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Does leisure time moderate or mediate the effect of daily stress on positive affect? An examination using eight-day diary data

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Abstract

This study tested the applicability of moderation and mediation models to leisure time as a stress coping resource. Analyzing eight-day diary data (N=2,022), we examined the *within*-person process of using leisure time to cope with daily stressors. We found that relatively high daily stress frequency, while reducing positive affect, prompted an individual to allocate more time to leisure than usual, which then increased positive affect, thus partially remedying the damage by high daily stress frequency. This within-person process, however, is significantly stronger among those with less leisure time on average than leisure-rich individuals. The findings support a partial counteractive mediation model, demonstrate between-person difference in the within-person coping process, and reveal the importance of positive affect as a coping outcome.

Keywords

leisure time; daily stress; mediation; moderation; positive affect

Daily stressors refer to “routine challenges of day-to-day living” (e.g., meeting work deadlines) and unexpected small events that disrupt daily life (e.g., arguments with one’s spouse) (Almeida, 2005, p. 64). Researchers have reported that frequent experiences of daily stressors have powerful influences on psychological well-being (Almeida & Kessler, 1998; Stawski, Sliwinski, Almeida, & Smyth, 2008). The significance of daily stress led researchers to examine various resources that help people cope with stress. One identified coping resource is leisure (e.g., Kabanoff & O’Brien, 1986; Reich & Zautra, 1981; Wheeler

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& Frank, 1988), the value of which, according to multiple researchers (Folkman, Moskowitz, Ozer, & Park, 1997; Pressman, et al., 2009), deserves more attention. It has also been suggested that studying how individuals use a particular resource, such as leisure, to cope with various stressors may be more informative than examining many ways of coping with certain stressors (Costa, Somerfield, & McCrae, 1996).

Studies in the leisure field, echoing the above suggestions, have focused on leisure as a coping resource (e.g., Chun, Lee, Kim, & Heo, 2012; Nimord, Kleiber, & Berdychevsky, 2012) and have tested various theoretical models that may explain how individuals use leisure to cope with stress, including moderation and mediation (e.g., Iso-Ahola & Park, 1996; Iwasaki, 2003a). According to the moderation model, a coping resource has the greatest protective effect when an individual is exposed to the most intense stressors (Pearlin, 1999). According to the mediation model, exposure to stress influences a mediator, which then affects psychological outcomes (Aneshensel, 1999). So far, empirical studies of leisure coping have produced inconsistent results for both moderation (Iso-Ahola & Park, 1996; Iwasaki & Mannell, 2000; Kirkcaldy & Cooper, 1993) and mediation (Iwasaki, 2003a; 2003b) models, indicating need for further research.

Besides mixed evidence for the two theoretical models, there are gaps in the leisure literature that call for more research. First, previous research (e.g., Heintzman & Mannell, 2003; Iso-Ahola & Park, 1996) mainly conducted *between*-person comparisons. Few studies have taken a *within*-person approach to trace how the process of using leisure to cope with stress unfolds within the same person over time. Second, previous research either studied leisure as activities (e.g., Caltabiano, 1995; Zuzanek, Robinson, & Iwasaki, 1998) or assessed the underlying psychosocial mechanism of leisure as a coping resource (e.g., Iwasaki, 2003b). Despite the psychological benefits of having leisure time (Robinson, 1995), few studies examined the time aspect of leisure, i.e., whether the amount of leisure time a person has helps him/her cope with stress. Third, positive affect is a significant stress outcome (Folkman and Moskowitz, 2000), and the ability to sustain positive affect in time of stress can help prevent the onset of serious psychological symptoms (Ong, 2010). Despite the importance of positive affect, it is unclear whether leisure as a coping resource sustains positive affect in time of stress.

To fill the gaps in the literature, the purpose of this study is to examine whether the moderation or mediation model explains the effect of leisure time as a coping resource on positive affect on days with frequent daily stressors. We also examine whether there is any between-person difference in the within-person coping effect.

Daily Stress Frequency and Coping

Researchers have documented frequency of daily stressors among adult Americans. For example, Almeida, Wethington and Kessler (2002) collected daily diary data from a national sample of adult Americans for eight consecutive days, and found that the participants experienced at least one daily stressor on nearly 40% of the study days. On more than 10% of study days, participants experienced multiple daily stressors. Past studies (Almeida & Kessler, 1998; Stawski, et al., 2008) have also demonstrated that daily stressors have

powerful influence on well-being, by having separate and immediate effects that are confined to a single day, and by piling up over several days to create lasting frustrations and irritations (Almeida, 2005; Lazarus, 1999; Zautra, 2003).

Given the significance of daily stressors, researchers have examined various resources that facilitate coping, such as social support and self-esteem (e.g., Krause, 1987; Russell & Cutrona, 1991). Another coping resource that has been identified is leisure. For example, Reich and Zautra (1981) found that regular weekly participation in pleasurable activities (including leisure) is related to lower distress, especially among those who experienced high level of stress. Wheeler and Frank (1988) identified four stress buffers, one of which is leisure activity. Given the promise of leisure as a coping resource, multiple stress researchers (Folkman, et al., 1997; Pressman, et al., 2009) suggested that studying leisure is an important agenda, the result of which can contribute substantial knowledge about how people cope with stress.

Leisure as a Stress Coping Resource: Moderation or Mediation

Leisure researchers have tested various models that may explain the role of leisure as a stress coping resource (e.g., Iso-Ahola & Park, 1996; Iwasaki, 2003b; Iwasaki & Mannell, 2000). Two models have received lasting attention: moderation (also termed the buffer model) and mediation. According to the moderation model (Figure 1), a coping resource has the greatest protective effect when an individual is exposed to the most intense stressors (Pearlin, 1999). On occasions when a coping resource is less needed, the individual also gains less from the resource. In other words, the occasions when the individual is most protected by the coping resource are the very occasions when an individual is at the greatest risk for detrimental outcomes of stress. Therefore, the scope and intensity of stress influence the magnitude of the protective effect of the resource. As illustrated in Figure 1, path *a* shows the protective effect of coping resource on psychological outcome, which is influenced by the scope and intensity of stress (path *b*).

