events: Creating a positive cascade

There is reason to believe that one positive event might increase the likelihood of subsequent positive events. In line with behavioral activation (BA) theory, a positive event, such as exercise, may expose an individual to environmental reinforcers and subsequently improve thoughts, mood, and overall quality of life (Hopko, Lejuez, & Robertson, 2006). BA has been successfully implemented as a treatment for depression (e.g., Jacobson, Martell, & Dimidjian, 2001) and anxiety (e.g., Hopko et al., 2006), where clinicians emphasize strategies to reduce avoidant behaviors and augment engagement in potentially rewarding situations. Ultimately, repeated engagement in rewarding situations is theorized to disrupt habitual patterns of withdrawal

behavior. Engagement in exercise may serve as a mechanism to increase engagement in future positive events, leading to a "cascade" of positive experiences. Results of a specific case study provide support for the notion that the engagement in goal-directed activities (e.g., spending time with family, practicing relaxation techniques, exercising) provided increased positive reinforcement, leading to an overall decrease in withdrawal behavior (Hopko et al., 2006). By providing this reinforcement, positive events such as exercise may increase the likelihood that an individual will continue to pursue positive reinforcement by engaging in additional positive activities. In this vein, successful engagement in one positive event (e.g., exercise) may increase the likelihood that subsequent positive events will occur.

Given the possibility of this positive cascade, it is important to note that exercise may be a uniquely attractive positive event to target. Not only is exercise linked to various psychological and physical benefits, it also has the capability of serving as both a social (e.g., jogging with friends) and achievement (e.g., completing a workout routine) event. Though exercise can be a social event, many exercise activities (e.g., walking or jogging) may be done alone, and the completion of solitary exercise may be classified as an achievement event. Furthermore, many exercise activities can be completed without specific equipment. As a result, exercise requires little to no cost and can be immediately available to the majority of individuals. With this in mind, we chose to focus on exercise as a simple and controllable positive event, which might serve to trigger a cascade of subsequent positive events.

1.5. Present study

We designed our study to examine the relationship between exercise on a given day and other daily positive social and achievement events. As our study is the first to explore these constructs together at the daily level, we reached our hypotheses cautiously. Our primary hypothesis was that exercise on a given day would be positively related to the occurrence of positive social and achievement events on the same day. Because the same-day relationships discussed so far do not address direction of causality, we also examined lagged relationships between daily exercise and positive social and achievement events. Specifically, we explored the relationship between exercise on day n and positive social and achievement events on day $n + 1$. We expected exercise on one day to predict increased positive social and achievement events on the next day.

Daily diary methodology may be particularly apt to examine the impact of exercise on positive events. This contextualized approach is able to capture within-person variability which can be missed by traditional global assessments. Daily diary studies also reduce the potential for recall bias by minimizing both the distance between an event and its recollection, as well as the number of events being recalled at one time (Nezlek, 2011). Relatedly, reviews of the exercise literature identify the frequent use of correlational designs by researchers examining the effects of exercise (e.g., Michie, Rothman, & Sheeran, 2007; Webb & Sheeran, 2006) as a limitation warranting immediate attention. To our knowledge, no research to date has explicitly examined the relationship between daily exercise and daily positive social and achievement events.

2. Methods

2.1. Participants

We initially sampled 186 college students from the Northern Virginia area. Seven participants were excluded for providing <14 days of data. The final sample consisted of 179 participants (127 women) with a mean age of 24.00 years ($SD = 9.07$) and an ethnic composition of 56.6% Non-Hispanic White, 12.7% Latino/Hispanic, 12.7% Asian, 7.8% African American, 1.8% Middle Eastern, 1.2% Native American, and 7.2% other.

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