Multiple studies in the leisure literature have tested whether the moderation model applies to the effect of leisure coping. Caltabiano (1995) found that frequency of stressful life events moderated the effect of social leisure activities on illness symptoms. Iso-Ahola and Park (1996) reported that the effect of leisure companionship on depression differed by life stress frequency. More recently, Schneider, Ainbinder, and Csikszentmihalyi (2004) revealed that pursuing leisure activities had much greater psychological benefits for high-stress working parents than low-stress ones. Researchers have also studied the effect of physical activity, but the results were not significant (Kirkcaldy & Cooper, 1993; Zuzanek et al., 1998). Overall, the support for the moderation model has not been consistent.

Mediation is the other model tested by leisure researchers (Figure 2). In the model, a mediator is a factor that intervenes in the stress-health relationship (Aneshensel, 1999; Stone & Neale, 1984). A stressor influences the mediator, which then affects psychological outcomes (Aneshensel, 1999). Therefore, the effect of the stressor on psychological outcomes is transmitted through the mediator. The mediation model can take effect in two ways: deterioration and counteractive (Ensel & Lin, 1991; Pearlin, 1999). According to the

deterioration effect, stressors reduce the capacity of coping resources, which subsequently undermine health and well-being. The counteractive effect, on the other hand, reasons that stressful events prompt an elevation of resources to a higher level that consequently enhances well-being (Iwasaki, 2003b).

Research in the leisure field has provided empirical evidence for the mediation model, and the results indicated that the mediation model mainly works for stress severity rather than stress frequency. Iwasaki (2001) reported that beliefs in the coping capacity of leisure mediated the effect of stress severity on mental ill-health and psychological well-being among undergraduate students. Using the same dataset, Iwasaki (2003a) found that multiple strategies of using leisure as a coping resource (termed as “leisure coping strategies”) mediated the effect of stress severity on immediate coping outcomes. In another study, Iwasaki, Mannell, Smale and Butcher (2002) replicated the mediation effect of leisure coping strategies on the relationship between stress severity and mental health among police and emergency response service workers. However, using the same dataset but with stress *frequency* as the independent variable, the mediation model was not supported (Iwasaki, 2003b).

Clearly, mixed evidence exists for the moderation and mediation models, indicating that more research is needed. Moreover, there are at least four gaps in the literature that require further research. First, past studies mainly conducted between-person comparison, which is informative but not enough in explaining the effect of leisure coping. A *within*-person strategy is also needed to examine how the less coping process unfolds within the same individual over time (DeLongis, Folkman, & Lazarus, 1988). Such strategy can also be augmented by studying how within-person processes differ between individuals (Nesselrode, 1991).

The second gap in the leisure literature is that daily stress, despite its significance, has received little attention. Iwasaki (2003b) did measure daily stressors, but its conceptualization of stress also included chronic stressors and major life events. Doing so confounded types of stressors, leaving it unknown to what type(s) of stressors the mediation model is not applicable.

Third, most studies either examined leisure as activities (e.g., Calabiano, 1995; Zuzanek, et al., 1998) or assessed the psychosocial functions of leisure as a coping resource (e.g., Iwasaki, 2003b; Iwasaki & Mannell, 2000). Although scattered evidence suggested that the time aspect of leisure also contributes to stress coping (Bedini, Gladwell, Dudley, & Clancy, 2011; Heintzman & Mannell, 2003; Korpela & Kinnunen, 2011), no study has examined the effect of leisure time availability—the amount of time an individual has for leisure. Leisure time availability is important, because lowest amount of leisure time has been associated with highest level of psychological stress (Zuzanek, 1998) while having leisure time benefits stress coping (Patry, Blanchard, & Mask, 2007) and psychological well-being (Pressman, et al., 2009). Hence, more research is needed to understand whether leisure time availability matters to stress coping.

Fourth, the outcomes that most studies of leisure coping assessed include mental health, quality of life, and life satisfaction (e.g., Iwasaki, et al., 2002; Kirkcaldy & Cooper, 1993; Schneider, et al., 2004), all of which are indicators of well-being. Positive affect, another indicator of well-being (Carstensen, Charles, Isaacowitz, & Kennedy, 2003; Mroczek, 2001), has rarely been assessed. Moreover, positive affect ebbs and flows with daily experiences and may be the more interesting variable to study in the context of daily lives (Clark & Watson, 1988). Thus, assessing positive affect as an outcome may help us understand how leisure time is used to cope with daily stress.

Positive Affect as Stress Outcome

Both cross-sectional studies (Neale, Hooley, Jandorf, & Stone, 1987; Repetti, 1993; Watson, 1988) and those using repeated-measure designs (Smyth, Ockenfels, Porter, Kirschbaum, Hellhammer & Stone, 1998; Stawski, et al., 2008; van Eck, Nicolson & Berkhof, 1998; Zautra, Affleck, Tennen, Reich, & Davis, 2005) showed that daily stressors lead to decrease in positive affect. While stressful experiences reduce positive affect, researchers also pointed out that the ability to sustain positive affect in time of stress can provide “an important psychological time-out”, which may help prevent onset of serious psychological symptoms, such as depression (Ong, 2010, p. 361). However, exactly what coping resources people use to derive positive affect in stressful situations is still understudied. Multiple studies have associated pleasant events during leisure time with positive affect (David, Green, Martin, & Suls, 1997; Folkman & Moskowitz, 2000; Moskowitz, 2011). Studies of leisure have also demonstrated a positive relationship between leisure pursuits and positive affect (Carruthers & Hood, 2004; Hills & Argyle, 1998; Lawton, 1994, 1996; Lee, Dattilo, & Howard, 1994; Mitas, Qian, Yarnal, & Kerstetter, 2011; Ulrich, Dimberg, & Driver, 1991). However, none of these studies examined whether leisure is able to sustain positive affect when individuals are faced with daily stressors. In short, positive affect is an important stress outcome and leisure can generate positive affect, but no research has linked together and examined the relationship between daily stress, leisure and positive affect.

Research Purpose and Questions

The purpose of the current study is to examine, using a within-person approach, whether the moderation or mediation models explain the effect of leisure time as a resource to cope with daily stressors. Specifically, we asked two research questions (RQ), which are presented in model format in Figure 3. First, did leisure time moderate or mediate the effect of daily stress on positive affect? While the first RQ focuses on the within-person coping process, the second RQ examines between-person differences in the within-person process: Does the within-person process differ between individuals with little leisure time on average and those with abundant leisure time on average? In all analyses, we controlled for the effects of age, gender, educational level, employment status, marital status, and race.

Method

Sample and Procedure

Data for the current study came from the National Study of Daily Experiences (NSDE; Almeida, et al., 2002), which is the daily diary interview portion of the National Survey of Midlife in the United States (MIDUS). NSDE collected data from a national sample of the non-institutionalized, English-speaking population in the United States (N=2022). The sample, predominantly Caucasian (92%) and more than half female (56%), ranged in age from 33 to 84, with the majority being married (72%) and having 13 years or more education (70%). Participants completed a telephone interview at the end of each day for eight consecutive days, yielding 16176 completed interviews (2022 participants * 8 interview days). During each of these interviews, participants answered several questions about the previous 24 hours, including their experiences of stressful events, time use behaviors, physical symptoms, and positive and negative affect. NSDE data collection was spread across an entire year, and consisted of separate “flights” of interviews. Each flight, representing the eight-day interview sequence, was the same in content and execution. Each participant completed one flight of interviews and received \$25 for participating in the NSDE (for details regarding data collection, see Almeida, McGonagle, & King, 2009).

Measures

For the current study, we utilized self-reported measures of the frequency of daily stressors, daily leisure time availability, and positive affect. The effects of age, gender, educational level, employment status, marital status, and race were controlled for in the analyses.

Frequency of daily stressors—Daily stressors were assessed through the semi-structured Daily Inventory of Stressful Events (DISE, Almeida, et al., 2002). The inventory consists of seven stem questions asking whether the following seven types of daily stressors occurred within the previous 24 hours: arguments, tensions (could have had an argument but avoided), work/school stressors, home stressors, network stressors (stressors that involve the participant’s network of relatives or close friends), discrimination, and other stressors. For each daily interview, participants received a value of 1 for the relevant stressor domain if answering affirmatively to the stem question, and 0 otherwise. The number of daily stressors, ranging from 0 to 7, was calculated by summing the values of the seven stem questions on each interview day for each participant.

To examine the within-person process of stress coping and to assess between-person difference in the within-person process, it is necessary to form the daily change score of stress frequency for each participant across all study days. In order to do so, we first calculated each participant’s average stress frequency across the study days using SAS. We then subtracted each participant’s average from each of her daily value, obtaining a score that represents the participant’s daily change in stress frequency against her own 8-day average. The daily change score of stress frequency is also known as “person-centered” daily stress frequency (Zautra, et al., 2005, p. 1524). When the value of person-centered stress frequency is positive, stress frequency on this day is higher than personal average. When the value is negative, stress frequency on this day is lower than personal average.

Leisure time availability—Each day during the phone interview, participants were asked how much time they spent relaxing or doing leisure time activities in the previous 24 hours. If necessary, the interviewer would suggest to interviewees that leisure time activities refer to actively choosing to do things for oneself and may overlap with other categories of time use behavior, e.g., spending time with one’s children. Participants then provided their own estimates. In the current study, leisure time was calculated as the number of *hours* each day that participants devoted to leisure activities, e.g., 0.5 means that a participant spent 0.5 hour on leisure activities on a given day. For each participant, we also calculated daily change score of leisure time availability (i.e., person-centered leisure time) for each study day and personal average amount of leisure time across the study days. The daily change score represents the within-person aspect of leisure time, and the personal average amount of leisure time was used as the between-person factor in data analyses.

Daily positive affect—Daily assessment of positive affect was utilized as the outcome. Participants were asked whether in the previous 24 hours they felt: “in good spirits,” “cheerful,” “extremely happy,” “calm and peaceful,” “satisfied,” “full of life,” “close to others,” “feel like you belong,” “enthusiastic,” “attentive,” “proud,” “active,” and “confident.” Participants answered each positive affect item using a 5-point scale ranging from 0 (none of the time) to 4 (all of the time). For each study day, the sum of the 13 positive affect items was calculated, giving positive affect a range of 0–52.

Covariates—Age, gender, educational level, employment status, marital status, and race were included as control variables. Age was measured in years, and was centered at the sample mean (56 years old). The other five covariates were all coded as dichotomous variables. For gender, male was coded as 0 and female as 1. For educational level, 12 years or less of education was coded as 0 and 13 years or more of education as 1. For employment status, being employed (self-employment included) was coded as 1 and all others as 0. For marital status, being married was coded as 1 and all others as 0. For race, being Caucasian was coded as 1 and all others as 0.

Data Analysis

We used multilevel modeling (MLM, Singer & Willet, 2003) to analyze the data in SAS (version 9.3). According to Almeida and Wong (2009), the basic form of a multilevel model is as follows:

$$\text{Level 1: Outcome}_{ij} = \beta_{0j} + \beta_{1j}\text{Predictor}_{ij} + e_{ij}$$

$$\text{Level 2: } \beta_{0j} = \beta_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

At level 1, the outcome is expressed as a function of a within-person intercept, a within-person predictor and a within-person error term. At level 2, the within-person intercept and coefficient are respectively expressed as a function of a fixed intercept and a between-person error term. We first calculated the intraclass correlation (ICC) to make sure that there was sufficient variation in the outcome variable at both within- and between-person levels, which is necessary for further MLM analyses (Hoffman & Stawski, 2009; Raudenbush & Bryk,

2002). We then fitted four multilevel models. The first model tested the within-person moderation effect, and the second one assessed whether the moderation effect differed by average amount of leisure time. Using the approach proposed and verified by Bauer, Preacher, and Gil (2006), we then tested the within-person mediation effect and assessed between-person difference in the mediation effect using the third and fourth models. The effects of age and gender were controlled for in all analyses.

To get the standardized path coefficients at the within-person level, we used the method recommended by Hox (2010, p. 22):

$$\text{Standardized coefficient} = \text{unstandardized coefficient} * \text{standard deviation of explanatory variable} / \text{standard deviation of outcome variable}$$

Hox (2010) argued that standardizing variables to get standardized coefficients may not be a safe practice for statistical analysis like multilevel modeling that has complicated random parts. Applying the above equation is “a safer practice” (Hox, 2010, p. 23). Therefore, we used the equation to hand calculate the standardized path coefficients at the within-person level.

The final sample size was 14881 interview days, which is 91% of the total 16176 interview days. The data was missing at random. MLM allows unbalanced numbers of cases per participant (Reis & Gable, 2000), thus having the capacity of handling missing data. Therefore, participants with incomplete data are included in the analysis (Raudenbush, Brenner, & Barnett, 1995).

Results

Descriptive Statistics

Descriptive information regarding personal average of daily stress frequency, leisure time and positive affect is presented in Table 1. The average daily stress frequency for the sample was 0.5, but the variance was large, indicating that some participants encountered more daily stressors than others. Average daily leisure time was a little over three hours, and the large variance implies that some participants had more leisure time than others. On average, the sample experienced positive affect fairly frequently. In terms of correlations, higher average amount of stress frequency was related to lower average amount of leisure time and less frequent positive affect. The correlation between leisure time and positive affect was not significant. On average, Younger adults, those with higher educational level, and employed individuals experienced more daily stressors, less leisure time and less positive affect. Females, compared to males, experienced more daily stressors and had less leisure time. Married individuals had more daily stressors, less leisure time, but more positive affect. Caucasians, compared to individuals of other races, experienced more daily stressors.

Multilevel models

Before fitting the multilevel models, we calculated ICC, and found that 75.78% of the variation in daily positive affect was between person and 24.22% within person, meeting the criteria that at least 10 percent of the variance in the outcome variable needs to be within-person in order to move on to within-person analysis (Mroczek & Griffin, 2007;

Raudenbush & Bryk, 2002). We then fit the four multilevel models to test the moderation and mediation models. Again, the effects of age, gender, educational level, employment status, marital status, and race were controlled for in all analyses.

We first tested the within-person moderation effect. As shown on the left panel of Table 2, the interaction between person-centered daily stress frequency (DSF) and person-centered leisure time availability (LTA) was not significant ($b=0.19, p>0.05$). Although the within-person moderation effect was not significant, it is possible that such effect only works for certain individuals but not for others. Therefore, it is necessary to examine between-person difference in the within-person effect, and we introduced the between-person factor, average amount of leisure time, at level 2. The result was not significant ($b=0.01, p>0.05$) either. Thus, our findings did not support a within-person moderation effect, regardless of whether a person reported little or abundant leisure time on average.

Next, we tested the within-person mediation effect. As shown on the left panel of Table 3, person-centered DSF had no significant effect on person-centered LTA ($b=-0.03, p>0.05$) or positive affect ($b=-1.57, p>0.05$), the effect of person-centered LTA on positive affect was not significant either ($b=0.03, p>0.05$). We then assessed whether the within-person mediation effect differed by average amount of leisure time. As shown on the right panel of Table 3, person-centered daily stress frequency had a significant effect on positive affect ($b=-1.68, p<0.0001$), regardless how much leisure time an individual had on average. More importantly, average amount of leisure time moderated the effect of person-centered daily stress frequency on person-centered leisure time ($b=-0.11, p<0.0001$) and the effect of person-centered leisure time on positive affect ($b=-0.03, p<0.05$). In other words, the within-person partial mediation effect, rather than being universal across different types of individuals, differed significantly by average amount of leisure time. Among the six covariates, employment status had a significant effect on the relationship between person-centered leisure time and positive affect only. No other covariates had significant effect on any of the within-person relationships.

We also calculated the standardized path coefficients for the within-person effects, using the equation proposed by Hox (2010). The result shows that the negative effect of person-centered daily stress frequency on positive affect ($B=-0.1$) had greater absolute strength than the positive effect of person-centered leisure time ($B=0.4$). We also calculated the standardized indirect effect of person-centered daily stress frequency on positive affect, defined as $a \times b$ (Preacher & Kelley, 2011; see Figure 2), and the indirect effect was 0.06.

Taken together, the finding supports a counteractive, rather than deteriorative, within-person mediation effect that was moderated by a between-person factor—average amount of leisure time (Figure 4). Experiencing more daily stressors than usual on a certain day reduced positive affect on that day. Meanwhile, high daily stress frequency prompted individuals with less leisure time on average to increase, rather than reduce, the amount of time allocated to leisure (hence the counteractive effect). This increase in leisure time then increased positive affect for those with less leisure time on average.

Discussion

The current study examined the effect of leisure time as a resource to cope with daily stressors by testing the moderation and mediation models, controlling for the effects of age, gender, educational level, employment status, marital status, and race. We found that having more leisure time than usual partially mediated the effect of relatively high daily stress frequency on positive affect. On days when individuals encountered more daily stressors than usual, they experienced positive affect less frequently. Meanwhile, higher daily stress frequency triggered the individuals, particularly busier ones, to allocate more time to leisure than usual, which then increased positive affect on that day, partially remedying the negative impact of higher daily stress frequency. The result supports the counteractive rather than the deterioration effect (Ensel & Lin, 1991; Pearlin, 1999), indicating that people actively mobilize their coping resources to counter the negative effect of daily stressors rather than passively experiencing their psychological costs. Although it is not always possible to increase leisure time on a certain day, individuals seem to take advantage of the extra leisure time they manage to have to cope with daily stress. The partial counteractive effect of leisure time was particularly strong among busier individuals, i.e., those with less leisure time on average. Meanwhile, the coping effectiveness of allocating more time to leisure than usual is smaller among those already having abundant leisure time in daily lives. Our finding of the significant between-person difference in the within-person partial counteractive effect contributes to the leisure literature in five ways: 1) providing support for a partial mediation effect, 2) highlighting the value of the within-person approach, 3) demonstrating the importance of the time aspect of leisure, 4) showing the relevance of positive affect as a coping outcome, and 5) pointing out the significance of daily stress.

Our first contribution is providing empirical evidence for a partial mediation model with daily stress frequency as the predictor. Previous research supported the mediation model when stress severity (Iwasaki, 2001b; Iwasaki, et al., 2002) but not frequency (Iwasaki, 2003b) was the predictor. The disagreement between our finding and that by Iwasaki (2003b) may be due to two reasons. One reason is that Iwasaki tested the psychosocial functions of leisure as a coping resource, while we studied the time aspect of leisure. Emphasis on different aspects of leisure may cause the inconsistent findings. The other reason is that health, the outcome measure Iwasaki used, incorporated both physical and mental health. However, positive affect, the outcome measure we used, reflects psychological well-being (Carstensen, et al., 2003; Mroczek, 2001). Differences in the outcome measures may also help explain the inconsistent findings. Meanwhile, our study did not provide support for a within-person moderation effect, regardless of how much leisure time an individual had. The result implies that the effect of leisure time availability on positive affect did not differ by daily stress frequency. That is, the magnitude of the psychological effects of leisure time did not depend on daily stress frequency. Our finding echoed Kirkcaldy and Cooper (1993) and Zuzanek, et al. (1998), who did not find moderation effect for leisure-time physical activity. Meanwhile, our finding disagrees with earlier research that identified a significant moderation effect of leisure (Caltabiano, 1995; Heintzman & Mannell, 2003; Iso-Ahola & Park, 1996; Iwasaki & Mannell, 2000; Schneider, et al., 2004). Past studies used a between-person approach to study leisure coping, which

involves comparing different individuals rather than examining how stress and coping unfold *within* a person over time. Therefore, the inconsistent findings are not surprising, and more studies using a within-person approach are needed to further examine the applicability of the moderation model.

Our second contribution is highlighting the value of using a within-person approach (Caspi, et al., 1987; DeLongis, et al., 1988) to studying leisure coping. Past studies of leisure coping (e.g., Caltabiano, 1995; Iso-Ahola & Park, 1996) mainly conducted between-person comparisons. However, studying how the effect of leisure coping differs between individuals does not tell us much about the within-person process of using leisure to cope with stress. Our study, by examining leisure coping as a within-person phenomenon, contributes to a more comprehensive understanding of leisure as a coping resource. We also assessed whether there is between-person difference in the within-person process (Nesselrode, 1991). Doing so enabled us to find the differential effect of a partial mediation model. Otherwise, we would have concluded that neither moderation nor mediation model was applicable.

Our third contribution is showing that the time aspect of leisure matters to stress coping. Several earlier studies demonstrated the promise of the time aspect of leisure in coping research, by examining perceived sufficiency of leisure time (Heintzman & Mannell, 2003), satisfaction with time for leisure (Bedini, et al., 2011), and leisure time spent in nature (Korpela & Kinnunen, 2011). The current study adds to the literature by assessing whether the amount of leisure time that a person has helps the person cope with daily stressors. Our finding supports the argument by Pressman et al. (2009) that “taking the time to break from daily activities and work” may be crucial to psychological well-being (p. 726). While Zuzanek (1998) focused on the adverse psychological effect of lacking leisure time, our study makes it clear that it is equally important to study the benefits of having leisure time, as suggested by Patry et al. (2007).

The fourth contribution of this study is demonstrating the significance of daily stress, a unique form of stress that has a powerful effect on well-being (Lazarus, 1999; Stawski, et al., 2008; Zautra, 2003). Indeed, the effect of daily stress frequency on positive affect was bigger than that of leisure time, indicating that increased leisure time cannot completely offset the adverse effect of higher daily stress frequency. To recover from daily stress, individuals need to mobilize coping resources other than leisure time as well. Therefore, while advocating for the value of leisure time as a coping resource, we also need to be aware of the powerful impact of daily stress and be realistic about how far leisure time as a coping resource can go.

The fifth contribution is bringing attention to positive affect as a leisure coping outcome. Previous research has associated leisure, including the time aspect of leisure, with increases in positive affect (e.g., Carruthers & Hood, 2004; Hills & Argyle, 1998; Larson & Richard, 1994; Lawton, 1994; Lee, et al., 1994; Mitas, et al., 2011; Moskowitz, 2011; Ulrich, et al., 1991). Our study extends previous research by providing empirical evidence that leisure can increase positive affect on stressful days as well. More importantly, earlier studies of leisure coping mainly assessed relatively stable psychological constructs (e.g., psychological well-

being, mental health) as outcomes. However, positive affect, ebbing and flowing with daily experiences, is more sensitive to changes in daily living (Clark & Watson, 1988). Therefore, our study contributes to the leisure literature by showing that positive affect is an appropriate and important outcome to assess when studying how individuals use leisure to cope with daily stressors. Studying positive affect also bears practical value, since experiencing positive affect helps maintain mental health (Folkman, 1997; Fredrickson, 2001) and prevents the onset of serious psychological symptoms (Ong, 2010).

Study Limitations and Suggestions for Future Directions

There are several limitations in the present study that should be addressed in future research. The first limitation is the single measure of leisure time. With a focus on daily stress, time use and well-being, NSDE incorporated no other measure of leisure except for the amount of leisure time participants had in the previous 24 hours. Therefore, we did not know what activities participants engaged in in their leisure time. Additionally, using the adjective “relaxing” as a part of the description of leisure may have oriented the participants to focus more on “relaxing” leisure and to give less attention to more active types of leisure. We suggest future studies to measure not only the amount of leisure time individuals have but also what leisure activities they engage in. This singular measure of leisure time also failed to inform us whether the amount of leisure time a person had met the person’s *need* for leisure time (i.e., leisure time sufficiency, as measured by Heintzman & Mannell, 2003). It is possible that having too much leisure time does not benefit stress coping, and may even lead to negative psychological outcomes (Iso-Ahola & Weissinger, 1990). Right now, we cannot tell whether the significantly weaker within-person mediation among “leisure-rich” participants is due to an over-abundance of leisure time. We encourage future research to examine whether the congruence between need for and supply of leisure time affects coping effectiveness.

Another limitation is that, although we used a national sample of adult Americans, the participants were predominantly Caucasians. We encourage future research to replicate the current study with samples from minority groups, so as to validate the results in a more diverse population and to uncover cultural differences.

Conclusion

The current study examined whether the moderation or mediation model explains the within-person process of using leisure time to cope with daily stressors, with positive affect as the outcome. We also tested whether the within-person process differs between individuals. We found that relatively high daily stress frequency, while reducing positive affect, prompted busier individuals to allocate more time to leisure than usual, which in turn increased positive affect. The finding provides empirical evidence for a partial counteractive mediation effect that is particularly strong among individuals with less leisure time on average. Meanwhile, our findings did not support the moderation model. That is, the effect of leisure time on positive affect did not depend on frequency of daily stressors. Taken together, the results demonstrated the mechanism with which leisure time as a coping resource provides significant benefit. Our findings also confirmed the psychological impact

of daily stressors and demonstrated the value of studying daily positive affect as a coping outcome.

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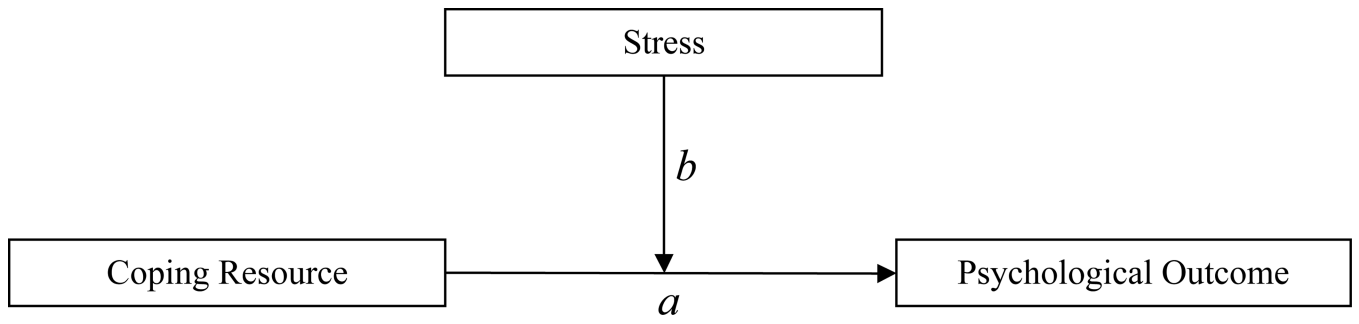


Fig. 1.
An illustration of the moderation model.

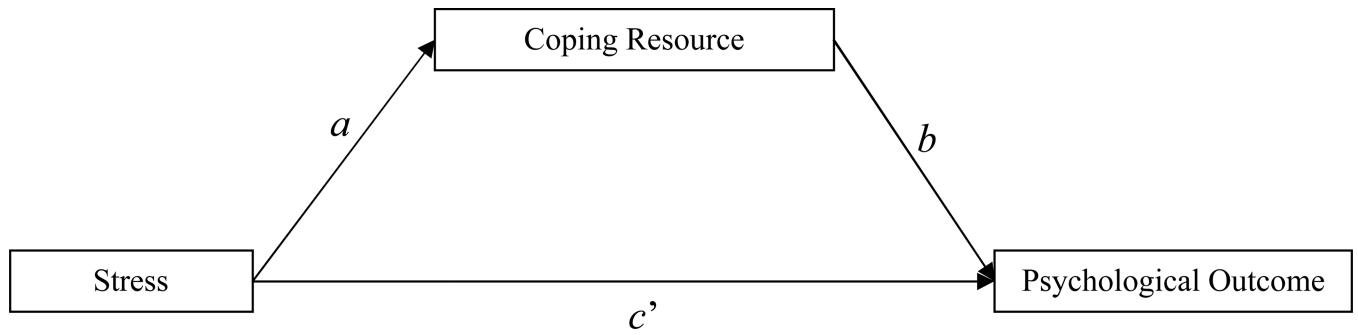


Fig. 2. An illustration of the mediation model. According to Preacher and Kelley (2011), the indirect effect of the independent variable on the outcome is defined as the product of *a* and *b* ($a \times b$).

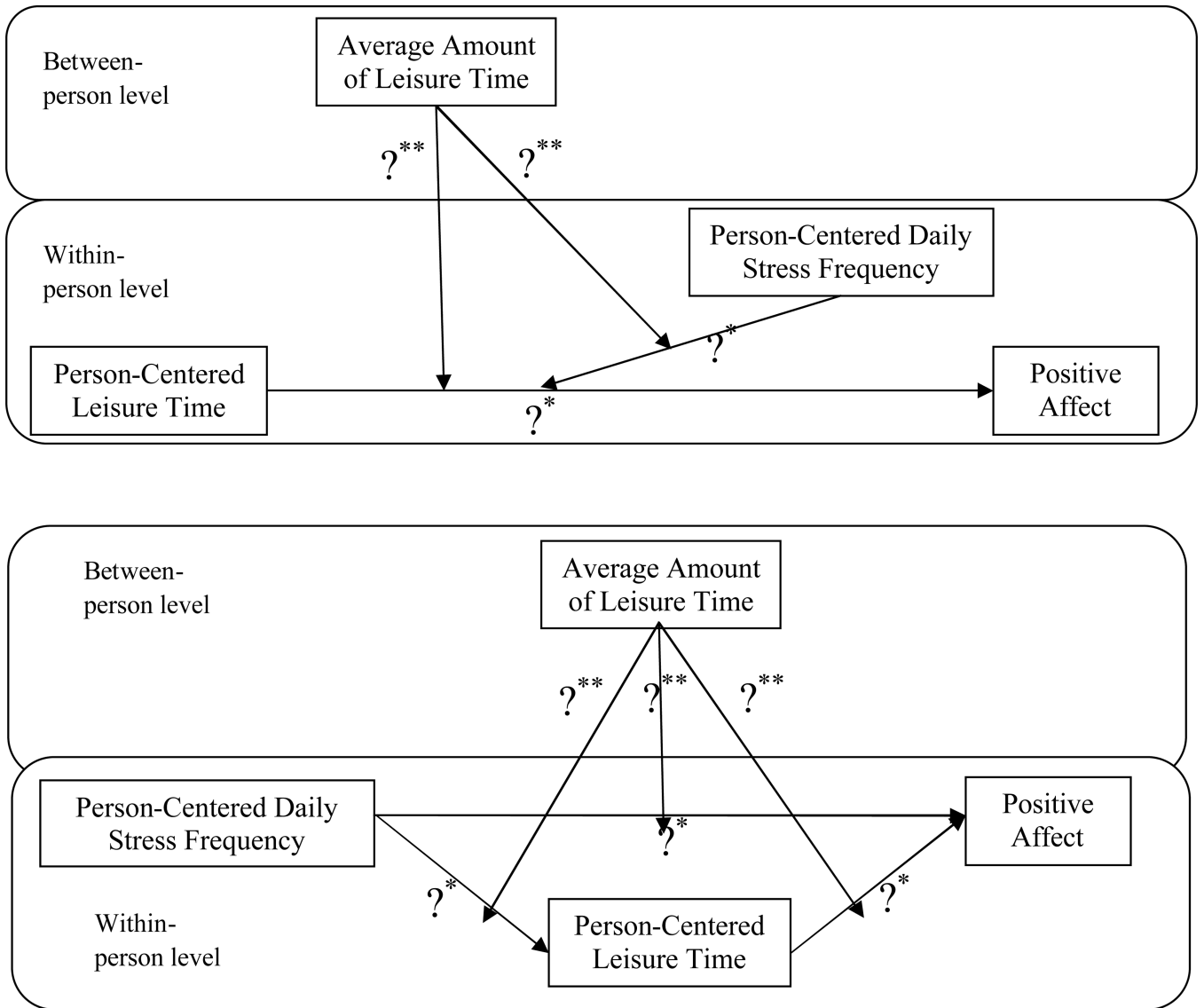


Fig. 3. Research Questions presented in model format: hypothesized moderation model (upper panel) and hypothesized mediation model (lower panel)
 *Research question 1
 **Research question 2

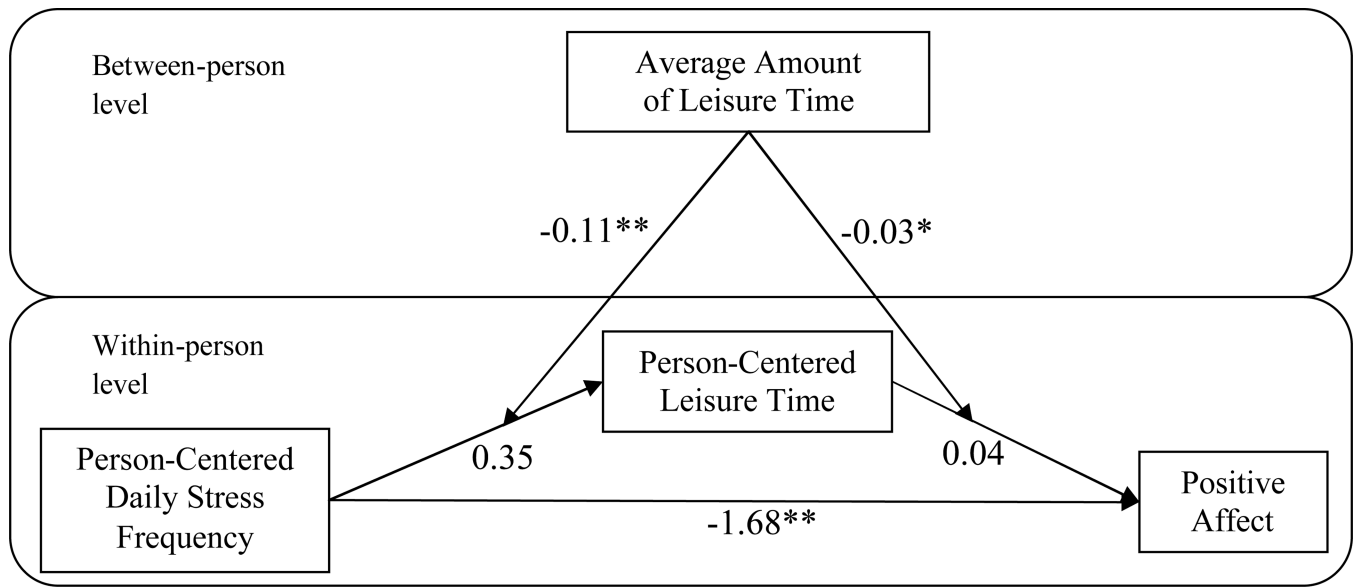


Fig. 4. Partial counteractive mediation effect moderated by average amount of leisure time, a between-person factor.
Note: All coefficients are unstandardized. $*p < 0.05$, $**p < 0.0001$.

Table 1

Correlations between Variables and Descriptive Statistics of the Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Average Daily	1.00								
2. Average Leisure Time Availability	-0.10**	1.00							
3. Average Positive Affect	-0.30**	0.01	1.00						
4. Age	-0.23**	0.14**	0.19**	1.00					
5. Gender	0.08**	-0.10**	-0.006	-0.02*	1.00				
6. Educational level	0.16**	-0.04**	-0.04**	-0.11**	-0.07**	1.00			
7. Employment status	0.15**	-0.18**	-0.03*	-0.51**	-0.10**	0.12**	1.00		
8. Marital status	0.02*	-0.07**	0.04**	-0.07**	-0.13**	0.04**	0.03**	1.00	
9. Race	0.03*	-0.01	0.003	0.04**	0.003	0.03**	0.02*	0.07**	1.00
Mean	0.53	3.08	35.27	56.24	NA	NA	NA	NA	NA
Standard Deviation	0.48	1.83	9.30	12.20	NA	NA	NA	NA	NA

Notes: NA=Not Applicable.

* $p < 0.005$,

** $p < 0.0001$.

Table 2

Unstandardized Estimates (and Standard Errors) of the Moderation Model

	Daily Positive Affect		Standardized coefficients
	Within-person relationship	Between-person difference in the within-person relationship	
	Unstandardized coefficients	Unstandardized coefficients	Standardized coefficients
Fixed effects:			
Within-person Intercept			
Intercept	33.67 (0.94)**	--	33.36 (1.05)**
Age	0.18 (0.02)**	--	0.18 (0.02)**
Gender	0.43 (0.43)	--	0.47 (0.43)
Educational level	-0.57 (0.46)	--	-0.56 (0.46)
Employment status	1.87 (0.51)*	--	1.91 (0.51)*
Marital status	1.36 (0.47)*	--	1.38 (0.47)*
Race	-0.39 (0.77)	--	-0.38 (0.77)
Average Amount of Leisure Time	--	--	0.08 (0.12)
Person-Centered Daily Stress Frequency (DSF)			
Intercept	-1.41 (0.38)*	-0.08	-1.48 (0.42)*
Age	-0.006 (0.008)	--	-0.006 (0.008)
Gender	-0.31 (0.17)	--	-0.3 (0.17)
Educational level	0.20 (0.18)	--	0.2 (0.19)
Employment status	0.03 (0.19)	--	0.04 (0.2)
Marital status	-0.25 (0.18)	--	-0.24 (0.18)
Race	0.31 (0.31)	--	0.31 (0.31)
Average Amount of Leisure Time	--	--	0.01 (0.05)
Person-Centered Leisure Time Availability (LTA)			
Intercept	0.002 (0.21)	0.0004	0.16 (0.14)
Age	-0.002 (0.003)	--	-0.001 (0.003)
Gender	0.04 (0.05)	--	0.02 (0.05)

	Daily Positive Affect			
	Within-person relationship		Between-person difference in the within-person relationship	
	Unstandardized coefficients	Standardized coefficients	Unstandardized coefficients	Standardized coefficients
Educational level	-0.08 (0.06)	--	-0.08 (0.06)	--
Employment status	0.14 (0.06)*	--	0.12 (0.07)	--
Marital status	-0.04 (0.06)	--	-0.05 (0.06)	--
Race	0.01 (0.1)	--	0.02 (0.1)	--
Average Amount of Leisure Time	--	--	-0.03 (0.01)*	--
DSF×LTA Interaction (the moderation effect)				
Intercept	0.19 (0.21)	0.47	0.1 (0.25)	0.30
Age	0.003 (0.005)	--	0.003 (0.005)	--
Gender	-0.04 (0.1)	--	-0.03 (0.1)	--
Educational level	-0.18 (0.11)	--	-0.17 (0.11)	--
Employment status	0.002 (0.11)	--	0.01 (0.11)	--
Marital status	-0.19 (0.11)	--	-0.18 (0.11)	--
Race	0.09 (0.18)	--	0.09 (0.18)	--
Average Amount of Leisure Time	--	--	0.01 (0.02)	--
Random effects:				
Variance, within-person intercept	75.41 (2.61)**	--	75.43 (2.61)**	--
Variance, DSF	1.63 (0.34)**	--	1.62 (0.34)**	--
Variance, LTA	0.24 (0.04)**	--	0.24 (0.03)**	--
Variance, DSF×LTA	0.4 (0.09)**	--	0.40 (0.09)**	--
Residual variance	21.76 (0.32)**	--	21.76 (0.32)**	--

Note: DSF=person-centered daily stress frequency (the independent variable), LTA=person-centered leisure time availability (the moderator), PA=daily positive affect (the outcome variable).

* $p < 0.05$;

** $p < 0.0001$.

Table 3

Unstandardized Estimates (and Standard Errors) of the Mediation Model

	Daily Positive Affect		
	Within-person relationship Unstandardized coefficients	Standardized coefficients	Between-person difference in the within-person relationship Unstandardized coefficients
Fixed effects:			
Intercept for LTA			
Intercept	0.02 (0.08)	--	0.002 (0.09)
Age	-0.0001 (0.0002)	--	0.0002 (0.0002)
Gender	-0.004 (0.04)	--	-0.0002 (0.04)
Educational level	-0.008 (0.04)	--	-0.007 (0.04)
Employment status	-0.005 (0.04)	--	0.004 (0.04)
Marital status	0.003 (0.04)	--	0.005 (0.04)
Race	-0.01 (0.07)	--	-0.002 (0.07)
Average Amount of Leisure Time	--	--	-0.002 (0.01)
DSF predicting the LTA			
Intercept	-0.03 (0.24)	-0.009	0.35 (0.24)
Age	0.006 (0.005)	--	0.007 (0.004)
Gender	-0.05 (0.1)	--	-0.095 (0.1)
Educational level	-0.06 (0.11)	--	-0.087 (0.1)
Employment status	0.002 (0.12)	--	-0.03 (0.11)
Marital status	0.02 (0.11)	--	-0.025 (0.1)
Race	-0.09 (0.19)	--	-0.055 (0.17)
Average Amount of Leisure Time	--	--	-0.11 (0.03)***
Intercept for PA			
Intercept	33.61 (0.99)***	--	33.34 (1.16)***
Age	0.18 (0.02)***	--	0.18 (0.02)***
Gender	0.43 (0.45)	--	0.47 (0.47)
Educational level	-0.57 (0.48)	--	-0.56 (0.51)

	Daily Positive Affect			
	Within-person relationship		Between-person difference in the within-person relationship	
	Unstandardized coefficients	Standardized coefficients	Unstandardized coefficients	Standardized coefficients
Employment status	1.88 (0.53)**	--	1.92 (0.57)**	--
Marital status	1.38 (0.5)**	--	1.4 (0.5)*	--
Race	-0.38 (0.81)	--	-0.38 (0.85)	--
Average Amount of Leisure Time	--	--	0.07 (0.13)	--
LTA predicting PA				
Intercept	0.03 (0.12)	0.006	0.18 (0.13)	0.04
Age	-0.002 (0.002)	--	-0.001 (0.002)	--
Gender	0.02 (0.05)	--	-0.001 (0.05)	--
Educational level	-0.05 (0.06)	--	-0.06 (0.06)	--
Employment status	0.15 (0.06)*	--	0.13 (0.06)*	--
Marital status	-0.04 (0.06)	--	-0.05 (0.06)	--
Race	-0.02 (0.1)	--	-0.02 (0.1)	--
Average Amount of Leisure Time	--	--	-0.03 (0.01)*	--
DSF predicting PA				
Intercept	-1.57(0.38)***	-0.09	-1.68 (0.42)***	-0.10
Age	-0.004 (0.007)	--	-0.004 (0.008)	--
Gender	-0.33 (0.16)*	--	-0.33 (0.17)	--
Educational level	0.25 (0.18)	--	0.26 (0.19)	--
Employment status	0.06 (0.19)	--	0.07 (0.2)	--
Marital status	-0.21 (0.18)	--	-0.2 (0.18)	--
Race	0.45 (0.3)	--	0.45 (0.31)	--
Average Amount of Leisure Time	--	--	0.02 (0.05)	--
Random effects:				
Variance, intercept for mediator	1.9E-18	--	2.95E-18	--
Variance, DSF predicting LTA	3.04 (0.79)**	--	2.13 (0.83)***	--
Variance, intercept for outcome	82.21 (16.00)***	--	91.18 (21.5)***	--

	Daily Positive Affect			
	Within-person relationship		Between-person difference in the within-person relationship	
	Unstandardized coefficients	Standardized coefficients	Unstandardized coefficients	Standardized coefficients
Variance, LTA predicting PA	0.22 (0.05)***	--	0.21 (0.03)**	--
Variance, DSF predicting PA	1.96 (0.62)**	--	2.41 (1.21)*	--
Residual variance:				
Variance, LTA	4.17 (0.05)***	--	4.18 (0.05)***	--
Variance, PA	23.88 (0.40)***	--	23.87 (0.40)***	--

Note: DSF=person-centered daily stress frequency (the independent variable), LTA=person-centered leisure time availability (the mediator), PA=daily positive affect (the outcome variable).

* $p < 0.05$;

** $p < 0.005$;

*** $p < 0.0001$.